

NAAA eNewsletter

NAAA's 2022 Ag Aviation Expo Knox It Out of the Park!

A week of solid rain had no effect on the spirits of attendees inside the Knoxville Convention Center who traveled to Tennessee from near and far for NAAA's 2022 Ag Aviation Expo that took place Dec. 5-8. The 56th annual Ag Aviation Expo in Knoxville was a welcome affair, with participation returning to pre-pandemic levels for attendees and exhibitors alike.

The show was an overwhelming success thanks to stellar programming (including an important new safety course), exciting announcements (including progress on the Storm Cat, Storm Aeronautics' modified Ag-Cat), outstanding exhibitors and a terrific setting in Knoxville, which hosted the Ag Aviation Expo for the first time.

Here are four metrics that speak to the 2022 Ag Aviation Expo's success.

Exhibitors: NAAA had another stellar trade show, with 161 exhibitors and four aircraft on display inside the Knoxville Convention Center's exhibit hall, as well as several UAVs. Thank you to Air Tractor, Thrush Aircraft, Bell and Rotor Gear Solutions for providing aircraft to display at the 2022 NAAA Trade Show.

Attendance: Nearly 1,600 attendees and booth personnel registered for the 2022 Ag Aviation Expo, similar to other pre-pandemic conventions held in cities like Savannah and Orlando. The ability to host every event except a PAASS fundraiser at the Knoxville Convention Center was a major plus.

Auction: The 2022 Live Auction raised important and necessary resources to support NAAA programs and services. We are very thankful for all the companies that support NAAA programs by donating an auction item and greatly appreciate Pratt & Whitney Canada for donating a brand-new PT6A-34AG engine. There were several bidders, but ultimately, operator Nick Bunger of Air Trac Inc. in Pasco, Washington, came out on top in a spirited bidding exchange for the engine, purchasing it for \$487,000. Thank you again to Pratt & Whitney Canada and Bunger for supporting NAAA in such a generous fashion.

NAAA Operator member Nick Bunger (center) of Air Trac Inc. in Pasco, Washington, was the top bidder for Pratt & Whitney Canada's brand-new PT6-34AG engine at NAAA's Live Auction.

Sponsors: NAAA was honored to have **37 companies sponsor different events and items** at the 2022 Ag Aviation Expo. Thank you again to everyone, including our Diamond Sponsors: BASF, Corteva Agriscience, Pratt & Whitney Canada, Syngenta and UPL.

Diamond Sponsor UPL sponsored the packed Welcome Reception.

This year's show yielded plenty of highlights, and NAAA was on the scene cataloging them. Let's recap the 2022 Ag Aviation Expo's big week!

SUNDAY, DEC. 4

Wire Avoidance Course a Striking Success

Brand new at the 2022 Ag Aviation Expo was the Flying in the Wire and Obstruction Environment Course. The course was offered on Sunday before the expo officially began and was five hours long. Packed into that five hours was a tremendous amount of information that ag aviators can use to keep themselves safe when operating in the low-level flying environment. The course was well attended, with over 150 people packed into the room. The feedback from participants afterward was enthusiastically positive, with many indicating that they had learned many valuable lessons that they strongly felt could one day save their life.

The course was taught by Robert "Bob" Feerst from Utilities/Aviation Specialists (UAS), pictured above. Bob has over 30 years of experience working with gas and electric utilities, and he has used that experience to develop safety courses to teach aviators how to operate safely in the wire environment. The course he taught at the expo was specifically tailored to ag aviation, shortened from UAS's full-day and two-day courses. Bob's biography can be read [here](#).

The course covered numerous topics related to flying in the wire environment. One subject was visibility science. Participants learned how easily their vision can fool them when it comes to seeing wires. A key takeaway message is wires must be treated as an invisible hazard. You cannot rely on your ability to always see them, so you must instead learn to read the poles and associated hardware that will indicate where wires are located. Insulators point in the direction of the wire and can be used to indicate when a wire is turning. Even if you think you can clearly see a wire, there are numerous illusions that will cause you to misjudge its position relative to you. You must always assume there are wires if you see structures. Remember that even if you see one set of wires, that's no guarantee you will see them all.

Another key point was how short-term memory can cause you to forget about wires you knew were there. Your short-term memory can hold between five and nine thoughts at once. When your short-term memory is full and something else important comes along, you need to remember in the short term that something must go. Often the first thing that entered your memory is the first thing out. When you scout the field, the wires and obstacles are first and foremost in your mind. As you make your application passes, though, other things begin to require your attention and take up short-term memory space. Once your short-term memory hits full capacity, you can inadvertently forget about the wires.

The hat says it all: SAFETY FIRST.

When it comes to experience protecting you from a wire strike accident, it was pointed out that experience does not automatically mean you're safe around wires. In fact, many wire strike accidents occur to very experienced pilots. Pilots were also taught not to ignore their gut feelings. A gut feeling is actually a physiological response initiated by your subconscious, which frequently notices dangers, such as wires, before you become cognitively aware of them. The feeling in your gut is your brain shutting down your digestive system to conserve energy for a fight or flight response. When your gut tells you something is wrong, listen and get up out of the wire environment to determine what caused your body's reaction.

This is only a sampling of what Bob talked about. For those who were able to attend the class, NAAA sincerely hopes the lessons you learned will reduce your chances of striking a wire in your ag aviation career. For those who were not able to attend, NAAA is working hard to bring the course back for the 2023 Ag Aviation Expo in Palm Springs, California.

MONDAY, DEC. 5

Expo Lifts Off With Astronaut Scott Kelly's Kickoff Speech

Former astronaut Scott Kelly kicked off the 2022 Ag Aviation Expo with a humorous and inspiring address.

The Expo began Monday with a terrific Kickoff Breakfast address by Scott Kelly, the former NASA astronaut and retired U.S. Navy Captain who spent nearly a year in space aboard the International Space Station. He titled his kickoff address "The Sky is Not the Limit: Lessons from a Year in Space" and told the audience he wanted to talk about doing the hard things in life.

Kelly described himself as neither a great student growing up nor a very good fighter pilot initially. When he was 18, he read *The Right Stuff* by Tom Wolfe, which documented the stories of the first Project Mercury astronauts selected for the NASA space program. It may have seemed like a giant leap, but reading Wolfe's book inspired Kelly to become an astronaut.

Fueled by his newfound drive, he said he turned himself into a slightly below-average student and then a slightly above-average student in school. As a Navy pilot, early on, Kelly struggled to land his fighter jet onto an aircraft carrier—so much so that his superiors gave him the option of flying another airplane that he wouldn't have to land on a ship. Instead, Kelly stuck with it and said he became a pretty good fighter pilot by the end of his first year.

"What I've learned is that no matter how bad you are at something at first has no bearing on how good you will become if you work hard and believe in yourself," Kelly said.

"I think the idea of being able to take risks and sometimes fail is what separates the people who are very resourceful," he added. Yet we don't often hear about all the failures a person or organization experiences before achieving their success.

NASA selected Kelly as an astronaut in 1996. (His twin brother, Sen. Mark Kelly, also became an astronaut). That year, Scott Kelly and 34 other astronauts went to Cape Canaveral to learn how to fly the space shuttle. The Navy and NASA taught Kelly the idea of compartmentalization and to focus on the things you can control in an aircraft or spacecraft.

Kelly flew four space flights, piloting the space shuttle Discovery to the Hubble space telescope in 1999 and subsequently commanding the space shuttle Endeavour on a mission to the International Space Station in 2007.

Kelly's long-duration space flight experience includes two flights on the Russian Soyuz spacecraft, launching and landing from Kazakhstan, and two stays aboard the International Space Station as commander. His first time at the International Space Station was a 159-day mission in 2010-2011. A few years later, he returned to the International Space Station for a record-breaking 340-day mission in 2015.

Kelly noted that between his two missions, he spent more than 500 days of his life on the multinational International Space Station—an absolute engineering marvel. "Building the International Space Station is the hardest thing we have ever done," he marveled.

He ended his remarks with these words of inspiration: "After spending a year in space, I was absolutely inspired that if we can dream it, we can do it. If we have a goal and a plan; if we're willing to take risks, make mistakes—at times even being willing to fail; if we focus on the things we can control and ignore what we can't; if we test the status quo and we work as a team, because teamwork makes the dream work. We can choose to do the hard things, and if we do that, the sky is definitely not the limit."

Precision Agriculture Session

NAAA Precision Agriculture Committee Chairman Glenn Holloway introduces the Precision Agriculture Session panelists.

The Precision Agriculture Session kicked off with a brief presentation by Gene Avakyan of Edison Aerospace on its new Heavy1 uncrewed agricultural aircraft. Roughly the size of a Cessna 172 and with a 200-gallon hopper, the intent is for this aircraft to be a direct replacement for customers' existing aircraft. In other words, current manned aircraft operators are the intended market for this aircraft.

A panel discussion consumed the remainder of this session, with a slew of movers and shakers in the precision aerial application field ready to talk shop. In addition, and just as importantly, several ag pilots joined the panel to provide real-world insight as actual users of the various technologies and systems up for discussion.

Insero, the purveyor of AgPilotX, was represented by Greg Guyette. AgPilotX utilizes an iPad as a controller/display in conjunction with an accompanying light bar and connection hub. Guyette stressed the importance of reducing clumsiness and complexities in the cockpit and on the ground with managing jobs. AgPilotX is geared toward fewer, more intuitive button presses and smart workflows.

Transland, represented by Alan Haigood, primarily discussed the new Satloc Falcon GPS system. With significantly faster processing and enhanced integration with other Transland components, the Falcon will facilitate interoperability with more components for precision application.

One such component is the Aircraft-Integrated Meteorological Measurement System (AIMMS). Steve Foster represented Aventech Research, the manufacturer of AIMMS, and discussed its new deep integration with the Satloc Falcon GPS. Because the Falcon already has many of the required components for AIMMS (Display, one of the two needed GPS units, etc.), the integration was quite synergistic. AIMMS allows the applicator to monitor wind conditions in real time.

Reg Moen represented DynaNav. Bradley Reed, an operator using DynaNav, was also on hand for the discussion. DynaNav GPS and flow control systems are equally installed between helicopter and fixed-wing aircraft. When asked how DynaNav contributes to making a precision application, Reed was quick to point out the ability to mark multiple end passes to minimize spraying during altitude changes in field ingress/egress over power lines and trees.

Troy Reabe represented Reabe Aircraft Improvement. Their new gate system is in the process of being integrated with multiple GPS systems. When asked about the challenges his company faces, Reabe explained the difficulty of making products intuitive. He stressed that it is important for users to report pain points with products so that the manufacturers can make fixes or improve the documentation.

Perfect Flight, represented by Vinny Velho, is a Brazilian company that has created a platform to unify the output of GPS logs and allow an operator to visualize the applications from their entire fleet together. Sam Ellet, an operator who will be employing Perfect Flight at his operation in Louisiana in 2023, was on hand to give his perspective. When questioned on why he chose to use Perfect Flight, he explained that the ability to quantify the precision of each application was a big draw. In addition, it allows operators to mentor young pilots more closely by going over specific applications and fields with them.

Capstan Ag, the creator of the SwathPro system, was represented by Jeff Hemeyer. The SwathPro system utilizes a pulsing valve every 4 inches on specialized booms to facilitate on-the-fly changes to mitigate drift and compensate for crosswind. Lary Graf, a SwathPro user from Louisiana, was asked to identify the issues SwathPro helped him solve. Put simply, says Graf, it helps his operation with drift. With 90% of their work being herbicide applications, SwathPro has been a tremendous help.

There was substantive discussion during the Q&A portion of the session, with much interest in the interoperability of components and providing the applicator with the best set of tools, regardless of their chosen platform. There was a general consensus that employing these tools to the greatest extent possible will be integral to the long-term viability of our industry.

Low Altitude & FAA Update Session

The Low Altitude & FAA Update Session featured three speakers covering the rules and regulations of Part 137 operations and two of the biggest threats to ag aviation and other low altitude aviators—UAS and wires. Attendees were provided briefs on all of these subjects to keep them up to speed on the latest information and happenings.

Starting the session off was John Attebury, the Part 137 lead for the FAA's General Aviation and Commercial Division. John started off by providing some good news for operators dealing with issues adding an aircraft to their operation or bringing in outside aircraft to assist during a peak of activity in their season. The issues revolve around the letter of authorization (LOA) A003. The FAA requested ag operators add their aircraft to an LOA A003 after 9/11 to comply with DHS's request to track ag aircraft for security purposes.

Because LOA A003 originated with operations requiring OpSpecs, over time, many FAA inspectors began to demand they inspect an aircraft before they allowed an operator to put it on their LOA A003, a requirement not supported by Part 137 regulations. John, working closely with NAAA, was able to change the process. Now when an operator requests that a FSDO add an aircraft to their LOA A003, the FSDO will immediately issue the updated LOA A003 without requiring an inspection of the aircraft prior to issuance. The FSDO may inspect the aircraft at a later date.

Next, John covered rules on the use of non-U.S. aircraft under Part 137. Canadian and Mexican ag operators may conduct operations in the U.S. under United States-Mexico-Canada Agreement (USMCA). Similarly, U.S. ag operators may operate in Mexico or Canada under USMCA. For a U.S. operator to use a foreign ag aircraft, the operator must obtain a Foreign Aircraft Permit under 14 CFR §375.41.

John also talked about the backlog of FAA operator certifications. The backlog is affecting parts 91K, 125, 133, 135, 137, 141, 145, and 147. As a result of the delays, the FAA implemented an oversight process to increase efficiency. There has been a significant increase in Part 137 applications due to UAS applicants; as a result, all Part 137 certifications, both manned and unmanned, are receiving higher priority. John finished by addressing chief supervisor knowledge and skills test documentation. Currently, the FAA is required to provide a logbook endorsement or a letter as documentation the chief supervisor met the requirements. If the documentation is lost or was not provided by the FAA, revised guidance being drafted by the FAA will allow it to accept other documentation, such as Part 137 certification records, as proof.

Madison Dixon touts the research Mississippi State University's Raspet Flight Research Laboratory is conducting by collecting GPS flight log data from ag aircraft donated by NAAA members.

Next in the session was Madison Dixon, research director at Mississippi State University's (MSU) Raspet Flight Research Laboratory. Madison is the lead on a project in coordination with NAAA conducting research to support the continued safety of agricultural aviators as UAS operations become more common in low-altitude airspace. The project collects GPS flight log data from ag aircraft donated by NAAA members with only the flight characteristics saved; all personal information is scrubbed. The data is then analyzed to characterize ag air traffic, which is then used to model the real-world flight characteristics of ag air traffic. The model educates UAS operators about where ag aircraft fly and ensures the FAA and other regulators and policymakers working on adding UAS to the NAS understand the importance of preserving the safety of ag aviators by preventing collisions with UAS. Raspet is now working with MIT Lincoln Labs to further advance the research effort. Raspet is **still looking for GPS flight log data** to improve their model and better characterize ag aircraft flight patterns.

Finishing the session was Scott Bretthauer from NAAA. He gave a presentation that will ultimately be intended for ag aviators to present to their local electrical companies. The purpose of the presentation is to educate rural electrical companies on the importance of ag aviation and the dangers that wires present to ag pilots. It encourages electrical companies to install newly developed wire markers to reduce the risk of ag aviators striking a wire while making aerial applications. The RotaMarka from Balmoral Engineering in Australia is a moving wire marker that can be installed at a low cost. Its movement is powered by the wind and dramatically increases the likelihood of an ag aviator noticing it during an application. NAAA will be making the presentation available to NAAA members in 2023.

Storm Aeronautics Session, Including Update on the Storm Cat's Development

Jared Storm of Storm Aeronautics presented a session regarding Storm Aeronautics' safety products and the redesign of Ag-Cat agricultural aircraft. A history of the Ag-Cat, Hershey Flying Service and Storm Aeronautics was presented.

Regarding its safety products, Storm Aeronautics has produced and sold 800-plus sets of Storm Cutters, which are wire cutters that go on the landing gear of Air Tractor aircraft. The Storm Cutter is credited with saving lives and reducing injuries. Storm's next safety development was the Storm Shield windscreen for Air Tractor and Thrush aircraft. More than 600 Storm Shields are in use today, with no reported incidents of the Storm Shield breaking on impact with a bird or object.

Storm Aeronautics has come up with many Ag-Cat improvements, such as larger fuel capacity and heavy landing gear. The company also has upcoming projects on Ag-Cat parts, including a redesigned tailwheel, air conditioning system with filtration, pilot harness and bottom load fuel.

Jared then discussed his most exciting development: a better Ag-Cat named the Storm Cat. To be clear, this redesigned aircraft will be an STC-modified aircraft, not a new type certificate. There is a demand for a larger hopper capacity, more powerful aircraft that retains the robust, AD-free airframe of the Ag-Cat. This demand exists both in the U.S. and internationally. The redesign of the fuselage airframe will be 32 inches longer and 8 inches wider than a current A or B model Ag-Cat. It will be powered by a PT6A-140AG 867-shaft horsepower turbine engine. It will have a 500-gallon hopper and carry 160 gallons of fuel. Modeling of the aircraft was expected to be completed in December 2022. The wings and horizontal stabilizers have been load tested and perform well above the required load-carrying conditions. One pair of wings was tested with 16,165 pounds, which calculates to a 4.5 g rating.

All structural requirements of the FAA are being met in development. Storm Aeronautics expects to have a project development number issued in 2023 and then have three years from that date to complete the project. The Storm Cat will start with a data tag and an A or B model Ag-Cat fuselage. The aircraft will be built up from that initial starting point. If this project is successful, a type-certificated aircraft will be considered.

The session ended with discussions about the advantage of having a robust, high-performing aircraft that can be slowed down in the field and still have a relatively high ferry speed. The Storm Cat is expected to work in the field at 100 to 125 mph and ferry at 140 to 150 mph.

Insurance Session

Operator Perry Hofer of Doland, South Dakota, addresses one of the 40 ag aviation insurance tips covered at the Insurance

Session.

Over 100 attendees enjoyed a lightning-fast trip through 40 tips from insurance experts on how to get the most out of their insurance dollars. The session was moderated by John "JT" Helms of Old Republic Insurance, the allied voting member for NAAA's insurance division. Joining Helms on the dais to impart their insurance knowledge were: Emily Burg (formerly Day) of Starr Companies, who is an underwriter of workers' compensation; Perry Hofer of Doland Aerial Spraying (a longtime purchaser of ag aviation insurance); Randy Hardy of AssuredPartners Aerospace as a broker representative, Mary Beth Schwaegel of AIG who underwrites ag aviation hull and liability; and lastly Aaron Hatch, also of AIG, who is a claims adjuster for ag aviation.

After brief introductions, the attendees were pelted in a rapid-fire manner with tips from the experts. They were strictly held to one minute per tip by the dreaded buzzer Helms surprised the experts with. Mary Beth's expression as the first panelist to get buzzed was definitely worth the price of admission! Lots of ground was covered in a short period. Attendees were kept awake by the buzzer, which provided a bit of comedy for a subject that can otherwise get a little boring. No one wants to use their insurance, but the attendees left with a better sense of how to squeeze the most out of those dollars.

All-Day PT6A Seminar

Sunday's all-day PT6A Seminar was hosted by Pratt & Whitney Canada. Peter Wilkinson, P&WC's PT6 turboprop customer support manager for the ag market, presented an excellent summary of how the PT6A engines operate, covered some of the current issues, and was well received by approximately 55 attendees. Robert Craymer and Fletcher Sharp from Covington Aircraft were also present for the entire program, offering additional support for Peter.

Radial Engine Session

Monday's Radial Engine Session was chaired by Covington Aircraft's Logan Simmonds, who was the sole presenter. About 45 attendees listened to Simmonds discuss many of the routine maintenance items, along with sharing information on what oils to use, cylinder break-in procedures and proper takeoff settings. Lots of questions were asked and answered during the Q&A portion.

Oakes Abbott presides over Covington Aircraft Engine's specialty 50th anniversary merchandise.

PT6A Turbine Session

Monday's PT6A turbine panel had the following companies/representatives attending: P&WC – Peter Wilkinson, Covington Aircraft – Robert Craymer, StandardAero/Dallas Airmotive – Wendell Lambert, Prime Turbines – Kevin Blakesley, and TAE Aerospace – Will Williamson. Fletcher Sharp from Covington Aircraft was the moderator. The PT6A Session covered a wide range of topics, including compressor washes/rinses, turbine oils, performance charts, Bleed Off Valve (BOV) maintenance, engine preservation during the offseason, updates from Pratt on changes to the PT6 maintenance manuals when prop strikes/wire strikes/sudden stoppage are involved, and the need to perform all inspection criteria to overhaul levels as opposed to what had been in the maintenance manuals. Approximately 110 people attended the session.

TPE331 Engine Session

Bruce Hubler with TAE Aerospace moderated this session along with Danny Moore from CD Aviation and Cory Paxton with Turbine Standard. There were 45 people in attendance.

To spur conversation, Hubler started with a review of the regulations that govern maintenance. Part 137 requires an "airworthy aircraft" but does not address other maintenance. Maintenance requirements are found in Part 91. Discussion continued on what is needed for maintenance beyond the annual inspection and Airworthiness Directives. Life-limited parts need to be tracked and replaced or repaired as required for continued airworthiness. This is of particular importance to turbine engine maintenance. The owner or operator of an aircraft is responsible for ensuring that maintenance is accomplished.

Discussion of ADs on the TPE331 engine primarily focused on the AD requiring an oil sample and analysis (SOAP). This AD affects engines with a torque sensor, but it should also be done on those engines with strain gauges, as the affected bearings are the same on both. There was also discussion of various ADs, maintenance, inspections and who may perform these and sign them off as being completed.

The session ended with a discussion of propeller blades, balancing and vibration analysis. It is necessary to have a proper blade angle setting and fuel controller setting to provide the correct performance for proper landing configuration.

TUESDAY, DEC. 6

NAAA General Session

The 2022 NAAA General Session explored “Healthy Public Relations” in a nod toward NAAA’s two outstanding speakers, senior AME (and aerial applicator) Dr. Stan Musick and Michelle Miller, a full-time advocate for agriculture better known as the Farm Babe.

Dr. Musick was the opening speaker. He covered several medical topics, including medication risks, stress, sleep issues, the potency and half-lives of over-the-counter drugs, the dangers of fatigue and how to get a medical special issuance.

Dr. Stan Musick delivered high-quality air medical advice in rapid fashion to Ag Aviation Expo attendees at the 2022 General Session.

It is not just a lack of sleep that will negatively affect pilots; sleep disruption is problematic too. “Sleep is a huge thing. Sleep deficit is cumulative. You can’t overcome it with one good night’s sleep,” Musick said. “Sleep disruption is a major cause of fatigue.”

He offered several fatigue mitigation strategies, including for pilots to limit their alcohol consumption. Ag flying demands judgment and focus. All of that gets diminished when you’re fatigued, Musick said.

Dr. Musick also highlighted sleep apnea conditions. Obstructive sleep apnea affects 20 to 40% of adult males, he said.

The special issuance (SI) of a medical certificate requires more information and hoops that a pilot and AME need to jump through. It may require the pilot to do certain things each year to reauthorize their medical certificate. All SIs require a certain waiting period. It could be three months, six months or more.

Deferrals of medical are bad enough; denials are even worse, Musick said. That’s why it’s important to read your medical records. Sometimes a mistake may appear on a person’s medical record. If they go unchallenged, they will be accepted “as is” by the FAA, and that can create a huge headache for a pilot surprised to learn their medical certificate got rejected.

Dr. Musick joked that his medical exams are free; what pilots pay him for is to help them work their way through the FAA medical clearance process.

Michelle Miller spoke about the importance of advocating for aerial application with people outside the industry to manage public perceptions. “If we keep talking to each other, we aren’t going to have as much of an impact,” she said.

Next, Farm Babe Michelle Miller discussed how to cultivate connections with consumers and be an advocate for agricultural aviation and farming.

She began by describing her transformation from an anti-GMO advocate living in Chicago, after she had previously lived in L.A., to becoming a full-time influencer dedicated to busting myths about food and farming. When the controversial documentary *Food Inc.* came out, Miller bought what the filmmakers were selling hook, line and sinker.

After leaving Chicago, she moved to Pensacola, Florida, and worked as a bartender. At that point, Miller still viewed agriculture through the prism of *Food Inc.* Her views changed when she met and began dating a farmer from Iowa.

Miller began seeing things in a whole new way after observing the care farmers exercise and being exposed to agriculture on a regular basis. That prompted her to create a catchy moniker for herself—the Farm Babe—and become a social media advocate promoting agriculture instead of dissing it.

Today her @FarmBabe social media channels reach 3 million users a month. A meme maven, Miller is adept at using humor to make salient points about the benefits of using hormones and antibiotics in agriculture, how agriculturalists promote the environment and soil health, or to dispel myths about organic food production. Making advocacy campaigns fun is another differentiator that works for her.

It’s difficult to stay ahead of messaging that is anti-ag, but it is important to dispel negative narratives about proven agricultural practices. “We have to connect with these people,” Miller said, “because, at the end of the day, we all want the same thing.” We all want things to be better.

When you’re thinking about advocacy, think about the things that mean the most to you, Miller advised. Advocating is basically talking about what you do as an agricultural pilot or farmer. Think about how you can better tell the story of agriculture and ag aviation in a fun and interesting way.

Intra-agriculture fights can be self-defeating. “How are we going to build public trust if we keep pitting ourselves against each other?” Miller asked. “If we’re not telling our story, somebody else will,” she added.

Miller said that environmentally conscious people, particularly celebrity ones, are often well-intentioned but misinformed people.

Despite political factions seemingly growing ever-further and further apart, Miller said that when it comes to conversations about food, keep in mind that over 90% of people are in what she refers to as the “movable middle.”

Here are some communication tips Miller suggested:

- Have empathy—these are friends.
- There's no wrong platform to #AGvocate. Find the platform and things that work best for you.
- Be yourself!
- Share humor or memes.
- Find your voice. Share your personality. Show kindness. ("Really, just always lead with kindness. Kindness and empathy," Miller said.)
- Share your expertise. You are the expert, a trusted voice. ("Don't shy away from it. Own it! You spray chemicals, and you are the expert," she said.)

Aerial applicators can communicate what they do in different ways. Having conversations and stepping out of your comfort zones can lead to breakthroughs. The first step is listening, though—especially on social media. If someone writes or says something negative about aerial application, politely respond with, "I'm curious. Where did you hear that information?" Then let the person know where they can go to find accurate information. For example, in social media post, you can reply, "For more information, please visit _____." The trick is to be authentic, Miller said.

Farming and aerial application are hard. There's a lot that isn't in a farmer or aerial applicator's control. However, Miller said, "There is one thing that we can control. We can control the perception."

Attendees were all ears when General Session speakers Musick and Miller spoke.

WEDNESDAY, DEC. 7

Helicopter Session

Longtime Helicopter Session moderator Jeff Reabe of Reabe Aircraft Improvement skillfully guided conversation and questions on such topics as the availability of helicopter parts and whether those parts are as good today as the ones made 30 years ago, drone encounters and what to do about them, how to mitigate wire strikes, and safety equipment for helicopters. Reabe introduces topics and then queries the audience of helicopter applicators and suppliers for answers and their opinions on the subjects at hand.

A Bell supplier said he believed that today's helicopter parts are as good as they were 30 years ago. However, the ag aviation industry's helicopter fleet is comprised of legacy aircraft that aren't made anymore. That can make sourcing replacement parts a challenge.

Manufacturers like Bell do an excellent job of maintaining parts for their legacy helicopters. However, as new helicopters enter the market, it could get harder to support old helicopters, someone observed. That, coupled with other vendor and supply issues, could put helicopter operators in a bind. For example, rotor blade materials have been very hard to come by.

Meanwhile, insurance has gone through the roof, as have fuel and the price of parts. "We all deal with farmers," Reabe said. "We can't compete if we can't get parts that last."

An audience member brought up a drone encounter his helicopter operation had during a job. They got their growers involved, informing them of what was happening and how unsafe it is for a manned ag aircraft and drones to operate in the same area if the drone operator doesn't give the right of way to the helicopter pilot, as the FAA requires.

An FAA representative in the audience asked any ag operators who encounter a drone encounter to report it to their FSDO. NAAA's UAV encounter checklist provides a step-by-step guide on how to respond after a UAV encounter, including what steps to take to report it to various entities, including the FAA.

Despite the current regulations requiring drones to yield to manned aircraft, the FAA representative remarked that within the drone community, there are a lot of bad actors who aren't following the rules.

Another topic that spurred much discussion was the importance of reducing wire strikes. Some audience members had attended the wire avoidance course offered on Sunday, while others had not. Education, not technology, is the key to avoiding wires, one longtime helicopter operator suggested. (Wire strike avoidance is one of the main focuses of the 2022-2023 PAASS Program.)

In terms of helicopter safety equipment, Reabe gave the audience a tip. Installing a low fuel warning is a simple safety enhancement that could save someone's life, and the part "costs about a hundred bucks," he said.

Relationship Drift Session Mitigates Off-Target Communication Between Spouses

The Relationship Drift Session emphasized the importance of properly timed yet consistent communications between ag pilots and their spouses year-round, not just during the applications season. The session, now in its fourth year at the convention, heard from ag pilots and their spouses about communication techniques that work and don't work, emphasizing the importance, particularly from a safety standpoint, of ag pilots not bringing personal stress into the cockpit with them during the application season. The session was moderated by relationship veterans Darrin Pluhar (Montana), Sue Stewart (Texas) and South Dakotans Jane Pitlick and Perry Lee Hofer.

The participants were separated by gender into different rooms and polled on various questions ranging from their current relationship

status to the number of marriages they've had to the length of their current marriage. A plethora of good advice was shared by both females and males alike. Here are a few key bullets:

- Don't wait to address an issue—communicate about it early. With that, calling an ag pilot while they are in the cockpit was not recommended. Instead, it was suggested to call the operation's office, and staff there would notify the pilot of the message once the pilot was on break and in a mindset outside of piloting an application aircraft. In the event a text is sent to the ag pilot to call the spouse once landed, it was recommended that such texts be sent only during an emergency situation so that the pilot isn't unduly stressed and doesn't lose flight focus when receiving such a message. Issues should be discussed after work when processing time can be factored in, not directly before going to sleep or leaving in the morning.
 - One-third of the participants felt they didn't communicate or listen to their spouse adequately about all that is entailed of an ag pilot during the busy application season. Of the men, 84% polled grew up in ag, and 52% of women grew up in ag. Lesson: Let your significant other know early what career you are in and its demands.
 - One participant stated you typically do annual maintenance on an ag aircraft, but you do continual maintenance on your relationship: "My personal aircraft is maintained all year long."
 - A few couples in attendance had reached half-century anniversaries, and they admitted to peaks and valleys. With that said, they stated that staying the course, working together, compromising and engaging in timely communication ultimately brought them back together and made them closer.
 - The book by author Gary Chapman, *The Five Love Languages*, was recommended. In summary, those five love languages are words of affirmation, quality time, physical touch, acts of service, and receiving gifts.

The Relationship Drift Session has now been conducted at state and regional ag aviation conventions, in addition to the NAAA Ag Aviation Expo. Its popularity is due to the emotional intelligence and intangible wisdom it imparts, which can lead to mitigating distractions, honing focus and centering ag pilots while they are behind the controls of an agricultural aircraft.

Athena Program

This year's Athena Program dovetailed the Relationship Drift Session by focusing on "The Importance and Challenges of Balancing Family, Home and Work." Athena presenters Jane Barber Pitlick and Sue Stewart delivered the content.

They began by noting what matters most to people in the aerial application industry are their loved ones. Different dynamics may apply at home and work, though.

For the spouse or significant other of an aerial applicator, it's important that their ag pilot comes home safely, for them to spend time being a parent, and for the couple to respect each other and spend quality time together. Ensuring the aerial applicator gets proper rest during the season is also essential.

When an aerial applicator is at home, they should be present, spend mealtime together as a family and help around the house. At work, aerial applicators' safety is paramount, so by necessity, they must prioritize the mission at hand and compartmentalize to separate their work and home life. The operation's employees, equipment and customers are priorities at work.

The Athena presenters counseled that work and home life are equally important, but knowing how to balance the two will create a safer environment at work and a happier home life.

One of the keys to balancing work, home and family life is communication, including being upfront about matters of concern. Pitlick and Stewart cautioned that tough conversations should be tackled with care. Knowing how to initiate those conversations without going off-topic is vital. Courses or counseling can provide training on conflict resolution.

One audience member pointed out that sometimes the story we tell ourselves is not what their aerial application-loved one is saying. She remarked that women tend to fill in the blanks concerning what their ag pilot partner may be thinking, and those assumptions aren't always accurate. "We don't really realize all those things that are going through that pilot's mind," she continued. It's a good idea to take a step back in those instances, she advised, because you want the pilot's mind to be clear when they're out treating the field.

Ag pilots face numerous challenges on a daily basis during the spraying season. Their significant others face challenges too. Ag pilots should recognize that by showing appreciation and acknowledging that what their spouse does matters just as much.

Husbands and wives aren't the only ones affected by the rigors of the aerial application season. If the company allows it, taking your kids to the airport can make a big difference in getting an operator/pilot's children to realize what their father does and why he can't be around or available while he is working.

In closing, the Athena presenters noted that taking unnecessary stress out of the cockpit and the home will create a safer work environment and cultivate a happier family life. Having a support network at work and home can make life easier for an ag pilot, their spouse or significant other, and their families.

The NAAA Support Committee presents the Athena Program. The educational program's primary intent is to support women in the agricultural aviation industry, but many of the lessons can be just as applicable to men. Most of the approximately 40 attendees at this year's program were women.

Capstan Ready to Equip

Capstan Ag Systems again highlighted its SwathPRO boom system at the convention. The big news is Capstan's SwathPRO aerial spray system has received its STC from the Federal Aviation Administration. It is now available for sale as a factory-installed option on new Air Tractor aircraft and a retrofit installation on used Air Tractor airplanes (models 4, 5, 6 and 8) through the Air Tractor worldwide dealer network.

The patented, individually optimized SwathPRO nozzle spray system has an electronic solenoid at each nozzle station that controls both flow and pressure to adjust for pattern disturbances during flight. The individual nozzle control using pulse width technology on each nozzle can apply up to 1 to 10 gallons per acre at up to 40 continuous PSI and 60 to 100 intermittent PSI. The system can perform variable or constant rate application work with ease as the pilot seamlessly activates and deactivates individual nozzles from the cockpit.

Jeff Heymeyer and Adam Madison of Capstan presented at the company session, in addition to Paul Soulek, an applicator from Wall, South Dakota, and Ken Lauderdale, an applicator from Caldwell, Texas.

Lauderdale, a 48-year operator, said, "You can't do a straight line with any other boom," referring to what the Capstan system can solely accomplish. He showed pictures of how it can paint arboricide aerial application work in straight lines, killing nuisance, water-consuming voluntary brush but staying clear of the cash crop.

Lauderdale compared the revolutionary nature of the Capstan SwathPRO to the aerial application industry with the air conditioner equipped in his aircraft. "Once you have it, you ain't going back," Lauderdale said. He also stated that the "on-off" system works impeccably, and the solenoid valves and nozzles are quite durable.

Soulek said about the Capstan SwathPRO, "for drift mitigation, they are tops," and "some might have price shock in regard to their sales price, but what does drift cost?" he asked rhetorically. When questioned about streaking, Soulek said there has been no streaking in corn and soybean fungicide work he has conducted with the system.

Turbine Conversions Session

Henrique Campos from SABRI and São Paulo State University in Brazil was the featured speaker at the Turbine Conversions Session. Henrique is an agronomist in Brazil who conducts research, training and spray clinics. He spoke about aerial applications in Brazil, a sizeable ag-producing country with 2,400 agricultural aircraft. Aerial application in Brazil is primarily used to treat rice, sugarcane, corn, soybeans and cotton. Brazil uses the same aircraft and nozzle types used in the U.S. The pesticide labels, however, are different than those in the U.S.

There is growing public opposition to agricultural aviation in Brazil, so Henrique works with aerial applicators to ensure they are making accurate applications. He focuses on the type of nozzles used, their positioning on the boom, creating the correct droplet size for the application, swath width and coefficient of variation (CV), the height and speed of the aircraft, and the weather. Once an aircraft participates in a fly-in clinic, Henrique places a QR code on the aircraft so people can look up the aircraft's spray data.

As in the U.S., ensuring agricultural aircraft maintain high productivity is important in Brazil. Henrique presented a breakdown of the factors that he sees affecting productivity along with a percentage estimating each factor's level of impact on productivity: tank mixtures (43%), swath width (6%), the shape of the treatment area (17%), and spray volume (34%). Brazilian aerial applicators have begun to use high-flow loading systems to increase productivity and reduce the number of people needed for loading.

Nozzle selection in Brazil is primarily based on the type of pesticide being applied. For insecticide and fungicide applications, rotary atomizers are frequently used. Conventional hydraulic nozzles are more popular for herbicide applications, with many being made with straight stream nozzles. The rotary atomizers are typically set to produce a 200-micron droplet for insecticides and fungicides, while a coarse droplet spectrum is used for herbicide applications. Rotary atomizers tend to produce a wider pattern, while conventional hydraulic nozzles produce a more uniform pattern.

For rotary atomizers, setting the blades at the correct angle is important as this determines the droplet size. Applications with rotary atomizers are very commonly administered at 2 gallons per acre. Henrique has found that low-volume applications are sensitive to the weather. Brazil is working to lower the GPA to allow UAS to spray more productively.

Chemical Session

The Chemical Session offers attendees an opportunity to hear from pesticide and adjuvant manufacturers about new products or updates to existing products. The session was moderated by Lynn Justesen of UPL, who also serves as the Allied Industry representative for the Chemical Division on NAAA's board.

John Garr of GarrCo Products started things off by highlighting a few products he receives the most questions about. Stimulate™, a broad spectrum, highly concentrated microbial-fueled biological, aims to significantly enhance plant health for increased yields. This is meant to be accomplished by converting unavailable nutrients to usable forms. He also discussed Control Duo™, combining a unique nonionic surfactant blend that does not negatively reduce droplet size with GarrCo's drift mitigation adjuvant, Control WM™.

John Shultz represented BASF and mentioned several products. Renestra™, a dual mode of action insecticide that launched last year, combines a broad spectrum pyrethroid (Fastac™) with a new mode of action targeted insecticide (Sefina®). Sphaerex™ fungicide is

replacing Caramba® for controlling head scab on wheat. Shultz concluded by elaborating on Veltyma® fungicide, which offers a greatly expanded application window. Product availability looks to be somewhat strained in 2023, similar to last year.

Corteva's Rachel Walker gave a briefing on its rangeland and pasture products. DuraCor® herbicide was released in 2020 and will replace many GrazonNext® acres. DuraCor™ has two active ingredients, including Rinskor™, the first new active ingredient introduced into the range and pasture market in roughly 15 years. It offers much better drift mitigation and is anticipated to provide season-long broadleaf control while being safe on grasses. When asked about supply chain pressures, Walker stated that there would be a free flow of rangeland products by summer 2023 but expressed frustration that only three companies are currently allowed to produce chemical container caps. They are all located in China.

Rounding out the session, Lynn Justesen provided attendees with an overview of the current state of UPL. While being the fifth largest chemical company in the world, with nearly 100 active ingredients in its portfolio, UPL is still working on increasing its name recognition. He noted that even if you haven't heard of UPL, you have likely used several of its products. Centered at its OpenAg® Center in Research Triangle Park, North Carolina, Justesen highlighted UPL's global field research efforts and wide range of products in its pipeline. Looking at the supply chain, UPL is doing well with its manufacturing base in India rather than China.

The representatives took several questions at the end of the session, which led to an extended discussion about the future role of biologics in the industry. While opinions varied, there was consensus that they will have to play a role in balancing the risk cup for continued releases of more traditional products.

Phenix Solutions UAS Session

Casey Zimmerman of Phenix Solutions presented information on the development of the Phenix Ultra 2XL. The Ultra 2XL is considered a heavy-lift unmanned aircraft system. It is designed for both military and civilian uses.

The unmanned aircraft is a single mast, coaxial with counter-rotating rotors and a rotor diameter of 24 feet. The unit is designed with high rotor clearance for safe hot fueling and loading and a skid system that allows different modules to be easily mounted underneath the fuselage, including a tank and pump for spraying. The aircraft will have an empty weight of less than 1,000 pounds and a gross weight of 3,000 pounds. The spray system is expected to have a liquid capacity of between 175 and 190 gallons.

The aircraft will use the Rolls Royce RR 300 turbine engine. It will be built using current Part 27 type certificate standards. Phenix Solutions expects to be flying a prototype within six months.

Hydrovant Session

Hydrovant is a water-based polymer adjuvant developed by Corbet Scientific that works to protect the pesticide and hold it on the target. The session was presented by Jeff Summersill from Thomas R. Summersill Inc. in Florida. He is a distributor for the new adjuvant and an aerial applicator. Jeff now uses Hydrovant on much of his own aerial application work in Florida after finding that it increased the length of control with insecticide applications for his customers. It has a use rate of 12.8 fluid ounces per 100 gallons of spray solution for aerial applications.

Hydrovant forms a polymer matrix on the surface of the leaf that works like scaffolding to hold the active ingredients in place. Because it functions more like a mesh than a coating, it allows water and gases to flow through the leaf. It is highly rainfast, which means it is resistant to being washed off and remains effective even after rainfall or irrigation. A Cornell University study found Hydrovant significantly increased rainfastness by 35% to 45%. Because the active ingredient stays on the leaf longer, even after a rain event, it improves the overall performance of the application.

Hydrovant is currently registered in 15 countries with patents in nine countries. It was just approved for use in California. Hydrovant is supported by numerous research studies on multiple crops, including tomatoes, pumpkins, soybeans, citrus, cotton and corn. It is not phytotoxic, and there are no tank mixing issues with other pesticides or adjuvants. It can be used with other adjuvants and can benefit applications of both contact and systemic pesticides as well as fertilizers.

Perfect Flight Session

Perfect Flight's Destiny West and Vinicius Velho explained how data analytics from the Perfect Flight App can improve aerial applicators' performance by providing metrics such as an ag pilot's "waste rate." Waste rate refers to the percentage of the applied product that ends up outside the targeted field. Other key performance indicators that Perfect Flight measures are the success rate, uniformity rate and error rate of an aerial application.

Perfect Flight is a data gathering and management system that develops reports on spray applications, which can then be used to improve applications. From these reports, they can generate shapefiles that contain the areas that the initial application missed. Armed with that information, an operator can send a pilot back to the field to make cleanup passes or another spray platform, such as a ground rig or drone, to spray the areas that a conventional aircraft could not treat.

A poor application can cause crop performance to suffer and pest pressure and resistance to increase. It can also increase the aerial

applicator's liability and negatively impact their perception and the industry's perception in general.

Perfect Flight's analysis of an aerial applicator's as-applied maps will reveal how the pilot fared in the four performance areas referenced above. A U.S. operator who has been using the Perfect Flight App said that it provides objective proof of how well or not a pilot fared treating a given field. Seeing that data can be eye-opening for an operator and their pilots, but what the Midwestern U.S. operator and other Perfect Flight users have found is that ag pilots' performance rapidly improves when they are presented with objective, measurable application metrics to benchmark themselves against. In addition to incentivizing pilots—who are competitive by nature—to become more efficient applicators, seeing that information can enhance pilot safety by showing them that slowing down results in safer turns and better applications.

In the five years it has existed as a platform, Perfect Flight has analyzed 75 million acres, including 30 million acres in the past year. Velho and West highlighted a series of studies Perfect Flight conducted by analyzing its application data, including one on the financial benefits of reducing the percentage of off-target spray. The study compared 173,000 acres sprayed by aerial applicators before and after using Perfect Flight. Between 2019 (before using Perfect Flight) and 2020 (after using Perfect Flight), the aerial applicators collectively cut their waste rate by 10%. As a result, they applied \$130,000 worth of product more to the fields than in 2019, which equates to 75 cents more product per acre of land treated.

Besides success rate, uniformity rate, waste rate and error rate, other data presented in Perfect Flight's application reports include total plots area, total applied area, internal applied area, external applied area, non-applied area, total overlapped area and internal overlapped area. Perfect Flight integrates with most GPS guidance systems and Microsoft Power BI, a business intelligence platform.

THURSDAY, DEC. 8

Air Tractor Session

Air Tractor President Jim Hirsch covered the company's activities this year and its plans for 2023 at the Air Tractor Session. Air Tractor has built more than 4,000 airplanes since 1974 and reached a milestone last month, completing its 1,000th AT-802. The AT-502XP is also proving its popularity, with 121 produced since its launch in 2016.

The manufacturer is working to increase its capacity to build more airplanes to meet market demands. In addition, Hirsch affirmed Air Tractor's focus on enhancing service and spare parts support to match the growing fleet.

While supply chain headaches continue to challenge Air Tractor, the company managed to deliver 185 out of the targeted 195 airplanes in 2022. Daily and weekly disruptions of parts and materials availability have held up production, says Hirsch. Some of the major hang-ups include late engine deliveries, changing manufacturers of wing spar material and the availability of fuel pumps.

Even with those ongoing disruptions and increased costs associated with them, Air Tractor has a goal of increasing production to 218 airplanes in 2023.

Hirsch moved on to highlight several new products, including the company's new aluminum tailwheel and axle assembly. Now standard on the AT-602 and AT-802, it offers better corrosion resistance and bearings which can be easily greased for long service life.

Capstan's SwathPro system is now available for new and used Air Tractors through the dealer network. It offers individual nozzle flow control to facilitate on-the-fly setup changes, ultimately improving accuracy, drift mitigation and productivity.

The AT-802F Fire Response Dispersion System (FRDS) Gen. III is FAA STC certified and IAB, USFS and BLM approved. Hirsch notes that the new all-electric system allows for faster, more accurate doors. More than 80 systems have been installed since its launch in 2020.

An update to the long-running AT-1002 development program projects the 1,060-gallon prototype to fly in the summer of 2023.

Hirsch announced that the Sky Warden™ ISR Strike Aircraft was selected for U.S. Special Operations Command's Armed Overwatch Program. The Sky Warden™ is an AT-802U airframe that has been fully outfitted for the intelligence, surveillance, reconnaissance and strike missions by L3Harris. As many as 75 airplanes could be ordered over six years, with an initial six planned for delivery in 2023.

After a significant effort, a new Turn Smart video has been produced by Air Tractor. The video premiered at the NAAREF Safety Session, and it is being donated in its entirety for use in future PAASS Programs and NAAREF educational content.

Thrush Aircraft Session

CEO Mark McDonald presented the Thrush Aircraft Session. The session covered production updates, program status, safety and plans for 2023.

Production has experienced a difficult period with inflation causing, on average, a 47% increase in the price of supplies since the beginning of the year. Labor has been difficult to find, but that has gotten better in the last six months. Thrush Aircraft currently employs 200-plus people. The supply chain is being managed by increasing the inventory of materials and spare parts.

Production improvements include a ramp-up of production with improvements in manufacturing processes that increase efficiency. Thrush Aircraft expects to deliver 30 aircraft by the end of 2022. Production of aircraft slowed down during the first half of 2022 as the manufacturer waited for the P2 and the P2+ to be certified. They expect to produce 40 aircraft in 2023. A few aircraft waiting for certain parts at the end of 2022 will also be sold in 2023, bringing a forecast of 45 aircraft being sold in 2023. Thrush Aircraft expects to increase production by 10 aircraft a year after 2023.

Thrush Aircraft displays its new 510-P2 ag plane featuring a PT6-34AG engine and a four-bladed Hartzell propeller.

The PT6-140-powered 510 P2+ and the PT6-34-powered 510 P2 single cockpit aircraft were both certificated by the FAA in 2022. Within the first and second quarters of 2023, Thrush expects the dual-cockpit 510 P2+ and dual-cockpit 510 P2 to be certificated.

Thrush Aircraft is doing conversions on the H80 510 Thrush, converting the aircraft to a PT6-34-powered Thrush, and will also be remanufacturing H80 Thrush aircraft. During a “conversion,” an owner provides the airframe. In a “remanufacturing,” Thrush Aircraft owns the airframe that is being converted. After training, dealers throughout the world will be able to perform conversions.

Thrush continues to work on safety, including holding a safety session earlier during the Expo. Thrush aircraft currently have no airframe ADs. McDonald closed the session by taking questions from the attendees on a variety of issues ranging from business finances to forecasting future demand around the world.

NAAREF Safety Session

The new *Turn Smart* video from Air Tractor made its debut at the 2022 NAAREF Safety Session. The video featured a combination of interviews, stunning animation and flying demonstrations in an effort to educate ag aviators on how to safely conduct an ag turnaround.

Kyle Schroeder from Air Tractor introduced the video by providing information on the lethality of stall/spin accidents that result from improperly turning an aircraft. Taking over from Kyle, Mike Rhodes, former Chief Test Pilot with Air Tractor, introduced Steve Gustafson, an ag pilot from Louisiana and an AeroShell Aerobatic Team pilot. Steve grew up in ag aviation. He started loading for his father when he was 10 years old before becoming an ag pilot himself.

Steve describes what a safe ag turn looks and feels like. The maneuver must be planned, and you should preserve a margin of safety for when the unexpected happens. Steve next talked about the dangers of uncoordinated flight and the misuse of rudder while making ag turns. To assist with his description, animation was displayed to help pilots understand what can happen when turns are uncoordinated. The animation depicts the differences in drag and lift between ailerons up and down, adverse yaw and the four left-turning forces on an aircraft: torque from the propeller, P-factor, spiraling slipstream and gyroscopic precession. The animation allows viewers to easily understand all of the forces at play on an aircraft and specifically how they impact an aircraft during an ag turnaround.

Mike and Steve then discussed the change in an aircraft’s center of gravity as the contents of the hopper are applied and the need to be a smooth and steady pilot. Returning to maintaining a margin of safety, *Turn Smart* turned to Colonel Mullane, USAF Retired and former NASA space shuttle astronaut, to discuss normalization of deviance. Normalization of deviance occurs when you are operating under pressure to complete a task, which causes you to consider using a shortcut that is less safe than the normal procedure to save time. If you survive, you will be more likely to take the shortcut the next time you’re under pressure. Over time, the deviation from safety becomes your new normal.

Going back to Mike and Steve, they talked about the technical aspects of what happens when an airplane stalls in a turn when one wing is still producing lift while the other wing is no longer producing lift. To better demonstrate these concepts, Mike joined Steve in his T-6 for some flying examples of what happens when a turn is done incorrectly, causing a stall spin. The video closed with some key points:

- Beware of overly aggressive turns.
- Back off 10%. Maintain your safety margin.
- A wing at zero-G cannot stall.
- Stay vigilant for “normalization of deviance.”
- Practice slow flight, stalls and recoveries.
- Coordinated use of flight controls in every turn.
- Pay attention to operating weight and CG shift.
- Turn using no more than 10 degrees of flaps.
- Choose the correct turnaround maneuver for the mission.

The new version of *Turn Smart* is a great video and was well-received by the audience. The knowledge it imparts to ag pilots will undoubtedly save lives. NAAREF thanks Air Tractor for the time and resources it put into producing such a high-quality safety education video. Air Tractor has indicated it will be releasing *Turn Smart* publicly in the first quarter of 2023. If you didn’t make the 2022 NAAREF Safety Session, be sure to catch *Turn Smart* when it’s released so you can turn smart!

MENTORING OFFERINGS

Compass Rose Session (Dec. 4)

NAAREF's Compaass Rose program facilitates structured discussions between agricultural pilots of varying experience levels. For new or aspiring agricultural pilots, this is an opportunity to enhance their knowledge and professionalism, learning from seasoned pilots and operators. It is also an opportunity for those experienced pilots to hear the questions and concerns of new pilots and gain a deeper understanding of their own role in the mentorship process.

The program was popular again this year, with 70 new or aspiring agricultural pilots and 35 experienced pilots or operators in attendance. PAASS presenters Damon Reabe of Waupun, Wisconsin, and Matt Peed of Arlington, Georgia, conducted the program.

The 2022 Compaass Rose program focused on communications, expectations and prioritizing safety in the mentor/mentee relationship. Other topics covered included the role of ag flight schools and whether an aspiring pilot should be expected to work on the ground before moving into a flying position.

After brief introductions, the pilots with five or fewer years of experience moved into a separate room. Both groups were asked a series of multiple-choice questions, with participants answering anonymously using mobile polling. The new pilots' questions included: Is your mentor/instructor safety conscious regarding your training? Experienced pilots were similarly asked: Are you prepared to teach safe flying habits to a trainee?

Having the groups split up allowed the participants to discuss their answers in a judgment-free zone. After each group discussed their answers individually, they reunited to review their responses to the survey questions collectively. The whole group discussed each topic, emphasizing areas where there was greater variance between the more seasoned and newer pilots' views.

There were several follow-up questions from the group, including how to gain experience and employment. These were addressed by the veteran pilots and operators in attendance. The attendees looking to enter the industry found the session very helpful and expressed appreciation throughout the Expo.

'Ask the Expert' Speed Mentoring Session (Dec. 5)

NAAREF's "Ask the Expert" Speed Mentoring Session was once again one of the more popular events for pilots new to the industry. The session included 72 "mentees"—people with five or fewer years of experience in ag aviation—and 36 mentors, which equates to one mentor for every two mentees.

A large percentage of the mentees were looking to break into the industry. The mentors included operators, pilots, flight training representatives and individuals from the insurance industry.

After the mentees fanned out around the room, two to four mentors joined them at each table. After brief introductions, the mentees asked questions for 15 minutes before the mentors rotated to different tables. This format allows for a more direct, personal interaction and benefits mentees by enabling them to hear views from several different perspectives.

The mentees had a range of questions, including about training, obtaining their first seat, operator relations, how to transition to turbine aircraft and how to safely operate in the low-altitude environment.

A great deal of discussion centered on building relationships with potential employers and how to pick a company the pilot would want to work for. The aspiring ag pilots at one table were advised to choose their mentor and operation to work at carefully because the operator's record matters more than theirs does when it comes to getting the new pilot insured. At the same time, mentors stressed the importance of loyalty and how much additional cost employers incur when taking on an inexperienced ag pilot, such as time invested and increased insurance premiums.

Agricultural aviation is a small industry, and attitudes and work ethic follow pilots as they progress in their careers. In a conversation about the attributes it takes to stick in the industry, one mentee asked if character development carries as much weight as a pilot's technical development. "I'd say even more so," a mentor responded.

Safety was a big topic of conversation at every table, and the operator and pilot mentors had plenty of sound advice to share. For instance, if something doesn't feel right while flying across a field, pull up immediately and reassess by taking another look around the area. It's better to take five minutes to reassess a field than to wait five weeks for an airplane to be repaired. "No acre is worth your life," another mentor counseled; at the end of the day, it's just a job. One operator mentor said he has a sign posted at the end of his runway to remind his pilots of three things each time they go out on a job: *Safety first. Quality second. Efficiency third*—in that order.

NAAA's thanks go out to organizer Tom May and the three dozen mentors who volunteered their time to help others become a valuable part of the ag aviation industry. Dozens of mentees stuck around long after the session officially ended to continue discussing ways to become qualified ag pilots.

In Closing ...

We could go on, but we'll save other details about the convention, including details of 2022's best and brightest acknowledged at the concluding Excellence in Ag Aviation Banquet, for the next issue of *Agricultural Aviation*. If you like what you learned in Knoxville or read

here, save the dates for Dec. 4-7, 2023, and join us in Palm Springs, California, at the 2023 Ag Aviation Expo.

How Would You Rate the 2022 NAAA Ag Aviation Expo? Please Tell Us by Dec. 21!

Thank you to the attendees and exhibitors for joining us at the 2022 NAAA Ag Aviation Expo in Knoxville last week.

We are continually working to improve our education sessions, networking, trade show and the programs/services offered to attendees. Click the link below to complete the short survey so that we have substantive input to help us continue to improve future Ag Aviation Expos. Please complete the survey by Dec. 21.

- **Attendee survey click [here](#)**
- **Exhibitor Survey click [here](#)**

All responses are anonymous, but if you wish to share further details, please contact [Lindsay Barber](#), NAAA's Director of Meetings, Marketing & Special Projects. Thank you for taking the time out of your schedule to complete this important survey. We look forward to seeing you Dec. 4-7, 2023, in Palm Springs, California.

NAAA Comments in Support of Wind Direction-Based Buffers as an Endangered Species Protection to Keep Methomyl Available for Aerial Uses

In October, the EPA released proposed revisions to the methomyl proposed interim registration review decision. The changes were proposed as part of the EPA's effort to address its obligations under the Endangered Species Act (ESA). The proposed changes are part of a pilot project aimed at dealing with the EPA's current backlog of ESA concerns. The pilot project focused on three endangered species that are most likely to require mitigation to avoid adverse effects from methomyl applications. The three species are the valley elderberry longhorn beetle, the vernal pool tadpole shrimp, and the California tiger salamander. The proposed changes also included alternative mitigations for the 2009 Biological Opinion from the National Marine Fisheries Service (NMFS) to protect salmon species.

Earlier this month, NAAA submitted comments on the proposed changes that were highly supportive of one of the main mitigation strategies—wind directional buffer zones. For years NAAA has been articulating to the EPA that mandatory buffers adjacent to sensitive areas do not need to be permanent no-spray zones. Instead, NAAA has repeatedly requested buffer zones based on wind direction. The buffer zone is only required when the wind is blowing toward the sensitive area; no buffer zone is required when the wind is blowing away from it. NAAA did raise one concern over one proposed mitigation to require a coarse droplet size near the habitat of the valley elderberry longhorn beetle.

The proposed mitigations will only be required when applications are made within the range of the endangered species near critical habitat, depending on the specific species being protected. The [EPA's Bulletins Live! Two](#) will be used to show applicators the location of ranges and critical habitats for endangered species. Some of the proposed mitigations only apply during certain months based on the biological activity of the species.

NAAA's full comments can be read [here](#). In January 2023, NAAA will be commenting on updates to the EPA's ESA work plan and proposed label language for ESA mitigations.

Take the Covington Challenge! Covington Aircraft Pledges to Match Donations to NAAREF Made by Dec. 31

In honor of its 50th anniversary, Covington Aircraft Engines will [match any donations](#) made to NAAREF—up to a total of \$50,000—before the end of the year. This is an incredible opportunity to double the value of your NAAREF donation, which is why NAAA and NAAREF encourage operators, pilots and supporters of NAAREF's safety education and efficacy programs to take the Covington Challenge!

NAAREF programs, which include PAASS and Operation S.A.F.E., were designed and are succeeding in promoting safety and environmental professionalism to the aerial application industry. Since it first hit the stage in 1998, PAASS—the Professional Aerial Applicators' Support System—has reduced ag aviation accidents by nearly 26%, the fatal accident rate by 10% and drift complaints by 26%. That's a phenomenal achievement, and PAASS played a significant role.

NAAREF programs save lives, enhance our industry's reputation, enable insurance discounts, and help us meet regulatory requirements for certification. Without successful NAAREF educational programs, it's unquestionable that the regulatory requirements facing aerial applicators would be more rigorous. But it takes industry donations from individual members and organizations to ensure top-quality and effective NAAREF programs.

Please [donate now](#) to support NAAREF's programs and cultivate education, safety and technology advancements in the industry. Making a tax-deductible donation by Dec. 31 will effectively double the value of your contribution thanks to Covington's matching funds.

NAAA and NAAREF appreciate Covington Aircraft's generous offer to donate up to \$50,000 to NAAREF's programs and [incentivize other donors](#) to take advantage of Covington's matching funds.

Covington also continues to be a generous supporter of NAAA. The company has been a longtime sponsor of the Ag Aviation Expo, donates valuable Covington gift certificates to NAAA's auction and pledges \$1,000 in funds each year for the NAAA Support Committee's

annual scholarship media contest.

NAAA salutes Covington Aircraft Engines on its 50th anniversary of supporting aerial applicators as one of the industry's premier radial and turbine engine overhaul facilities and is thankful for its continued generosity.

NAAA CEO Andrew Moore presents a plaque on behalf of the staff, board and members of NAAA to Paul Abbott in honor of Covington Aircraft's 50th anniversary.

Thank You, NAAA Ag Aviation Expo Sponsors!

NAAA sincerely appreciates the companies that supported NAAA and the agricultural aviation industry with a sponsorship for the 2022 NAAA Ag Aviation Expo last week. We have been fortunate over the years to be able to count on many of our Allied Industry and operator members who sponsor a convention program, activity or item that benefits attendees.

Thank you to our 2022 Ag Aviation Expo sponsors:

- **Diamond Sponsors:** BASF, Corteva Agriscience, Pratt & Whitney Canada, Syngenta, UPL North America
- **Platinum Sponsors:** Transland
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We know that sponsoring companies can support many organizations, so we very much appreciate their support of NAAA! If you're interested in a 2023 Ag Aviation Expo sponsorship in Palm Springs, California, please contact [Lindsay Barber](#), NAAA's Director of Meetings, Marketing & Special Projects.

Important Call for GPS Data to Protect Manned Ag Aircraft from Drones

Earlier this year, an FAA advisory committee weighted with drone interests from Amazon, Google and other unmanned corporate interests suggested that the agency promulgate rules that drones operating beyond visual line of sight be permitted to:

- Increase their weight to 1,320 pounds
- Not equip with ADS-B identification technology
- Not give the right of way to manned aircraft when operating in rural, low-altitude airspace because they claimed there are no other users of this airspace.

As an ag aviator, you know these requests to be patently unsafe and based on false premises. As such, we call on you to help us collect information on ag aircraft's use of the low-altitude airspace. NAAA is working with and supports Mississippi State University's (MSU) Rspet Flight Research Laboratory and its continuing research on safe operational distances between low-altitude, manned aircraft and drones. The study's objectives are to:

1. Identify Ag Aircraft Operational Trends
2. Develop Ag Aircraft Operational Model
3. Validate Model through Observation/Collection of Empirical Data
4. Inform/Educate UAS Operators
5. Promote Safety in all Low-Altitude Ag Environments

Your voluntary participation in this study is critical to achieving these objectives. NAAA encourages you to donate your GPS flight log data to participate in this timely research. Logs from any year(s) are welcome and will be washed of any identifying information prior to use.

Many of you have previously contributed during the first stage of data collection from 2017 to 2020 when NAAA members donated 49,180 flight logs from 20 states. The second stage of the study began in 2021 and seeks to additionally include aircraft make and model info. These details are important, as the airspace modeling will be impacted by aircraft types differently, such as fixed-wing versus helicopter operations.

More GPS flight log data is needed to continue this study. Because of the diverse growing areas and unique geographical challenges experienced by aerial applicators, it is imperative that as many states and regions as possible are represented. This will ultimately help facilitate the safe integration of unmanned aircraft into these different airspaces.

As a reminder, NAAA and Rspet have agreed that all submitted information will remain confidential, and all GPS flight logs will be stripped of any personally identifying information before any research is conducted using the data.

There are several methods available to submit your data:

1. Request a secure upload link for larger uploads OR email directly to Madison Dixon, Research Director.
Email: mdixon@raspet.msstate.edu
2. Mail a flash drive or other storage device to the address below. (The device will be immediately mailed back once data is received if a return address is provided):

Address:

Attn: Madison Dixon
Raspet Flight Research Lab – Bldg. 2
114 Airport Rd.
Starkville, MS 39759

NAAA Follows Up Its Deep Aviation Safety Concerns with the FAA Drone BVLOS ARC by Entreating DOT Secretary Buttigieg to Not Compromise Low-Altitude Ag Pilots' Lives

Following up on a letter, testimony and other advocacy efforts to the FAA since last spring, on Nov. 29, NAAA followed up with a separate letter to Transportation Secretary Pete Buttigieg expressing the aerial application industry's serious concerns about the FAA considering promulgating via a proposed rulemaking many dangerous recommendations detrimental to low-altitude aviation safety from the FAA's Unmanned Aircraft Systems (UAS) Beyond Visual Line of Sight (BVLOS) Aviation Rulemaking Committee's (ARC) report published earlier this year.

In the letter to Buttigieg, NAAA included statistics on the great value aerial application provides to agriculture, forestry and public health. It also explained the severe aviation risks that UAS flying BVLOS in the 10- to 500-foot AGL airspace pose to manned, low-altitude aircraft flying in the same airspace, particularly when the UAS may weigh up to 1,320 pounds (about the size and speed of a Piper J3 Cub), no longer be required to provide the right of way if manned aircraft are not equipped with ADS-B technology, and be permitted to fly BVLOS without giving right of way or being ADS-B technology equipped when operating in "Shielded Areas."

The ARC's definition of a shielded area is a "volume of airspace that includes 100 feet above the vertical extent of an obstacle or critical infrastructure and is within 100 feet of the lateral extent of the same obstacle or critical infrastructure..." The ARC defined an obstacle as "any object of natural growth, terrain, or permanent or temporary construction or alteration, including equipment or materials used and any permanent or temporary apparatus." In this volume of airspace, UAS do not need to have ADS-B or other means to detect manned aircraft (MA) because, according to the ARC report, manned aircraft do not operate in this airspace. NAAA responded in the letter stating, "This claim is dumbfoundingly inaccurate ... it is the exact space that aerial applicators operate in when performing their mission treating cropland bordered by trees, utility poles, within 100 feet AGL and the like." Included in the letter was a GPS printout satellite map of manned aircraft swaths to cropland surrounded by obstacles (see illustration in the letter by clicking [here](#)).

NAAA also stated that other manned aircraft besides agricultural aircraft also operate in the 500-foot AGL airspace or below to properly perform their missions, such as emergency medical services, law enforcement, fire suppression, wildlife surveys, powerline patrol and others. These operations occur in a task-saturated environment for pilots due to the numerous existing obstructions, including wires, towers and terrain. BVLOS operations would add to the saturation by concentrating more aircraft in that airspace. Moreover, NAAA stated that the current relatively small size of UAS makes visual detection nearly impossible and referenced the 2015 Colorado Agricultural Aviation Association tests conducted to see if manned agricultural aircraft, both fixed-wing and rotor, could locate a drone over a field. The results were that of four fixed-wing aircraft pilots, only one could locate the UAS and could only do so for a few seconds. The only helicopter, which included a pilot and a visual observer, found the UAS but reported that it was extremely difficult to maintain visual contact. NAAA followed up the point to make the case that it would be perilous for drones not to always be mandated to give way to manned aircraft by stating that for "a low-altitude manned aircraft to visually track a darting ... [UAS] while also avoiding ground affixed objects and performing either a policing, application, search, and rescue, etc. task is impossible and a safety hazard."

An FAA ARC makes recommendations, not policy. The agency takes into account ARC reports and recommendations before proceeding with draft policy. The recommendations from this FAA UAS BVLOS ARC were not unanimously supported. Helicopter Association International, the General Aviation Manufacturers Association, Aircraft Owners & Pilots Association and Air Line Pilots Association voted against the ARC's recommendations and were just a few of the manned aircraft organizations asked to serve on the FAA UAS BVLOS ARC. NAAA served on the FAA UAS Remote ID ARC in 2017 and co-signed a minority report that urged the agency to require drones from 0.5 pounds or greater to be equipped with remote ID (RID) technology. That requirement was ultimately included in the final RID rule. NAAA will continue to follow up on this most important issue to protect low-altitude manned aircraft from drone policies dangerous to the safety of manned aircraft.

Downstow Aero Crop Service Co-Founder Dick Nixholm Passes Away at 95

NAAA is saddened to report that Richard H. "Dick" Nixholm, one of the founding members of the National Agricultural Aviation Association in 1966, passed away Nov. 28 at the age of 95.

Dick was born Sept. 23, 1927, in Yonkers, New York, to Hilmer Harold Nixholm and Anna Nixholm. In 1937, when he was 10, Dick's family bought a working dairy farm in Pittsgrove, New Jersey, where he helped while attending grade school and high school. Dick graduated from Vineland High School in 1945. Afterward, he enlisted in the Army and was assigned to the 10th Mountain Division based at Camp Hill in Leadville, Colorado. While there, he became part of the newly formed "Ski Soldiers" and made the rank of Corporal. Although the war ended before making it overseas, Dick was honorably discharged for his service.

Dick returned to the dairy farm to start managing it but had an itch to learn how to fly. He started taking lessons at Vineland-Downstown Airport, where he received his private pilot's, helicopter, commercial and instructor's licenses. He began teaching people to fly under the G.I. Bill while still managing the farm.

Pictured from L-R, Downstown Aero Crop Service co-founder Dick Nixholm, Curt Nixholm, his son, and Dick's fellow co-founder and business partner, Peter Cugino.

In 1953, Dick decided to sell off the cows and dairy business so he could fly full-time, learning how to "crop dust" at the airport, where he met his late business partner Peter Cugino. That was when they purchased the airport and the "crop dusting" business to form Downstown Aero Crop Service in Vineland, New Jersey, where they were partners for over 50 years. As business flourished, Dick managed the aviation and agricultural side of the operation while Pete ran the grounds and aircraft maintenance. Over the years, they operated more than 10 aircraft. Dick loved to meet with farmers to discuss issues with their crops and did so for many years, becoming a self-made expert in vegetable crops. He also mentored many new pilots in agricultural aviation (Dick always disliked the term "crop duster").

Dick accumulated over 20,000 hours of flight time, with 17,000 of those hours "all under 10 feet," as he would call it. From flying Piper Cub Dusters to Stearmans and onto his beloved 450-horsepower Ag-Cat, he always had a love for flying. From fighting wildfires and spraying mosquitos to treating vegetables, cranberries, and blueberries, Dick did it all.

He was the charter president of the Northeast Agricultural Aviation Association, formed in 1966, and was on the original committee that formed the National Agricultural Aviation Association in Washington, D.C. He was also a charter member of the Half-a-Hundred Club, a group that was originally populated with about 50 agricultural aviation operators from across the country.

In 1986, Dick and his business partner Pete were awarded NAAA's William O. Marsh Safety Award, which recognizes achievements in safety and education. Dick was most proud of this award, as he always promoted safe flying in the agricultural aviation industry. His final aerial spray application before his retirement was on Oct. 10, 2005, at the age of 78.

For many years, Dick would spend the winter months at his second home in Jupiter, Florida. He was an avid world traveler who loved to deep sea fish, spend time with his grandchildren, and, most of all, entertain his family and friends, who loved his ability to add humor into any conversation with his quick wit.

Dick was preceded in death by his first wife, Winifred B. Nixholm (nee Becker), baby daughter Beth Ann, baby son Scott, and his second wife, Ruth Nixholm (nee Christman).

He is survived by his son, Curtis Nixholm, and daughter-in-law, Shari Nixholm (nee Masatani), grandchildren Jessica Nixholm, Sean Nixholm and Kylie Nixholm, and favorite grand-dog Quincy the Chiweenie of Pittsgrove, as well as stepdaughter Janis Owens and her husband, Glen, of Pittsgrove, step-granddaughter Shannon Groome and her husband, Jim, great-grandson Avery and his wife Brittany Fralick and son Bryson of Millville, and great-grandson Logan Groome of the U.S. Navy.

In lieu of flowers, the family requests donations in Dick's name to:

National Agricultural Aviation Research and Education Foundation
c/o NAAA
1440 Duke Street
Alexandria, VA 22314

NAAA extends its sincere condolences to Curt Nixholm and his entire family in their time of grief over the passing of family patriarch Dick Nixholm.

NAAA Urges the FAA to Prioritize Safety, Suspend BVLOS Waiver Approvals

On Nov. 25, NAAA submitted a letter to FAA Administrator Billy Nolen registering serious concerns about the sharp uptick in Part 107.31 waivers issued for unmanned aircraft (UA) to operate beyond visual line of sight (BVLOS). Many of these waivers permit BVLOS operations where the remote pilot in command (RPIC) or the visual observer (VO) can monitor the surrounding airspace of the UA in flight but cannot see the UA itself.

In a recent two-month span, from Sept. 1 to Nov. 3, there were 16 such waivers issued, while only 17 were issued the entire year in 2020. This represents a substantial increase in BVLOS waivers without any required detect-and-avoid technology.

In the letter, NAAA asserts that the provisions of these waivers compromise the safety of manned aviation in low-altitude airspace. Put plainly, if an RPIC or VO cannot see the UA due to terrain, structures or general visibility problems, they may not be able to see low-flying agricultural aircraft. Supporting evidence for this was cited from the Mississippi State University's Rasper Flight Research Laboratory, explaining that an agricultural aircraft making application passes and turns (at a combined average of 38 feet AGL) may escape the notice of an RPIC or VO scanning for traffic.

Most of these waivers also include a requirement for high-visibility painting and/or strobes to increase visibility. However, if these measures were adequate, it would not be necessary to issue the waiver in the first place, as the UA could be seen by its own RPIC and/or

VO.

NAAA concluded the letter by reiterating the need to suspend the issuance of Part 107.31 waivers until adequate traffic management systems, such as detect-and-avoid technologies, are developed and approved. Allowing BVLOS operations without these technologies poses a significant safety threat to the agricultural aviation industry and all other manned aviation operating in low-altitude airspace. You can read the full letter [here](#).

EPA Approves Revised Pesticide Applicator Certification Plans for 13 State and Federal Agencies

Late last month, the EPA approved pesticide applicator certification plans for six states, two U.S. territories and five federal agencies. The approved plans comply with the 2017 Certification of Pesticide Applicators (CPA) final rule, which established stronger standards for people who apply restricted-use pesticides (RUPs), including aerial applicators. The rule required that agencies with existing certification plans submit proposed modifications to comply with these new standards. The new standards included the establishment of an aerial application category that would require unique continuing education for that specific form of application.

Existing certification plans for state, territory and tribal authorities will remain in effect until **Nov. 4, 2023**, unless the EPA approved their proposed plan modifications.

The six states and two territories, as well as their respective lead agencies responsible for enforcing pesticide regulations that had their plans approved, are:

- **Alaska** (Alaska Department of Environmental Conservation)
- **California** (California Department of Pesticide Regulation)
- **Nebraska** (Nebraska Department of Agriculture)
- **New York** (New York State Department of Environmental Conservation)
- **Oregon** (Oregon Department of Agriculture)
- **Vermont** (Vermont Agency of Agriculture, Food and Markets)
- **Puerto Rico** (Puerto Rico Department of Agriculture)
- **U.S. Virgin Islands** (U.S. Virgin Islands Department of Planning and Natural Resources)

The five federal agencies that had their plans approved are:

- U.S. Department of Agriculture, Animal and Plant Health Inspection Services, Plant Protection and Quarantine
- U.S. Department of Agriculture, Forest Service
- U.S. Department of Defense
- U.S. Department of Energy; Bonneville Power Administration
- U.S. Department of the Interior, Bureau of Land Management

The EPA has specialized certification requirements for aerial application that include the following:

- A person must be at least 18 years old to qualify as a noncertified applicator using RUPs. (Exception: A person under the supervision of an immediate family member and applying non-commercially must be at least 16 years old.)
- Required pesticide certification at least once every five years through either written exams for each certification or by completing specific training in a continuing education authority for commercial applicators.
- Requires states to adopt Continuing Education Unit (CEU) criteria for the quantity, content and quality assurance of CEUs and verification of completed CEU coursework.
- Allow states to require recertification by exam or completion of CEUs.
- States must require commercial applicators to maintain the following records for a minimum of two years: Current law mandates that state plans include requirements for certified commercial applicators to maintain operational records with the following information for at least two years: the name and address of the person for whom the pesticide was applied; the location of the pesticide application; the size of the area treated; site to which RUP was applied; time and date of application; product name and EPA registration number of RUP applied; the total amount of the pesticide applied; the name and certification number of the certified applicator that made or supervised the application, and if applicable, the name of any noncertified applicator(s) that made the application under the direct supervision of the certified applicator.
- Requires state certification plans to specify whether and under which circumstances the state would certify applicators based on the applicator having been certified by another state.
- Defines “use” as in “to use a pesticide” to include any pre-application activities (including arranging for application, and mixing and loading), applying the pesticide or supervising use by a noncertified applicator, transporting or storing pesticide containers that have been opened, cleaning equipment, disposing of excess pesticides, spray mix, equipment wash waters, pesticide containers, and other pesticide-containing materials.
- Certification exams for aerial applicators must test knowledge of the following areas:
 - **Labeling** – Label requirements specific to aerial application, including:
 - Spray volumes.
 - Buffers and no-spray zones.
 - Weather conditions specific to wind and inversions.
 - **Application equipment** – Understanding of how to choose and maintain aerial application equipment, including:
 - The importance of inspecting equipment prior to use.
 - Selecting the proper nozzles.
 - Knowledge of the components of an aerial application system, including hoppers, tanks, pumps and nozzles.
 - Interpreting a nozzle flow rate chart.

- Determining the number of nozzles for intended pesticide output using nozzle flow rate chart, aircraft speed and swath width.
- How to ensure nozzles are placed to compensate for uneven dispersal due to uneven airflow from wingtip vortices, helicopter rotor turbulence and aircraft propeller turbulence.
- Where to place nozzles to produce the appropriate droplet size.
- How to maintain the application system.
- How to calculate the required and actual flow rates.
- How to verify flow rate using fixed timing, open timing, known distance or a flow meter.
- When to adjust and calibrate equipment.
- **Application considerations** – The applicator must demonstrate knowledge of factors to consider before and during application, including all the following:
 - Weather conditions that could impact application by affecting aircraft engine power, takeoff distance and climb rate or by promoting spray droplet evaporation.
 - How to determine wind velocity, direction and air density at the application site.
 - The potential impact of thermals and temperature inversions on aerial pesticide application.
- **Minimizing drift** – The applicator must demonstrate knowledge of factors to consider before and during application, including all of the following:
 - How to determine drift potential using a smoke generator.
 - How to evaluate vertical and horizontal smoke plumes to assess wind direction, speed and concentration.
 - Selecting techniques that minimize pesticide movement out of the area to be treated.
 - Documenting special equipment configurations or flight patterns used to reduce off-target pesticide drift.
- **Performing aerial application** – The applicator must demonstrate competency in performing an aerial pesticide application, including all the following:
 - Selecting a flight altitude that minimizes streaking and off-target drift.
 - Choosing a flight pattern that ensures applicator and bystander safety and proper application.
 - The importance of engaging and disengaging spray precisely when entering and exiting a predetermined swath pattern.
 - Tools available to mark swaths such as GPS and flags.
 - Recordkeeping requirements for aerial pesticide applicators, including application conditions if applicable.

FAA Proposes AD for Tail Rotor Drive on Bell 206 Model Helicopters

The FAA proposes to adopt a new airworthiness directive (AD) for all Bell Textron Canada Limited Model 206A, 206A-1 (OH-58A), 206B, 206B-1, 206L, 206L-1, 206L-3 and 206L-4 helicopters. This proposed AD was prompted by a loss of tail rotor drive due to a failure of an adhesively bonded joint between an adapter and a tube on one of the segmented tail rotor drive shaft (TRDS) assemblies.

This proposed AD would require the following:

- Determining if an affected TRDS is installed.
- Repetitively inspecting the bond line for damage.
- Repetitively performing a proof load test of the TRDS assembly.
- Depending on the results of the inspections or proof load tests, removing an affected TRDS from service.

Read the complete proposal [here](#). The FAA is accepting comments on the proposed AD until Jan. 12, 2023. To comment, follow the directions listed in the proposed AD.

Two ADs Affecting Bell 206 Model Helicopters

The FAA has issued the following two airworthiness directives for Bell 206 helicopters:

Main Rotor Blade Delamination: The FAA is adopting a new airworthiness directive (AD) for Bell Textron Canada Limited Model 206L, 206L-1, 206L-3 and 206L-4 helicopters with a certain part-numbered main rotor (M/R) blade installed under Supplemental Type Certificate SR02684LA. This AD was prompted by delamination of M/R blades. This AD requires a repetitive inspection for delamination and, depending on the results, removing the M/R blade from service and reporting certain information.

This AD requires action before the M/R blade accumulates 400 total hours time-in-service or 2,400 engine starts since initial installation on any helicopter or within 100 hours TIS after the effective date of this AD, which is Dec. 23, 2022. The complete AD may be viewed [here](#).

Tail Rotor Drive Shaft Thomas Coupler: The FAA is superseding airworthiness directive (AD) 2021-26-08, which applied to certain Bell Textron Canada Limited Model 206, 206A, 206A-1, 206B, 206B-1, 206L, 206L-1, 206L-3 and 206L-4 helicopters. AD 2021-26-08 required removing certain nuts from service, installing newly designed nuts, and applying a specific torque and a torque stripe to each newly installed nut. Since it issued AD 2021-26-08, the FAA determined certain torque values and part numbers need to be revised.

The new AD, 2022-20-04, has an effective date of Dec. 23, 2022. You may view this new AD and the changes made [here](#).

Renew Your Membership for 2023: We're Better Together!

Thank you for your support of NAAA as a 2022 member. NAAA delivers remarkable value that benefits your bottom line, provides the crop input tools you need, enhances the industry's safety and professionalism through substantive educational programming and offers

excellent business networking opportunities. Please [renew your NAAA membership](#) for 2023. Watch our new video below, where you'll hear from your fellow members why membership is essential to your business.

NAAA continues to passionately advocate on behalf of ag aviation and raise awareness about its benefits to the public and national policymakers, which we capitalized on across policy and all media channels during the [100th anniversary](#) of the industry.

This positive coverage of the industry and its importance to global food, fiber and bioenergy production comes at a crucial time as NAAA fights to preserve the aerial use of pesticides that are being targeted for cancellation or unnecessary and burdensome restrictions under current EPA leadership. It takes your membership resources to save these aerial uses and positively represent the industry before the public.

As the industry moves into its second century, NAAA and NAAREF have developed a way to augment industry advancement of safety and application accuracy while showing your customers, regulators, insurers, pesticide manufacturers, and the public the professional nature of the industry. Our new [Certified-Professional Aerial Applicator Safety Steward \(C-PAASS\)](#) program, launching in 2023, will fill that very role for those that want to participate. We know education works to reduce accidents and drift occurrences based on PAASS program stats. Since the first PAASS season in 1998-1999, the ag aviation accident rate (number of accidents per 100,000 hours flown) has dropped nearly 26%, and the fatal accident rate has fallen 10%.

The impetus for developing C-PAASS was to expand and gain recognition for maximizing professionalism by ultimately receiving additional benefits for being certified, such as insurance discounts and more flexibility pertaining to pesticide label language and for ag pilots to market to their customers that they have undergone additional training and development to best ensure that they can provide high-quality service.

Please make it a priority to [renew your NAAA membership](#)—the payoff far exceeds what you will spend in dues in the form of effective advocacy that reduces regulation and taxes affecting your aerial application business. Trade association membership dues are tax deductible.

[NAAA Releases Book of the Century! Buy It Today](#)

NAAA has released the book of the century—a century of agricultural aviation, that is.

One hundred years ago, an aerial crop dusting experiment spawned the birth of the agricultural aviation industry. To commemorate agricultural aviation's 100th anniversary, NAAA is pleased to present [Agriculture's Air Force: 100 Years of Aerial Application](#).

Agriculture's Air Force provides a new, updated account of aerial application's history, 35 years after Mabry Anderson's masterpiece, *Low & Slow: An Insider's History of Agricultural Aviation*, was published. NAAA's meticulously sourced book is based on a collective history of the agricultural aviation industry based on material from *Agricultural Aviation* magazine, *AgAir Update*, *Low & Slow* and other resources.

Beginning with [Agricultural Aviation's Spring 2021 issue](#), NAAA published excerpts from *Agriculture's Air Force* and continued to do so through the [Fall 2021 issue](#). Those stories are just a small slice of what's in the 268-page hardback edition, however. The complete book contains so much more.

Agriculture's Air Force delves into the intersection of agriculture and aviation. It chronicles the agricultural aviation industry's growth from its infancy in 1921 through the boom times after World War II and on to today's modern era of high-tech aerial application.

The finished hardback book has been years in the making but well worth the effort. "This is a significant piece of work covering not just the industry's history, but its essence," NAAA CEO Andrew Moore said. "We are proud of it and believe it will make a lasting contribution to the industry."

The story of agricultural aviation is much like the broader story of aviation: It is mostly punctuated with interesting smaller moments sandwiched between milestone developments. Aerial application is also the story of technological leaps and bounds.

Agriculture's Air Force covers five eras spanning more than 10 decades. In addition, it features 34 Spotlight pieces focused on significant individuals, organizations, trends, technologies and topics related to aerial application.

Agriculture's Air Force: 100 Years of Aerial Application may well be NAAA's most enduring 100th anniversary initiative. One thing's for sure: It is no textbook. The commemorative book is written from a fresh perspective that is entertaining and enlightening. Readers will come away with a new appreciation for agricultural aviation as a profession and the dedicated individuals who propel it forward.

Order Your Copy of Agriculture's Air Force Today!

Agriculture's Air Force retails for \$45, excluding shipping. Order it from [AgAir Update's Online Store](#).