Agricultural Aviation

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Cover image courtesy of Walt Disney Studios Motion Pictures

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Agricultural Aviation is the Official Publication of The National Agricultural Aviation Association

President's Message

Dana Ness

Much to Look Forward to This Summer

The weather appears to be changing for the better in some parts of the country stricken by drought last year, although it has delayed planting for many weeks in some locations. The drought had expanded far east of the Mississippi River last year. For the time being, the Midwest and Southeast appear to be back on track in terms of moisture. Unfortunately, the same cannot be said for the Southwest which still appears drought-stricken. We look forward to the return of the busy season for many applicators. The "corn run" is anticipated to be back at full strength, although it might be a few weeks later in some places.

I would encourage ALL pilots and operators to review what they learned this past offseason from the PAASS Program and take the time to think about what each and every one of us can do to ensure safety for our personnel and our industry. As we all get deeper into our seasons we need to think about the effects of the long hours of flying and working that we are subjecting our people and ourselves to. The hot temperatures also factor into reducing the performance of not only our aircraft but of our own bodies and minds. Don't be afraid to take a little extra time to make sure that everything is fine before proceeding lest we make costly errors in judgment.

Meanwhile, Back at NAAA…

I would like to let everyone involved in agricultural aviation know exactly how much work NAAA as an association does for all of us in the industry, whether you are a member or not. The highly qualified staff of NAAA is constantly busy working on issues surrounding the industry. They work closely with federal regulatory agencies, members of Congress and their staffers, state regulatory bodies, media outlets and a myriad of aviation and farm organizations to promote and advance agricultural aviation. I have the great pleasure of working closely with NAAA's staff, seeing and hearing on an almost daily basis what a valuable role they play. They meet with all of the above mentioned groups regularly not only to educate and advance the industry, but also to form those personal relationships that help make NAAA the premier organization it has become.

One of the most important issues for this year is passage of a good sound farm bill, and hopefully included in that will be language eliminating the NPDES permit for aquatic application of pesticides. This will be no small task with the gridlock that remains inside of the beltway.

Another activity the Association has been active in is working with Walt Disney Studios ahead of the release of the animated comedy adventure *Planes*, a spinoff of the wildly popular kids' movie *Cars*, featuring a crop duster named Dusty as the main character. Jay Calleja, NAAA's manager of communications, and I had the opportunity to get a first look at the film, to ensure that it was not going to paint the industry in a negative light. We found it to be quite the opposite, in fact. *Planes* opens in theaters across the country Aug. 9. Circle the date and see it with your family. I don't think you will be disappointed.

I would like to remind you to please renew your NAAA membership for 2013 if you have not already done so. I firmly believe the industry would be greatly diminished if we did not have this association in place doing the fine work it does for the entire industry, member or not. Membership will also provide you a great discount to a super convention that we have in store in Reno in a few months. You can read more about this on pg. 22. So please, when you get a chance, either renew your membership or if you are not currently a member please join. The only voice in the industry representing us nationally is NAAA, and without your membership, you have no voice.

Fly safe, operate safe and remember, "Upon the performance of each rests the fate of all"! ■

Executive Director's Message

Andrew Moore

Straight Talk

It's what consumers want when it comes to hearing about American agriculture, so let's take the gloves off and tell them what we do and the care we take to do it!

I recently attended an event hosted by the U.S. Farmers & Ranchers Alliance (USFRA)[1] that presented some very interesting information it had collected on consumer beliefs, especially in regards to their thoughts and feelings about agricultural production in the country today.[2] First, before getting into their thoughts about agriculture, it might be a safe bet to say that the average consumer is generally pretty skeptical. According to the USFRA survey, only 38 percent trust the government and only 33 percent say the media gets its facts straight.

Unfortunately, this consumer incredulity trickles through to their thoughts about agricultural production, where 49 percent of consumers say American agriculture is on the wrong track. The old message of our food supply being safe, affordable and abundant is now being suspiciously received. According to the USFRA's findings, when agriculture uses the word "safe" the consumer hears "they are tampering with nature"; when they hear us use "affordable" the consumer hears "they are cutting corners to make more profit"; and when they hear the term "abundant" the consumer hears "too much is being produced leading to obesity, diabetes and other negative health effects."

Now for the good news. There is a way that we can be more effective in gaining the trust of the average consumer about agricultural production and aerial application. The USFRA survey indicates that consumers think positively about those in agriculture when they hear a commitment from us to do better—to be more precise in how we do our job. In fact, when consumers hear this it is received with a 70 percent approval rating. This jumps to an 84 percent approval rating when agricultural production is transparent about what it does, such as adding webcams at its facilities.

In addition to NAAA's public relations tools, SafeFruitsandVeggies.com and the U.S. Farmers & Ranchers Alliance (www.fooddialogues.com) are two more resources you can refer to for guidance on communicating credibly with the public.

Now I'm not necessarily advocating that you bolt a camera at your mixing-loading site or underneath your aircraft and connect it to the web for a live video feed; however, I do think we can freely state exactly what we do and how we do it and not be afraid of doing so. One poignant comment from a particular consumer was, "If [agricultural production] is not so harmful, why don't [they] just tell us about it?" Why not, indeed? We have a great story to tell. Aerial applicators are some of the most talented pilots in aviation. We embrace technology to ensure precision. The products we use are some of the most heavily regulated across all industries.

1 The U.S. Farmers & Ranchers Alliance (USFRA) consists of multiple farmer and rancher-led organizations and agricultural partners representing virtually all aspects of agriculture. The organization is working to engage in dialogues with consumers about how today's food is grown and raised. USFRA is committed to continuous improvement and supporting U.S. farmers' and ranchers' efforts to increase confidence and trust in today's agriculture (*www.fooddialogues.com*).

2 *www.fooddialogues.com/resources/ag-day-2013/agday-2013-usfra-session.mp3*

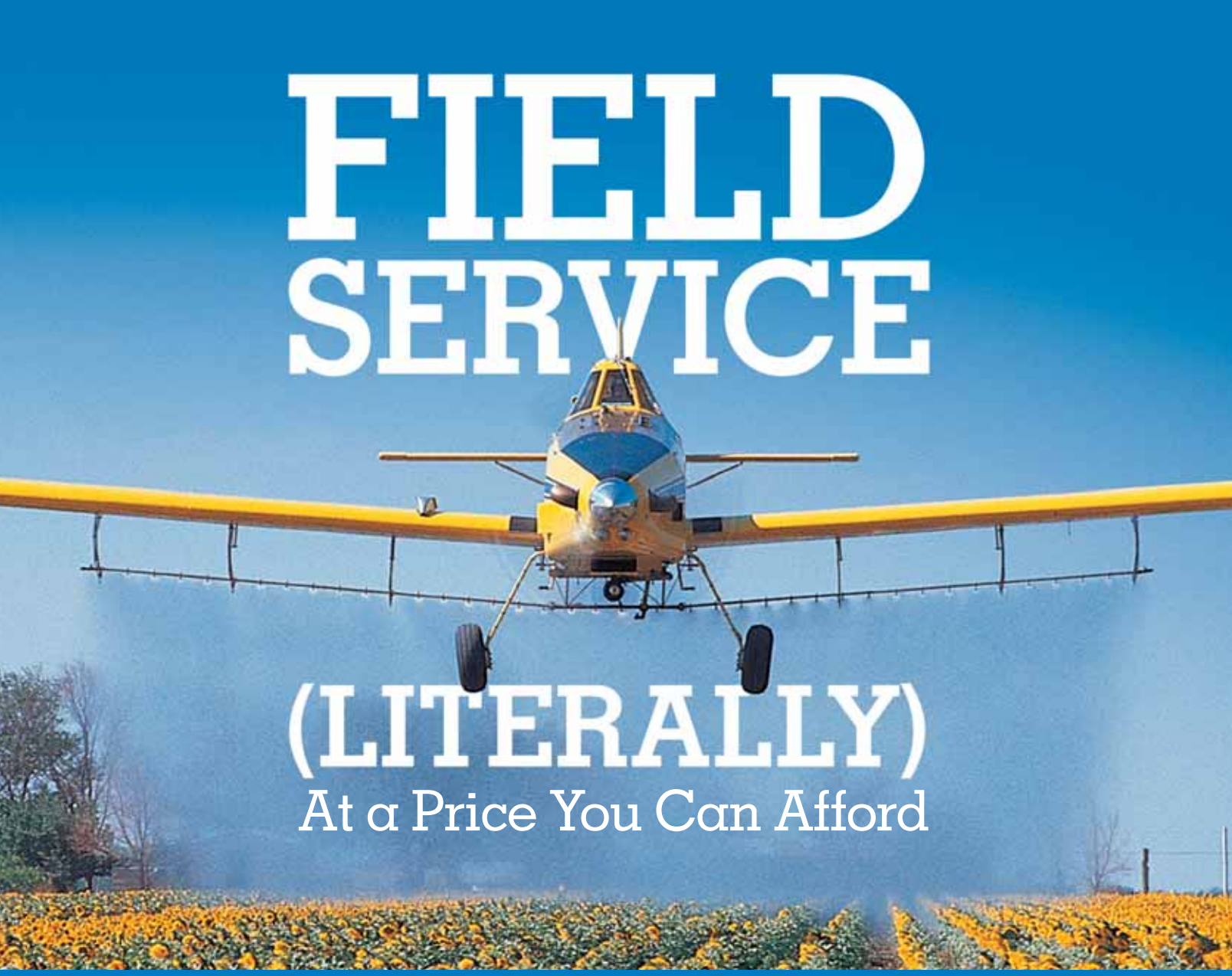
It's alright if consumers are skeptical and ask pointed questions. We are those same consumers asking those same tough questions when it comes to deciding which loader truck to buy, or which political candidate to vote for. When a consumer or client asks a question it can be a good sign because it means their mind isn't made up. So if someone asks you if the products you use are safe, you can respond, "Yes, pesticides when used according to the label are safe. For example, a man could consume 133,951 servings of celery in one day without any effect even if the celery servings have the highest pesticide residue recorded for celery by USDA." (See residue calculator at *www.safefruitsandveggies.com*.) Or if someone shares with you a concern they have about the effects of pesticides in the environment, you can respond, "Yes, this is my concern too and why I, as an aerial applicator, am constantly striving to do better because if the land isn't healthy I don't have a job. This is why my ag aircraft is equipped with GPS so we don't overspray product; and we precisely configure our booms, and use sophisticated nozzles, and smokers (or AIMMS[3]) to know which way the air is moving to ensure an accurate application."

3 Aircraft Integrated Meteorological Measurement System

There are many significant tools, events and projects underway that could positively affect aerial application's and agricultural production's image. One is this USFRA survey. It helps us to diagnose the problem and tells us what we need to do to remedy it. NAAA's Media Relations Kit—available to members in hardcopy form or on NAAA's website[4]—provides us with talking points to use with an inquiring public about what we are doing to apply more precisely and be improved stewards of the environment. Also, on pg. 25 of this issue you will find details about our upcoming convention's general session in Reno this December, which will focus on how to tell our important story effectively to the public. Key projects underway that appear as if they will benefit agriculture include the announcement that Oscar-winning and two-time Emmy-winning filmmaker James Moll will produce a feature-length documentary about the next generation of American farmers and ranchers and look into the latest farming procedures, practices and technologies that are changing and improving the landscape of modern agriculture. Moll received an Academy Award for directing and editing the feature documentary *The Last Days*, executive produced by Steven Spielberg, which tells the story of Jewish Hungarians, now U.S. citizens that were persecuted by the Nazis during World War II.

Last but not least is the subject of our cover story. On Aug. 9 Disney will release the animated film *Planes*. The protagonist of the film is Dusty the spray plane—an industrious, principled and ambitious aircraft. We've seen the film and believe it is a positive portrayal of our industry. It is the best mass media project that's come along to positively portray our industry in a long while. Now it's up to us to listen to what the public wants and give them the straight talk they want to hear. We have a good story to tell. Let's seize this opportunity. ■

4 *www.agaviation.org/content/naaa-media-relations-kit*



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WNAAA President's Message

Dona Jorden

The Ebb and Flow of Ag Aviation

Many types of business are cyclical, none more so than agricultural aviation. Not only is our industry subject to the rhythm of growing seasons, but to other variables such as annual rain patterns, commodity markets and technological change in relation to genetically modified crops, just to name a few.

Most of the people I have met during my career in support of agricultural aircraft operators are able to maintain a positive outlook in spite of the economic ebb and flow of the business. Everyone has a "run" or two in the memory banks to keep their hopes up. If it would just rain, or if the price of corn or cotton would go up…

The key is to maintain your business and equipment in good operational order so as to be able to take advantage of positive developments when they occur, and to maintain value in your investment for sale or retirement when the time comes.

Last year, 80 percent of the land in the United States was affected by the drought. This winter has given little relief in drought-stricken areas, and experts report that drought is intensifying in the grain belt with 70 percent of the United States currently in some stage of drought conditions. As we say in Texas, "This is not our first rodeo!"

The worst droughts in the history of the United States occurred during the 1930s Dust Bowl era and the period from 1950–1956. From this experience, farmers learned new techniques in cultivating crops while saving the soil. These were hard times for agriculture, but many astute agribusiness people survived. Predominately these were the folks who strengthened the staying power of their business during good times in order to ensure their survival during downturns.

How does the ag aviation business owner get through the hard times with little stress and worry? I asked some successful ag operators this question.

So what does Mother Nature have in store for us next? No one knows the answer to this question; we can only speculate. With speculation comes stress and worry. So how does the ag aviation business owner get through the hard times with little stress and worry? I asked some successful ag operators this question. The consensus was, by being prepared to go with the ebb and flow and knowing the culture of the business.

These are a few tips I was given to help survive in difficult times.

1. **Make sure to take care of your valued employees.** They are a valuable asset and essential to the success of a business. If you have to restructure your business somewhat in order to keep those employees, it will save you time and money in training new employees when things turn around.
2. **Maintain all your equipment and keep it in good working condition.** This will give you a solid operational capability when the recovery occurs. If it does not, and you need to liquidate your assets, you will get top dollar for your equipment.
3. **Protect your financial situation when times are good.** Make good investment decisions and be conservative with your good fortune.
4. **Be consistent in your business practices.** Be fair and honest with your customers and let them know they can trust you and that you will do the best job for them.
5. **Protect the integrity of your business.** This is essential to the success of the ag aviation business owner.
6. **Understand the risks and the rewards.** Sometimes we have to take a financial risk in order to gain the rewards of success.
7. **Keep your personal stress in check with your family.** Be patient and listen. Don't lash out in haste. Your family is your support group.

As we go about our daily business, remember we will have good times and bad times. The history of ag aviation will show there will always be good years and bad years; just ask those who have been there and survived it all. They know the ebb and flow of the ag aviation business. ■

Washington Report

By Danna Kelemen

Compliant vs. Complacent: The Importance of Safety and Risk Management in Your Aerial Application Business

The catastrophic explosion at the West, Texas, fertilizer plant on April 17 has speculation swirling in Washington and across the country about what might or might not have occurred. Regardless of where the blame lies, the one thing we can take away from the tragedy is that accidents can and do happen—often when least expected. Sometimes accidents are simply an unfortunate chain of events, but many times they are preventable. The choice we make in business is whether to be proactive or reactive in how we prepare for the likelihood of an accident—do we have all the appropriate safeguards in place, and are we compliant with the regulations and standards governing our business? In the aerial application industry, these regulations can be complicated, burdensome and downright confusing. It's good to know there are resources available to help you be compliant rather than complacent in preventing a tragedy like the West fertilizer plant explosion from occurring at your facility.

In a unique opportunity several NAAA staff members recently had the chance to take part in an agricultural retail tour. The Asmark Institute's Retail Live! Tour gave NAAA Executive Director Andrew Moore, Manager of Communications Jay Calleja and Manager of Government and Public Relations Danna Kelemen the chance to see a different side of the agricultural industry from an ag retailer's perspective. Among the many things learned during our abbreviated tour of the South and Midwest, perhaps the most poignant was the realization that no matter the size, the facet or location of a business in the agricultural industry, the focus remains on doing what is "right"—whether that be in the field, in the shop, in the air or in the office. We invite you to keep reading for a rundown of what we saw and experienced on our whirlwind agricultural retail tour and how the many regulations we learned more about may translate into helping you stay safe and compliant in your agricultural aviation business.

The Asmark Institute

Established in 1990, the Asmark Institute is a national resource center providing risk management services and products to the agricultural retail industry. Their mission is to imagine, solve, build, collaborate and lead on behalf of the ag retail industry, and in doing so invited representatives from the Agricultural Retailers Association, the Fertilizer Institute, CropLife America, CropLife Foundation, CropLife Media Group, the Ohio AgriBusiness Association and NAAA to experience a "day in the life" of an agricultural retailer. Little did the group know that a typical day for any one such retailer—whether it be a family-owned multi-generational business, a small or large independent retailer or a farmer cooperative—entails a multi-faceted approach to business that encompasses being an agronomist, safety and risk management specialist, advisor and trusted friend to the communities in which they live and work. The Asmark tour included all aspects of the diverse and varying ag retail industry including visits to NAAA members Scott Schertz and Rick Reed's aerial application businesses, safety demonstrations, visits to a variety of ag retail businesses, and regulatory and emergency response training.

As a not-for-profit educational organization, Asmark occupies a distinct niche in the industry—enabling them to address regulatory requirements on an individual basis in an effort to develop state-of-the-art solutions. To say it is a one-stop shop for compliance services for agribusinesses is an understatement. Asmark offers a plethora of regulatory compliance tools—far too many to detail, but just a few to mention include risk management planning services, one-of-a-kind training courses, Spill Prevention, Control & Countermeasures (SPCC) and Chemical Facility Anti-Terrorism Standards (CFATS) guidance assistance. What began as a home-based consulting business now consists of 24 employees who have trained more than 1.8 million people and

serve retail agribusinesses, state and national trade associations, educational institutions and government agencies. According to Allen Summers, Asmark Institute Founder, President and Tour Guide Extraordinaire, "Everything we've done is because it's something people needed."

Regulatory Compliance

In an industry beholden to numerous rules and regulations, aerial application is governed predominately by regulations stemming from multiple agencies, including the Federal Aviation Administration (FAA), the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the Federal Motor Carrier Safety Administration (FMCSA), the Department of Transportation (DOT) and the Department of Homeland Security (DHS). While the FAA regulations deal primarily with the safety aspects of the ag aircraft and its flight use, the other side of agricultural aviation deals with the pesticides applied to crops and the methods by which these crop protection products are stored, delivered and applied, including emergency planning, worker protection standards, transporting of pesticides and the filing of lengthy and laborious reports.

With the overall mission of protecting human health and the environment, the scope of the EPA is broad and far-reaching. Two of the Agency's goals focus specifically on protecting America's waters and ensuring the safety of chemicals and preventing pollution, thereby directly impacting aerial applicators. While NAAA advocates on behalf of the industry at the federal level to prevent burdensome rules and aims to keep members up to date on the latest regulations governing ag aviation, you may be surprised to learn that several of the following regulations may be instrumental, as well as required for your aerial application operation by not only EPA, but also OSHA, FMCSA, DOT and DHS in risk management planning and accident prevention. Some regulations discussed hereafter you may be very familiar with, while others not as intimately. Whatever your comfort level, NAAA hopes the following information provides some food for thought as to being safe and compliant at your ag aviation facility.

Photo by Michael Kennedy

Clockwise from top left: The Asmark staff who participated in and led the Ag Retail Live! Tour (Back: Allen Summers, Megan Hill, Nick Clements, Front: Jessica Shely, Melissa Roby, Amber Duke and Donna Jones); Jerry Mattingly, Helena Chemical Company, explains a mini-bulk label; NAAA Operator Scott Schertz prepares for an aerial application demonstration at his operation in Hudson, Ill.; and Ag Retail Live! Tour participants at the Layco/Yargus Manufacturing facility in Marshall, Ill.

The SARA (Superfunds Amendment and Reauthorization Act) Title III – Tier II Report is mandated under Section 312 of the Emergency Planning and Community Right-To-Know Act (EPCRA). Tier II forms under SARA document facilities with hazardous chemicals housed on site above certain thresholds regarding the types, quantities and locations of such deemed chemicals. Relevant examples for ag aviation include diesel fuel, Jet A, methomyl and chlorpyrifos. And while Tier II reporting is federally mandated, reporting is done on the state and local level. To ensure full compliance NAAA recommends you check the reporting requirements and procedures for your state. The Tier II Reports must be submitted annually to local fire departments, Local Emergency Planning Committees (LEPC) and State Emergency Response Commissions (SERCs) to help those agencies plan for and respond to chemical emergencies. Many aerial application businesses do store chemicals qualified as "hazardous" and therefore would be required to file the necessary paperwork each year by March 1. Penalties for violations can reach up to $27,500 for each violation and multiply on a daily basis, so NAAA urges members to check the reporting obligations for your state (*www.epa.gov/osweroe1/content/epcra/statetier2.htm*), as well as EPA's List of Lists (*www.epa.gov/emergencies/docs/chem/list_of_lists.pdf*) to determine the thresholds for the chemicals regarded as "hazardous."

If you do indeed store chemicals such as anhydrous ammonia, aqua ammonia or nitric acid, some of which may be found

on EPA's List of Lists, you may also be subject to submitting a Risk Management Plan (RMP). Under the Clean Air Act Amendments of 1990, Section 112r required EPA to publish regulations and guidance for chemical accident prevention at facilities using substances that posed the greatest risk of harm from accidental releases. This Agency regulation requires companies that use certain regulated flammable and toxic substances to develop an RMP "on or before" a regulated substance is stored at a facility. The list of chemicals included can be found at *www.gpo.gov/fdsys/pkg/CFR-2011-title40-vol15/xml/CFR-2011-title40-vol15-sec68-130.xml* and the RMP is designed to provide "worst case" scenario planning and help local fire, police and emergency response personnel who must prepare for and respond to chemical accidents. More information about whether you may need to develop and submit an RMP and how to do so can be found at *www.epa.gov/emergencies/content/rmp/index.htm*.

Working in tandem with the Emergency Planning and Community Right-To-Know Act (EPCRA), OSHA issued a requirement for certain facilities to develop an Emergency Response Plan and an Emergency Action Plan. The Hazardous Waste Operations and Emergency Response (HAZWOPER) rule requires a facility that has personnel who would be expected to respond to the uncontrolled release of a hazardous substance to be trained to the proper level. An Emergency Action Plan is a written plan only required of facilities with more than 10 employees. More information on both types of emergency planning standards can be found at *www.osha.gov/Publications/osha3122.pdf*. In addition to emergency response and action, OSHA also requires employers to perform a written assessment of the workplace to determine if any hazards exist that would necessitate the use of personal protection equipment (PPE). Any use of PPE would likely be in conjunction with other worker protection standards (WPS) already in place and likely being practiced by aerial applicators. Unfortunately, EPA associates more occupational risks to aerial mixer-loaders (and ag pilots) because the Agency assumes that as a result of an ag aircraft applying more product daily than a ground rig, the mixer-loader for that plane (and pilot) is exposed to more product, hence, is more at risk.

It is imperative aerial applicators keep in mind the regulations dealing with pesticide containers and containment with regard to their impact on human health and the environment. The regulations have implications for the agricultural aviation industry because commercial applicators with containers and dispensing areas for agricultural pesticides must comply. The Pesticide Container and Containment (PCC) regulations are mandatory for facilities that handle agricultural pesticides, custom blenders of pesticides, retailers that refill containers and commercial applicators. NAAA encourages members to visit the EPA's container and containment website, *www.epa.gov/pesticides/regulating/containers.htm*, to gain more extensive information and updates and ensure you are in compliance with this important rule. As most aerial applicators are aware, alongside the PCC rule, EPA's Spill Prevention, Control and Countermeasure (SPCC) Plans are critical in establishing security and environmental tactics for preventing oil discharges (water runoff) from reaching navigable waters of the U.S. or adjoining shorelines. As an agricultural aircraft owner and operator, there are three criteria you need to consider when determining if an SPCC Plan is necessary for your operation: (1) does your facility store more than 1,320 gallons of bulk oil above ground, (2) do you store oil in 55-gallon or larger containers, and (3) is there a "reasonable expectation of an oil discharge" to water? If you store less than 1,320 gallons of oil, you are not required to prepare an SPCC Plan. In addition to the resources and information found on the NAAA website (*www.agaviation.org/content/spill-prevention-control-and-countermeasures-spcc*), you should visit *www.epa.gov/oem/content/spcc/* to ensure compliance for your facility under the SPCC Rule.

Chemical security is understandably one of the biggest challenges and threats to risk management. Within ag aviation the Chemical Facility Anti-Terrorism Standards (CFATS) imposed by the Department of Homeland Security (DHS) can be confusing, as oftentimes aerial applicators are only in possession of regulated chemicals for a very short period of time. Nonetheless, staying in compliance with CFATS is crucial and can fall under differing categories. If it is determined a facility possesses or plans to possess any




Photo by Michael Kennedy

From left to right: Dr. Bob Wolf explains his interactive training aid used for the BASF On Target Application Academy; Aerial view of a Crop Production Services facility; Schertz performing a mock aerial application treatment with water; NAAA staff pose with NAAA Operator Rick Reed (second from left) at his operation in Mattoon, Ill.; a diked and sloped loading pad at an ag retail facility allows employees to safely rinse chemical residues into an underground holding tank; and Reed explains the features of an ag plane.

of the chemicals listed in Appendix A: DHS Chemicals of Interest (COI) list, at or above the screening threshold quantity (STQ), the facility must register with the DHS and conduct a "Top-Screen" analysis. Only "high risk" chemical facilities notified in writing by DHS are required to complete and submit the Chemical Security Assessment Tool's (CSAT) Security Vulnerability Assessment (SVA) to the department. Facilities that receive such a letter are initially considered high risk and preliminarily assigned to Tier 1, 2, 3 or 4 based on an analysis of the Top-Screen questionnaire they submitted. Depending on which of four risk-based tiers a facility falls in, it will have to meet different standards of performance. NAAA urges members to visit the DHS website (*www.dhs.gov/chemical-facility-anti-terrorism-standards*) for the Chemical of Interest (COI) list and more information on meeting the CFATS standards.

Last, but not least, a discussion regarding accident prevention in the workplace would not be complete without touching on the FMCSA's commercial driver's license (CDL) requirements. NAAA formally petitioned the FMCSA requesting CDL vehicle drivers working with agricultural aircraft operators be exempt from the CDL knowledge and skills tests and be eligible to receive a restricted CDL. NAAA further requested an exemption to the restricted CDL requirements to allow these drivers to transport fuels used to power agricultural aircraft engines if transported in quantities of 1,000 gallons or less. Unfortunately both requests were denied by the FMCSA; however, NAAA did receive confirmation from a DOT representative that a CDL is not required for a driver transporting a tank or non-interconnected tanks of aviation turbine engine fuel (Jet A) (a combustible liquid) with a capacity of 119 gallons or less as long as the vehicle's total weight is less than 26,000 lbs. In addition, according to the DOT, non-interconnected tanks of 119 gallons or less filled with Jet A are not required to be placarded.

Compliance Assistance

As an industry comprised of primarily small businesses, it can undoubtedly be overwhelming to consider the multitude of regulations promulgated by the federal government that could potentially impact your business. NAAA certainly works tirelessly on your behalf to advocate and support the interests of aerial application, but it is beneficial to know there are organizations, like the Asmark Institute, that do exist to support safety and risk management compliance activities as well. Certain Asmark services are available to aerial applicators for free such as their SPCC and RMP compliance guides. Labor law posters and emergency signs are available at cost. One of Asmark's premier programs—their Lighthouse package of services—offers the broadest selection of regulatory assistance and the highest level of personal service available in the United States. These services can be made available to aerial application operations that belong to state and/or regional agricultural retailer associations. Some of the other compliance tools the Asmark Institute offers may be made available on an a la carte basis to aerial application operations. For more information visit: https://www.asmark.org/.

Regardless of if you need compliance assistance or where you turn to for that assistance, it is essential for your business, your employees and the industry that you don't become complacent with regard to safety and risk management. Being compliant with the regulations and standards governing aerial application is simply yet another manner by which we demonstrate the professional operating standards that make our industry so highly regarded and a vital part in producing a safe, affordable and abundant supply of food, fiber and biofuel. NAAA is here to serve you and urges you to visit the policy section of NAAA's website, www.agaviation.org, for more information on many of the aforementioned regulations. ■

Aerial Application's New Leading 'Man'

By Jay Calleja
Manager of Communications

A behind-the-scenes look at the making of Disney's *Planes*, starring Dusty Crophopper

Four years ago a trio of self-described aviation buffs holed themselves up in a room and began dreaming up ideas for a story about airplanes. They weren't just any aviation enthusiasts, however. The creative team behind *Cars*, the hit film from Pixar Animation Studios and Walt Disney Pictures, had their sights set on creating an aviation-themed spinoff above the world of *Cars*.

SO BAD HE'S GOOD *Say, what's that on Dusty's nose? Contrary to what you may think, it's not a skull and crossbones. The Piston and Cross-Wrenches insignia is actually a badge of honor from his mentor, Skipper Riley, symbolizing the rarified air Dusty has entered. The name derives from the Jolly Wrenches, an esteemed squadron the old Navy Corsair commanded during his military days.*

Courtesy of Disney

Skipper Riley is an old Navy Corsair who reluctantly agrees to train Dusty Crophopper for the qualifier and subsequent race around the world he enters. (The skull and crossbones on the building behind Skipper, which are actually a piston and crossed wrenches, are explained on the previous page.)

Shortly after the creative session got underway, executive producer John Lasseter, director Klay Hall and screenwriter Jeffrey Howard were casting about for the aerial equivalent to Lightning McQueen, the lead in *Cars* and *Cars 2,* to compete in a race around the world. Improbably, they seized upon the idea of a crop duster as the main character for precisely that reason, the improbability of an ag plane competing in a world-class air race. Suddenly, a wave of ideas poured out with the intensity of an aerial water drop.

"Let's make a movie about a crop duster who's going to enter this race around the world!" someone suggested. "There's going to be a lot of fish out of water stuff! What's it going to be like for a little plane like that to fly into big airports? To fly across water and go to places he's never been?" "Wait, wouldn't it be cool if he ends up on an aircraft carrier and meets some fighter planes?!!"

"A lot of the details you see in the movie are things that came out of that first day and that first basic notion," Howard said. "Then the more that we started to research the history of aerial application and talk to different people who do it, and even talk to other pilots who don't do it, we discovered that it actually fit really well for what we wanted to do with the story."

The project has been in development since 2009. Four years later, the aerial application industry has good reason to look forward to Disney's *Planes*, which opens Aug. 9 in theaters across the country. The animated comedy adventure stars Dusty Crophopper, an ag plane voiced by comedian Dane Cook, and a cast of aviation characters, including a crusty biplane named Leadbottom voiced by Cedric the Entertainer.

Planes is the latest brainchild from Lasseter, Disney and Pixar's chief creative officer and the creator of the *Cars* and *Toy Story* movie franchises. The two *Cars* films alone grossed over $1 billion in box office revenue worldwide. Regardless of its eventual box office intake, *Planes* is already shaping up to be a huge bonanza for aerial applicators and the agricultural aviation industry. Exposing a legion of kids and adults to the skill and sheer "wow factor" aerial applicators display is publicity that would be impossible for NAAA to buy.

In the lead-up to the film's release, Disney's publicity machine has made a concerted effort to court aviation associations and air show enthusiasts.

NAAA had been trying to make inroads with Disney since the fall of 2011 once it learned about *Planes*' lead character to ensure that the industry was positively portrayed in the film. Disney contacted NAAA this spring about promoting the film, and in early April, NAAA President Dana Ness and I had the opportunity to watch an early cut of the film at Disney's Burbank, Calif., studio. (Our verdict: Two thumbs up.)

Disney is in the midst of an auspicious rollout for aviation aficionados this summer. A real-life version of Dusty Crophopper is appearing at select air shows across North America, starting with the Bethpage Air Show in Jones Beach, N.Y., in late May and ending with the 2013 EAA AirVenture in Oshkosh, Wis., July 29–Aug. 2. EAA AirVenture attendees also will have an opportunity to see an advance screening of the movie on Aug. 2.

The studio hired Texas-based aerial applicator Rusty Lindeman to play the role of Dusty in the air show performances. Lindeman customized his Air Tractor 301 to match Dusty's paint scheme and features for the role. Air Tractor Inc. had a hand in the makeover, which also included a turbine engine conversion that transformed the piston aircraft into an AT-400A.

"We're really pleased that Disney approached Air Tractor to help with this project," Air Tractor President Jim Hirsch said. "When the Dusty Air Tractor flies past air show spectators, they'll be entertained and learn how aerial spray planes play a big role in helping feed the world—as well as how we do our job in a professional and responsible way to protect our environment."

Meanwhile, an onslaught of *Planes* and Dusty-related merchandise and apparel is set to grace retail store shelves, including Dusty T-shirts, a remote control model of Dusty, the VTech Disney Planes Dusty Laptop (made for children ages 3 and up), a "Disney's Planes" videogame and everything in between. "I can think of no better scenario than a three-year-old running [with Dusty Crophopper] around a living room in New York City. I just think that can do nothing but good for us," said Doug Thiel, owner/operator of Thiel Air Care Inc. in Chowchilla, Calif.

Thiel is no voice actor, but he contributed a vital voice to *Planes*, the sound of the 1,170 horsepower PT6-65 turbine engine that powers his Air Tractor 802. The film's sound recording team drove to his airstrip last summer to capture every possible sound imaginable that a turbine aircraft can make.

Courtesy of Disney

Patterned after a vintage Stearman biplane, Leadbottom is the proprietor of Vitaminamulch, a special blend of vitamins, minerals and mulch that works miracles when sprayed on crops. "In the movie, he is the first naysaying voice to Dusty," Howard says. "We wanted Leadbottom to be comedic and a little bit crusty, but still a likeable guy." Cedric the Entertainer possesses all three of those qualities and fittingly serves as the voice of Leadbottom.

It's all rather remarkable, and the lengths the filmmakers went to stay as true to real life as can be expected for an animated picture about talking airplanes are evident. How did they go about that process and where did it all start? Disney granted *Agricultural Aviation* exclusive access to some of the key participants in the process to find out what it took to bring Dusty Crophopper to life.

The Learning Curve

The gestation period for bringing an animated script from the page to the screen is a long one. The on-screen product may seem like pure fantasy, but the reality is it takes a lot of artistic and technical expertise to get to that point. Although they had attended air shows as fans and Hall came from an aviation family (his father was a Navy test pilot), the filmmakers had had very little exposure to aerial application heading into the project. Disney is nothing if not thorough, though. A stickler for details, Lasseter has always preached to his team that if they're going to depict something on screen, they're going to do it right.

Courtesy of Disney

TOY STORY *The Wing Control Dusty Crophopper Radio Control Plane from Mattel is just one example of the many Planes-inspired toys due in stores from Disney Consumer Products and licensees such as Mattel, Thinkway and LEGO Duplo. Die cast figurines, talking figures, construction sets and more will be available starting in July at mass retailers across the country.*

Courtesy of Disney

The official Planes movie poster.

The filmmakers sought out ag pilots, air racers, aircraft mechanics and manufacturers and turned to YouTube videos, pictures and books to get a better feel for the look and flying styles of ag planes and the other racing aircraft depicted in the film. Aerial applicators' penchant for low-level flying informed a fear of heights for Dusty in the film. They also discovered that ag pilots possessed an excellent skillset for air racing, affirmation that their initial inclination to have the story revolve around a crop duster was the right call. "It's very instinctive stick and rudder flying—very precise, low-level—which is what air racing is about," Howard said.

For simplicity, the term *crop duster* is used throughout the movie even though the production team knows better. "One of the first things we learned was, 'No, no, you don't really call it crop dusting, it's aerial application.' So, there's a line very early on where Leadbottom, the older biplane crop duster, says, 'Are you disrespecting the sweet science of aerial application?' It's something he takes very seriously, so we wanted to make sure we got that official term in," Howard said.

"Authenticity makes it a better movie," the screenwriter added. "Even people who don't quite understand those terms, you can kind of feel when those type of things have been researched rather than just made up."

The Art of Becoming Dusty

Developing the characters is one thing, bringing them to life is another process altogether. As art director for *Planes*, Ryan Carlson has dominion over the visual look of the film. "I spent *a lot* of time during character development researching and studying

the actual planes, photos, videos—anything I could find to help inform the design," said Carlson via email.

He and the character designer also spent a lot of time drawing, first to establish the overall character and shape of the planes. Then they devoted significantly more time to working out the details.

Creating the look of Dusty was an evolutionary process. "We always knew Dusty should be a turbo prop, but there were a lot of iterations getting the proportions and shapes correct so that he looked good both as a character and as an airplane," Carlson said. "One of the first rules we defined was that the characters had to look like they could actually fly. Some of our early designs looked good as a character, but were too cartoony to be believable in the air. It was a bit of a balancing act to get both to work. Dusty also needed to look part hardworking farmhand and part racer. We wanted him to look like he could win.

"The other big rule of our world is 'Truth in Materials.' If something is made of metal, it remains rigid. If it is a rubber tire, it will have some squash and bounce, just as it would in real life. We spent a lot of time studying crop dusters: their control surfaces, landing gear, engines, spray equipment, etc. to make sure we got the details correct."

The finished version of Dusty Crophopper was influenced by several different ag aircraft. Carlson says they focused primarily on the Air Tractor 302 and 402, Cessna Ag Wagon, Rockwell Thrush and Dromader aircraft.

Spreading *Planes* Wings

Another critical component vital to Lasseter's "Truth in Materials" mantra was making sure the flying sequences depicted were as realistic and

Photos courtesy of Disney

MAGIC KINGMEN *Director Klay Hall (top) and screenwriter Jeffrey Howard (middle) were two of the prime players who conceived of a crop duster as the protagonist for Disney's* Planes. *Art Director Ryan Carlson (bottom) was tasked with bringing Dusty Crophopper and the rest of the* Planes *characters to life.*

technically accurate as possible. Flight specialist Jason McKinley joined the crew midway through the project to oversee that aspect of the film.

Before being brought on board, McKinley had studied mostly combat aircraft. Ag pilots may recognize his work on the series *Dogfights* on The History Channel. McKinley created, directed and produced the air combat reenactment show. He also created most of the air combat sequences in the 2012 film *Red Tails* about the Tuskegee Airmen. To get up to speed on agricultural flying, McKinley and his team studied YouTube videos and any footage Disney had.

"Sometimes we would watch footage and figure out the general average roll rate of the plane and even try and determine what the minimum turn radius would be at certain speeds," he said. "We would really try to get an accurate flight envelope so that when the audience is watching the aircraft it looks realistic and there's nothing out of bounds as far as what that type of plane can do."

McKinley isn't a pilot himself, but he was able to lean on Sean Bautista, a former F-16 National Guard pilot who traveled with the production crew for several days visiting with various pilots, including Thiel's operation on the day they miked up his AT-802 for sound recording. Bautista had previously spotted a flaw in the film that predated Thiel's recording session. The crew had already been recording sound for several months by that point, but getting Thiel's AT-802 on record was vital because originally the engineers had used sound from a piston engine for Dusty. "We were like, 'Yeah, he's not a piston engine, he's a turbine, so we need to get the right engine,'" McKinley said.

Thiel figures 15–20 representatives from Disney showed up on that June 2012 day, including McKinley, Bautista, producers and several sound technicians. After Thiel uncowled the aircraft, they taped microphones to the front and back of the engine. They put a microphone underneath the cockpit and one in the tail section. Crewmembers also used several handheld mics to follow alongside the aircraft. "It took them quite a while—a couple of hours—to get all the microphones in place and get them synched," Thiel said.

Eric Dumigan Photography, www.airic.ca

A live action version of Dusty Crophopper hit the air show circuit this summer flown by aerial applicator Rusty Lindeman of Rusty's Flying Service, D'Hanis, Texas. Lindeman transformed his Air Tractor 301 into a turbine-powered AT-400A to go along with the Dusty paint scheme.

Over the course of the next couple of hours Disney's team performed the recording equivalent of a complete workup on the 802. They recorded a startup. They recorded a shutdown. They recorded Thiel taxiing. They recorded him backing up. They lined eight microphones alongside the runway for his takeoff and landings. "Then they found out about beta—reverse. They loved that sound. I hope that comes through in the movie," Thiel said. "It makes a really neat sound."

The funniest moment of the day came when a young woman approached Thiel right before takeoff. "She was obviously from the city, and she says, 'And we want the sound of a flyover.' I said, 'Okay.' And she said, 'I'm going to stand in the middle of the runway with my microphone over my head, and I want you to fly over me as low as you feel comfortable.' I said, 'Are you kidding me? Do you really know what we do?' And she says, 'Well, just fly over me as low as you feel comfortable.' So I said, 'Okaaaay.'"

She staked her spot, the crew called for the flyover and Thiel dropped down as low as he could go. "We had to do it four times because the first two times she was screaming in the mic. The third and the fourth time she laid down. That was the best part of the day!"

*[**Editor's Note:** No sound techs were harmed in the recording of the movie, but the young technician walked away having learned a lesson: Don't ever explicitly or implicitly issue a "how low can you go?" challenge to an aerial applicator.]*

On a more practical note, McKinley left with a much better feel for how an ag plane handles and how to make Dusty Crophopper behave like a real ag plane. "What was funny was Doug was so calm and quiet, and then in the air the talent he showed flying for us, it was amazing how he could

Eric Dumigan Photography, www.airic.ca

Lindeman performs at the Waterloo Air Show in Ontario, Canada, in early June.

maneuver the aircraft and get it to turn on a dime," he said.

Will It Pass the Sound Test?

The challenge of matching sound to the movement of the aircraft on screen epitomizes the complex anatomy that lies beneath the surface of an action-filled animated film.

"What's interesting is you'd be surprised, everybody knows what a plane sounds like when it flies by," McKinley said. "Everyone sees planes so often and hears them that if we were off a few feet from where the plane should be in the real world to where he is in the animated space, you would be able to tell and the general audience would be able to tell, and that would take them out of the story."

"That's why just in that one particular area we had to be so exact," McKinley added. "[In Thiel's case] we wanted to try to cover every maneuver that we could think of so that we could match that up with the dynamics of the plane in the film."

"I was really impressed with the sound I heard on the film. It was extremely accurate," said NAAA President Ness, who owns and operates Ag-Air Inc. in Rudyard, Mont.

Transforming real-life aircraft maneuvers into a reasonable computer-generated facsimile presented another set of challenges. "It's astounding how difficult it is to get this to do it in a computer and have it not look like it's a toy or on wires," McKinley said. "Roll rate and turn radius turned out to be the most important part of the realism for us in the film, which is not something you would think about."

Kid Tested, Father Approved

For all its technical brilliance, *Planes* remains at heart a family film in the traditional sense of the word. It's short on gross-out gags and long on humor, determination and heart. The script was inspired by the big-tent philosophy shared by Lasseter, Howard and Hall.

"I think a family movie in the truest sense of the word means that everybody—the parents and the kids—can get something out of it," Howard said. "A lot of times you'll hear the word 'family movie' and it's really code for 'Well, it's for kids.' … John would advise us to try to make it as much as you can for the dads and for the adults."

Although the aerial applicators the filmmakers visited with contributed to the crisp maneuvers and nimble flying Dusty displays, in many respects the writers looked within to get to the heart of Dusty's journey. "We pull a lot of things from our own lives," Howard admits. "We just pulled from that universal feeling of thinking that you can be more than who you are, in Dusty's case more than what he was built for—that he can rise beyond his seeming limitations or the limitations that society has placed on him. … We have a line in the movie that he's flown thousands of miles, but he's never really been anywhere. But he has this great yearning to get out there and test himself and believes that he can be a racing plane and do this big race."

Elevated to the Big Screen

For all of the marketing muscle Disney is putting into the picture now, similar to Dusty's character, *Planes* emerged from the more humble beginnings of a planned direct-to-video release before the studio elevated it to a big screen theatrical release.

Planes' promotion was agricultural aviation's gain too. Even if the production values had been on par with what they are today, a straight-to-DVD release would have resulted in Dusty being exposed to a decidedly smaller and, likely, less-multi-generational audience.

"From the very beginning we assumed it was going to go direct-to-DVD, but we always had the possibility in the backs of our heads of, 'Hmmm, what if it could go theatrical?' With everything we do we make it to be the best that we can possibly make it and let the chips fall where they may," Howard said. "It became theatrical because it was good."

So good, in fact, Disney reportedly is already considering making *Planes 2*. ■

DECEMBER 9–12, 2013 ◆ RENO, NEV.

NAAA'S 2013 CONVENTION

Returns to Lively Reno

By Lindsay Barber
Manager of Meetings, Marketing & Special Projects

See you in the Biggest Little City in the World

NAAA is returning to Reno, Nev., for the 47th Annual Convention & Exposition Dec. 9–12. Join us in the Biggest Little City in the World for the biggest little convention you'll ever attend. Along with being the world's largest agricultural aviation trade show, there's no better place to network, socialize and hear from industry experts than NAAA's Annual Convention.

Reno has always been a great location for pilots and exhibitors attending the NAAA Convention & Exposition because of the ample show space and numerous aircraft that pepper the trade show floor due to the large trade show doors and close access to the Reno airport. Numerous NAAA members and allied companies have asked to return to this energetic, fun city and Reno is ready for our return!

Extend your trip before or after the convention and take advantage of the beautiful mountains surrounding the Reno area. Spend a couple of days skiing in Lake Tahoe or visit the National Automobile Museum and the Nevada Museum of Art.

BOOK YOUR ROOM AT THE BEAUTIFUL SILVER LEGACY RESORT CASINO

Join us in Reno at the beautiful Silver Legacy Resort Casino this December. When staying at the Silver Legacy Hotel, you will be provided with complimentary transportation between the hotel and the Reno-Sparks Convention Center for the trade show.

Silver Legacy Resort Casino Highlights:

- Enjoy dining in six unique Reno restaurants and eateries
- More than 85,000 square feet of 24-hour Reno casino excitement
- Top-name Reno entertainment at Catch-A-Rising-Star Comedy Club
- Be pampered in the award-winning health spa
- Exclusive and unique boutique shopping inside the hotel

The room rate is $75/night + taxes for a single or double. Book your room online at www.agaviation.org or call 1-800-687-8733 and give the reservation code NAAA13. The deadline to book your room is Nov. 6.

2013 Kickoff Breakfast: The Miracle on the Hudson

The 2013 Kickoff Breakfast is a must-see for everyone attending the convention. You'll hear from First Officer Jeff Skiles, co-pilot of the "Miracle on the Hudson" U.S. Airways flight.

On Jan. 15, 2009, a bright 20-degree afternoon, U.S. Airways Flight 1549 departed from New York La Guardia Airport for Charlotte, N.C. Everything was normal until Skiles spotted a formation of Canadian geese on the right side of the aircraft, seemingly headed directly towards them. Flying the plane manually, he was relieved when the nose of the plane rose above the geese, but that relief was short-lived.

A few seconds later, he heard four distinct *thunks* as the birds crashed into the engines of the Airbus A320. Both engines immediately failed and Skiles' instrument panel malfunctioned. Captain Chesley Sullenberger took over flying the plane and tipped the nose down to retain airspeed. Within 60 seconds the pilots concluded that returning to La Guardia or diverting to Teterboro or Newark Airports was too risky since they'd have to fly over densely populated areas and there was no guarantee that they'd

2013 CONVENTION SCHEDULE

Updates online at www.agaviation.org

Sunday, Dec. 8

TBD	Aircraft Move
8 a.m.–4:30 p.m.	CD Aviation Seminar
9 a.m.–4 p.m.	Pratt & Whitney Canada PT6 Seminar
12 p.m.–6 p.m.	Registration
12 p.m.–4 p.m.	PAASS PDC Meeting
4 p.m.–6 p.m.	Compaass Rose
4:30 p.m.–6 p.m.	NAAA/WNAAA Board Meetings

Monday, Dec. 9

7:30 a.m.–6:30 p.m.	Registration
8 a.m.–8 p.m.	Exhibitor Setup
8 a.m.–9:45 a.m.	Kickoff Breakfast
10 a.m.–12 p.m.	ASABE Technical Session
1 p.m.–6 p.m.	Concurrent/Company Sessions
6:30 p.m.–7:30 pm	Welcome Reception

Tuesday, Dec. 10

7 a.m.–8:30 a.m.	CP Products Breakfast/Seminar
7:30 a.m.–5:30 p.m.	Registration
8 a.m.–11:30 a.m.	Exhibitor Setup
8:45 a.m.–9:30 a.m.	NAAA Business Meeting
9:45 a.m.–11:30 a.m.	NAAA General Session
11:30 a.m.–6 p.m.	Registration
12 p.m.–5:30 p.m.	Trade Show
5:30 p.m.–7 p.m.	Live Auction & Reception
7:30 p.m.	Pratt & Whitney Canada Reception

Wednesday, Dec. 11

7:30 a.m.–4 p.m.	Registration
8 a.m.–9:30 a.m.	Concurrent/Company Sessions
10 a.m.–4 p.m.	NAAA Trade Show
3 p.m.	Silent Auction Closes
4 p.m.–5:30 p.m.	Concurrent/Company Sessions

Thursday, Dec. 12

8 a.m.–6 p.m.	Registration
8 a.m.–2:45 p.m.	Concurrent/Company Sessions
5:30 p.m.–6 p.m.	Farewell Reception
6 p.m.	Farewell/Awards Banquet

make it. Surrounded by nothing but skyscrapers and neighborhoods they decided to head to the only open, flat space available—the Hudson River.

Skiles, the son of two pilots, started flying when he was 16 and has logged more than 21,000 hours in the sky to date. He holds an Airline Transport Pilots license and is currently qualified as a captain on five transport category aircraft. Skiles currently works as the vice president of communities and member programs for EAA, a 179,000-member sport pilot organization.

Kickoff Speaker Jeff Skiles

Enjoy the breakfast buffet and hear the stories, lessons and scenarios from Skiles' experiences in the cockpit. His presentation will have you on the edge of your seat. Tickets for the Kickoff Breakfast and Farewell Banquet are included in the "with banquets" registration package. Anyone with a "without banquets" package can purchase tickets for the 2013 Kickoff Breakfast à la carte.

There is so much to enjoy!

The Kickoff Breakfast is just the start of good things to come. Other sessions and events not to miss include:

ASABE Technical Session: NAAA's educational programming leads off with the ASABE Technical Session, led by members of the American Society of

Agricultural and Biological Engineers (ASABE). As always, you can expect a science-based overview of the latest state-of-the-art aerial application research, but in an effort to make the session more useful for aerial applicators, ASABE's presenters will focus more on practical uses for the information presented. Instead of individual researchers presenting their own work, the protocol in the past, ASABE's Aerial Application Committee will come up with topics and assign each one to a speaker or speakers to address. So instead of just hearing about Speaker A's work on topics such as volume applications, boom setups or the effects of active products and adjuvants on droplet size, the presenter will share Researchers B, C and D's work in the same areas and offer tangible solutions from the body of research that attendees can put into practice. The revamped format was well received when it was introduced last year. *(Some states allow CEUs for this session.)*

General Session—Earning a Skeptical Public's Trust: How to Make a Compelling Case for Agricultural Aviation and the Work You Do: According to the National Institute of Food and Agriculture, fewer than 2 percent of Americans farm for a living today, and only 17

Contact Information for Booth & Sponsorship Sales

We look forward to your participation in this year's convention. Booth sales and sponsorship opportunities are already available. Visit the website at www.agaviation.org. For questions, please contact Lindsay Barber at the NAAA office at 202-546-5722 or by email at lbarber@agaviation.org

NAAA CONVENTION: YOUR BEST DEAL

Theme	"Ag Aviation: Agriculture's Best Deal"
2013 NAAA Convention	Dec. 9–12
Start of Online Registration	July 8
Online Exhibit Sales	Open Now
Cutoff for NAAA Room Block	Nov. 6

Support the Industry with a Sponsorship

According to an NAAA Industry Survey, 73 percent of aerial applicators surveyed would be "very likely" to use the products and services of a company that sponsors an event at the NAAA Convention. Don't miss out on an opportunity to get your name in front of 1,000+ attendees! We have several sponsorship opportunities available, such as the Farewell Banquet, General Session, the Internet Café, coffee breaks and a variety of signage throughout the NAAA Convention & Exposition featuring your company's logo. The earlier you sponsor, the more advertising you'll receive! Your sponsorship will be visible to attendees via convention signage and banners, in the convention program and throughout various other NAAA publications. For sponsorship opportunities, please contact Lindsay Barber at 202-546-5722 or lbarber@agaviation.org.

percent of the U.S. population lives in rural areas. Realistically, the farm is a long way off from the fork for 49 out of 50 Americans. Agriculture is good for America—and not just the 2 percent of Americans who work in it, but for all Americans. The other 98 percent don't always get that, however, which is why NAAA has made advocacy and public relations training the focus of the 2013 General Session.

To prepare you for answering questions and educating individuals and the media about our industry, you'll hear from Leonard Gianessi, Director of the Crop Protection Research Institute at the CropLife Foundation, about the value of modern crop protection technology in meeting global food production needs. You'll then hear from Steve Powell of Solum Consulting about the need and importance of building an advocacy story. Powell will explain how to advocate on the consumers' "turf" and provide tips for telling our industry's story during a news interview. All attendees, including spouses, employees of operations and allied companies, will leave this session armed with tips and resources to educate and advocate more effectively for their businesses and on behalf of the agricultural aviation industry.

Concurrent & Company Sessions: Several education sessions will be on the docket throughout the week, including programming focused on application technology, chemicals, engine performance and maintenance, security and FAA regulations, helicopters and airframe sessions. The PAASS presenters—our roving safety instructors—moderate Com*paass* Rose, an information-sharing session geared toward low-time and prospective ag pilots. Com*paass* Rose has proved to be so popular that NAAA and NAAREF will be offering even more programming for new and wannabe ag pilots this year.

In addition to Compaass Rose, NAAA will be hosting a new "speed mentoring" session at the 2013 Convention for new and low-time ag pilots.

"Speed mentoring" is one of two new offerings that will debut at the 2013 Convention. The idea is to give new and low-time ag pilots an opportunity to meet with established pilots, operators

and key allied representatives in small group-type settings that will allow for more personalized mentoring. Another new session, presented by NAAREF, will focus on safety and include a video on human factors.

Trade Show: In NAAA's 2012 post-convention survey, 71 percent of respondents identified the NAAA Trade Show as their favorite program. There's a reason it's the convention's premier event. The world's largest agricultural aviation trade show annually features 100+ exhibitors from all facets of the agricultural aviation sector—chemicals, parts and supplies, aircraft and engine manufacturers, maintenance and more. Talk to the company representatives you work with on a daily basis and learn about other allied companies that support our industry. We expect another strong showing of exhibitors this year. Anything you need for your business, you'll be able to find at NAAA's Convention & Exposition.

Networking: The 2012 post-convention survey reveals another truism: The No. 1 reason people attend is for the networking, which practically goes on 24/7 at the NAAA Convention. Between the Kickoff Breakfast, Welcome Reception, Live Auction, Pratt & Whitney Canada Reception, Farewell Banquet, private functions and informal get-togethers, there are no shortage of opportunities for socializing and networking with friends and business acquaintances.

WNAAA Convention: The WNAAA Convention offers a mix of business and pleasure with education and fun-filled onsite and offsite activities, including the WNAAA President's Open House, the always informative Athena Program and this year's guest speaker, Cathe' Fish, a CFII, MEI who has taught more Flight Instructor Revalidation Clinics and Flying Companions

Like the convention center in Savannah in 2012, the Reno-Sparks Convention Center has ample room to accommodate a wide array of ag aviation aircraft and exhibitors.

Courses than any living speaker. She has been one of the AOPA Air Safety Foundation's leading instructors since 1983 and is known for delivering upbeat, information-packed seminars.

What else is there? Plenty. Get more convention details online at www.agaviation.org. ■

Don't Wait! Nominate Someone for an NAAA Award Today

Each year, NAAA recognizes a handful of members for outstanding contributions to the aerial application industry. This year's award recipients will be honored at the Farewell/Awards Banquet, the closeout to the 2013 NAAA Convention & Exposition. This industry is filled with exceptional people who go above and beyond the call of duty, often with little fanfare. We need your help to identify these unsung heroes. There are 10 NAAA Award categories and one NAAREF award.

NAAA Award Categories

Agrinaut Award: Honors the agricultural aircraft operator or operating organization that has made an outstanding contribution in the field of ag aircraft operations. The recipient for the award must be or have been actively engaged in commercial agricultural application with an agricultural aircraft and the achievement cited should be a "state of the art" contribution for the benefit of the agricultural aircraft industry as a whole.

Allied Industry Individual Award: Recognizes the NAAA members or staff and/or an allied industry individual who has significantly contributed to the allied industry and their exhibit efforts.

Delta Air Lines "Puffer" Award: Recognizes the individual who has made an outstanding contribution to the design of agricultural aircraft and/or related equipment.

Evans-Christopher Operation S.A.F.E. Award: Recognizes individuals or entities that have made outstanding contributions to the Operation S.A.F.E. program. This Award is presented by NAAREF.

John Robert Horne Memorial Award: Honors a pilot with five years or less experience in the agricultural aviation industry that has an exemplary safety record and/or has contributed to safety in ag aviation.

Larsen-Miller Community Service Award: Recognizes outstanding contributions by a member to his community.

Most Active Woman Award: Recognizes an outstanding contribution by a woman who is active in the affairs of the industry or the association.

Opal & Bill Binnion Memorial Award: Acknowledges those who contribute to the WNAAA in their efforts to educate the public about aerial application.

Outstanding Service Award: Awards outstanding service to the commercial agricultural aviation industry or to its association.

Related Industry Award: Recognizes outstanding contributions by an allied industry member and his company.

William O. Marsh Safety Award: Recognizes significant achievements in safety, safety education or an outstanding operational safety program.

The Awards Nomination Form is available as print-only and fillable PDFs at *www.agaviation.org/content/naaa-annual-awards*. (For quick access to the fillable form on your mobile device, scan the QR code above with your smartphone or tablet.) The form is also in the 2013 NAAA Membership Directory. To make a nomination, fax or email completed entries to NAAA at 202-546-5726 or *information@agaviation.org*. **The deadline is Sept. 13.** ■

Donate an Auction Item to Support the Industry

Support the aerial application industry by donating an auction item to NAAA, WNAAA or both organizations. The earlier you come forward, the more exposure you'll get. In exchange for contributing to the NAAA/WNAAA auctions, we will showcase your company's contribution to the aerial application community in Reno and in the period leading up to the convention on the website and in future NAAA publications.

NAAA Convention auctioneer Kevin Palmer

Donated auction items provide income for association projects and programs. To donate an auction item, fill out a form online at www.agaviation.org, contact NAAA at 202-546-5722 or email *information@agaviation.org*. Big-ticket items are usually reserved for the Live Auction, with smaller items allocated for the Silent Auction, but final determinations are made onsite once all the offerings have been inventoried.

There's no doubt about where one company's contribution will be. To commemorate the 50th anniversary of the PT6 engine, Pratt & Whitney Canada is contributing a brand new PT6A engine. The first time P&WC offered a new engine, a PT6A-34AG in 2010, it raised $350,000 for the Association, an amount that clearly meets the threshold for the Live Auction. ■

47th Annual NAAA Convention & Expo

Reno, Nev. ◊ Dec. 9-12, 2013

Pre-registration must be received by Wednesday, Nov. 27, 2013. Use this form and register today!

MEMBER REGISTRATION: You must be the designated member of an Operator or Allied Industry Company, State Association Executive, or have a Pilot, Affiliated Operator, Affiliated Allied, Associate, International or WNAAA membership in your name, or be the spouse of an NAAA member to qualify for member rates.

Registration at the convention site will cost $50 more per person!

NAAA Members	Registration With Banquets	Registration Without Banquets
Member	$335	$230
Spouse	$280	$170
Child (under 12)	$115	Free

Non-NAAA Member	Registration With Banquets	Registration Without Banquets
Non-member	$460	$355
Spouse	$400	$295
Child (under 12)	$115	Free

Banquets: Kickoff Breakfast and Farewell/Awards Banquet

EXTRA BANQUET/RECEPTION TICKET FEES:

NOTE: Attendance at the Welcome Reception, Auction Reception and Farewell Reception is included in your registration fee. Purchase Kickoff Breakfast or Farewell/Awards Banquet tickets only if you purchased a "without banquets" package. Purchase extra Welcome Reception and Farewell Reception tickets only for guests with no registration package.

Monday, Dec. 9	Kickoff Breakfast	$45/each	# needed ___
Monday, Dec. 9	Welcome Reception	$45/each	# needed ___
Thursday, Dec. 12	Farewell Reception	$30/each	# needed ___
Thursday, Dec. 12	Farewell Banquet/Awards	$80/each	# needed ___

REGISTRANT: First Name _____ MI _____ Last Name _____

(Please print your name as you would like it to appear on your convention badge.)

Company _____ Phone _____

Address _____ City _____ State_____ Zip _____

Country _____ Fax _____ Email _____

SPOUSE REGISTRANT: _____

(Please print name as you would like it to appear on convention badge.)

ADDITIONAL REGISTRANTS:

First _____ MI ____ Last _____

First _____ MI ____ Last _____

First _____ MI ____ Last _____

First _____ MI ____ Last _____

PAYMENT:

Registrant Fee $_____ Credit Card _____ or Check # _____

Spouse Fee $_____ Card# _____

Add'l Registrants $_____ Exp Date: _____ Phone _____

NAAA Dues $_____ Address _____

Banquet Tickets $_____ City _____ State _____ Zip _____

TOTAL DUE $_____ _____

(*U.S. funds only, must accompany registration*) *"Signature is permission to bill Credit Card."*

Mail payment and registration form to: NAAA – 1440 Duke Street – Alexandria, VA 22314 – Fax 202-546-5726 –
Print registration or register online at www.agaviation.org
Questions? Call 202-546-5722 or email information@agaviation.org.
Online registration opens July 8 at www.agaviation.org.

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The deck is stacked in your favor for a rewarding week filled with good people, great programming, excellent exhibits, and outstanding opportunities—all at the nation's premier gathering of agricultural aviation professionals and enthusiasts. Highlights include:

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From "The Miracle on the Hudson," Kickoff Speaker **JEFF SKILES**, co-pilot of U.S. Airways Flight 1549

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Jeff Skiles

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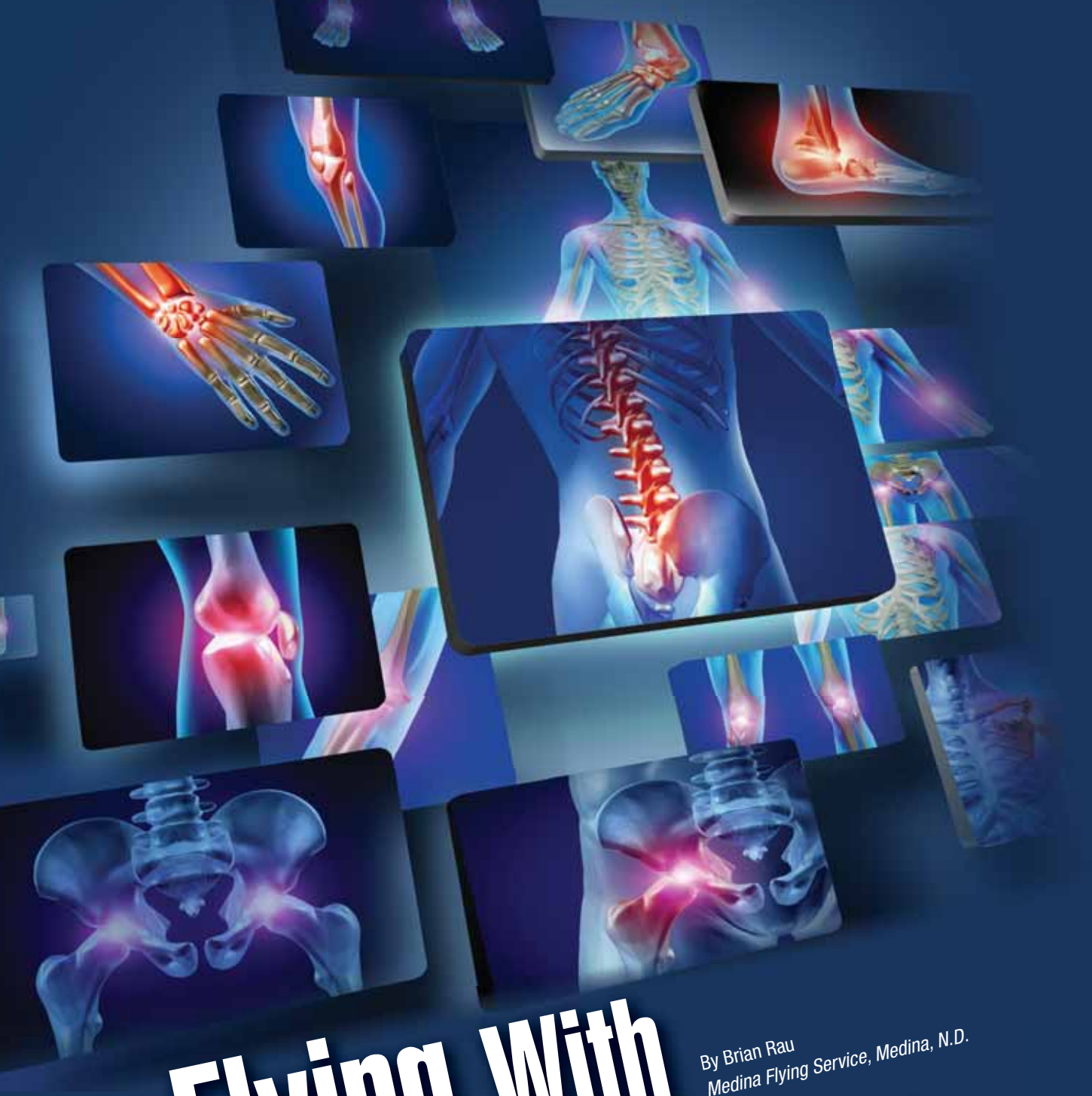


Flying With Life-Limited Parts

By Brian Rau
Medina Flying Service, Medina, N.D.

As longtime aerial applicators can attest, it's not just the aircraft's equipment that wears down over time

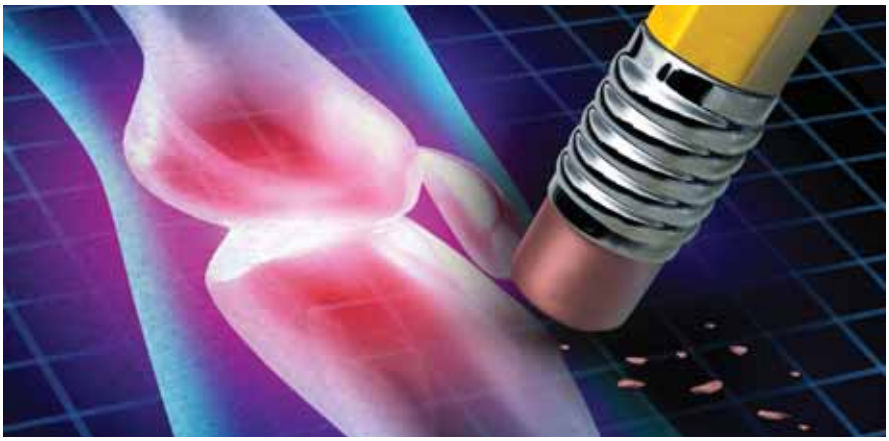
My wife Elly was quite pleased when I came home and told her I was finally seeing a therapist. That pleasure was somewhat subdued when I explained that the therapist was a physical therapist who had been recommended by the orthopedic specialist I had visited. Over the last 10 years or more, I had developed some chronic joint problems (knee and shoulder) that were progressively becoming worse. I had feared the worst, in that I was possibly developing some type of disabling arthritis. I have always been physically active, including my work as an ag pilot and farmer, and in the offseason Elly and I liked to visit places where we would fly into backcountry strips and do a lot of hiking. Lately my main physical activity is playing with my four grandchildren. Not wanting to give any of that up, I decided I had better be proactive and see what could be done to correct the issue.

It started with a trip to a general practitioner, who recommended my seeing an orthopedic surgeon. Having a few connections with the nurses at Jamestown Regional Medical Center (JRMC) from my work as a paramedic, I found the recommended orthopedic surgeon was held in high regard. (Nurses are the ones who really know who the good docs are.) The appointment with the orthopedist began with detailed questions and a physical exam which involved moving the affected joints and limbs in different directions to determine what the problem might be. This process reminded me of the old joke where the patient says, "Doc, it hurts when I move my arm like this," and the doctor replies carelessly, "Then don't move your arm like that." I didn't tell that joke to the orthopedist, because at this point I really wasn't sure how well my insurance was going to pay regarding this type of an exam. A series of simple X-rays of the affected joints showed very minimal degeneration which was considered normal for my age. (I am starting to dislike discussions that start with "As you age…")

The discussion continued with the doctor suggesting the possibility of doing MRI scans that could show spurs and other abnormalities which could be affecting the joints. He also mentioned that the joints could be getting out of place by doing repetitive motions with the limbs not in the best position and not moving the joint in its full range of motion. Considering that possibility, I thought it had merit, since many of the limb positions and motions in an aircraft are the same as the ones used while operating farm equipment. Those two endeavors are how I spend much of my life. I often pontificate that how you live each day is how you end up living your life. With a referral needed for insurance coverage, the doctor approved a series of visits with one of the medical center's physical therapists.

On my first "therapy" session I met Sandra Hoff who is both a physical therapist (PT) and a doctor of physical therapy (DPT) at JRMC *(see related story: "The Anatomy of Shoulder Discomfort," pg. 37)*. I guess they decided that advanced training would be required to deal with a difficult patient such as myself. A PT or DPT has completed extensive study and internship involving

"Muscle burn" type pain from working muscles is okay, but pain in the joint itself is not good.



many issues involving bones, joints, muscles, tendons and ligaments. The session started with some exam aspects of the same type that the orthopedic surgeon performed, but focused more on different types of exercises involving the affected joints. We were learning which exercises I could do that would help work the appropriate muscles, without causing further injury to the joints. I needed to learn that "muscle burn" type pain from working muscles was okay, but pain in the joint itself was not good. The first couple of weeks were spent going through this process of adding different exercises, sometimes having to back off on a particular exercise until other muscles were strengthened to hold the joint in the correct position. The exercises were carried out at home twice daily.

The knee problem seemed the easiest to identify and treat. Sandra observed that the joint was not moving properly, which was apparent by the position of the knee cap and watching the joint itself move. Treatment involves exercises that stretch the muscles on one side of the knee while strengthening the muscles on the opposite side. The knee joint responded positively from the start and, even though it is early in the season, therapy appears to be a complete success.

The shoulder has not been as easy to work with, and success at this point is not certain. Sandra explained to me that the shoulder is a complex joint which allows a wide range of motion. If you move your arm through its complete range of motion, you quickly realize that no other joint allows that much movement. Because of the wide range of motion that we all enjoy and use to our benefit, the shoulder suffers from lack of stability. I am currently

working on two stretching exercises and 11 different strengthening exercises on the one shoulder joint. In my case, part of the problem appears to be a scapula (shoulder blade) that does not lay flat, as it should, when the arm is moved in certain positions.

The joke "Then don't move your arm like that" has a certain amount of truth in that your body is telling you that damage may be occurring. If you are able to change how you do something and the pain stops, that is probably a reasonable way to handle a problem. My knee problem was aggravated by how I was getting in and out of the aircraft, as I was putting all my weight on the one leg and then rotating, which was putting stress on the knee. Choosing a different way to get out of the aircraft helped considerably. Since my presence is required to manipulate the controls during flight, there does not seem to be an easy way to help the shoulder out; however, if you do not have servo tabs on your flight controls and they are available, that would be one way to help your joints.

As you age, an increase in aches and pains is probably normal. When the pain becomes chronic or limits your activity, however, I suggest that action should be taken. I would recommend seeing a specialist. Unless you have extensive knowledge of bones and joints (i.e., you are a PT) it would be very difficult to determine on your own the best course of action. For me the exercises are still ongoing and the shoulder does feel better than it did last year, but more invasive action may be needed at some point. Sometimes people asked me what my retirement strategy is. And I usually reply, "To make my next engine overhaul run out of time at the same point as my spar caps run out of time." Now I have to add, "To make my joints last just as long." ■

Time to Rethink Your Cockpit Exit Strategy?

Watching a non-pilot attempt to climb into the cockpit of an ag plane can be downright comical, but even seasoned pilots aren't all that graceful when it comes to entering and exiting a single-seater. It doesn't always look pretty, but there's an art to squeezing into tight places. Bo and Luke Duke of *The Dukes of Hazzard* were the deans of this kind of performance art, slithering and sliding into the General Lee with the zeal of a NASCAR driver. The machinations ag pilots go through to slip into the aircraft may not rise to that level, but it comes close.

There's no one right way to enter and exit the cockpit, but all methods aren't created equal. Not all aircraft are designed the same. The Ag-Cat, for example, needs to be accessed from the left side, while some other aircraft can be entered from either side. Aside from putting unnecessary strain on your joints, certain exit routines can actually compromise the safety of the aircraft. Brian Rau has spent most of his career getting in and out of the left side of aircraft he was flying, but recently he thought better of it. With the help of his physical therapist, he came to a simple conclusion: avoid the left side of his Thrush and use the right side instead. Rau's new method of entering and exiting from the right side of the aircraft keeps his left knee from bearing the brunt of his weight and eliminates the possibility of inadvertently kicking one of the engine control levers on the left side or, worse, the emergency dump handle. The difference between exiting from the left and right side becomes apparent in the following examples.

NAAA encourages aerial applicators to evaluate the safety and efficacy of their cockpit entry and, at the same time, mitigate unnecessary strain placed on the body's joints and muscles while entering and leaving the cockpit. It's the right thing to do for your own safety and for the safety of others on the ground. Plus, your knees will thank you for it. ■

The first example demonstrates how Rau has historically gotten in and out of his aircraft. It involved putting his left leg in the cockpit first and getting it out last on the left side of the aircraft. There are two problems with this, Rau concedes. First, he was putting all of his weight on the left leg and needed to rotate 180 degrees with the weight on it. More importantly, the spray handle, engine controls and emergency dump handle are in the way and could easily get bumped. Exiting in this manner is a potential safety hazard.

In this photo, Rau gets out of the left side with his left leg first instead of the right leg. This variation is much easier on the knee because there isn't as much rotational force, but it is even more of a safety hazard than before because the controls could be bumped more easily.

The last example shows why getting out of the aircraft on the right side is optimal. With this method, Rau can lead with his right leg and slide out without any rotational forces on the left knee. Best of all, none of the controls are in the way. We'll call it the "scoot and slide" method. If the Duke boys had been ag pilots instead of a thorn in Boss Hogg's side, there's little doubt about which exit strategy they would have employed. They were on to something with their unorthodox entry/exit method, so surely they would have said "Yeeeeeh-haw" to option 3.

The Anatomy of Shoulder Discomfort

By Sandy Hoff, PT, DPT
Physical Therapist
Jamestown, N.D.

Editor's Note: *The content of this article is provided for general informational purposes only and is neither intended as nor should be considered a substitute for professional medical advice. Do not use the information for diagnosing or treating any medical or health condition. If you have or suspect you have a medical problem, promptly contact your professional healthcare provider.*

Motion at the shoulder is made up of two moving areas: how the scapula moves on the ribs and how the upper arm moves at the shoulder. Impingement symptoms can include difficulty reaching behind you, reaching overhead and general weakness of the shoulder. If pain continues, loss of motion can also occur. Pain is typically located along the front of the shoulder but can also start in the back of the shoulder and spread to the upper arm.

Primary causes of impingement type symptoms in the shoulder include weakness of the rotator cuff; overuse causing inflammation; posterior capsule tightness; anatomic variations of the acromion (the outer end of the shoulder blade); degenerative changes related to age; and postures and positions leading to forward head and rounded shoulders. Secondary causes are instability and imbalance of the glenohumeral joint and scapulothoracic joint. Any of the above listed variations can cause the tendon to become "pinched" between two other structures, causing pain.

Unless significant evidence from imaging is present, most impingement cases will be treated conservatively (non-operative) at first. Physical therapy can narrow down the causes of pain. Once the cause is determined, a plan of action can be started. Courses of treatment may include manual therapy, stretching of tightened muscles and strengthening of weak muscles through a supervised exercise program, taping to correct joint alignment or possible injections from the physician to decrease inflammation.

Shoulder pain is one of the most common physical complaints, but some simple measures can help alleviate recurring discomfort. Here are four tips to decrease shoulder impingement:

Build strength: Strengthen weak upper back/shoulder blade muscles to correct for any imbalance and instability.

Avoid poor sleeping habits: Lying on the affected shoulder or on your stomach contributes to impingement symptoms. Those positions continue to round the shoulder forward and put pressure on the tendons. Additionally, try to avoid sleeping with arms up and over your head or under your pillow.

Improve your posture: Many activities during the day lead into poor posture. The more time we spend in poor posture, the more likely impingement symptoms occur. Working on squeezing the shoulder blades together multiple times during the day, as well as increasing core strength, can help further reduce impingement symptoms.

Warm up before prolonged activity: Doing gentle stretches and allowing for full motion at the shoulder can help tissues around the joint loosen up and prepare for activity. Five to 10 minutes of stretching beforehand can make a dramatic difference in outcomes.

There are a variety of shoulder stretches. The following are two common ones prescribed for rehabilitation:

Latissimus Dorsi stretch: (Standing): With hands on wall or rail and feet shoulder-width apart, move chest toward floor. Hold 15–30 seconds. Repeat 3–5 times. Do 1–3 sessions per day.

Pectoralis stretch: (Standing in doorway): Arms forming a T, step forward through the door until stretch is felt. Hold 15–30 seconds. Slide arms up to form a V and repeat the stretch. Repeat 3–5 times. Do 1–3 sessions per day.

If you are experiencing shoulder discomfort or other joint pain, check with your local hospital or physical therapist for screenings. Some facilities, such as Jamestown (N.D.) Regional Medical Center, offer free screenings. A simple 15- to 20-minute screening can help determine the need for possible therapy, a physician's examination or other options. ■

Sandra Hoff is a physical therapist and a doctor of physical therapy at the Jamestown Regional Medical Center in Jamestown, N.D.

The Facebook Phenomenon

Ag pilots are connecting on Facebook in droves through groups like Crop Dusters United

By Jay Calleja
Manager of Communications

Facebook is the world's most popular social networking site, and it's not even close. According to a survey by the Pew Research Center's Internet & American Life Project, two-thirds of online American adults (67 percent) use Facebook. That's more than four times higher than the next most popular social media platform, Twitter (16 percent). The Pew survey was conducted in late 2012.

In 2011, NAAA conducted a communications services survey that asked members about their social media use. The survey found that while a little less than half of the respondents (46 percent) were using social media for personal or professional reasons at the time, Facebook was the runaway favorite among those who were using a social networking site. Seventy-two percent of respondents were on Facebook. In comparison, only 17 percent of members were on LinkedIn, a more business/contacts-oriented social networking site, and just 10 percent were on Twitter.

What sets Facebook apart, for aerial applicators and users in general, is the social component. The social networking site provides a simple and easy forum to connect and keep in touch with friends, family, colleagues and—for those who have a Facebook page for their business—customers. Increasingly, the Facebook group Crop Dusters United (CDU) has become a popular gathering place for aerial applicators, a virtual watering hole where they can belly up to the bar and connect with fellow ag pilots from across the country. As of mid June, CDU had 1,169 participants in its Facebook group.

Perry Lowry of Lowrys Flying Service Inc. in Hamburg, Ark., started Crop Dusters United one late January evening in 2010, as a way to connect with other ag pilots on Facebook. The second-year operator was flying for another operator on a timber contract and had been on the road for about a month when he found himself stuck in a hotel room surfing the web and checking Facebook. "I was bored to death and just set it up," Lowry said. He had seen other crop dusting Facebook groups peter out at about 30 members and figured he knew more people than that. He was right.

Within two days CDU had 97 members, but there wasn't much activity. It grew to a couple of hundred members within a year and there was a little bit of chatting going on but not much else. That changed in 2012 when "it just exploded." Lowry found

himself flooded with requests to join CDU. "Last summer, I would check it in between loads when I was getting loaded, and I was getting 20 requests every 30 minutes. I mean, it got astronomical, and I said, 'There ain't no way [I can keep up with this alone.]'"

At that point, Lowry knew he needed backup, so he tapped seven other CDU participants to help administer the now secret Facebook group: Tommy Benton (Ark.), Garry Joe Girdley (Ark.), Rick Lott (Ga.), Danny Lowry (Miss.), George Parker III (Idaho), Jay Needham (Texas) and Mike Thompson (Texas). David Strohl (Ark.) was recently named an administrator too. Before granting them admin rights, Lowry issued a simple edict to each administrator. "I don't want pleasure pilots in it, someone who's not actually seeking a career in agricultural aviation. I don't want farmers in it. And I try to keep freeloaders out of it," he said. "I don't want folks in there who are going to take things in the wrong context and run with it."

That was a concern of Lowry's because CDU originally started as a public Facebook group. At the time, he says it was the only option available because he wasn't given the option to make it a private group. "I knew it would benefit us better for it to be closed," he said. He tried to contact Facebook on several occasions about converting it to a closed group to no avail.

"I know we have a lot of folks that don't know what we're about and what we do. And I knew at any given time any [CDU] member could post what they wanted on there, no matter how it reflected on our industry, and anybody could see it," he said.

Lowry would do the best he could to monitor and delete certain posts, but his worries persisted until he was finally able to privatize the group. CDU became a closed group late last year and was changed to a secret Facebook group in June for an added measure of privacy. "That became a little bit of a headache, but with these other administrators, that took a load off of me," Lowry said.

Most of the material on CDU is exactly what you would expect to find on a social networking site for

Landscape of Social Media Users	% of Internet users who…
Use Any Social Networking Site	**67%**
Use Facebook	67%
Use Twitter	16%
Use Pinterest	15%
Use Instagram	13%
Use Tumblr	6%

Source: Pew Research Center's Internet & American Life Project Post-Election Survey, Nov. 14–Dec. 9, 2012. N=1,802 Internet users.

The Face of Facebook Users

Facebook Usage	% of Internet users who use Facebook
Sex	
Male	62%
Female	72%
Age	
18–29	86%
30–49	73%
50–64	57%
65+	35%
Urbanity	
Urban	72%
Suburban	65%
Rural	63%

Source: Pew Research Center's Internet & American Life Project Omnibus Survey, Dec. 13–16, 2012. N=860 Internet users. The margin of error is +/- 2.9 percentage points.

ag pilots. About half of the posts are purely social posts, and the other half pertain to getting questions resolved.

"If I've got five to 10 minutes I could post a question on there concerning my business or my airplane, and within 10 minutes I'll have multiple responses to my post, and it will be from folks who have probably experienced the same issue, and it will be from people from all over the United States and some other countries," Lowry said. "You get real-time answers. That has made this group grow to the size that it is now. … It's just an information highway."

Of course, like any freewheeling online community, the information highway has its share of potholes. Not unlike other social media sites it does, on occasion, include unrelated eyebrow-raising material and comments that some might consider vitriolic.

Posting videos is a popular feature on Facebook, but it can be particularly tricky in part because creating and posting them is so easy to do nowadays. All it takes is a smartphone. For safety reasons, NAAA and NAAREF believe filming oneself during application operations presents an unnecessary distraction for the pilot. Moreover, the Federal Communications Commission (FCC) prohibits cell phone use while in flight *(see box)*. According to an ag aviation insurance underwriter, while filming in the cockpit would not invalidate a pilot's insurance per se if an accident were to occur while recording, it would factor heavily into whether the policy gets renewed. At best, it would result in higher premiums not only for the pilot in question but for everyone in the underwriter's book. At worst, the pilot could be denied coverage at renewal.

"Social media is a great way to stay in touch with folks all over the country. CDU helps ag pilots find help to relieve a backed-up schedule, buy or sell an airplane, locate parts, see new ideas on application techniques or catch up with old friends," said NAAREF President Randy Hale. "With all these great benefits also comes the responsibility of stressing safety and professionalism in every word we share. As NAAREF president and a PAASS presenter, I would urge all of us to keep safety and professionalism at the forefront of all the things we share online and to remember that new pilots may be viewing these posts and influenced by its content."

The Facebook Friendly Skies

Perhaps more than anything else, CDU offers a healthy sense of community to a group of pilots who typically toil alone. Through CDU, Lowry has been able make new friends from across the country and do something he never considered when he created the Facebook group.

"I'm an operator—ain't nothing special about me. But I get countless amounts of messages from guys, especially younger guys, just breaking into this business, thanking me for creating a group which put them in touch with an operator that's actually given them their first job," Lowry said. "That throws chills down my back. I couldn't have gotten where I was without somebody really going out on a limb and helping me personally, and this is one way, at least, I have been able to give back to the industry."

"I never imagined it growing to the magnitude it has grown," Lowry continued. "I don't see anything bad. All I can see is this thing getting bigger and better." ■

"Cell phones and other mobile devices must be turned off and put away…"

The Federal Communications Commission (FCC) prohibits cell phone use while in flight. Here is the exact wording of the FCC's regulation. Code of Federal Regulations (CFR) Title 47, Part 22, §22.295 is titled "Prohibition on airborne operation of cellular telephones" and reads as follows:

Title 47: Telecommunication
PART 22—PUBLIC MOBILE SERVICES
Subpart H—Cellular Radiotelephone Service

§ 22.925 Prohibition on airborne operation of cellular telephones.

Cellular telephones installed in or carried aboard airplanes, balloons or any other type of aircraft must not be operated while such aircraft are airborne (not touching the ground). When any aircraft leaves the ground, all cellular telephones on board that aircraft must be turned off. The following notice must be posted on or near each cellular telephone installed in any aircraft:

"The use of cellular telephones while this aircraft is airborne is prohibited by FCC rules, and the violation of this rule could result in suspension of service and/or a fine. The use of cellular telephones while this aircraft is on the ground is subject to FAA regulations."

Social Media Rules to Live By

By Sarah Alsager, social media guru
COMMUNIQUE Inc., Jefferson City, Mo.

When it comes to social media, there's much more to the story than gossiping teenagers, overbearing neighbors and opinionated friends. For those of us in the business world, social media has become a way to share our message with the millions of people who participate in these online forums on a daily basis.

Like us on Facebook!

Become a Facebook fan of NAAA's at www.facebook.com/NationalAgriculturalAviationAssociation.

But, as you know, along with great opportunity comes great responsibility. Handled properly, social media platforms offer a convenient way to communicate your organization's important message with those around you. With that in mind, we've developed a list of six guidelines to consider before you post, tweet and share. The same rules would apply irrespective of medium or whether you're engaging from a business or personal social media account.

1. Anything you say on Facebook/Twitter/Instagram can be used against you. Social media sites are considered public forums of information, so assume that everything you post has the potential to be shared with other people. That's the nature of social media communication. Even things said in a private message or in a closed group can go viral. It only takes one person to copy what you've posted and send it out to everyone in their network. This doesn't mean you should be paranoid about posting, just be mindful.

2. You're a human being. Act like it. Social media is about people connecting with people, not faceless organizations and businesses. Make your interaction human-like so that people can relate to you on a personal (and sometimes informal) level. Exclamation marks, ampersands and smiley faces are okay! 😀

3. Tell the truth—and not just your own version of it. Believe it or not, not everything on the Internet is true. *Gasp!* As a representative of your industry, it's important that you do your research before posting information that may be inaccurate. Utilize and cite reputable sources for your content. Proper spelling and grammar is also important in delivering a successful message.

4. Show some respect. Individuals from all walks of life participate in social media and are bound to have different opinions than you do. Even if you don't agree with someone, you need to be respectful of their right to share what they think. Foster the thoughtful discussion of opposing ideas, but feel free to cut it off if it gets ugly. In the end, you want to create an online community in which people feel comfortable sharing their thoughts and aren't afraid of being chastised for having an opinion.

5. Take the high road. Sometimes people will say or do things online that will aggravate you, but just because your response is coming through the computer doesn't mean you can say whatever you want to. Follow this advice: if you wouldn't say it in person, don't say it online.

6. Social media is a two-way conversation. Facebook and other social media sites are a way for people to converse with you and your industry, which means you need to not only disseminate information, but also listen to your community and respond to them. When people comment, you should acknowledge them by responding and interacting with them. That goes for positive and negative comments. Social media is a place for people to express their opinions; those opinions should not be censored. ■

Sarah Alsager is the vice president of public relations and new media at COMMUNIQUE, which specializes in communicating healthy messages for agricultural and food company audiences, including clients such as the United Soybean Board and various state commodity groups. In addition to managing social media campaigns for the agency's clients, Alsager has conducted social media training sessions with national agriculture organizations including NAAA, Northarvest Bean Growers Association and American Agriwomen. Find them online at www.CommuniqueInc.com, www.Facebook.com/CommuniqueInc and www.Twitter.com/CommuniqueInc.

COMMUNIQUE
cultivating healthy ideas

Delaware Operation S.A.F.E. Clinic Opens Eyes

By Jennifer Marsik Friess
Special to Agricultural Aviation

Normally agricultural aviators don't have much of an audience when they're out spraying, but April 15 was an exception. There were more than 70 guests watching 10 planes and one helicopter from sunup until just about sundown at Chorman Airport in Greenwood, Del. The occasion was an Operation S.A.F.E. calibration clinic for Chorman Spraying LLC.

Jeff Chorman was the highest bidder on an Operation S.A.F.E. Fly-In auctioned at NAAA's 2012 Convention last December. Certified Operation S.A.F.E. Analysts John Garr of adjuvant manufacturer GarrCo Products Inc., and Dr. Dennis Gardisser of WRK of Arkansas LLC, an application technology and aviation insurance company, have been conducting fly-ins for about 30 years combined. They donated their expertise, traveling with equipment in tow to Chorman Airport to check out 10 planes and one helicopter that serve the Delmarva Peninsula.

"We can all go to the meetings in the winter and sit through these lectures about pattern testing and nozzle placement, but unless you actually fly your airplane over the string and have a trained professional evaluate your spray pattern and make recommendations, you really don't know exactly what's coming out of your airplane, and how," explained Chorman.

Operation S.A.F.E. spray pattern testing starts with the flight line, a 150-foot long section of string placed perpendicular to the aircraft's line of flight. A fluorescent dye is mixed with water in the hopper and sprayed across the string. The string is then run through a fluorometer which measures the amount of fluorescence coming from the string. A software program records and displays the spray pattern properties. Garr and Gardisser were evaluating three key aspects of the spray: uniformity of the swath, effective swatch width and droplet size. Spray droplet size is measured by placing water-sensitive cards across the pattern. If problems are observed, the analyst may suggest moving nozzles, shutting them off or positioning them further away from the boom if necessary to achieve a better pattern.

Chorman capitalized on Garr and Gardisser's visit to host a customer appreciation event, bringing in about 70 customers, chemical salespeople and vegetable processors, as well as competitors—some of whom pattern-tested aircraft of their own—to observe the spray evaluation, talk to the experts and hear a presentation during lunch.

Gardisser commented that Chorman's decision to bring in his customers, colleagues and competitors was a thoughtful way to connect. "The guests came before and stayed after the luncheon to observe," he said. "They listened to consultations and asked a lot of technical questions about additives and surfactants.

"There is a misconception that higher volume is better, so we shared recent research that demonstrates that droplet spectrum is better than total volume," he continued. "It's much more efficient to use 3–5 gallons, when some operators and farmers are using up to 10 gallons per acre."

"We had a lot of conversations about tank mixes, and the right products and combinations of adjuvants to insure a homogenous mix and proper deposition," Garr added. "And nozzle placement is always an important and easily corrected performance component."

"We haven't had the opportunity to pattern-test our airplanes, because there hasn't been a fly-in clinic in this part of the country since the mid-80s," Chorman explained. "We've upgraded our fleet and wanted to see exactly where we stood on swath, droplet size and so forth. I invited our competitors so we could all learn."

"This is a very important program for our industry," said NAAA Executive Director Andrew Moore, who made the trip from NAAA's headquarters in Alexandria, Va., to observe the event. "Between the pilots, operators, ground crew and all the cogs involved in the aerial application process, how these aircraft operate so quickly, effectively and efficiently is amazing. It's a beautifully choreographed process. The farmers, the chemical companies and canneries, etc., seemed very impressed at the length the industry goes to, to do what they do."

That's what Chorman had in mind when he extended the invitations. "We are the only operator on the Delmarva operating turbines up until this year, and we wanted to dispel the myth that a slower airplane does a better job than a turbine," he said. "That's why we invited the chemical salesman and the vegetable processors to hear and see what Dennis and John had to say. That was good for people to hear, because it's one thing coming from me, but another thing coming from an expert. Several people commented they didn't know a heavier, faster airplane has better penetration than a lighter, slower one; or that by running less water but making the right droplet size it is just as effective as running a higher gallon-per-acre."

In addition to pattern-testing Chorman Spraying's fleet, two other NAAA operator members participated in the training exercise. Matt Crabbe of Crabbe Aviation LLC flew up from Mechanicsville, Va., to calibrate his turbine-powered Air Tractor 502B. Curt Nixholm, operator of Downstown Aero Crop Service in Vineland, N.J., observed the proceedings from the ground while chief pilot Eddie Carter Jr. flew Downstown's newly refurbished turbine Ag-Cat over the string.

"I didn't fully understand what the Operation S.A.F.E. program was all about until we were all done and I had time to debrief with Dennis and John," Chorman said. "Their expertise is excellent."

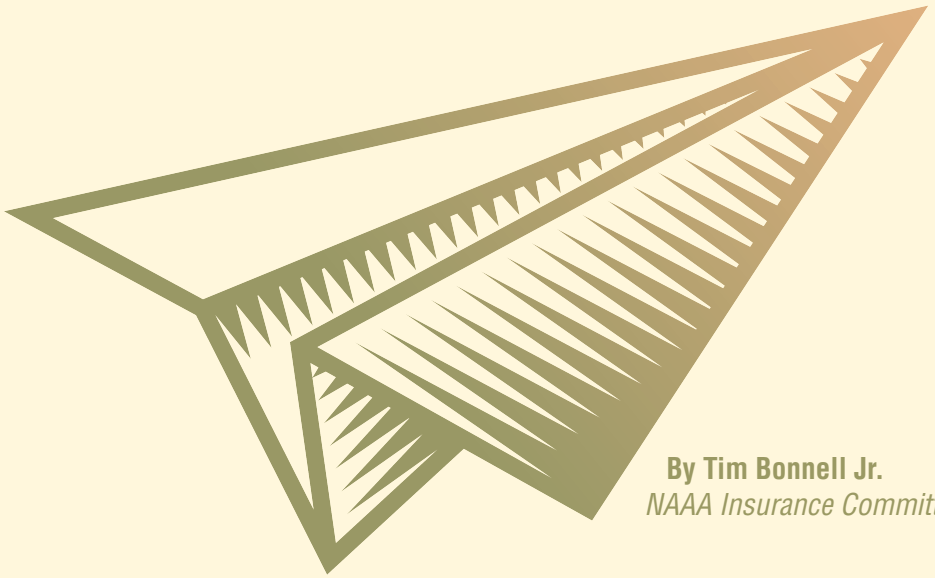
"It was a great day," Moore said. "This industry is very fortunate to have professionals such as Dennis Gardisser and John Garr that donate so much of their time, effort and resources to calibrating ag aircraft nationwide. Also for operators like the Chormans, who put their equipment through the calibration process. It is what makes Operation S.A.F.E. a premiere program, and the farmers reap the dividends."

The added benefit is that Operation S.A.F.E. certified pilots have maximized their performance, which gives them and their customers peace of mind. ■

Contact John Garr at 765-395-3441, mrfoam1@garrco.com or visit www.garrco.com. Contact Dr. Dennis Gardisser at dgardisser@wrkofar.com or visit www.wrkofar.com.

Photo by Kevin Fleming

Clockwise from top left: After an aircraft is flown over the collection string, an Operation S.A.F.E. analyst will run the string through a fluorometer to measure the amount of fluorescence produced by the dye; Jeff Chorman positions to fly the company's helicopter over the string; spray droplet cards record droplet spectrum; Operation S.A.F.E. analyst Dennis Gardisser suggests using a "smiley face" configuration for the length of drop nozzle tubes at the center of a turbine Thrush spray boom; Matt Crabbe pattern tests his Air Tractor 502B; Downstown Aero Crop Service's turbine Ag-Cat zooms over the flight line; hosts Jeff and Allen Chorman (far right) with Operation S.A.F.E. analysts John Garr and Gardisser; Eddie Carter Jr. checks the spray nozzles on Downstown's Ag-Cat with Gardisser.



By Tim Bonnell Jr.
NAAA Insurance Committee

Aerial Application Insurance Coverages

When an agricultural aviation operator experiences damage to an aircraft or has someone calling to allege chemical drift damage, the last thing he wants is to be worried about whether he had the proper insurance coverage for the potential loss. A range of coverage types are available, so it is essential to understand which coverages are on your policy, what isn't covered and which endorsements are available to help shore up any coverage deficiencies. The information that follows will outline the basic types of aircraft hull and liability coverages, some of the key exclusions and several available endorsements for an agricultural aviation insurance policy.

Aircraft Physical Damage (Hull) Coverage

Aircraft Physical Damage (Hull) Insurance is the coverage that protects the financial interests of the aircraft owner and/or the insured party from sudden and accidental losses that occur to the insured aircraft. This coverage isn't for mechanical breakdowns.

You can purchase physical damage coverage for the aircraft on the ground not-in-motion only (the engine hasn't commenced the starting process), or include full flight. The amount of insurance coverage is selected by the insured and agreed to by the underwriter. This amount is called the Insured Value, and is the amount that will be paid in the event of a total loss.

It is important to carry the appropriate amount of physical damage insurance on the aircraft to avoid under or over

insuring the aircraft. Either one could result in a partial loss being unfavorably totaled and/or set the aircraft owner up for an economic loss. Bluebook valuations, and comparing at what price similar (age, equipment, etc.) aircraft are being sold are good practices in setting an appropriate amount of physical damage coverage. It is also important to consider whether the GPS is insured as part of the aircraft or needs to be excluded from the value and policy if it is covered under a separate property policy.

Liability Coverage

Liability is the condition of being legally liable to a third party for damages caused in whole or in part by you. Insurance policies respond in two ways when you become legally liable: 1) to pay the damages you are legally obligated to pay up to the coverage limit, and 2) to provide a legal defense, until the limits of liability are exhausted. The legal defense costs are separate from the liability limits in agricultural aviation policies and can often incur much higher expenses than paying the actual claim.

There are two basic types of liability coverage on an agricultural aviation insurance aircraft policy: 1) **Non-Chemical (Aircraft) Liability**, for third-party bodily injury and property damage not by chemical application, and 2) **Chemical Liability** for damage resulting from the aerial application of chemicals. Many refer to Chemical Liability in slang as "drift insurance." Chemical Liability has several options and unique exclusions.

The three chemical liability category options:

- **Comprehensive Chemical "CC"** – Provides coverage for liability incurred out of the aerial application of seeds, fertilizers or any chemical except Picloram.*

When an aircraft gets damaged, the last thing you want to worry about is whether your insurance will cover it.

(Some policies also add after "except Picloram;" "or any defoliant or desiccants applied in dust form; or any inorganic arsenical compound, except arsenic acid used in liquid spray form as a cotton desiccant or defoliant.")

- **Restricted Chemical "RC"** – Provides coverage for liability incurred out of the aerial application of seeds, fertilizers, insecticides, or fungicides only (sometimes rodenticides are also included in the RC definitions).
- **Excluding Chemical "XC"** – Provides coverage for liability incurred out of the aerial application of seeds and fertilizers only.

Operators can purchase a write-back endorsement providing coverage for liability incurred from the aerial application of **Picloram (Tordon, Grazon).*

These three categories of chemical liability on an unendorsed policy apply to claims arising out of the aerial application to a property not owned by you or the person for whom you are spraying. For example, if you are spraying a wheat field for Farmer A and cause drift damage to Farmer B's field, then the policy will provide coverage for the damage to Farmer B. However, if you spray the wrong field (Target Crop) for Farmer A, apply the wrong chemical to the target field (Target Crop), or cause drift damage to another field owned by Farmer A (Adjacent Fields) there is no coverage

FARMER A Field 1: Wheat (Target Crop)	**FARMER B** Field 1: Wheat (Chemical Liability)
FARMER A Field 2: Soybeans (Adjacent Fields)	**FARMER B** Field 2: Wheat (Chemical Liability)

in the unendorsed policy. To cover these exposures the policy needs to have **Target Crop and Adjacent Fields endorsements**. These can be separately purchased, but if you purchase the Target Crop coverage the Adjacent Fields is generally included. Target crop coverage is also known as **Crops Worked Upon** and **Crops Being Treated**.

Additional Endorsements

In some situations a farmer or contract issuer will require the operator to name them as an additional insured to the operator's insurance policy. Individual farmers can be named as an additional insured, or a **Farmer, Owner, Grower endorsement** might be available to satisfy this requirement. If you are considering either of these options, it would be advisable

to review the policy limits available and dilution of those limits because you will be sharing the same limit of liability with the additional insured. Since separate limits are not provided for each insured, adding an additional insured dilutes the coverage.

Here are some other key exclusions and endorsements to note.

Exclusion: There is no coverage for any claims arising out of the aerial application to rights-of-way or easements for public or quasi-public persons or bodies, waterways, railroads, pipelines or utility companies.
Endorsement: A **Rights-Of-Way write-back endorsement** is available to be added to a policy.

Exclusion: There is no coverage for any claims arising out of the aerial application to any residential area.
Endorsement: A **Residential Areas write-back endorsement** is available to be added to a policy. This is generally important with mosquito and gypsy moth control applications.

Exclusion: There is no coverage while the aircraft is used for smoke or fire patrol, firefighting or control, or any activity in support of those uses.
Endorsement: Several **Wildfire Control, Fire Fighting and Fire Patrol endorsements** are available.

Exclusion: Any claims arising out of the aerial application of herbicides or glyphosate to forests, woods, timberlands or tree farms.
Endorsement: A **write-back endorsement** may be permitted in certain situations.

Exclusion: There is no coverage for any type of pollution, including noise and environmental.
Endorsement: Separate **Environmental Pollution Liability** policies may be available.

Exclusion: There is no coverage if the aircraft is leased, rented, or loaned to anyone other than the Named Insured.

Exclusion: There is no coverage for any claims that are designed to be covered by **Workers' Compensation**.

A few insurance companies may limit the coverage territory for chemical applications to the state of domicile and adjacent states. Operators who spray outside this territory should have their policy endorsed, if necessary, to include any other state in which they spray.

Most states require minimum limits of liability. However, the most common limits on aerial application policies are

$100,000 each person, $300,000 each occurrence for bodily injury, and $100,000 each occurrence for property damage. These limits usually apply to both Non-Chemical (Aircraft) Liability and Chemical Liability. There are higher and lower limits available in many circumstances. Chemical Liability limits of $300,000 each occurrence (and potentially higher) may be available in many situations although at higher premiums. Non-Chemical (Aircraft) Liability limits of $500,000 and $1,000,000 each occurrence are often purchased to satisfy contracts. Most policies will have aggregate (total) limits for bodily injury and property damage on the policy. These aggregate limits may vary by policy (often depending on how many aircraft are on a policy) so it's important to make sure you know your aggregate limit.

Many agricultural aviation operations also have an exposure at the airports/locations from which they operate. This would be remedied with a General Liability policy covering losses, such as slips and falls, at the premises from where they're operating. This may only include the premises coverage mentioned above, or be expanded to include products/liability or hangar keepers legal liability if the operator also sells fuel or performs maintenance for others. This liability coverage is for third party bodily injury and property damage claims. The policy does not, however, cover pollution and environmental damage claims. There are separate policies available for this exposure.

While this information gives you some of the basic information about agricultural aviation insurance, it by no means covers every detail, coverage and exclusion of the policy. As always, please read your insurance policy. There are other insurance policy types that were not discussed in this article, such as environmental/pollution liability, business income insurance, property and contents coverage, workers compensation insurance, life and health insurance, that your operation may require. Please visit with your aviation insurance agent to make sure you have the proper coverages to meet your operation's needs. ■

Is there an insurance matter you would like to learn more about or think would be of interest to Agricultural Aviation's readers? The NAAA Insurance Committee welcomes your suggestions. Please send insurance article ideas to information@agaviation.org.

Photo by Michael Kennedy

Understanding Spray Classifications by Droplet Size

One of the first things any applicator is concerned with when setting up their equipment is the droplet size or spray classification required as specified by the label and application site conditions. This can potentially be a confusing process when mixing droplet size numbers and spray classes along with the tools, such as the spray nozzle models, used to make these decisions. The droplet classification system itself can also provide some confusion. This article will focus on why a classification method is used, how it is used to classify nozzles and what the actual spray classes mean relative to physical droplet size.

The classification scheme was developed as a method to ensure that measurements of droplet size were consistent between the labs and research facilities that make droplet size measurements. With this in mind, the American Society of Agricultural and Biological Engineers adopted a Standard (ASABE S572.1 – Spray Nozzle Classification by Droplet Spectra) that defines a set of standard reference nozzles and spray pressures that each testing facility should use to establish a measurement scale to define a series of Droplet Spectra Classifications (DSC) ranging from EXTREMELY FINE to ULTRA COARSE. This method ensures that though absolute droplet size numbers may vary between test facilities, the assigned DSC remains constant. So a nozzle setup that produced a MEDIUM spray at one facility would be classified as MEDIUM by any other facility. These reference nozzles and pressures also provide a check to ensure that day-to-day testing is done in a consistent manner. This becomes increasingly important given the number of test facilities being used to evaluate agricultural spray technologies.

The standard defines a series of nozzles and pressures, each of which defines the boundary between the specific DSCs. For a given test facility each of these nozzle/pressure combinations is evaluated by a test facility and the results used define the boundaries to be used by that lab to assign DSC. As an example, from the current USDA-ARS Spray Atomization Models, the droplet size data corresponding to the boundaries between the applicable spray classes are given in Table 1. These numbers represent the border between each of classes.

Spray Class	DV0.1*	DV0.5*	DV0.9*
Very Fine/Fine	84	182	309
Fine/Medium	141	280	524
Medium/Coarse	160	429	834
Coarse/Very Coarse	244	531	929
Very Coarse/Extra Coarse	299	655	1,390

Table 1. Current USDA-ARS spray nozzle models Droplet Size Classification boundaries

**$D_{V0.5}$ = Volume Median Diameter – The spray droplet diameter for which 50% of the spray volume consists of droplets of equal or lesser diameter. $D_{V0.1}$ and $D_{V0.9}$ – Similarly, the spray droplet diameter for which 10% and 90% of the spray volume consists of droplet of equal or lesser value.*

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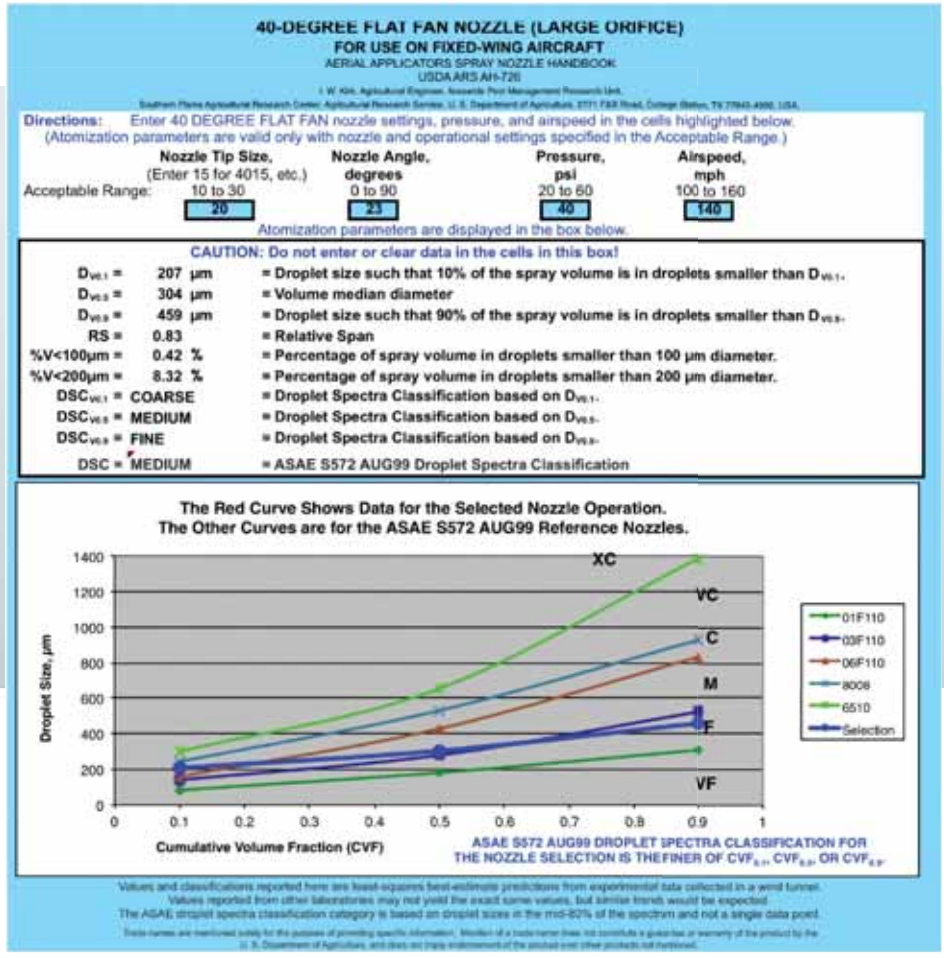


Figure 1. Example Result from the current USDA-ARS Spray Atomization Models

After evaluating a given nozzle operating under a given pressure, orientation and airspeed, the resulting $D_{V0.1}$ and $D_{V0.5}$ values are compared to those from the standard reference nozzles to determine the DSC (see the definitions in Figure 1 for explanations of $D_{V0.1}$, $D_{V0.5}$ and $D_{V0.9}$). The smallest class determined from either $D_{V0.1}$ of $D_{V0.5}$ is assigned. For example, for a given nozzle setup a $D_{V0.1}$ of 150 µm and $D_{V0.5}$ of 300 µm[1] is measured. Both of these result in classifying the spray as MEDIUM, so this particular nozzle and operating condition would be a MEDIUM spray. On the other hand, if the $D_{V0.1}$ was 110 µm and the $D_{V0.5}$ was 300 µm, the $D_{V0.1}$ results in a FINE class while the $D_{V0.5}$ results in a MEDIUM class, so this would be classified as a FINE spray. The reason for using the smallest class in which a spray occurs for classification is based on the desire to be conservative in terms of minimizing potential drift from a given spray setup.

While the spray classification standard can look complicated, it merely provides a scale that we can use to assign the DSC to any nozzle setup that is tested. The use of a classification system makes label language easier to write and interpret because it is not necessary to use numerical values when describing the required droplet spectrum. Also, because of the

1 µm = microns

Knowing the Droplet Spectra Classification means you can follow the label. Knowing the actual numerical values means you can fine tune your aircraft to optimize both efficacy and drift reduction.

differences in numerical values from different labs potentially reported for the same nozzle setup, the use of a spray class helps with consistency in label compliance as a MEDIUM spray is a MEDIUM spray regardless of who made the measurement. Another benefit of the classification system is ease of understanding. If you've ever had to listen to us or others talking about spray droplet size, you know what we mean! The numbers can be confusing, and a simple classification makes it easier to know what droplet size is needed and what nozzle setups will provide that class.

An obvious drawback to the classification system is the loss of detail. Just because two nozzle setups both have their spray classified as MEDIUM does not mean they are identical. One will likely have a lower percentage of fines (droplets smaller than 100 microns in diameter) but that detail is omitted when the class is assigned. This is why we feel the numerical values are still important when setting up your aircraft. Knowing the class means you can follow the label. Knowing the actual numerical values means you can fine tune your aircraft to optimize both efficacy and drift reduction.

The USDA-ARS aerial spray nozzle models (available at *http://apmru.usda.gov/aerial/*, then click on the "Atomization Models" link) provide both the numerical values as well as the classification. The example provided in Figure 1 shows spray nozzle model output for a 40-degree flat fan nozzle with a size 20 orifice, 23 degrees nozzle deflection, operated at 40 psi and an airspeed of 140 mph. The values for the $D_{V0.1}$, $D_{V0.5}$, and $D_{V0.9}$ are at the top of the output, followed by the percentage of spray contained in droplets less than 100 and 200 microns. Following this is the Droplet Spectra Classification (DSC) for the $D_{V0.1}$, $D_{V0.5}$, and $D_{V0.9}$ values and the overall droplet spectra classification. The graph at the bottom shows the droplet spectra curve for the selected nozzle setup in red in comparison to the reference nozzle droplet spectra curves (plotted from data in Table 1). For this setup, the overall classification would be MEDIUM because that is the smallest class into which the $D_{V0.1}$ and $D_{V0.5}$

fall. For label compliance, you would need to focus on the overall DSC.

Figure 1 also shows why the $D_{V0.9}$ value is ignored for classification. This is an aerial nozzle setup, which typically means a narrow droplet spectrum. It had a $D_{V0.9}$ of 459 microns, which places it in the FINE droplet category for the $D_{V0.9}$ value. However, a droplet with a diameter of 459 microns is not at risk for drift. If the $D_{V0.9}$ value were used for classification, this setup would be classified as FINE. For this nozzle setup a classification of FINE would be very misleading implying a high risk of drift. This is clearly not the case, as this setup has less than 1% of its total spray volume consisting of droplets smaller than 100 microns.

The takeaway here is that while we tend to talk only in absolute droplet size diameters, the DSC category will be the industry standard used by those involved in pesticide applications and should be what you use to make sure you're in compliance with the label. The droplet diameters help make sure your aircraft is setup to do the exactly the job you want it to. Use the USDA-ARS Spray Atomization Models to verify label compliance and set up your aircraft. And don't fall asleep the next time you have to listen to one of us talk about spray droplet size! ■

Drs. Fritz, Hoffmann and Bretthauer are members of the American Society of Agricultural and Biological Engineers.

P&WC's PT6 Engine

Brilliant Design Still Paying Dividends

Pratt & Whitney Canada's iconic PT6 engine marks its 50th anniversary this year. It's a remarkable engine with a remarkable track record. While every new model of the engine incorporates the latest in technology, many of the decisions made by the PT6's original designers have stood the test of time and have directly contributed to the engine's outstanding reliability and its enduring success.

The choices the engineers made held many benefits, all of which combined to create an engine with a reputation for unmatched dependability. The PT6 engine has basic in-flight shut down (IFSD) performance of one event per one million hours of flight, 10 times better than the industry standard which is 10 events per one million hours of flight.

The traditional approach was to use a single shaft layout connecting both the gas generator and the power turbine sections of the engine. The PT6 engine's engineers however recognized this tended to limit engine performance in the operating envelope, increased operability restrictions and decreased flexibility in terms of operation and maintenance.

"That was what the designers wanted to address," says Denis Parisien, Vice President, General Aviation at P&WC. "They opted to go with a free turbine layout whereby the power source, the gas generator turbine, is not directly connected to the shaft that turns the propeller. Because the turbine is not directly connected to the shaft, starting the engine is much simpler and requires a smaller starter device."

The free turbine layout additionally allows for the use of a simple hydro-mechanical engine control system and provides for the selection of a wide range of propeller speeds and sizes.

The PT6 engine is also designed to power a simple propeller, also known as a single-acting propeller because it is configured with a spring on one side and a hydraulic piston on the other. Every PT6 engine ever made uses a single-acting propeller.

The team chose an opposed shaft layout which is simpler than the alternative, a concentric shaft layout. An opposed shaft layout has the two shafts pointing in opposite directions, separate from each other. The concentric layout places one shaft inside the other, adding to the complexity of the design.

"When you reduce complexity, you reduce costs," says Parisien, "and simpler designs are easier to operate and maintain."

The PT6 engine's design also means a screen can be used to cover the air inlet which leads into the air chamber, helping prevent foreign object damage.

From a maintenance perspective, one of the engine's most beneficial aspects is the work that can be conducted while the engine is on wing, eliminating the need to remove the engine and ship it to a shop for routine maintenance.

"Because the power and gas generator sections are separate," explains Parisien, "a technician can open up the engine and access all the hot section parts for inspection while the aircraft is in the field."

By enhancing many components of the original engine, including the compressor, the turbine and the combustion chamber, P&WC engineers over the years have greatly improved the engine's operating power and its specific fuel consumption. Today's PT6 engine is up to four times more powerful than the original engine, has a 40 percent better power-to-weight ratio and consumes up to 20 percent less fuel.

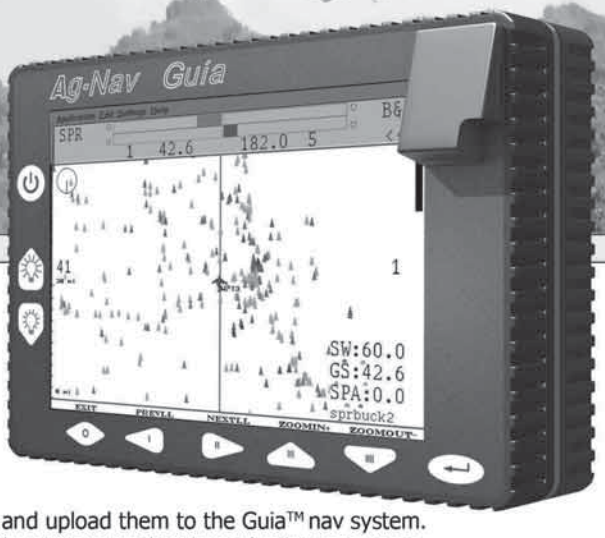
P&WC recently introduced the PT6A-140 engine to power Cessna's Grand Caravan EX, which incorporates advanced aerodynamics, a more efficient compressor and the latest generation of hot section materials. The engine is the first variant of next-generation products that produces 1,075 shp (shaft horsepower) thermal for significantly improved climb, cruise and take-off performance in hot and high operation.

While the basic layout of the engine and its diameter have remained the same over the years, P&WC has consistently employed the latest in materials and analytical methods in every new generation of the PT6 engine. This has ensured the engine continues to deliver the optimal performance on which its reputation has been built. ■

The intricate anatomy of a PT6 engine compressor

AG NAV

GPS PRECISION NAVIGATION



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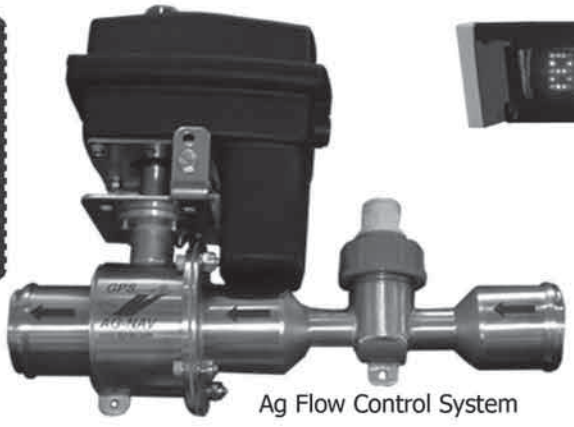

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RETURN THIS APPLICATION TO: NAAA, 1440 Duke Street, Alexandria, VA 22314 www.agaviation.org

Or Fax to: 202-546-5726. Questions, call 202-546-5722 or email to information@agaviation.org

Welcome to New Members

As of May 15, 2013

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Shawn Sullivan
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Heritage Ag LLC
Americus, GA

Curtis Priest
Merced County Mosquito
Abatement District
Merced, CA

Patrick Cohen
Cabot, AR

Brandon Mills
Greenwood, DE

Kevin Saltzman
Rayne, LA

Kyle McElwain
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Daniel Bierwagen
Grass Valley, CA

Cole Correia
Pleasant Grove, CA

Brandon Elliott
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Tanner Farrar
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Kelsey Monk
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Scott Oliphant
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James Ormond
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Keith Taylor
Taylor's Flying Service
Griffithville, AR

Jordan Whichard
Washington, NC

Jacob Williams
Hart, TX

ASSOCIATE

Vaughn Ross
V.R. Ross Associates
Baton Rouge, LA

Dwayne Mobley
Dallas, TX

William White
Royal Flying Service
Royal City, WA

James Allmon
Maypearl, TX

Ronald Del Vecchio
University of Minnesota Crookston
Crookston, MN

Jeremy Searls
Willis, TX

2012 FAA General Aviation Activity Survey Underway

Please help us provide accurate information on aviation activity and aviation safety. The 35th annual General Aviation and Part 135 Activity Survey (GA Survey) for reporting on calendar year 2012 is underway.

The FAA's annual GA Survey is the only source of information on the general aviation fleet, the number of hours flown and the ways people use general aviation aircraft. These data help to determine funding for infrastructure and service needs, assess the impact of regulatory changes and measure aviation safety. The GA Survey is also used to prepare safety statistics and calculate the rate of accidents among general aviation aircraft.

If you were selected to complete this year's survey, you would have received a postcard invitation or a survey form in the mail along with a postage-paid envelope. You can complete the survey online or by mail.

Why is your participation important?

- *The FAA needs your help to prepare accurate estimates of aviation safety.* Data from this survey are used to calculate fatal accident rates for general aviation and Part 135 aircraft.
- *The FAA needs to hear from everyone who receives an invitation to participate!* Please respond, even if you did not fly your aircraft during 2012, you sold it or the plane was damaged.
- *Your responses are confidential.* Tetra Tech is an independent research firm that conducts the GA Survey on behalf of the FAA. The information will be used only for statistical purposes and will not be published or released in any form that would reveal an individual participant.
- *A short version of the survey form is available for owners of multiple aircraft.* We know your time is valuable. If you own three or more aircraft and receive several surveys, please contact the survey contractor.

Questions? Own three or more aircraft? Please contact Tetra Tech toll-free at 1-800-826-1797 or email infoaviationsurvey@tetratech.com.

A Word from NAAA on the GA Activity Survey

NAAA feels it is extremely important to provide the FAA with accurate information since the GA Survey is the only source available to estimate the amount of hours flown by ag aircraft. Don't assume because the title mentions Part 135 that it does not apply to ag aircraft owners. The data compiled will estimate the ag hours flown and the type and number of aircraft used by our industry during 2012. Full participation by Part 137 operators, if they receive a request to complete the survey, is crucial since the information is used to calculate the accident rate within our industry.

NTSB Accident Report

Date	City	State	Aircraft Type	N #	Injury	Description of Accident
02/07/13	Forrest City	AR	AT-502	198LA	None	Control problem–bolts missing from aileron control tube
02/24/13	Greenbrier	AL	AT-301	7310N	None	Struck tree with right wing
04/24/13	Bowling Green	MO	AT-301	23416	None	Power loss–forced landing after departure
05/02/13	Pomeroy	WA	R44 II	442RN	None	Settled to ground after takeoff from truck
05/04/13	Somerton	AZ	OH-58A+	911RN	None	Hit terrain avoiding wires during night operation
05/05/13	Lamar	MO	PA-25-235	82509	FATAL	Hit ground during proficiency demonstration
05/05/13	Udall	KS	AT-602	628JP	None	Hit power line–wing damaged on forced landing
05/07/13	Lyons	KS	A188B	731JF	Minor	Power loss during spray turn–impacted ground
05/08/13	Lyons	KS	AT-301	23257	None	Distracted by door opening and hit terrain
05/10/13	Hartford	KY	Bell 206B	94PH	None	Hit power line then impacted ground
05/15/13	Butte City	CA	G-164D	83110	Minor	Hit terrain–overbanked, could not recover
06/06/13	Ludlow	SD	We 620B	350WR	FATAL	Hit terrain for unknown reason

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Dr. Bradley Fritz
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Dr. Clint Hoffmann
Kerry Porter
Rod Thomas

Memorials presented to the PAASS Program

NAAREF and the PAASS Program express sympathy to all those who have lost loved ones or friends and wish to have them remembered through a memorial. We are extremely grateful to those families who, during their time of grief, decided to request that memorial donations be made to the PAASS Program. Those memorials will be used in the production of our PAASS safety and educational program with the goal of preventing injury or death to those engaged in the aerial application industry. The donors remain on the list for a year after their donation is received.

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