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2012 Aerial Application Survey:

Profile of the Industry

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President's Message

Mark Hartz

The Power of Professionalism

As I begin my travels visiting many of the state conventions I am time and again reminded of what great people we have in our industry. The hospitality is overwhelming, the fellowship is heartwarming and the professionalism with which they conduct their conventions is impressive.

Professionalism. That word just jumped out at me as I typed that last sentence. I am intrigued by that word. Let's look at a couple of definitions of professionalism.

pro.fes.sion.al.ism noun

1: The conduct, aims, or qualities that characterize or mark a profession or a professional person.

2: The skill, good judgment, and polite behavior that is expected from a person who is trained to do a job well.

Those definitions are courtesy of the Merriam-Webster Dictionary. I really like that last one, but I also have another take on the meaning of professionalism which is: To do the right thing even when no one is looking.

How does the issue of professionalism apply to us? The root word profession is defined as a type of job that requires special education, training or skill. Well, our profession certainly requires all of those qualities in spades. While you may arrive at our profession absent of special education, training or skill, I guarantee before you take your first flight in an agricultural aircraft you will have had a great deal of specific education and training. Generally speaking, new people coming into this industry possesses some skill in regards to flying an aircraft, which is enhanced as they progresses through their initial training in becoming a professional aerial applicator.

With the extensive training programs within the industry, such as the PAASS Program developed and presented by the National Agricultural Aviation Research and Education Foundation (NAAREF), numerous stewardship brochures including the extensive and very informative aerial applicator edition of "50 Ways to Treat Your Pesticide," which Syngenta produced with the support and assistance of NAAA, and more, all in our industry have access to the information on how to conduct our operations with professionalism. There is no valid excuse for saying, "I just didn't know."

While there is an amendment to the United States Constitution giving us the right to bear arms, there is no such amendment giving us the right to aerially apply crop protection products. If you ask me, our ability to do what we do is a privilege and not a right.

Counter Public Perception Through Professionalism

There is a tendency in our country today to be opposed to anything that one might be unfamiliar with. As our population shifts to a more urban-based mindset, there is an ever-increasing disconnect between the agrarian roots our country was founded on and that which constitutes modern society today. In this age of tabloid journalism, YouTube and other means of instant access to the masses, actions by all can enter in the public domain in a matter of moments. Therefore, it is incumbent upon everyone in our industry to conduct themselves with professionalism. There are enough unfounded accusations of wrongdoing—be it drift complaints, human exposure incidents or operating too close to towns and outlying homes—as it is; we certainly don't need to add to the problem by providing those who oppose us with legitimate complaints. Nothing can be gained by inflaming public opinion against us. We must strive to lessen the impact when our world intersects with that of the general public.

Another aspect of professionalism that we must pay close attention to is the service we provide to our customers. With technology that exists today the work we do for our customers is scrutinized in more ways than we ever thought possible. By now everyone in this industry knows what parameters

optimize the application job done with their aircraft whether it be wet or dry materials. Professionalism dictates that we reject the temptation to deviate from the optimum swath width to a wider swath when you are suddenly way behind in your workload. While you may not get a pat on the back for a great job you just might get a swift kick for a job that was botched because you were in a hurry.

Professionalism also dictates that you take care of aircraft or application equipment issues when they occur rather than waiting until the rush is over. Nothing says unprofessional like trailing spray to and from the field. These are just some of the things that turn public opinion against us. We must strive to eliminate from our mindset any self-justification that it is O.K. to operate this way in a pinch. "Just for a little while" doesn't cut it.

We have recently seen how a part of the government that up to this point has never intervened in how our industry operates has cast a wide net of governance over us. The decision by the U.S. 6th Circuit Court of Appeals regarding the NPDES Pesticide General Permit shows how vulnerable our industry is to outside regulatory forces. While NAAA does everything it can to prevent these intrusions from occurring, sometimes the political system thwarts our efforts to eliminate or reduce their impact.

Let's all take a step back and examine our operations and look for ways to improve how we operate. It is incumbent on all of us to enhance the perception the public has of this great industry, make safety a priority and continue our role in helping to provide the world with safe, affordable, abundant food and fiber. ■

Executive Director's Message

Andrew Moore

Prescience[1]

"There are no secrets to success. It is the result of preparation, hard work and learning from failure."

—Colin Powell, Former Chairman of the U.S. Joint Chiefs of Staff and U.S. Secretary of State

It's good to be optimistic. And when considering the economic outlook of U.S. agriculture there is a lot to be optimistic about. Assuming favorable weather for crops U.S. farmers will enjoy solid profits in 2012, with crop and livestock receipts on par with 2011. According to USDA's Economic Research Service, net farm income for 2011 was a record $21.8 billion, up 28% and matching the increase from 2010.

Providing strong demand and good prices for U.S. farm goods are the dual increases of world income levels and population (7 billion moving up to 9.3 by 2050). In China, for example, 225 million low-income households will migrate to the middle class by 2020 and about 125 million in India. This creates more demand for meat, dairy and the grains to produce for both.

Decreasing ag commodity stocks are also pushing the demand curve upward. According to USDA, world year-end stocks of corn and other feed grains were over 190 million metric tons from 2008–2010; 165 million in 2011 and forecast to be less than 160 million metric tons in 2012. Another helpful variable for U.S. ag exports is that trade pacts, such as the Trans-Pacific Partnership, will boost U.S. ag exports to Pacific Rim countries as a result of reduced tariffs, the region's growing population and its countries' growing economies.

This positive outlook benefits ag aviation, for if farmers are getting a good price they are more likely to utilize aerial application services to ensure quick and effective delivery of crop protection products, and prevent damage to their crop and top-soil erosion that other forms of application can cause.

Rainy Day Fund

While optimism is good, it's better to be cautiously optimistic and use the resources collected in the good times to be prepared in the event we enter an agricultural economic downturn. Ag commodity prices are high, which is good for us, but forecasts indicate that fuel, one of our primary operational expenses, will also be on the rise. According to a recent *Financial Times* article, veteran oil watcher Paul Horsnell of Barclays Capital predicts oil prices of $185 a barrel by 2020 due to the unstable and sweeping changes occurring in the Middle East; demand growth from energy-hungry nations in the developing world such as China and India; and a lack of stomach for more domestic

MAKING THEMSELVES AT HOME *NAAA hosted Sen. John Boozman (R-AR) at its annual AgAv PAC breakfast in February, and several constituents were among those in attendance. Pictured from left to right: NAAA Executive Director Andrew Moore; NAAA's Arkansas board representative Brenda Watts, Watson, Ark.; NAAA President Mark Hartz, Almyra, Ark.; Lou Stokes, Parkin, Ark.; Doug Davidson, Clinton, Ark.; Dennis Gardisser, Lonoke, Ark.; and Sen. Boozman. The PAC breakfast was held in conjunction with NAAA's Spring Board Meeting in Alexandria, Va. (pg. 39).*

[1] human anticipation of the course of events: foresight

oil production here in the U.S. The average price for a barrel of oil in 2011 was $86.84; 2008 holds the record for the highest average price of oil in any one particular year at $91.48 a barrel.

Also looking forward, even more significant advances are projected in biotechnology including developing plant varieties with drought tolerance and nitrogen utilization. These two developments alone could markedly increase yields, expand supply and decrease ag prices. It's best to prepare for these scenarios of higher input costs and decreased economic activity while profits and resources are high.

For well over a decade now, NAAA has moved the development of aerial application research technology to the forefront of its most important issues. This has resulted in an increase in federal spending on aerial application research at USDA's Agricultural Research Service. Many key developments have come out of this program that have either built or will build efficiencies into the aerial application of crop protection products. Using precision application by coordinating infrared mapping with geographic information systems, global positioning systems and flow control systems can now—and will with increasing accuracy in the future—enable specific and ranging doses of product to be applied to the different areas of a field depending on the need of the individual plant. This enhances effectiveness and fuel efficiency.

Whether it is drift mitigation technologies, proper set-up and use of new application technologies to carry less water

WELCOME BACK! *NAAA sponsored a reception with other national agricultural commodity groups for congressional ag staffers welcoming them back to Capitol Hill to begin the 2012 legislative session. From left to right: Danna Kelemen, NAAA's manager of government and public relations, Andrew Moore and David Rokeach, legislative assistant for U.S. Representative Randy Neugebauer.*

per unit of active ingredient per acre resulting in fuel and application efficiency and effectiveness, etc., the tools that enable all these enhancements should be considered and adopted today to prepare for the chance, and some would say likelihood, of an ag economic downturn. Take advantage of windfall profits and invest in new technologies or consider an expanded business model such as diversifying and retailing chemicals if you aren't already. At a minimum, take time to consider how you might prepare and implement for slower economic activity. Even if economic activity continues at this record pace, preparation, if nothing else, can bring peace of mind. ■

"Before anything else, preparation is the key to success."

—Alexander Graham Bell, American Inventor of the telephone in 1876

WNAAA President's Message

Kathy Diehl

An Inside Look at the WNAAA

One of my goals for this year is to increase involvement in the WNAAA. With this in mind, a quick primer about who we are, what we do and why we do it seems appropriate.

The WNAAA is the companion organization to NAAA. Members are comprised of any NAAA member, NAAA Allied member or spouse or representative of any member. The women of this group are dedicated to education, communication and the positive promotion of the industry both publicly and within our membership. This is made possible through many programs such as the Athena Project, WNAAA scholarships and activities at the National Convention.

In addition to our own convention, representatives from both NAAA and WNAAA serve as exhibitors at various educational and agricultural trade shows throughout the year, such as the FFA National Convention and Expo. The purpose for exhibiting at these large ag shows is to bring new people into the industry and promote the importance of aerial application to our nation's farmers.

The WNAAA Board is made up of representatives from each state or regional association, past WNAAA presidents and an officer team. All board members are expected to attend three board meetings and serve on assigned WNAAA committees which meet during those meetings. Board members may also be asked to serve on NAAA committees. The Spring Board Meeting is held in February and takes place in Washington, D.C. The Fall Board meeting is in October and held in a different location each year. The last board meeting is held at the National Convention. Currently, the standing committees for the WNAAA are as follows:

Fellowship is high on the agenda at the WNAAA Convention, and women of all ages are welcome. Informal events like the WNAAA President's Reception are one of several get-to-know-you events scheduled during the convention.

Convention: Develops and hosts a variety of activities for all women attending the National Convention.

Ways & Means: Selects and directs the ordering of merchandise to be sold at the WNAAA booth during the annual convention, and obtains items for the live and silent auctions.

Raffle: Organizes and obtains items for a raffle to be held at the annual convention.

Scholarship: Conducts the award selection process to determine two winning scholarship essays. This committee will also develop the next year's topic.

Budget and Finance: Reviews WNAAA finances and prepares the annual budget to be submitted to the Board of Directors for approval and presentation to NAAA Board of Directors.

Policies and Procedures: Reviews the WNAAA bylaws, as well as general policies and procedures of all WNAAA committees.

Nominating: Selects WNAAA nominees for the offices of President, Vice President, Secretary and Treasurer, and the recipient of the Opal and Bill Binnion Memorial Award.

Athena: Members consist of Athena presenters who develop a new program each year to be presented at the National Convention and any state or regional convention when invited. The Athena Project is designed to help wives who work in the aerial application business and office workers strengthen client and customer relationships since they are often the first people to interact with clients and customers. It also teaches them how to extoll the benefits of aerial application and talk about our environmental stewardship.

"Alone we can do so little; together we can do so much."

—Helen Keller

The success of the WNAAA has been achieved because of the involvement of its members. The involvement of this group does not end after the board meetings or convention, but continues throughout the year. Serving on a committee can be time-consuming, but the end results are very rewarding and extremely important to our entire organization. Each member is invaluable when sharing their ideas, knowledge and enthusiasm with others in the aerial application industry. The involvement of every member continues to determine the direction, focus and success of the WNAAA, and the many programs we support.

I would personally like to invite all women who have a stake in this industry to become members of the WNAAA. All members are welcome to attend any board or committee meeting. The networking opportunities are abundant and many lifelong friendships have been formed. I have found that there is always someone willing to listen when you have problems or concerns in your business or within the industry. Join the WNAAA today and help us continue the promotion of the agricultural aviation industry and its contribution to society. ■

Washington Report

John Thorne and Danna Kelemen

Pesticide NPDES General Permits

An Update on How They Affect Aerial Applicators

Every NAAA member who applies pesticides into, over or near waters of the U.S. or helps make decisions about applying such pesticides is now subject to pesticide NPDES general permits (PGPs)—either developed by EPA or individual states. For the states in which you operate, you will need to know what's needed to comply with these PGPs to avoid triggering enforcement action, or worse, citizen suits. This overview supplements NAAA's comprehensive review of the NPDES permit (*www.agaviation.org/content/epafinalnpdes12-1-11*) and other resources developed by NAAA for its members.

It is now a federal violation of the Clean Water Act (CWA) to spray a pesticide from an airplane or ground sprayer into (directly or nearby so that it settles into) a waterbody of the U.S. without coverage by, and compliance with, an NPDES permit. EPA's PGP became effective when posted Oct. 31, 2011, but for 120 days (through February 2012) the agency focused on compliance assistance related to the PGP, rather than enforcement. Of the 44 states that are developing their own versions of the PGP, a few hadn't completed their PGPs by the first of 2012, but will soon. You may evaluate your compliance requirements for those other states by examining the chart of state pesticide NPDES general permits (*www.agaviation.org/sites/default/files/State_Analysis_1-3-12.pdf*) located on NAAA's website. Hyperlinks to the actual permits are located in this chart, allowing you to study details not included in the chart. Keep in mind that although the compliance requirements themselves are quite burdensome, the benefit is that once coverage is gained the applicator and/or decision-making entity that has hired the applicator is protected from the substantial enforcement penalties (up to $37,500 per day for each violation, going back to the original date of the violation) as well as citizen suits. Of course, the newly implemented PGP requirements are in addition to all other applicable requirements, such as FIFRA label requirements.

Applicators and Decision-makers: The key question is who must apply for PGP coverage versus who is automatically covered. To assist applicators in determining whether an NPDES permit is required for a pesticide application EPA has developed an interactive pesticide permit decision tool (*cfpub.epa.gov/npdes/pesticides/prtool.cfm*). EPA has established different requirements for applicators and decision-making entities (e.g., your clients), and it's important to know the difference between these categories so you can meet the PGP requirements that apply to your business. Overall, the PGP regulates the activities of pesticide "*operators*" involved in discharges (pesticide applications) into, over or near waters of the U.S. These are either (1) "*applicators*" who perform the application of pesticides or have day-to-day control over the pesticide applications (i.e., they are authorized to direct workers to carry out those activities) that result in discharges to U.S. waters; or (2) "*decision-makers*" who have control over the decision to perform pesticide applications, including the ability to modify those decisions, that result in discharges to U.S. waters. Automatic coverage for those operators to whom it is available is a benefit, for less paperwork and compliance requirements are involved.

In the PGP, applicators have less burdensome requirements than decision-makers. But when an applicator is also a decision-maker (makes the decision to apply, what to apply, etc.), the applicator must comply with all applicable requirements imposed on *both* applicators and decision-makers. Furthermore, when the PGP references all "operators," both applicators and decision-makers must comply. To make things more confusing, the PGP states "subcontractors" who are hired by an owner or other entity but are under the *supervision* of such owner or entity generally are not considered by EPA to be operators (their clients that hire them would be the entities regulated by the PGP). On the other hand, landowners or other entities are

not likely to be considered an operator subject to the PGP if, for example, they own the land but the pest control activities are being performed outside of their control (e.g., a public agency is spraying for mosquitoes over private property, or a private party is spraying for weeds on public lands leased from the federal government).

TABLE 1: NPDES PGP Requirements for Pesticide Applicators

Requirement	Requirement Descriptions
Use Pest Management Measures	To the extent not determined by the decision-maker, applicators must use only the amount of pesticide and frequency of pesticide application necessary to control the target pest, using equipment and application procedures appropriate for this task; also maintain pesticide application equipment in proper operating condition, including requirement to calibrate, clean, and repair the application equipment and prevent leaks, spills, or other unintended discharges; and also assess weather conditions (e.g., temperature, precipitation and wind speed) in the treatment area to ensure application is consistent with all applicable federal requirements.
Conduct Certain Monitoring Activities	During any pesticide application with discharges authorized by the PGP, all applicators must, when considerations for safety and feasibility allow, visually assess the area to and around where pesticides are applied for possible and observable adverse incidents, as defined in Appendix A (www.epa.gov/npdes/pubs/pgp_appa.pdf), caused by application of pesticides, including the unanticipated death or distress of non-target organisms and disruption of wildlife habitat, recreational or municipal water use;
Take Corrective Actions as Needed	Operators must review and, as necessary, revise the evaluation and selection of Pest Management Measures (described in (1) above) for the following situations: any spill, leak or unauthorized release or discharge of pesticides not authorized by this PGP or another NPDES permit; the EPA concludes or applicator becomes aware that the Pest Management Measures are not adequate/sufficient for the discharge to meet applicable water quality standards; any monitoring activities indicate a failure of such Pest Management Measures to meet PGP requirements; an inspection or evaluation of activities by officials reveals that modifications of Pest Management Measures are necessary to meet requirements of the PGP; or any operator observes or is made aware of an adverse incident as defined in Appendix A. Any corrective actions must be made before or, if not practicable, as soon as possible after the next pesticide application that results in a discharge. Refer to NAAA's summary and interpretation of the PGP and the PGPs themselves to identify your responsibilities.
Document Adverse Incidents	If an operator observes or is otherwise made aware of an adverse incident, as defined in Appendix A, which may have resulted from the discharge of a pesticide to a water of the U.S., the operator must immediately notify the appropriate officials (cfpub.epa.gov/npdes/contacts.cfm?program_id=410&type=REGION). In addition to the 24-hour adverse incident telephone report, he or she must also file a 30-day written report to the appropriate EPA Regional office and to the state lead agency for pesticide regulation (see npic.orst.edu/reg/state_agencies.html). Also, if an operator becomes aware of an adverse incident to threatened or endangered species or critical habitat, notification of National Marine Fisheries Service (NMFS) in the case of anadromous or marine species, or the Fish & Wildlife Service (FWS) in the case of terrestrial or freshwater listed species or habitat is required. Additional information on federally listed threatened or endangered species and federally designated critical habitat is available from NMFS (www.nmfs.noaa.gov) for anadromous or marine species, or FWS (www.fws.gov) for terrestrial or freshwater species.
Report Certain Spills and Leaks	If an applicator or other operator becomes aware of a spill, leak or other unpermitted discharge that triggers notification and results in an adverse incident, then this must be reported.
Recordkeeping	All for-hire applicators must retain the following records: (a) documentation of equipment calibration; (b) information on each treatment area to which pesticides are discharged, including: description of each treatment area, including location and size (acres or linear feet) of treatment area and identification of any waters, either by name or by location, to which pesticide(s) are discharged; Pesticide use pattern(s); Target pest(s); Name of each pesticide product used including the EPA registration number; Quantity of each pesticide product applied to each treatment area; Pesticide application date(s); and Whether or not visual monitoring was conducted during pesticide application and/or post-application and if not, why not, and whether monitoring identified any possible or observable adverse incidents caused by application of pesticides.
Records Retention	All required records must be documented as soon as possible but no later than 14 days following completion of each pesticide application. Operators must retain any records required under this permit for at least three years after the Operator's coverage under this permit expires or is terminated. Operators must make available to EPA, including an authorized representative of EPA, all records kept under this permit upon request and provide copies of such records, upon request.

Table 2: Definition of Waters

Waters of the U.S. *Enforceable Definitions*	"Waters of the United States" is defined in the Clean Water Act (CWA), in federal rules at 40 CFR 122.2, and modified by two recent Supreme Court rulings.[1] The definition is linked to commerce and navigability: • All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; • All interstate waters, including interstate "wetlands;" • All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, "wetlands," sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters: (a) Which are or could be used by interstate or foreign travelers for recreational or other purposes; (b) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (c) Which are used or could be used for industrial purposes by industries in interstate commerce; • All impoundments of water otherwise defined as waters of the United States under this definition; • Tributaries of waters identified in paragraphs above;[2] • The territorial seas; • "Wetlands" adjacent to waters (other than waters that are themselves wetlands) identified above.
Waters of the State *Enforceable Definitions*	Definition of state waters varies greatly from state to state, but generally includes: • All lakes, bays, impounding reservoirs, springs, wells, rivers, streams (including intermittent streams), creeks, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, natural ponds, estuaries, marshes, inlets, canals, sounds, adjacent oceans or seas within the territorial limits of the state; • All other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private which are wholly or partially within or bordering the state or within its jurisdiction (except those private waters which do not combine or affect a junction with natural surface or underground waters); • Any "waters of the United States" as defined under the Clean Water Act that are not included in the preceding description. • Tributaries of such waters, including adjacent wetlands, any manmade bodies of water that were originally created in surface waters of the state or resulted in the impoundment of surface waters of the state, including adjacent wetlands.
EPA/Corps Rulemaking *Proposed Rulemaking*	Potential rulemaking changes to the definition of "waters of the United States" will likely be similar to the 2011 proposed guidance.[3] These changes will likely include: • Will extend the definition based on agency expansive reinterpretation of the opinions of Justice Scalia and Justice Kennedy in the Rapanos Supreme Court decision;[4] • May expand regulation of 'traditional navigable waters' simply if a canoe or kayak can float on it; • May expand interstate waters subject to CWA to "all rivers, lakes, and other waters that flow across, or form a part of, state boundaries"—and these waters need not be navigable, nor have a significant nexus to a traditional navigable water; • May consider as jurisdictional all other waters that are "similarly situated" with waters of the same resource type, or are "in the region" if they fall within the same watershed, no matter how far apart or whether they differ in flow or physical/ ecological characteristics, and they alone or in combination have an effect on the chemical, physical or biological integrity of traditional navigable waters; • May adopt an over-broad definition of "tributaries" to establish jurisdiction over manmade drainage ditches, all tidal ditches, culverts, drain tiles, dry desert arroyos, and seasonal streams remote from any navigable water. • Millions of miles of ditches may become jurisdictional waters of the U.S. under the EPA/Corps rule.

1 *http://water.epa.gov/lawsregs/guidance/wetlands/CWAwaters.cfm*
2 *Note: Jurisdictional tributaries may include features (e.g., seasonally wet ditches or conveyances) that are dry at the time of pesticide application.*
3 *http://water.epa.gov/lawsregs/guidance/wetlands/upload/wous_guidance_4-2011.pdf*
4 *Rapanos v. United States, 547 U.S. 715 (2006). See also: http://www.acoel.org/post/2011/12/01/Finding-Consensus-Amid-ChaosThe-Third-Circuit-Weighs-in-on-the-Interpretation-of-Rapanos.aspx*

EPA and State Jurisdictional Water: EPA's pesticide NPDES general permit (PGP) regulates pesticide applications that result in discharges to "Waters of the U.S.," whereas many state versions of the newly implemented PGP regulate pesticide applications that result in discharges to "Waters of the State." The differences between these jurisdictional definitions can be great and may create confusion and potential legal jeopardy for aerial applicators who service clients across state lines. Jurisdictional "waters" aren't just rivers and lakes, but may be dry ditches, potholes or playa lakes at the time of pesticide application. Recently EPA and the Corps of Engineers announced they will undertake a rulemaking to expand the jurisdictional reach of the "Waters of the U.S." definition.

NAAA created the following chart to provide members with an overview of the differences between these different definitions. Defining "Waters" is a *very* complex issue, one that remains unresolved after even two Supreme Court cases; a definitive evaluation is beyond the scope of this overview. The chart in Table 2 is meant to provide NAAA members with a brief understanding of the issues and links to additional resources. For more information, please refer to NAAA's website and the references identified in the chart.

Many Decision-Making Customers are now Regulated by the PGP: The PGP doesn't just affect NAAA members. Many decision-making customers of NAAA members are regulated by the PGP and will seek your input for their recordkeeping

Definition of Waters	
Waters of the U.S. *Nonenforceable Definitions*	Not defined as waters of the United States are waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the Clean Water Act (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition). This exclusion applies only to manmade bodies of water which neither were originally created in waters of the United States (such as disposal area in wetlands) nor resulted from the impoundment of waters of the United States. Prior converted croplands are not waters of the United States, nor are agricultural stormwater discharges or return flows from irrigated agriculture.
Waters of the State *Nonenforceable Definitions*	Not defined as surface waters of the state are waste treatment ponds or lagoons designed and actively used to meet requirements of the Clean Water Act (other than cooling ponds as defined in 40 CFR Part 423(m) that also meet the criteria of this definition), unless they were originally created in surface waters of the state or resulted in impoundment of surface waters of the state.
EPA/Corps Rulemaking *Proposed Rulemaking*	Not likely to be defined as "waters of the United States" under the new rule: • Artificially irrigated areas that would revert to upland if the irrigation ceased. • Artificial lakes or ponds created by excavating and/or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing. • Artificial reflecting pools or swimming pools excavated in uplands. • Small ornamental bodies of water created by excavating and/or diking dry land to retain water for primarily aesthetic reasons. • Water-filled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel, unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States. • Groundwater drained through subsurface drainage systems. • Erosional features (gullies and rills), swales and certain ditches; • Others

and reports. EPA has indicated all operators (applicators and decision-makers) will be jointly and severally responsible for any permit violations. This essentially constitutes liability for all applicators working under a decision-maker, not solely the applicator who violates the CWA. Because of this you will likely see changes in your pesticide-treatment contracts soon, as decision-makers realize their PGP requirements and potential liabilities. As you negotiate contracts with your customers, it would be wise for applicators to review the model contract language (*www.agaviation.org/content/naaacontractlanguage*) NAAA has developed as an example of the types of considerations necessary for applicators to segregate their PGP requirements from those of their decision-making customers.

Requirements for Pesticide Applicators: Pesticide applicator requirements are less burdensome than decision-maker PGP requirements, but they are still enforceable and noncompliance could expose an applicator to enforcement action or citizen suits. (Warning: This following list is lengthy, but many of the activities listed are those you are likely to do already, such as maintain your equipment, calibrate your spraying apparatus, and keep spray logs. However, these activities now are enforceable requirements that also involve required documentation and recordkeeping. Now both the activity itself (e.g., calibration) and the documentation of those activities in records are separately enforceable under the PGP). Perhaps the most important aspect of being an applicator is that you are *automatically* covered by the PGP without having to complete time-consuming forms. To meet the PGP requirements to minimize the discharge of pesticides to waters of the U.S., in addition to following the FIFRA label requirements, you must complete the activities described in Table 1 (see pg. 11).

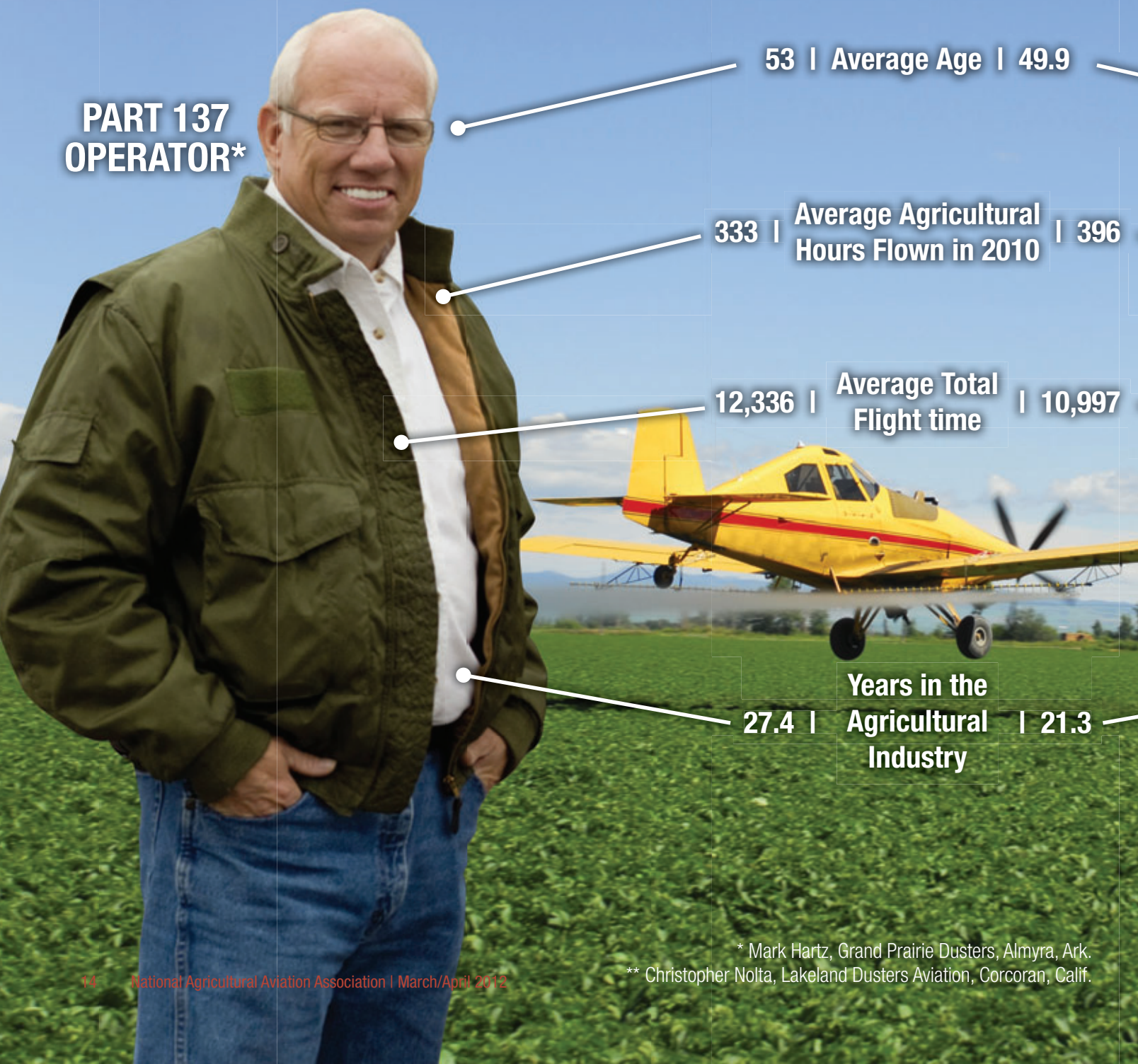
Potential Sources of Legal Jeopardy: Just as you have compliance requirements, you will have legal jeopardy if you fail to perform the PGP requirements in the right manner or by the deadlines for them indicated in the PGP. Some of the potential sources of legal jeopardy that you should be on the lookout for include: failure to realize that you may be a decision-maker; failure to be covered by the PGP; failure to recognize a "water of the U.S." or "water of the state"; failure to be fully aware of each state's PGP requirements; citizen suits; joint and several liability; and certification of "no adverse effects" on listed species or habitat.

Future of NPDES PGPs: Much is still to be determined about EPA's PGP and the 44 other state PGPs. Many of the most subtle nuances may be revealed in EPA's recently published 3,000-page response to public comments, or additional EPA announcements on the agency's website. NAAA will continue to work with a coalition of agricultural organizations for a legislative exemption from Clean Water Act NPDES permits and will keep you informed as the issue evolves.

NAAA urges members to contact their senators now and ask them to personally call Senate Majority Leader Harry Reid to request H.R. 872 be passed. If you do not know who your senator(s) is, please visit http://www.Congress.org and enter your zip code under the "Get Involved" heading to find your appropriate Member of Congress. Without a congressional fix, aerial applicators should immediately undertake efforts to comply with the EPA PGP or state PGPs in the states where they do business, and may be subject to enforcement and/or citizen action suits should they violate either the recordkeeping or performance aspects of the PGP. ■

Portrait of the 21st Aerial Applicator

By Jay Calleja, Manager of Communications



* Mark Hartz, Grand Prairie Dusters, Almyra, Ark.
** Christopher Nolta, Lakeland Dusters Aviation, Corcoran, Calif.

Century

A landmark NAAA survey of operators and pilots offers the most comprehensive glimpse of the aerial application industry ever

Field/plane image: Shutterstock.com/Denton Rumsey

If the President of the United States was delivering an address about the aerial application industry instead of the state of the union, it might go something like this:

My fellow Americans, the state of the aerial application industry is strong! To be sure, there are challenges before us—challenges such as the newly implemented NPDES Pesticide General Permit requirements, less federal funding for aerial application research and an ever-increasing number of tower hazards. They say you can't stop progress, and whether it's MET towers or RTK (Real Time Kinetics) towers, towers will continue to be a thorn in aerial applicators' side. NAAA remains undaunted and indeed has made significant headway on this issue, including getting language into the newly enacted FAA Reauthorization Bill directing the FAA to examine the feasibility of an online public database that would list the location and height of free-standing towers and other potential low-altitude aviation obstructions. The aerial application industry is making progress too—progress on embracing new technologies reducing drift incidents, preventing accidents and helping to feed more Americans and citizens around the globe by making farmers more productive and protecting their crops. They may fly under the radar, but the sky's the limit for these unsung heroes. May God bless America's ag pilots!

Progress has always been a hallmark of the aerial application industry. This is evident by two revealing new surveys undertaken by NAAA. Eight years after conducting its last industry survey a new view of the industry has emerged thanks to two landmark new surveys of Part 137 Operators and pilots conducting agricultural operations. Taken together, the 2012 Operator and Pilot Surveys paint the most comprehensive portrait of the aerial application industry ever.

METHODOLOGY

SRA International conducted a web-based survey of Part 137 operators and pilots between December 14, 2010, and March 31, 2011, for the National Agricultural Aviation Association. The survey was funded by a grant provided by the Southwest Center for Agricultural Health, Injury Prevention, and Education in Tyler, Texas. To ensure confidentiality, a Data Use Agreement was signed assuring the data belongs to NAAA and it will not be disclosed without NAAA's permission. The survey was designed to gather data about the demographics, standard practices, equipment in use, crops and acres treated, risk perceptions, and health and safety of operators and pilots working in the aerial application industry. It was modeled after similar paper-based surveys conducted in 1992, 1994, 1998 and 2004. A total of 508 operators and 324 pilots responded to the survey. The pilot portion of the 2012 survey was the first of its kind to focus exclusively on agricultural pilots. Please refer to the full reports for more information on the methods used for each survey.

The typical aerial application operator is a healthy, 53-year-old male with 27.4 years of industry experience. On the whole, agricultural pilots are a few years younger and slightly less experienced, but it's only a matter of time before many of them become operators in their own right. It would be a mistake to take the middle-age median as the sign of an aging industry. Far from it. NAAA's most ambitious survey to date points to an industry getting better with age. It is an industry comprised of operators and pilots who show little to no signs of slowing down. And why should they? With the benefit of better equipment, bigger, faster aircraft and wisdom only experience can bring, they are able to accomplish more work in less time, safely and efficiently. That's what happens when you are quick to embrace new technologies and constantly honing your craft.

Background

NAAA surveyed Part 137 operators and pilots from December 2010 through March 2011 to gather data about the demographics, standard practices, equipment in use, crops and acres treated, risk perceptions, and health and safety of operators and pilots working in the aerial application industry. While previous industry surveys focused purely on Part 137 operators, NAAA surveyed non-operator pilots for the first time. Two separate reports emerged as a result, one that focuses on operators and another that focuses exclusively on non-operator/agricultural pilots. The landmark studies provide an excellent frame of reference to compare and contrast the two groups.

This article covers findings in both surveys, drawing comparisons to results from the 2004 Agricultural Aviation Pesticide Use Survey, when appropriate. The 2012 industry survey data substantiates many of NAAA's previous findings but also reveals some surprising new truths, such as the fact that there are fewer Part 137 Operators active in the agricultural application industry than previously thought. The new Operator Survey highlights the advances that have taken place in the eight years since the last survey was released. In addition to updating the standard data of prior surveys, the 2012 surveys delved into previously unexplored matters such as risk perceptions, workplace injuries and general health. This newfound data will aid in the development of future safety education programs. It will also provide agencies such as the EPA and FAA with an accurate picture of today's aerial application industry and give them a better understanding of the standard procedures in place and technological advances that have occurred over the past seven years.

Fewer Operators

Based on research done prior to the 2004 survey, the Association came to the conclusion there are approximately 1,625 operators in the aerial application industry and approximately 1,600 additional working ag pilots. Based on the 2012 Operator Survey, we now know there are fewer operators carrying out agricultural application activities than previously thought. Among those in the initial list of 1,734, a portion could be linked to an

email address maintained by NAAA. Based on telephone call responses, it was estimated that 1% of the 1,734 were firefighting operations and 14% were no longer in the application business. Therefore, the total population of Part 137 operations who conduct agricultural operations was estimated to be approximately 1,350. Overall, 831 respondents participated in the survey, 508 operators and 323 pilots. Although the survey was primarily directed at operators, pilots provided information at a 3-to-2 ratio of operator to pilot respondents. Assuming there were 1,350 operators who conduct agricultural operations, this is a 37.6% response rate for operators. The operators reported they used 2, 587 employees for an average of 5.1 employees per operation.

The 2012 Survey of Part 137 Operators is very similar to what NAAA conducted in 2004. Despite using different methods, the content and response rates were nearly identical. The 2004 survey was mailed to participants whereas the 2012 survey was web-based. The 37.6% response rate among operators is very high compared to other online surveys. The healthy returns are more than statistically valid—coming from a geographically diverse group of operators, they accurately reflect Part 137 operators as a whole. The Pilot Survey further validates those findings. The pilot results closely correspond to the operator results, suggesting that the reliability of both surveys is high.

Table 1: Comparison of FAR Part 137 Operators and Ag Pilots

	Operators	Pilots
Average Age	53	49.9
Years in the Agricultural Industry	27.4	21.3
Average Years as an Ag Pilot	25.5	19.7
Average Total Flight Time	12,336	10,997
Average Total Agricultural Hours	9,946	8,510
Average Agricultural Hours Flown in 2010	333	396

^ *Operator data based on 508 operator respondents*
^^ *Pilot data based on 324 pilot respondents*

Demographics

To say the aerial application industry is a male-dominated industry is hardly news. Of the 508 operator respondents, all but three—less than 1%—were male. Ninety-four percent of the operators were also pilots. Of the non-operator/ag pilots surveyed, three out of 324 were female (1%).

On average, operator respondents have been Part 137 certificate holders for 21.8 years and had 5.7 years of experience in the industry before they became operators. Operators have been in the industry 6.1 years longer than pilot respondents (27.4 years to 21.3 years) and have, on average, 5.8 years of agricultural flying experience on non-operator pilots (25.5 to 19.7). The typical operator is three years older than the typical ag pilot. The Average age of operator respondents was 53. Pilot respondents were 49.9, on average.

Operator respondents had an average of 12,336 hours of total flight time, including 9,946 hours of agricultural flight time. Total flight time for pilot respondents ranged from less than 100 to 34,000 hours for an average of 10,997 hours. Pilots logged an average 8,510 hours of agricultural flight time. Total flight time reported by operators was 11% more than ag pilots. Total agricultural flight time was 17% more than pilots. The experience gap notwithstanding, pilot respondents flew an average of 63 hours more than operators did during the 2010 application season. A side-by-side comparison of operators and pilots appears in Table 1.

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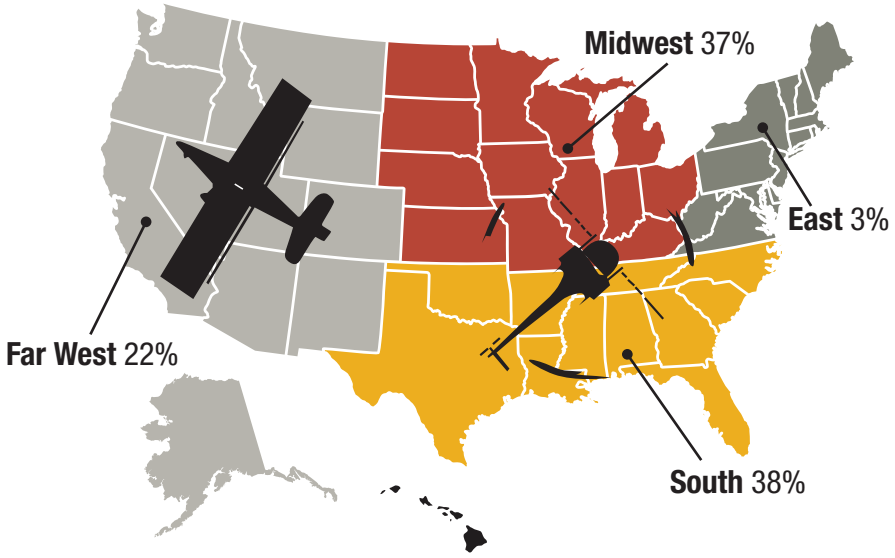
The proportion of ag planes to helicopters has held constant—87% airplanes and 13% helicopters, according to the 2012 Industry Survey, compared to 88% and 12%, respectively, in the 2004 Industry Survey.

Geography

Respondent business headquarters were in 44 different states, all but Connecticut, Nevada, Rhode Island, Vermont, West Virginia and Hawaii. In the 2004 survey, responses were received from application businesses in 41 of 50 states. The top five states for aerial application business headquarters, among the 2012 operator respondents, are: 1) Texas (11.2%), 2) Arkansas (7.9%), 3) Minnesota (6.7%), and tied for fourth at 5.1%, Kansas and California. The composition is very similar to the distribution of aerial application headquarters in the 2004 survey. The only differences are Arkansas was first, Texas ranked second and Louisiana had the third-most operator headquarters among the top five states in 2004. See Table 3 for more information on all states with aerial application headquarters and a comparison between the 2012 and 2004 surveys.

Figure 1: Regional Distribution of Part 137 Aerial Application Operation Headquarters



Regardless of where their business is based, it is common for operators to conduct business in two or more states. When asked to list each state in which they do aerial application work, the majority of operator respondents identified two or more states. As Table 4 indicates, it appears non-operator pilots get around even more than operators. This finding isn't necessarily surprising given that it is common practice among many non-operator pilots to work for more than one operator depending on the time of year and the application seasons in different parts of the country.

Table 2: Comparison of Part 137 Operator Business Headquarters by State, 2012 and 2004

State	'11 %*	'04 %**	State	'11 %*	'04 %**	State	'11 %*	'04 %**
AK	0.2%	0.0%	LA	4.1%	7.0%	NY	0.4%	0.5%
AL	0.4%	1.0%	MA	0.2%	0.0%	OH	1.0%	0.5%
AR	7.9%	10.3%	MD	0.2%	0.0%	OK	3.9%	2.8%
AZ	0.8%	1.0%	ME	0.2%	0.3%	OR	2.9%	1.7%
CA	5.1%	5.4%	MI	1.4%	0.7%	PA	1.0%	1.0%
CO	2.4%	4.4%	MN	6.7%	5.2%	SC	0.6%	0.7%
DE	0.2%	0.3%	MO	2.4%	1.9%	SD	3.3%	2.1%
FL	1.0%	1.9%	MS	3.5%	4.2%	TN	0.8%	0.7%
GA	2.6%	2.1%	MT	3.5%	4.4%	TX	11.2%	9.1%
IA	2.8%	1.9%	NC	2.0%	1.6%	UT	0.4%	0.3%
ID	2.8%	1.9%	ND	5.5%	5.2%	VA	0.4%	0.7%
IL	2.8%	1.7%	NE	4.3%	4.9%	WA	2.6%	4.2%
IN	1.2%	0.5%	NH	0.2%	0.2%	WI	0.8%	0.9%
KS	5.1%	5.4%	NJ	0.4%	0.2%	WV	0.0%	0.2%
KY	0.2%	0.0%	NM	0.4%	0.3%	WY	0.4%	0.2%
						TOTAL	100%	100%

**2012 percentages based on 508 responses, ** 2004 percentages based on 572 responses*

Table 3: Top States in Which Aerial Applications Are Performed

Ranking	Top 10 States Identified by Operators*
1.	Iowa (17.3%)
2.	Texas (15.7%)
3.	Minnesota (14.7%)
4.	Arkansas (13.2%)
5.	Nebraska (12.4%)
6.	Illinois (12.2%)
7.	Kansas (11.6%)
8.	North Dakota (11.2%)
9.	South Dakota (9.4%)
10.	Oklahoma (9.0%)

Ranking	Top 10 States Identified by Pilots**
1.	Texas (22.5%)
2.	Iowa (18.8%)
3.	Nebraska (16.4%)
4.	Kansas (16.0%)
5.	Arkansas (14.2%)
5.	Louisiana (14.2%)
5.	Minnesota (14.2%)
8.	South Dakota (13.3%)
9.	Illinois (13.0%)
10.	North Dakota (11.1%)

**percent of 508 respondents*
***percent of 324 responses*

Equipment and Standard Practices

During normal operations, operators reported they had an average of two pilots and 2.1 aircraft per operation. That's slightly less than the 2.2 aircraft per operation reported in the 2004 survey. The largest reported business in the current survey employed 18 pilots during normal operations.

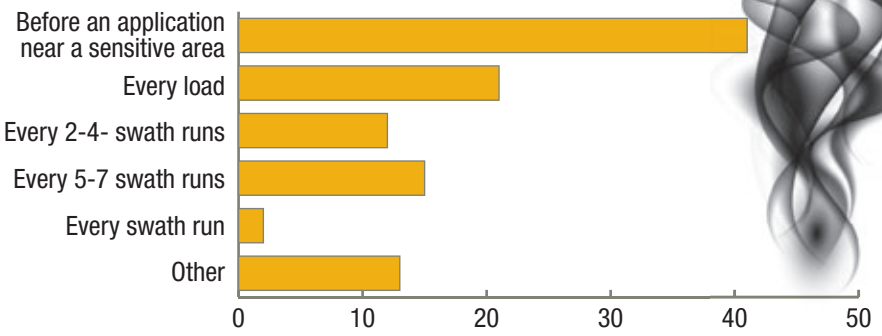
Fixed-wing aircraft account for 87% of the fleet and helicopters make up the remaining 13%. These are comparable to the 2004 survey when the proportion of fixed-wing aircraft and helicopters was 88% and 12%, respectively. Sixty-five percent of the helicopters are turbine powered and 68% of the fixed-wing aircraft are turbine powered.

Table 4: Equipment for Combined Fixed-wing and Rotorcraft Aircraft (Data from Operator Survey Results)

Equipment	Percent of Aircraft*
GPS with mounted light bar	99%
Smoker to determine wind direction	85%
Flow control for constant rate application	56%
Single boom shutoff valve	45%
Flow control for variable rate application	21%
On-board AIMMS	7%
Electrostatic aerial spray technology system	5%

**1,076 total aircraft (helicopters and fixed wing)*

Figure 2: Frequency of Smoker Use (Operator Results*)



** Responses in the Pilot Survey were nearly identical.*

Table 5: Methods Used to Minimize Spray Drift

Method	2012 Survey Operators*	2012 Survey Pilots**
Smokers	83%	79%
Drift control additives	82%	79%
Modify droplet size	79%	53%
Changes in flight patterns	73%	73%
Special nozzles	55%	61%
Wind detectors on the ground	47%	52%
On-board AIMMS	4%	4%

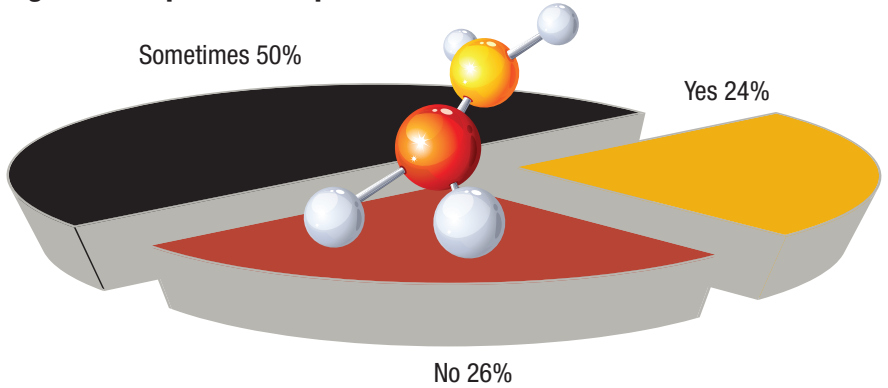
**percent of 508 respondents, **percent of 324 respondents*

Table 6: Swath Guidance Used

Method	2012 Survey Operators*	2012 Survey Pilots**	2004 Survey Operators***
GPS	93%	95%	92%
Automatic Flaggers	19%	17%	28%
Human Flaggers	1%	1%	4%
Other	1%	4%	4%

**percent of 508 respondents, **percent of 324 respondents, ***percent of 569 respondents*

Figure 3: Proportion of Operators Who Sell Chemicals



The new Operator Survey also highlights the technological advances that have occurred over the past eight years. Closed cockpits are in place in 99% of the fixed-wing aircraft and 87% of the helicopters used for aerial application. Ninety-eight percent of the combined aircraft are equipped with closed cockpits in the 2012 survey compared to an overall rate of 97% in 2004.

Operators in the second decade of the 21st Century use a variety of drift mitigation practices. Operations have become more reliant on GPS and less reliant on human or automatic flaggers for swath guidance. GPS allows for the precise application of pesticides and fertilizer, and the adoption rate has increased steadily over the years. GPS use has grown from 20% in 1994, to 60% in 1998, to 94.7% in 2006, according to an independent EPA survey, to the point where it is practically indispensible. Virtually all operators (99%) use GPS with a mounted light bar today. The proportion of aircraft equipped with a smoker[1] is also higher.

For swath guidance when applying pesticides, operators and pilots primarily rely on GPS. Human or automatic flaggers are seldom used nowadays. Other methods cited were visual references, marked fields, lead planes and the operator's experience in general. In 2004 more human and automatic flaggers were used. The 2012 Operator Survey also showed a slightly higher use of GPS for swath guidance. Swath guidance methods for operators and pilots are shown in Table 6.

1 Smokers enable pilots to safely inject a small amount of oil into the aircraft exhaust system creating smoke that is released into the atmosphere. This allows the agricultural pilot to determine wind direction and estimate the wind's speed, and to make adjustments as needed to ensure that the application stays within its target.

Operators and pilots also were asked to estimate how often pilots mix and load the products going into their aircraft. Three-fourths of the operators responded that their pilots mix and load their own application job 10% or less of the time. Responses among operators varied from 0 to 99%, but on average they answered that pilots mix and load their own spray jobs 14% of the time. Very few pilots report routinely mixing and loading their own aircraft.

Other notable findings with respect to operators' equipment, practices and operations:

- Three out of four operators sell chemicals in some capacity. Twenty-four percent responded they sell all of the chemicals they apply. Fifty percent sell chemicals sometimes, but not always.
- During a typical year, the average operator uses 2.8 loading sites.
- 92% of respondents engage in "hot" loading at their operation. Hot loading refers to loading an aircraft with fuel or chemicals when the engine is running.
- 88% of operators consider "hot" loading to be a requirement for operations.

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The average number of acres treated by an ag aircraft in a single day was higher in 2010 than it was in 2002 for most crops. Acreage data in the 2012 and 2004 surveys was based on the two most recent full seasons of aerial application work.

TABLE 7: Top Applications by Average Number of Acres Treated via Aerial Application

Application	Average Acres	Number/Percent of Responses	Total Acres Reported
Rice	40,646	82 (16%)	3,332,972
Cotton	36,242	135 (27%)	4,892,670
Mosquito Control	28,884	57 (11%)	1,646,388
Corn	23,200	336 (66%)	7,795,200
Roots and Tubers	22,225	74 (15%)	1,644,650
Forests	19,967	59 (12%)	1,178,053
Public Health Pest Control	17,841	10 (2%)	178,410
Soybeans	16,788	266 (52%)	4,465,608
Small Grains Wheat/Barley	16,146	308 (61%)	4,972,968
Orchards–Fruit/ Nut Trees	13,831	56 (11%)	774,536

TABLE 8: Ten Most Common CROPS TREATED Based on OPERATOR Response Rate

Application	Percent/Number of Responses	Average Acres
Corn	66% (336)	23,200
Small Grains Wheat/Barley	61% (308)	16,146
Soybeans	52% (266)	16,788
Pastures, Rangeland	42% (214)	11,130
Alfalfa	31% (159)	4,686
Cotton	27% (135)	36,242
Sorghum	19% (96)	7,951
Rice	16% (82)	40,646
Roots and Tubers	15% (74)	22,225
Leafy Vegetables	14% (69)	8,372

Crop Treatment

Based on operator responses, the highest average number of application acres in 2010, in order, were for rice, cotton, mosquito control and corn. However, the sample size for some of those top crops wasn't nearly as large as other crops that may have averaged fewer aerial application acres but were treated by a higher percentage of aerial application operations. Corn (66%), wheat/barley (61%), soybeans (52%), pastures/rangeland (42%) and alfalfa (31%) were the five most commonly treated crops among operator respondents. Consider the contrast between Tables 7 and 8.

When asked to list the usual and maximum number acres treated in a single day with a single aircraft for a variety of crops, the highest averages in terms of usual acres were applications to cotton, soybeans, corn and rice. This also was the case for the maximum acres treated in a single day using a single aircraft: cotton (1,122 usual acres/1,993 max. acres), soybeans (1,111 usual/1,953 max.); corn (959 usual/1,820 max.) and rice (946 usual/1,701 max.). Complete responses along with comparable data from the 2004 survey for the top seven crops are shown in Table 9. In nearly all instances, the average acres treated in the 2012 survey were higher than in 2004.

Table 9: Single Aircraft Usual and Maximum Acres Treated, 2012 and 2004 Surveys*

Application	Average Number of Usual Acres, 2012	Average Number of Usual Acres, 2004	Average Number of Maximum Acres Treated, 2012	Average Number of Maximum Acres Treated, 2004
Cotton	1,122	1,080	1,993	2,145
Soybeans	1,111	591	1,953	1,282
Corn	959	541	1,820	1,281
Rice	946	725	1,701	1,344
Forests	829	587	1,523	1,491
Pastures, Rangeland	774	549	1,546	1,238
Small Grains Wheat/Barley	770	597	1,608	1,307

** Acreage data in the 2012 and 2004 surveys based on the two most recent full seasons of aerial application work, 2010 and 2002, respectively.*

Power lines were deemed the No. 1 occupational hazard by both operators and ag pilots.

Perceptions of Risk

Operators and pilots were asked to rate the relative risk for a variety of occupational hazards on a scale of 1–10, with "10" presenting the greatest risk. Power lines, communication towers and meteorological evaluation towers (METs) are viewed by operators as the three leading risks, with power lines topping the list with an average of 6.5 on the risk scale. Pilots also viewed the top three hazards as power lines, communication towers and METs; however, the relative magnitude of the risk was higher for pilots. Pilots, for example, ranked power lines at an average score of 7.0 versus 6.5 among operators. Overall, Operators gave the hazards a lower ranking than pilots in all but two categories: rotating props and birds. The average risk score across all categories among operators was 4.2 and 4.5 among pilots (see Table 10).

When risk perception was broken out based on operators' length of time in the industry, a clear correlation emerged: The longer the operator has been in business, the lower the average risk perception. While results from the Pilots Survey were not broken out to this extent, the fact that employee pilots have almost six less years of ag flying experience on average than operators must factor into why pilots perceive occupational risks to a slightly higher degree than operators do.

Drilling deeper into the operator data, NAAA found that operators with less than 11 years of experience in the industry had the highest overall risk perception with an average risk score of 4.4. Conversely, operators with 40 or more years of experience were the only group with a sub-4.0 risk score (3.6). One exception where more experience did not translate to a lower degree of

Table 10: Risk Perception of Occupational Hazards*

Risk	Average Operators	Average Pilots
Power Lines	6.5	7.0
Communication Towers	6.1	6.6
Meteorological Towers	5.5	5.7
Birds	4.5	4.2
Rotating Prop	4.4	4.3
Wind Turbines	4.0	4.4
Mechanical Failure	3.9	4.4
Chemicals	3.7	3.8
Adverse Weather	3.6	4.1
Limited Space for Maneuvering	3.4	3.9
Engine Noise	3.2	3.5
Cockpit Clutter	2.0	2.2
Average Risk Score	**4.2**	**4.5**

** Based on scale of 1–10, with 1 presenting no risk and 10 presenting greatest risk.*

Obvious power lines are easy to see and avoid, but power lines and guy wires aren't always in the places ag pilots would expect. They can even show up along the edge of a field.

Fifty-nine percent of operators view wind turbines and METs as a safety risk. Thirty-five percent have a policy in place because of the hazards associated with working around wind turbines.

risk was among operators with 11–20 years of experience in the industry. They rated the three leading risks—power lines, communications towers and METs—higher than any other experience level did (see Table 11).

Wind Towers

When asked specifically about wind turbines and MET towers, 59% of operator respondents and 56% of pilot respondents said they pose a safety or field-accessibility issue. In addition, 35% of operators said they have policies regarding wind turbines or MET towers (see Figure 5).

Table 11: Operator Risk Perception of Top 3 Occupational Hazards Based on Experience

Risk	Years in the Aerial Application Industry				
	0-10	11-20	21-30	31-40	40+
Power Lines	6.4	7.0	6.4	6.5	6.2
Communication Towers	6.0	6.6	6.1	6.1	5.5
Meteorological Towers	5.6	6.1	5.5	5.6	4.5

Table 12: Average Operator Risk Perceptions across 12 Occupational Hazards Based on Experience

	Years in the Aerial Application Industry				
	0-10	11-20	21-30	31-40	40+
Average Risk Score	4.4	4.3	4.1	4.1	3.6

Figure 4: Are Wind and Meteorological Towers a Safety Risk? (Operator Results)

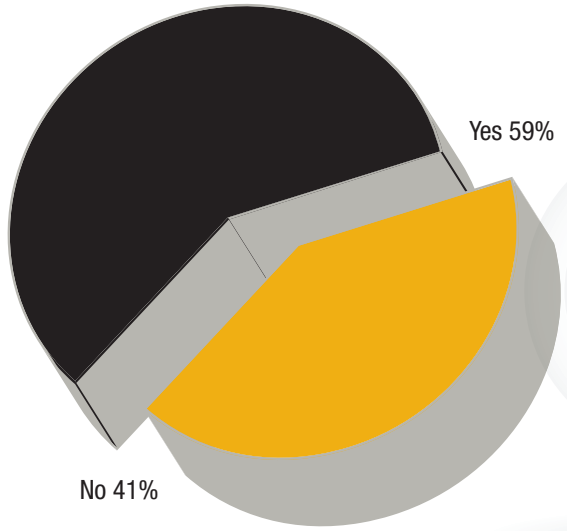
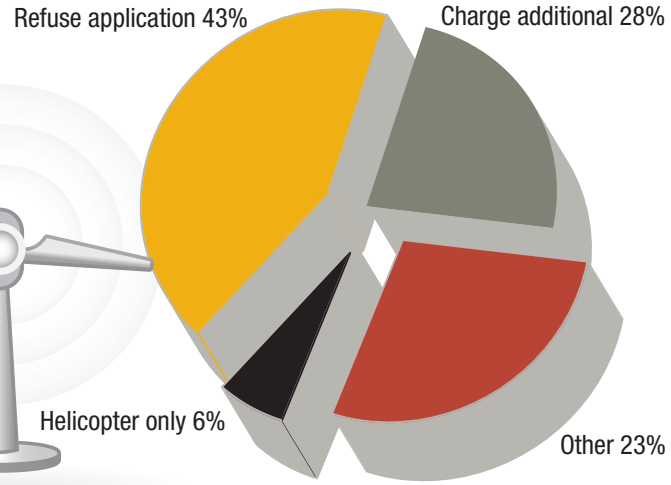


Figure 5: Reported Types of Policies on Wind Turbine or Meteorological Towers *Responses based on 35% of operators with specific wind tower policies in place.*



Hard Work

The days are long during the application season. Two-thirds of operators work 8-12 hours per day, and more than a quarter (27%) reported working an average of 13-16 hours per day during the application season. Among pilot respondents, 58% work an average of 8-12 hours per day in season, and 28% work 13-16 hours per day.

Do longer working hours translate to less sleep? One thing's for sure: it doesn't lend itself to sleeping in. When queried about their sleep patterns during the application season, 4% of operator respondents reported averaging more than eight hours of sleep; 64% said they sleep an average of 7-8 hours per day; and 32% acknowledged getting 4-6 hours of sleep. Pilot responses were almost identical. Sixty-two percent of pilots reported getting an average of 7-8 hours of sleep, 35% sleep 4-6 hours and 3% average more than eight hours of sleep a day.

More operators and pilots fly between 100 and 200 days a year than any other range offered in the survey—47% of operators and 46% of pilots fall within this range, according to the surveys.

Minor injuries are rare within the aerial application industry. Based on 444 responses, only 26 operators, or 5.85% of those responding, said someone at their operation sustained a work-related injury requiring treatment at a hospital or doctor's office.

Ninety-six percent of operators and pilots reported being in good, very good or excellent shape. More health data can be found in the full reports.

Precision Decisions

The 2012 NAAA Aerial Application Surveys of Operators and Pilots are proof that tremendous advances have taken place within the aerial application industry in the eight short years since the last survey was taken. The average number of acres treated in a single day with a single aircraft was greater during the 2010 season than in the 2002 season for most applications. Operations have become even more reliant on GPS and the precision application technologies that utilize it. The use of human flaggers has fallen precipitously from NAAA's first documented survey, going from 38% in 1994 to 1% today.

More and more operators are embracing a range of technologies and methods to increase efficiencies and minimize drift. GPS navigation

FUN FACT!

51% of pilots and 40% of operators work for pay outside the aerial application industry during the offseason. Within our ranks are commercial pilots, duck guide ferry pilots, bankers, bus drivers, firefighters, gunsmiths, nurses and law enforcement personnel, to name a few of the occupations cited.

is a given, but beyond that, 85% of agricultural aircraft have smokers, 56% have a flow-control valve for constant-rate applications and 45% have a single-boom shutoff valve.

Agricultural applications will become even more targeted and more prescriptive heading forward. Ag pilots will be able to respond to their customers' needs in a much more focused way than simply applying fungicide to 700 acres of corn. The job within the job will be to tailor the application based on the conditions of the soil or the crop in different areas of the field.

It's a concept already being embraced by the early adopters. Twenty-one percent of respondents' aircraft incorporate a flow-control valve for variable-rate applications, and 7% are equipped with AIMMS (Aircraft Integrated Meteorological Measurement System), a sophisticated onboard anemometer that syncs with the aircraft's GPS system. We expect the adoption of precision application technologies to continue to trend higher as prices come down and new technologies come to fore and anticipate future industry surveys will bear this out.

That's real progress. The state of the industry is strong indeed. ■

The 2012 NAAA Aerial Application Industry Surveys of Operators and Pilots will be released this spring. The full reports will be mailed to all NAAA members and available as premium content on NAAA's website. The 2012 Operator and Pilot Surveys will reside in the News & Publications section of www.agaviation.org.

Test Your Knowledge

Agricultural Aviation continues its series of questions to quiz you on your knowledge of aerial application topics. Thanks to the National Association of State Departments of Agriculture Research Foundation (NASDARF) for permission to use selected questions from their chapter review questions from the Aerial Applicator's Manual: A National Pesticide Application Certification Study Guide.

The Aerial Applicator's Manual is now available in electronic format on NAAA's website at www.agaviation.org/content/aerial-applicators-manual. Another way to find the manual is to scroll to the bottom of any page on NAAA's site (www.agaviation.org), click on "Links" in the footer, then scroll to the end of the Related Entities page and click on "Aerial Applicator's Manual" under "Publications." These instructions also are worth remembering to access other organizations and publications frequently needed by aerial applicators.

See pg. 56 for an explanation of the answers and the page or pages in the manual where the topic is discussed. Hopefully this will introduce those taking the quiz to the contents of the manual which we encourage everyone to study in the quest for industry knowledge.
—Ken Degg, NAAA Director of Safety & Education

How well will you fare? Let's find out!

1. **The format of pesticide labels is established by:**
- A. Pesticide manufacturer guidelines.
- B. Federal regulations.
- C. State laws.
- D. ASABE professional standards.

2. **Which of the following is one of the requirements for pesticide applicator certification?**
- A. Knowing how to use appropriate application methods for various pesticide formulations.
- B. Demonstrating safe aircraft operations.
- C. Following recommended aircraft inspection and maintenance schedules.
- D. Making applications at altitudes specified in regulations.

3. **First-aid instructions to use for pesticide exposure is found on:**
- A. Pesticide labels.
- B. OSHA's Emergency Response website.
- C. Supplemental labeling.
- D. Manufacturer literature.

4. **The color code for a nozzle that produces spray droplets in the extra fine category is:**
- A. Black.
- B. Red.
- C. Purple.
- D. Orange.

5. **The purpose of baffles inside a liquid spray tank is to:**
- A. Assure even mixing of the spray material.
- B. Prevent extreme pressure changes in the system.
- C. Reduce sloshing of the liquid during flight.
- D. Eliminate foaming of the spray mixture.

6. **The purpose of calibration is to:**
- A. Determine the capacity of the spray tank(s).
- B. Prevent off-target pesticide drift.
- C. Apply the correct amount of pesticide.
- D. Protect the environment.

7. **If an aircraft treats 14 acres per tank of spray mixture, how many pints of pesticide liquid should be put into the spray tank to apply at a volume of 1.5 pints per acre?**
- A. 11
- B. 15
- C. 21
- D. 24

8. **To avoid the adverse effect of headwinds or tailwinds on an application volume, you should fly:**
- A. Into the wind.
- B. Against the wind at all times.
- C. Back and forth, alternating between into the wind and against the wind.
- D. Crosswind or 45 degrees to the crosswind.

The next two questions are agricultural aviation trivia. Can you come up with the answers?

9. **Agricultural aviation history tells us the first use of an airplane for application of a pesticide occurred on Aug. 31, 1921, near Troy, Ohio. The Curtiss JN-6H, flown by Lt. John A. Macready, applied powdered lead arsenate to catalpa trees in an experiment to control the Catalpa Sphinx Moth. How was the pesticide jettisoned from the crude hopper into the propeller slipstream?**

10. **When was NAAA's Operation S.A.F.E. developed and what does the acronym S.A.F.E. represent?**

See answers on pg. 56

This story originally appeared in the November 2011 online issue of Texas Co-op Power magazine, a publication of Texas Electric Cooperatives.

Landing a Seat

By Camille Wheeler,
Texas Co-op Power Associate Editor

Wanted: Ag Pilots Who Can Fly Tail Wheel, Stick and Rudder—And Tell the Difference Between Soybeans and Alfalfa

Texas Co-op Power Editor's Note: *This story examines the biggest dilemma facing the small, aging agricultural aviation industry—retirement: As the world's population rapidly increases—and food and fiber demands along with it—who will fill the seats in expensive aerial application aircraft that require modern, high-tech knowledge and old-fashioned tail wheel, stick and rudder flying skills?*

The pilots file into the room, looking for a seat in a circle of chairs. There's plenty of room—no need to jockey for position. But mere minutes into a mentoring session at the 2011 Texas Agricultural Aviation Association (TAAA) convention, a harsh message is sinking in: Not just anybody can become an ag pilot.

It takes someone special to land a seat.

To be more precise, which is exactly what the ag aviation industry requires of its pilots, it takes individuals who can fly tail wheel, stick and rudder; show

loyalty to employers; spray the right fields with the correct crop-protection and growth-aid products; and demonstrate integrity by admitting to and learning from mistakes. The sticking point, of course, is that the only way to learn to fly an ag plane is to, well, fly one.

As the small and aging ag aviation industry braces for a vacuum of experienced pilots over the next five to seven years, the demand increases for new talent to fly ag planes and helicopters (which represent about 13 percent of the nation's aerial application fleet).

In the industry, there's no higher compliment than to be called a good "stick," meaning an ag pilot who has good control stick and rudder coordination—not an easy proposition while flying small aircraft at low altitudes in constantly changing weather conditions that can put a crosswind or a bird in your face in a hurry.

But skill alone can't fly ag aircraft. "I want to know this," co-session leader Leif Isaacson says, pointing an index finger to his head. "Some of the best sticks in the world are the worst guys to put into an ag plane because their ego runs away with them."

Judging by the grim faces and hunched shoulders around the room, not too many egos are off and galloping this morning. Some of the job-seeking 20-, 30- and 40-something-year-old pilots in the room have extensive experience flying commercial airliners and corporate jets. Yet they're seeking jobs in a new aviation field as the commercial airline industry cancels routes and cuts salaries.

But when Isaacson and session co-leader Rod Thomas go around the circle, asking those men for their total flying hours, only a few have logged much time in an ag plane cockpit. Some of the pilots have zero ag hours.

It's doubtful that any of these pilots will walk out of the hotel meeting room with a job. But after dialogue with the experienced ag pilots and aerial applicator business operators sitting in the same circle, the non-ag pilots will at least have a better understanding of what they're doing right—and what they're doing wrong—in their pursuit of that coveted first seat.

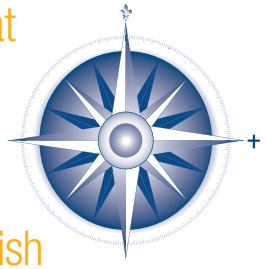
That's the simple version of what the National Agricultural Aviation Association (NAAA) hopes to accomplish through its Com*paass* Rose Series, which is administered as part of its Professional Aerial Applicators' Support System (PAASS).

The broader view is that Com*paass* Rose forums, such as this one held at the TAAA convention in January in San Antonio, are designed to expose pilots to a plethora of industry-related issues, from GPS and spray patterns to overall professionalism and ethics.

Perhaps the hardest lesson of all is learning that sure, total flying hours look great on a résumé. But the difference between flying a huge jet and a tiny ag plane, Isaacson says, is like the difference between driving a bus and a Ferrari. The skills don't automatically transfer.

"Not much in the flying industry equates to what we do," says Isaacson, a 59-year-old ag pilot who owns Desert Air Ag in Terreton, Idaho.

After dialogue with the experienced ag pilots… non-ag pilots will at least have a better understanding of what they're doing right—and what they're doing wrong—in their pursuit of that coveted first seat. That's the simple version of what the National Agricultural Aviation Association hopes to accomplish through its Com*paass* Rose Series.



The common denominator for any ag pilot, the veterans in the room say, is that he learns to perform ground duties before he learns to fly. But one 42-year-old pilot argues that his long-term experience flying commercial airliners and freight planes—and even a private corporate jet overseas—qualifies him to immediately fly ag planes.

Thomas, a 57-year-old ag pilot who's president of Thomas Aviation in Gooding, Idaho, asks the other business operators in the room if they'd give the pilot a seat in the cockpit of an ag plane.

"I wouldn't," says Roger Krause, a 65-year-old ag pilot and owner of Aerial Farm Service in Clifton, near Waco. "I'd put him on the ground and see what he does. He's got to start at the bottom."

The pilot protests, saying his expertise in the cockpit and as an aircraft mechanic make him well qualified. But the experienced ag pilots in the room, many of whom operate

their own crop-spraying businesses, stay on point. They're looking for pilots who are willing to grow into the job. Pilots who are interested in cultivating relationships with farmers, just like they have. Pilots who won't look down their noses at non-glamorous jobs like cleaning windshields, mixing and loading, making sure fields are clear of workers and monitoring wind conditions.

"Don't be insulted if you have to wash your own airplane," says Krause, who still insists on washing his plane 46 years after he first flew one.

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There's no higher compliment than to be called a good "stick," but there's a lot more to agricultural aviation than just flying the aircraft. Having the right temperament is crucial.

To be fair, business operators say, they owe the same level of integrity that they demand: When an inexperienced pilot has paid his dues and learned the ground drill, it's time to let him earn his ag wings. But, operators remind, they own the planes being flown. Even when they're not at the controls, they're responsible for every takeoff, every landing and every spraying pass. They've invested in the training of new pilots, a relationship that plays a critical role with insurance underwriters. So they ask for a commitment: Stay, learn, grow.

"Ride for the brand," Thomas tells the job seekers in the hotel room. "Don't leave for a dollar. That operator's reputation rides with you on every flight."

And do your homework. Krause's interview questions include this potential stumper: "At 100 feet, can you tell the difference between soybeans and alfalfa?"

Bracing for change

Ironically, it's the evolution of aerial application aircraft that has placed the industry on the precipice of difficult change.

Bigger and faster than ever, with jet-fueled turbine engines and hoppers typically holding up to 800 gallons, the ag planes and helicopters of today are capable of doing three times the work as older, smaller aircraft.

With the development of larger and more powerful aircraft over the past three decades, operators have decreased their fleets, often from five or six planes or helicopters to one. With fewer aircraft, they needed fewer pilots, and many operators filled their own seats.

Now, the industry is bracing for a vacuum of experienced pilots over the next five to seven years. New pilots, by and large, haven't been trained.

Yet the industry continues to help meet the food and fiber demands of a growing nation and world: According to the NAAA, ag pilots treat almost 80 million acres of cropland annually—about 25 percent of the total 309 million-plus acres of cropland commercially treated with crop-protection products. And almost all of the rice crops in the U.S., including Texas, are treated by aerial applicators.

Farmers across the nation have come to rely on top-notch aerial crop protection: According to the NAAA, aerial applicators in the U.S., on average, have 25 years of experience in the industry.

Still, the ag aviation industry, while robust and viable, is starting to show its age. The downside for agricultural growers is that some of the nation's estimated 3,225 ag aviation operators and pilots—already a small, tight-knit group—are nearing retirement or slowing-down age.

The NAAA does not keep retirement statistics per se, but in a preliminary survey conducted last spring, about 20 percent of the nation's 1,600 hired pilots listed their average age as 50. And almost a third of the nation's 1,625 aerial application business owners listed their average age as 54—within shouting distance of 62, early retirement-eligible age in the U.S.

This is not to say that these operators are about to sell their businesses; some today in their 70s show no signs of slowing down. And some pilots in their late 50s, 60s and 70s just aren't ready to quit. They love it that much.

[2011] NAAA President Rick Richter is grooming his 26-year-old son, Nick, to someday take over Richter Aviation in Maxwell, California. But the 59-year-old father, ag pilot and business owner understands others' reluctance to step down because he feels the same.

"The hardest part of it is, I'll tell you the truth," Richter says, "is to give it up. It's been so good. It's such a passion that it's hard for the older pilots to crawl out of that airplane and let somebody else take over. But I'm doing it with my son. I see him carrying on the legacy."

Know your limits

Saturday, July 17, 2000, was a scorcher in the Panhandle. By afternoon, the temperature had hit 103 degrees. It was too hot to safely fly with a full load, so Gaylon Stamps, owner of Stamps Spraying Service, and Joe Parazuski, one of his two pilots, busied themselves cleaning airplanes and preparing for the next spraying rounds.

By 6 p.m., the temperature had dropped to 93 degrees. It was still too hot to fly a big load, but Parazuski wanted to fly to see if he'd fixed an oil leak in a plane's radial engine. Stamps agreed to let the pilot spray a small, nearby grain-sorghum field with the hopper one-quarter full of herbicide. Parazuski climbed into the cockpit, warmed up the engine and saluted his boss. Stamps returned the salute, as per their custom, and Parazuski took off.

Gaylon Stamps knows firsthand that protecting their livelihood isn't the only thing operators have to worry about when training a new ag pilot.

It was the last time Stamps would ever see Parazuski, a close friend. They were both 54 at the time. "I watched as Joe eased the bird aloft, then continued to watch until he was a small dot low on the far horizon," Stamps wrote in an article published in *Agricultural Aviation*, the official publication of the NAAA. "Then he was out of sight. The last evidence of his having been there was the rumble of that old radial engine as it clawed the air toward the southwestern skies. Then the sound, too, was no longer to be heard."

About an hour later, Stamps got a call from a farmer. "Did you have a yellow airplane flying over here south of my house?" he asked Stamps. Yes, Stamps said. The farmer paused, and with a tremble in his voice, said, "I'm afraid he's crashed."

The cause of the crash east of Amarillo was a mystery: The hopper was almost empty, ruling out extra weight as a factor. And investigations by the Federal Aviation Administration and National Transportation Safety Board ruled out mechanical failure of the plane or the engine.

It's possible, Stamps says, that Parazuski, who crashed nose first, went into a snap roll during a steep turn, with the bottom wing stalling and the top wing continuing to lift, making the plane roll upside down.

Today, Stamps uses one plane at his business in the small town of Panhandle, northeast of Amarillo. His sole pilot, son-in-law Jason Davis, does most of the flying, and someday will take over the operation from the 63-year-old Stamps, who over the past three years has flown for other operators in Texas, New Mexico, Illinois, Iowa and Wyoming.

The accident was one of those cruel rarities never to be explained or forgotten. "Sometimes you just have to say, 'Things are what they are' and go on, and that's what I did," says Stamps, a former TAAA president who also is a longtime TAAA board member, a Texas delegate to the NAAA board of directors and secretary of the New Mexico Agricultural Aviation Association. "I had a lot of friends help me through it."

Stamps leaned on those around him, and in turn, he gives back to the ag aviation industry. Aerial application carries inherent risks, but many accidents can be prevented. Stamps, one of 10 PAASS presenters who work seasonally throughout the nation, is helping fulfill the program's two primary goals: reduce accidents and drift incidents (which occur when wind blows the aerially applied product away from the target area) through education.

PAASS, considered ag aviation's premier education program, is succeeding on both fronts: According to the NAAA, the number of reported drift incidents continues to decline. And per 100,000 ag flight hours, the industry has seen reductions of 20.7 percent and 11 percent in accident and fatality rates, respectively, since the program began in 1998.

Sure, ag pilots make mistakes. The key, says 2011 TAAA President Jason Wooten, is avoiding the ones that can cost you your life. Take the 33-year-old Wooten: He knows his planes, he knows his farmers. And he knows himself, as revealed in these interview responses at the TAAA convention in January:

"Have you ever crashed?" "No, ma'am."

"Have you ever come close?" "No, ma'am."

"You're that good?"

Wooten, wearing a black, button-down vest and a cap pulled down tight over his ears, smiled and then answered. "No, it's not that I'm that good," he says. "You gotta know your limits. You gotta know what you can do and keep it inside the envelope."

> "The hardest part of it is, I'll tell you the truth, is to give it up. It's been so good. It's such a passion that it's hard for the older pilots to crawl out of that airplane and let somebody else take over. But I'm doing it with my son. I see him carrying on the legacy."
>
> **—Richter Aviation Owner/Operator Rick Richter**

That means knowing your own skill level and the airplane's limitations, Wooten says. It means making split-second decisions while flying 6 feet above the ground at 130 mph. For example, his father, Dudley Wooten, who owns and operates B&W Aerial Spray in Dimmitt, taught him it's often better to go under power lines: That way, you can see the line, and you don't risk pulling up too late and hitting it. But whether you go under or over, make your decision and stick with it.

Ag pilots who grew up in the industry certainly have an advantage over those who didn't. After Wooten obtained his commercial pilot's license, at the age of 23, he and his dad flew in a tandem-seat plane, with the son in front, at the control stick. They identified obstacles and practiced flying around them.

When Wooten got his own plane, he practiced spraying water and handling the aircraft. His dad, standing on the turn row, watched Wooten make simulated spraying passes. He'd radio his son and ask, "How high are your wheels off the ground?" Wooten might say "6 feet," and his dad would fire back, "closer to 10."

So on the next pass, Wooten would drop lower. "How close are you now?" his dad would ask. "I don't know, 5 feet," Wooten would respond, to which his dad would say, "Nah, you're about 2 feet."

Generally speaking, says Stamps, who learned to fly in similar fashion under tutelage from his father, ag pilots are autodidactic. Save for two-seat training planes, you go it alone. "There is only one seat in a crop duster, and there is only so much you can learn from a book or a sermon," Stamps says. "The rest has to be learned from experience."

And for ag pilots—or crop dusters, as they sometimes still call themselves within their own ranks, even though they mostly spray liquid products—experience is often earned the hard way. Stamps likens the experience in the cockpit to what some drivers encounter on the road.

"If some people are about to have a wreck, they'll give up and throw up their hands," he says. "Some people are driving all the way through the wreck. That's what makes a crop duster: You can never give up."

Matt Fitch, who owns Fitch's Flying Service in Pearsall, southwest of San Antonio, tested his ag wings in South Texas under the guidance of the late Bill Nunley, who owned a crop-spraying business. They took test flights in a two-seat tandem plane. Fitch progressed to a one-seater, at first flying with an empty hopper, then spraying water and, finally, making real spray runs.

As a young pilot starting out on his own, Fitch recalls some scary incidents, including the day he clipped a power line and left a rudder hanging on it. But more than two decades later, the 49-year-old Fitch, who served as the 2010 TAAA president, says he can't imagine doing anything else for a living.

"It's like a religious experience," says Fitch, who rarely takes off the cross necklace his wife gave him. "Getting out early in the morning and seeing the sun rise from an airplane, realizing God sure does awesome work." ■

Camille Wheeler is Associate Editor of Texas Co-op Power magazine. "Landing a Seat" is one of several articles she wrote for an expansive two-part series on the aerial application industry which appeared in the September and November 2011 issues of Texas Co-op Power. To read more from Wheeler's series, please visit www.texascooppower.com/magazine-archives. Some of the articles available online did not appear in the print versions of the magazine.

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New Ag Pilots: How to Get Insured

By Doug Davidson,
on behalf of the NAAA Insurance Committee

Editor's Note: *This article originally appeared in the May/June 2009 issue. It is being reprinted and slightly amended at the NAAA Insurance Committee's request because the message of how to obtain insurance as a new ag pilot is an important one that bears repeating.*

It's the same old dilemma that has confronted all of us whoever desired to fly for a living. How do I get insured without enough hours, and how do I get enough hours unless I can get insured? I don't profess to be smart enough to solve this age-old enigma in one short article, but I can give you some ideas on how to get the upper hand.

Get Educated

There are a number of ways to make yourself a more attractive risk to an underwriter. Proper training is always a good start. I've never met an underwriter yet who didn't love training. Just for kicks, I logged on to the NAAA website and found an article that showcased four ag aviation schools.[1] Although there's nothing like actual experience, these schools offer great simulated ag training. Many utilize ag aircraft with a dual cockpit. These schools can take a beginner with no experience all the way to a prospective ag pilot with 250 hours.

[1] "Career Move: Training in Ag Aviation Prepares Pilots for a Different Kind of Flying," www.agaviation.org/content/ag-pilot-flight-school-information

They also offer abbreviated courses that teach ag aviation to private or commercial pilots without ag or tail-wheel experience.

Attend a PAASS or Com*paass* Rose Program at one of the state or regional conventions. Both programs were designed to offer training and support to our industry ag pilots. PAASS is designed for the experienced ag pilot/operator and Com*paass* Rose is designed for first year or beginning ag pilots. Com*paass* Rose was originated in 2002 with the specific purpose of allowing new pilots a forum to ask questions and discuss issues in a "safe" setting where no questions are considered too basic or too easy. Most underwriters will insist on PAASS Program attendance, but will also reward your efforts by taking this training into account in their premium calculation.

Get Connected

Don't be a "lone ranger." Join your state ag aviation association. Join NAAA. As of 2010, if the ag school you attend is an NAAA member, you will receive a complimentary NAAA pilot membership upon your successful completion of the course. Attend your state or regional annual convention and trade show. Attend NAAA's Annual Convention. Hopefully you made it to NAAA's 2011 Convention in Las Vegas. If not, then plan to this year. It's not too soon to start thinking about the 2012 convention coming Dec. 3–6 in Savannah, Ga. Take time to work the exhibit hall and get to know the vendors that provide services and sell products to the ag aviation industry. Learn how we all work together to form the greatest agricultural production team in the world! Get acquainted with operators in your area. Get acquainted with other pilots.

This section is possibly the most important to gain insurability. I'm safe to say that an underwriter will rarely take a chance on a "lone ranger" 250 hour commercial pilot in an ag plane. However, given the proper set of circumstances, that same underwriter will frequently take a chance on that same 250 hour commercial pilot when working under the direct supervision of an operator/mentor who has proven to be a good manager and a good risk over many years. There's a lot more to being a good ag pilot than pushing the stick forward and pulling it back. Find an operator who is willing to pour his knowledge into a new ag pilot and who is willing to invest in your future. Keep in mind, it's entirely reasonable to expect this to come with some commitment from the new pilot to stay around for a while and give the operator a chance to re-coup some of his investment.

Get a Plan

When I finished my flight training, I had the mistaken notion that Delta

was somehow going to seek me out and hire me on the spot as a new captain. Never happened, THANK GOD! Don't expect to start flying a $1.2 million dollar Air Tractor AT-802 as soon as you exit ag school with your 250 total hours. I don't care what it is you're trying to do, you need a plan. Insurance underwriters and agents love detailed plans. Keep it simple and reasonable. Crawl before you walk. Don't get impatient. Begin flying a lower valued aircraft that the underwriter and your boss are comfortable in sharing the risk. Where it is possible, begin applying seeds and fertilizer. Create a plan to advance from seeds and fertilizer to insecticides and fungicides before progressing to 2,4-D or Roundup. Create a plan to move from a recip or a radial to a turbine. Get a plan that makes sense and provides enough time at each step to allow for a safe progression to the next phase.

Some Dos and Don'ts for Aspiring Ag Pilots on the Job Trail

While there are no guarantees, your chances of finding an operator to mentor you as an ag pilot will improve if you follow this advice.

DO: Join NAAA and the state or regional ag aviation association in your area. Membership has its privileges. It shows that you are serious, for one, and grants you access to valuable resources like NAAA's Annual Membership Directory. Whether you are a pilot looking for a seat or an operator looking for a pilot, NAAA's directory offers a wealth of nationwide contacts and resources.

DON'T: Come across as opportunistic. Asking right off the bat how much money you can make as an ag pilot leaves a bad taste in the mouths of operators.

DO: Come across as humble and hungry at the same time. As operator Stan Jones put it, "I had one call [one] summer. The man's attitude was fantastic. 'I don't know anything. I'll come work for you; I'll do whatever it takes.' I hired him."

DON'T: Underestimate the importance of on-the-job training. If someone gives you the chance to get your foot in the door, think twice before turning it down, even if you consider it an inferior position. For instance, an operator may ask you to pay your dues for a year or two as member of the ground crew to learn the ag side of the business. The pay won't be great, but the experience will be invaluable.

DO: Register as a pilot looking for work on NAAA's website. You must be a member to be listed on the website; non-member listings will be kept on file at NAAA's office for distribution upon request to NAAA operators. Visit www.agaviation.org/content/job-listings for more information.

DON'T: Miss the Com*paass* Rose events at NAAA's convention and certain state conventions. NAAA created Com*paass* Rose to advise new pilots and people interested in getting into the industry.

DO: Attend NAAA's Annual Convention and conventions held by state and regional ag aviation associations. These are golden networking and learning opportunities.

DON'T: Get discouraged. You knew you weren't going to land a seat overnight, but chances are it's going to take longer than you think to catch your big break. Author Seth Godin refers to that period when you've experienced your seventh or eighth rejection as The Dip, that "long slog between starting and mastery." In his book "The Dip: A Little Book That Teaches You When to Quit (And When to Stick)," Godin advises, "Never quit something with great long-term potential just because you can't deal with the stress of the moment."

Conclusion

I obtained a seaplane rating at Jack Brown's Seaplane Base in Florida. Prior to my checkride, I learned that Jon Brown (Jack's son) had given more than 17,000 seaplane ratings over the last 33 years. I comforted myself in the probability that I was a better pilot than at least one of those 17,000 pilots who achieved their seaplane rating. And if so, I was sure I would pass the checkride. I DID!

At the next state or national convention you attend, observe a room full of ag pilots. All of these guys started out in the very same place you are standing. This should be an encouragement to you that your dream of being an ag pilot can be realized. They did it and so can you!

Final Note

Consult with an insurance agent that specializes in ag aviation. Better still, confer with the agent of the operator/mentor you plan to work for to help create the best insurability plan for your particular location. ■

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.*

DELTA FARM PRESS EXPERT DECLARES:

A pilot performs a test application during an Operation S.A.F.E. fly-in clinic by dispensing water with a purple dye, which is used for calibration purposes. The dye shows up well on cards and helps analysts evaluate the droplet size and coverage of the application.

Aerial applicators sometimes victims of unfair criticism for herbicide drift

By Ford L. Baldwin
Practical Weed Consultants LLC

Editor's Note: *This article originally appeared in the Delta Farm Press and is reprinted with permission. NAAA extends its thanks to the Delta Farm Press and the author for allowing us to share it with Agricultural Aviation's readers.*

I recently spoke at a meeting of the Arkansas Agricultural Aviation Association. That is a group that does not get "loved on" enough. I was actually invited because of some comments that some perceived as negative about spray volumes and such in an article written [last] summer. I did not know whether to wear a shirt with a target on it or not. Somebody asked me if I was charging them to speak. My response was, "No way"—it would be harder, therefore, for them to feel my talk was not worth what they paid me! Actually, they are a delightful group to speak to.

It goes without saying that we must have a viable aerial application industry in Arkansas. Those guys have a highly visible industry. Not many of us would want the sort of visibility in our business they have on a daily basis. Their industry has risks involved that not many of us would be willing to take.

I am also blown away by the technology in our current agricultural

aviation industry. I sat through a talk, waiting on my turn to speak, thinking, "A pilot needs a Ph.D. in computer science before he ever thinks about flying an airplane!"

Because of the nature of their business and their high visibility, they are often the target for comments like, "They are drifting stuff everywhere!" I see all sorts of drift situations and actually have looked at more individual drift situations from ground applications the past couple of years. I really do not subscribe to the argument that herbicides are more prone to drift from airplanes than ground rigs. They can be but it usually boils down to the decisions made by the operator of the equipment than the equipment itself. I see excellent applications from both and I see mess-ups from both.

Bad decisions made by a pilot can often affect larger areas, thus the reason for some folks feeling the way they do. Believe me, I have looked at some "wham doozies" for drift situations from airplanes through the years. However, I have seen some pretty good ones from ground applicators as well. I have also looked at a lot of situations where a drift occurred and could have been from either an aircraft or ground applicator working in the area. Some want to automatically blame the airplane simply because an airplane was a potential source. As many times as not, I find it was not the culprit.

Renowned weed scientist Dr. Ford Baldwin has written a weekly column in the Delta Farm Press for nearly 40 years. In January he spoke at the Arkansas AAA's 50th Annual Convention.

I am blown away by the technology in our current agricultural aviation industry. I sat through a talk thinking, "A pilot needs a Ph.D. in computer science before he ever thinks about flying an airplane!"

What some folks may not think about is that quite often an airplane may have time to get in and get a job done before the wind gets too high (or other conditions deteriorate), whereas a ground applicator may only get started good. He is then forced to make a decision to stop or to try to finish under conditions perhaps he shouldn't. That had a lot to do with my decision to help pursue an aerial label for Command years ago. The idea was actually planted by Dr. Ron Talbert, and I did the leg work with the company and proper regulatory authorities.

When we first got the ground application-only label for Command, I thought everyone would be spraying under ideal conditions because we had one chance to get it right or lose it. When I stared riding the roads and seeing applications being made under every condition imaginable I wondered, "What have we done?" It dawned on me that we had to spray under all those conditions to have a chance to get everything sprayed.

I felt that while some fields were best suited for ground applications, others could actually be sprayed under conditions less conducive to drift with aircraft sprayers. This was simply because they could get in and get a lot of acres sprayed while conditions were ideal. I believe that has stood the test of time, and there is no way our rice weed control programs would be where they are without the aerial label for Command.

Before I get any nasty emails, cards and letters, these comments and some to follow in the next article or two are in no way meant to be an airplane versus ground rig argument. I love them both. However, the aerial application industry in some areas may be at a crossroads due to some of the current trends taking place and perhaps some of the new technologies coming along. We are going to need more ground sprayers, in my opinion, but we also must maintain a viable and healthy aerial application industry. ■

Internationally recognized Arkansas weed scientist Dr. Ford Baldwin spoke at the Arkansas Agricultural Aviation Association's 50th Annual Convention earlier this year. Dr. Baldwin retired from the University of Arkansas Cooperative Extension Service as a weed scientist in 2002 and formed Practical Weed Consultants LLC with his wife Tomilea. He works with farmers, applicators and other agribusiness entities and writes a weekly column in the Delta Farm Press.

New Dues Structure on the Horizon for NAAA

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The National Agricultural Aviation Association (NAAA) is increasing its membership dues for the first time since 2008. The new rates take effect July 1, 2012, when NAAA's new fiscal year begins. The Board of Directors met in Alexandria, Va., Feb. 10–11 for NAAA's Spring Board Meeting and voted to increase dues in all categories by approximately 10%.

The decision to raise dues and restructure the fees for additional aircraft was not taken lightly, but the Board felt the moves were necessary in light of several changes taking place within the industry. Consolidation of operations over the past several years has resulted in fewer operators, aircraft and pilots in the industry. Based on research done prior to the 2004 industry survey, NAAA concluded there were approximately 1,625 operators. New research by SRA International, which conducted NAAA's 2011 industry survey *(see cover story, pg. 14)*, puts the estimate of Part 137 operators actively carrying out agricultural application activities closer to 1,350—17% fewer than previously believed. One result of larger conglomerates absorbing smaller operations is several former operator members have dropped down to the pilot membership category, resulting in a loss of dues revenue.

As of July 1, the new rates are as follows:

Operator *Plus $100 per aircraft for every aircraft over one*	$500
Participating Operator *Plus $100 per aircraft for every aircraft over one*	$1,000
Affiliated Operator	$200
Pilot	$200
Participating Pilot	$380
International	$250
WNAAA	$200
Associate	$95
Allied Industry *(1-10 employees)*	$500
Allied Industry *(11-50 employees)*	$750
Allied Industry *(50-100 employees)*	$950
Allied Industry *(101-500 employees)*	$1,100
Allied Industry *(500+ employees)*	$1,900
Affiliated Allied Industry	$200
State/Regional Association	$750

NAAA has been buoyed by substantial auction contributions in the past three years, but there are no guarantees from one year to the next. The concern among the Board was that if NAAA were to lose significant auction contributions, it would result in the Association running large deficits. A dues increase was seen as the best way to ensure that NAAA has the resources to continue to provide multiple and meaningful services to the membership. Since operators are the biggest benefactors of the Association's work, tying the operator dues structure to the number of aircraft was seen as the most equitable way to collect membership dues resources vital to performing the multitude of NAAA services to the industry. According to NAAA's 2011 industry survey, operators have 2.1 aircraft per operation, on average.

The most notable change in the membership structure is related to operators with more than one aircraft. Under NAAA's current dues structure, which expires June 30, 2012, operators pay $10 per aircraft for every aircraft over three. For example, an operator with four aircraft would pay $460 ($450 base dues, plus $10 for one additional aircraft over three). Starting July 1, that operator's dues would be $800 ($500 base dues, plus $100 for each additional aircraft over one).

The current dues rates will remain in effect through the end of June. Anyone who has not renewed for 2012 can join at the current rates until June 30. All members will be assessed at the new dues rates when renewing for a 2012 membership after June 30 or for the 2013 membership year.

Don't wait until right before the national convention to renew your 2012 membership. If you have not already done so, join now and save. There are four easy ways to renew your membership: online at *www.agaviation.org/content/membership*; by mail (1005 E Street SE, Washington, DC 20003), by fax (202-546-5726) or by phone (202-546-5722). The membership classifications are explained in the membership section of NAAA's website and in the Membership Directory. A membership application is located on pg. 54 of this issue. ■

NPDES Permits, Dues and Public Outreach High on the Agenda at NAAA's

Spring Board Meeting

The National Agricultural Aviation Association (NAAA), Women of the National Agricultural Aviation Association (WNAAA) and the National Agricultural Aviation Research and Education Foundation (NAAREF) held their spring board meetings Feb. 10–11 at the Hilton Old Town in Alexandria, Va. The meetings kicked off with a breakfast fundraiser for AgAv PAC, NAAA's Political Action Committee, featuring U.S. Sen. John Boozman, who hails from NAAA President Mark Hartz's home state of Arkansas. Sen. Boozman serves on the Senate Committees on Agriculture, Nutrition and Forestry and Environment and Public Works.

After NAAA's opening General Session, the various NAAA, WNAAA and NAAREF committees met to discuss a wide range of issues. Here are some of the highlights.

Government Relations Activities

The NAAA Board and Government Relations Committees indicted they are very pleased with the wealth of information NAAA has put together regarding NPDES PGP compliance information. As indicated by NAAA consultant John Thorne of Crowell & Moring LLP in his update on the status of NPDES permits during the General Session, the Association is the only organization he is aware of that has made such efforts to educate and prepare their members for compliance with the many nuisances of the NPDES permits. NAAA members can find not only a comprehensive overview of the permit and how it affects aerial applicators, but also a checklist of compliance activities, a model contract, delineation between "waters of the U.S." and "waters of the state," as well as a chart comparing the 44 state permits with the EPA permit that is in effect in Idaho, New Mexico, Alaska, Oklahoma, New Hampshire, Massachusetts and nationwide federal lands. Members can visit www.agaviation.org to access these and additional tools to help them decipher the newly enacted permitting system.

In addition to the continued extensive work on the NPDES permits, the Board is pleased with the other advocacy efforts undertaken by the staff. NAAA had a successful meeting with the Senate Aviation Subcommittee just days prior to the release of the President's FY 2013 budget to push for an aerial application exemption for the GA user fees included in the administration's budget. NAAA also met with the FAA Obstruction Evaluation Group to urge them to expand the METs Advisory Circular to include marking Real Time Kinetics (RTK) towers, Airborne Wind Energy Systems (AWES) and other free-standing and guy-wired towers, as well as to discuss the development of a voluntary listing of towers as a result of the database feasibility study language that NAAA was successful in seeing included as part of the FAA Reauthorization bill.

From left to right, NAAA President Mark Hartz, U.S. Congressman Alan Nunnelee (R-MS) and NAAA Executive Director Andrew Moore meet in Washington, D.C., to discuss federal aerial application research. Nunnelee was instrumental in inserting language in the enacted Fiscal Year 2012 Agricultural Appropriations Bill conference report supporting the importance of aerial application research conducted by USDA's Agricultural Research Service and the benefit it provides American agriculture. The language has been helpful in preserving current levels of funding at USDA-ARS at a time when funding has decreased by $80 million and 10 facilities have been closed over the past two years.

In Other Committee News…

The **Budget & Finance Committee** approved the FY 2012-2013 draft budget, which was subsequently approval by the full NAAA Board of Directors.

The **Communications & PR Committee** discussed a variety of outreach initiatives aimed at promoting the agricultural aviation industry, including updating NAAA's Members-Only Media Relations Kit and representation at a number of educational trade shows. Many avenues were discussed with respect to updating the Media Relations Kit, including updating and adding to the written materials, creating more multimedia material that can be referenced quickly in an effort to aid members that might not otherwise take the time to read lengthy publications, and the possibility of an online tutorial that would guide people inside the industry on how to educate the public about the benefits of ag aviation. An ad-hoc committee was formed to further investigate options for improving the NAAA Media Relations Kit.

In other news, the committee decided to continue the practice of furnishing free wind tower statements stuffers to NAAA operator members while supplies last, and look into the possibility of supporting a proposed documentary on the history of the industry. Further investigation is needed to determine the viability of the project. NAAA and WNAAA will have representatives at the Commodity Classic, Ag in the Classroom and the National FFA Convention this year. The Associations make a point of attending these events to generate interest in the industry among students and teachers and market aerial application services to farmers.

THE FINE FIFTEEN! *Fifteen participants completed the 2011–2012 NAAA/Syngenta Leadership Training Program during NAAA's Spring Board Meeting in February. Pictured from left to right, front row: Ryan Alme, TLB Air, Grafton, N.D.; Matthew Reck, Low Level Dusting Co. Inc., Greeley, Colo.; Leadership Training Program facilitator Steve Powell; Sue Stewart, D & S Aerial LLC, Haskill, Texas; second row: Doug Gibson, Gibson Flying Service Inc., Marianna, Ark.; Dean Heimermann, Countryside Aviation LLC; Chilton, Wis.; Mark Brown II, Quincy Flying Service, Quincy, Wash.; third row: Graham Lavender, AgAir Update, Perry, Ga.; Seth Olivier, Oligrow LLC, Delhi, La.; Brian Gibbs, Gibbs Aero Spray Inc., Fremont, Ohio; fourth row: Shaun Kinniburgh, Kinniburgh Spray Service Ltd., Taber, AB, Canada; Joe Coppick, Puyallup, Wash.; fifth row: Shane Root, Root Spraying Service Inc., Dighton, Kan.; Wes Sharp, Agri-Tech Aviation Inc.; Indianola, Iowa; sixth row: Brian Townsend, Townsend Aviation Inc., Monticello, Ind.; Andy Mitchell, M & M Air Service, Beaumont, Texas; back row: NAAA President Mark Hartz, Syngenta's Neil Strong; and NAAA Executive Director Andrew Moore. Syngenta Crop Protection has generously sponsored NAAA's Leadership Training Program since its inception in 1995.*

The **Convention Committee** reviewed NAAA's highly successful 2011 Convention and began planning for the 2012 Convention in Savannah, Ga. "Charting a Confident Course" was chosen as the theme of the upcoming convention. An elaborate mock trial loosely based on a real-life case is in the works for the General Session. Attorney Geffrey Anderson has agreed to choreograph the proceedings with assistance from the NAAA Insurance Committee. The mock trial will potentially include all stages of a trial as well as videotaping two juries in advance so attendees can see what happens during deliberation. Real operators will be used as witnesses. The committee also discussed sites for future conventions and stated the Fall

Board Meeting would be in Louisville, Ky., which is being considered as a potential future convention site.

The **Insurance Committee** agreed to develop an article for *Agricultural Aviation* that focuses on insurance coverage for applicators that may be accused of violating government statues such as the NPDES Pesticide General Permit.

As reported on pg. 38, the Board of Directors authorized the first membership dues increase in four years. The **Long Range Planning and Membership Committees** both brought motions to the full Board for a vote. Long Range Planning set the new operator and pilot membership levels and Membership examined the other dues categories. The dues restructuring comes in response to changes in the composition of the industry, including consolidation that has resulted in fewer overall operators but larger individual operations.

The **Research and Technology Committee** is planning a fact-finding trip to investigate how aerial application operations are conducted in Brazil. R&T Chairman Dave Eby reported he is working with Alan McCracken who suggested visiting regions with soybean and Midwest-type crops and then rice country before returning to the states. The approximate cost for the trip could be $3,000 per person, and a party of 22 appears to be optimal. Several committee members expressed interest in going, but the fact-finding mission would be open to the general membership as well. The committee approved a motion allocating funds to have two ARS researchers accompany the U.S. aerial applicators to Brazil to glean any new data that would be useful to aerial applicators domestically. More information will be forthcoming.

NAAREF News

Reporting on **NAAREFs committee discussions**, NAAREF President Rod Thomas informed NAAA's board that all U.S. operators should receive a copy of the NAAREF DVD "First Response: An Emergency Response to a Pesticide Spill" by the end of February. The DVD also can be played on a computer and has several PDFs of study material. Operators can order additional copies from NAAA, with the first one provided compliments of NAAREF. It will be left to the discretion of operators to get copies out to fire departments, police and emergency responders and to show at educational events at airports with their aircraft.

The Operation S.A.F.E. Committee requested funds for a "how to" video informing participating pilots and operators about their responsibilities before and during an Operation S.A.F.E. fly-in clinic. A pilot planning to attend a fly-in could watch the video online for briefing on things such as cleaning the aircraft, the hopper and ensuring the nozzles are in good condition with no leaks. Forms would also be available to allow participants to fill out required information in advance. The video should be ready in time for the 2013 Operation S.A.F.E. season.

The next board meeting will be held Oct. 12–14, 2012, in Louisville, Ky. ■

STATES' GENEROSITY TO NAAREF *NAAA Board member and Illinois representative Dominique Youakim (at left) presents NAAREF President Rod Thomas with a $2,000 donation to the PAASS Program on behalf of the Illinois Agricultural Aviation Association (ILAAA) at the NAAA Spring Board Meeting. Immediately following Youakim's announcement, New Mexico's Richie Crockett presented Thomas with $3,000 as the first installment of a three-year, $9,000 pledge to PAASS from the New Mexico Agricultural Aviation Association (NMAAA). During the presentation Crockett urged other states to support the program. In 2011, four state organizations, New Mexico, Illinois, South Dakota and Texas, donated $2,000 each.*

Brad Fritz (front), Dan Martin and Clint Hoffmann of the USDA-ARS Aerial Application Technology Group all shared findings from their research at the 2011 NAAA Convention & Exposition.

More Agricultural Engineering at Work

Recapping ongoing aerial application research from the 2011 ASABE/NAAA Technical Session

By Scott Bretthauer, Ph.D.
University of Illinois, Application Technology Extension Specialist

This is a continuation of an article in the January/February issue that provides summaries of research projects presented at the American Society of Agricultural and Biological Engineers (ASABE) Technical Session, one of many educational opportunities available at NAAA's 2011 Convention & Exposition in Las Vegas. Interestingly, several presentations focused on adjuvants and attempted to measure the effect they have on tank mixes and the droplet spectrum produced. Presentations and papers related to the 2011 ASABE Technical Session will be available soon at apmru.usda.gov/aerial and from a link at www.agaviation.org. Click on "Links" in the footer of any page on NAAA's website and look for the ASABE subhead.

Weather Conditions and Time Intervals to Reduce the Potential for Off-target Movement of Spray Due to Temperature Inversions—An Update

Authors: S. Thompson, Y. Huang, B. Fritz
Presenter: Steven Thompson

Atmospheric conditions near the ground can be unstable, neutral or stable. In unstable conditions, the temperature decreases with a gain in altitude. During a surface inversion with stable atmospheric conditions, temperature increases with altitude. Aerial applications should be conducted when they are neutral or unstable and avoided during an inversion.

Numerous drift complaints in Arkansas, equally divided between aerial and ground applications, related to spraying during inversions have brought on enhanced regulations. To prevent spraying during an inversion in Arkansas, no spraying of glyphosate can occur until there has been a 3-degree (F) increase in temperature from the morning low. Applications of glyphosate must stop after the temperature has dropped 5 degrees from the afternoon high.

The goal of this USDA-ARS project was to evaluate the effectiveness of these restrictions. Weather towers located in Mississippi were used to record temperature and wind data at multiple heights up to 90 feet for the project. This data was used to determine when inversions occurred and when the stability ratios, a numerical value used to characterize atmospheric stability, indicated stable conditions.

During the summer months, it was generally safe to spray (no inversion) starting sometime between 6 and 7 a.m. until sometime between 6 and 7 p.m. The period between 6 and 7 a.m. was the transition from stable (not ideal for spraying) to unstable conditions (ideal for spraying). Similarly, the transition from unstable to stable conditions occurred during the period between 6 and 7 p.m. The 3-degree increase in the morning and 5-degree decrease during the evening were good for avoiding inversions for the summer period. During the spring, the safe-to-spray period began between 7 and 8 a.m. and ended just after 5 p.m. In the evening transition period during the spring, it became unsafe to spray well before the temperature had dropped 3 degrees and the wind was calm. In the fall, the safe-to-spray period began sometime between 7 and 8 a.m. and continued to between 5 and 6 p.m.

The results showed that the 3-degree increase in the morning and 5-degree decrease in the evening were valid for the summer months. Spraying with winds as calm as 2.6 mph

was acceptable if the temperature change restrictions had been met. In the spring and fall, however, these temperature-change guidelines were not as good of an indicator for predicting stable conditions. Making applications when the wind speed was greater than 4 mph was a better assurance for making applications during unstable conditions.

TAKEAWAY: Not spraying until the temperature has increased 3 degrees from the morning low and after it has decreased 5 degrees from the afternoon high is a good way to avoid spraying during an inversion in the summer. During the spring and fall, not spraying when the wind speed is below 4 mph is a better method of avoiding making an application during an inversion.

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Accounting for Effects of Real World Tank Mixes on Droplet Size Estimates from USDA-ARS Spray Nozzle Models

Authors: B. Fritz, W.C. Hoffmann, W.E. Bagley

Presenter: Bradley Fritz

This USDA-ARS Aerial Application Technology Group (AAT) project examined the spray droplet size for real world tank mixes containing an active product with and without the use of additional adjuvants. The goal was to see how the droplet size from these real tank mixes compared to the droplet size from the blank solution used to test nozzles used for aerial applications. AAT researchers wanted to determine if an adjustment factor could be calculated for each tank mix that could then be used with the current spray nozzle models to adjust the droplet size data from those models

to reflect the impact of the tank mix used. They measured the droplet size for the 40-degree flat fan nozzle with 12 different spray solutions, including water only and water and the non-ionic surfactant (NIS) commonly added to make the blank used in nozzle droplet size testing. The remaining 10 solutions contained PowerMax (PM) and PM and various adjuvants. They then used the droplet size data for the different spray solutions along with the physical property measurements for the spray solutions to try to develop the correction factor.

The various spray solutions with PM reduced droplet size 5–10% compared to the water plus NIS blank solution, indicating the water plus NIS blank is not a sufficient mimic for all of the PM tank mixes. However, there was no relationship between the physical property measurements and the droplet size for the PM spray solutions. This means it will not be possible to develop and use a simple correction factor for the spray solutions that could be used with the current spray nozzle models. There was little difference in droplet size among the various adjuvants in the PM solutions, but this may not be true with other active ingredients. AAT will update the old spray nozzle models with the new high speed wind tunnel and the current droplet size measurement system, and then begin to develop tank mix-specific models. AAT's agricultural engineers would like industry feedback on the direction of this project.

TAKEAWAY: The pesticide product and adjuvants in a spray solution reduce the droplet size compared to a water and NIS blank used to measure droplet size for nozzles. A correction factor to adjust current spray nozzle models for various pesticides and adjuvants is not possible.

Characterization and Monitoring of Tank Mix Properties with a Handheld, On-Board Electronic System

Authors: R. Stocker, D.K. Giles
Presenter: Russell Stocker

Spray tank mixes used in aerial applications can have a variety of pesticide formulations and adjuvants in them, all of which affect the droplet spectrum produced, which in turn impacts the efficacy of the application and the risk of drift. Different formulations of the same active ingredient can create different droplet size spectra. Applicators often do not know how the various products in their spray tanks will impact droplet size. The authors of this presentation are working to develop a system that can be used on-board the aircraft to monitor tank mix properties to determine the droplet size being produced.

The objectives were to determine if a vibration sensor could be used to predict droplet size, and implement a system for on-board and in-field use. Vibration measurement was chosen because atomization causes vibration, and fluid properties of a tank mix affect the vibration of spray from nozzles. A laser droplet size analyzer was used to measure the actual droplet size in a wind tunnel and an accelerometer was used to measure vibration. Various nozzles, pressures and tank mixes were tested.

The results confirmed differences in droplet size among the various spray solutions. Results from the vibration measurements showed that the different tank mixes vibrated differently at certain frequencies, confirming that droplet size could be predicted accurately from vibration measurement. Development of an

on-board system was then begun for testing in an actual agricultural aircraft. The goal is to be able to measure droplet size in flight so that aerial applicators can monitor droplet size during applications.

TAKEAWAY: This project is developing a system that measures the vibration during spraying in order to predict droplet size. The goal is for aerial applicators to be able to measure droplet size in-flight.

Evaluating Drift when Spraying an Active Ingredient Tank Mix Solution with and without Additional Adjuvants

Authors: R. Wolf, S. Bretthauer, B. Fritz, W.C. Hoffmann
Presenters: Robert Wolf

The objective of this research project was to measure droplet size and drift from spray solutions that contained the active ingredient Headline Amp (HA). Various spray adjuvants were also evaluated to see how they impacted droplet size and drift when used with the active ingredient. The droplet size measurements were conducted in the USDA-ARS Aerial Application Technology Group's high speed wind tunnel. Two nozzle types were used to measure droplet size, a flat fan nozzle and a rotary atomizer.

Drift was measured in a field study with a subset of the adjuvants from the droplet size analysis. These adjuvants included a crop oil concentrate (COC), a high load COC, two currently available drift reduction adjuvants and an experimental drift reduction adjuvant. All applications were made at 2 gallons per acre (GPA). An examination of the droplet size data for the products tested in the field trial revealed that the COC and high load COC reduced fines and narrowed the droplet spectrum compared to the HA only spray solution. The two commercially available drift reduction adjuvants increased fines and widened the droplet spectrum out. The experimental drift reduction adjuvant reduced fines to the lowest amount in the study and maintained the same droplet spectrum width as the HA only solution.

The field study results were difficult to interpret because light and variable wind speeds complicated the test, producing highly variable results. However, overall the use of adjuvants improved in-swath deposition and reduced downwind drift. Using wind tunnel testing combined with a drift model has the potential to generate more useful data than field trials and at a much lower cost.

TAKEAWAY: Droplet size measurements testing showed adjuvants change the droplet spectrum compared to a solution with just a pesticide formulation. Field testing the adjuvants for differences in drift proved difficult to achieve.

System Development for String Analysis During Operation S.A.F.E. Clinics

Authors: Y.L. Chiu, R. Barbosa
Presenter: Yin-Lin Chiu

Louisiana State University (LSU) is developing equipment to improve the accuracy and efficiency of data collection during Operation S.A.F.E. clinics. A typical clinic requires several people to collect weather and aircraft data on the flightline for each pass made over the sampling line. In many situations, finding a suitable number of people who are experienced with running the equipment can be difficult. Speed and height measurement can be difficult given the limited amount of time available to take the measurements.

The goal of LSU's project is to develop an integrated system to automate the measurement of aircraft height and speed, wind direction and speed, temperature, and humidity. The flightline system uses a Stalker

Operator Chad Frei (foreground) listens intently during a presentation at the 2011 ASABE Technical Session.

Stationary speed sensor to measure speed, an MDL distance sensor for measuring aircraft height and an automated weather station. The height sensor triggers the weather station so that the weather data is recorded for the exact moment the aircraft passes over the string. A wireless terminal interface is used to provide the flightline data for recording.

LSU is also working on developing a new string analysis system to replace the older ones currently in use. The prototype uses a fluorescence sensor to measure the amount of tracer dye on the string and another sensor to automatically detect the green and red marks on the string that designate the beginning and end of the string sample to be analyzed. The prototype string analysis system has been tested with different nozzle setups and compared with the currently used string system and water sensitive cards. Future goals include developing a lower cost weather station and software for string analysis and interpretation.

TAKEAWAY: Louisiana State University is developing a new system to improve the accuracy and efficiency of flightline data collection at Operation S.A.F.E. fly-ins. In addition, they are also developing a new string analysis system for fly-ins.

EPA Container and Containment Rule Compliance Update from Bayer CropScience

Authors: J.D. Fish, M. Jones, J. Bloomberg
Presenter: Mike Jones

The pesticide industry is proactively working with the EPA to meet the requirements of the revised Pesticide Container and Containment (PCC) rule. Bayer CropScience has revised all its product labels to include container cleaning and disposal statements. It has conducted tests to confirm that products can be rinsed until the container is cleaned to 99.99%. It has updated bulk and repackaging agreements to require specifications for approved refillable containers and to require a tamper-evident seal, a one-way valve or both. A signed contract and recordkeeping of the

cleaning and repackaging processes is required prior to repackaging.

CropLife America has a new brochure available that describes the types of refillable containers for liquid pesticides. Bayer upgraded specifications for 275-gallon composite IBC containers to include a one-way valve plus tamper-evident seals and a vented top lid. The benefits of using tamper-evident devices or one-way valves on refillable containers are assurance of product quality, avoidance of risk of product cross contamination during repackaging, and that it protects all those involved, including the registrant, retailer/distributer, customer applicator and farmer.

The typical practice will be for refillables to use both tamper-evident devices and one-way valves. If tamper-evident devices or one-way valves are not used, removed or damaged, then the refillable must be cleaned by the repackager as instructed prior to refilling. Registrants and repackagers will need cooperation from end users to avoid unnecessary or unplanned costly removal or destruction of these devices.

TAKEAWAY: Bayer CropScience has instituted a variety of measures to comply with the revised Pesticide Container and Containment Rule, but implementing the new rule will require the response and cooperation of everyone involved. ■

SUCCESSION PLANNING:

Put Good Standards into Practice to Ensure a Smooth Transition

By Kevin Spafford
Legacy by Design, Chico, Calif.

Editor's Note: *This is Part 3 of a three-part series on succession planning. Parts 1 and 2 can be found in the previous two issues of Agricultural Aviation (November/December 2011 and January/February 2012).*

To the casual observer, aerial application may sound like a risky occupation. Most people assume flying is dangerous. Throw in that the aircraft, at maximum weight capacity, is flying a few feet above the ground in a tree-lined field and a layperson's reaction is, "No way!" Yet, as you know, with the right training, enough practice and following the proper procedures a person may become an efficient and effective professional. Not unlike other highly demanding avocations, following a defined set of protocols will improve efficiencies and enhance results.

For a business owner, nothing is more precarious than transitioning the operation from one generation to the next. For most owners, the business represents a lifetime of work. It is a testament to effort and the result of a lot of angst. When you consider retirement, or the next venture in your vocational life, you can't just walk away from your current operation. You've got too much invested and you expect a return on your equity. If you've been thinking about retirement and researching your options, you've no doubt come to realize there's no practice standard for planning succession. Until now, the process has been ill defined and the outcome chancy.

As a pilot, you know the value of standard operating procedures. You live by a code that rewards best practices and punishes sloppy effort. Following a defined process for succession will improve efficiencies and promote desired outcomes. In working with small business owners, I recommend the Comprehensive Succession Solution. This six-step planning process includes:

1 Regular Communication Meetings

Meeting on a regular basis through the discovery, design and implementation phases of planning will not only expedite the process, it will keep all interested parties informed. It may take a series of formal meetings to clearly pinpoint your goals, research alternative transition methods, make decisions and implement recommendations. Initial meetings may start with reviewing succession planning principles. You may have a single session detailing goals and defining the terms and conditions of your transition. Creating a learning environment, diligently working through the process and effectively communicating will help you achieve your succession objectives.

2 Discovery

Discovery is the process of learning everything possible about you, your operation and your succession intentions. If applicable, a planner will delve into relevant details about your buyer and the acceptable terms and conditions of your transition. This step involves a thorough analysis of all available emotional/factual information to help make recommendations in the preliminary stage. Effort here directly affects the outcome and the satisfaction you'll realize in the process. The quality and quantity of the information received directly affects the recommendations that'll be made.

Discovery meetings should be convened with every person involved in the process. It is important that each interested party is allowed to speak freely and share their concerns in a safe environment. Discovery will involve other professionals instrumental in the planning process including legal counsel, accounting, financial and in many cases a banker.

3 Preliminary Plan

Preliminary planning is often referred to as the "try-on" phase in the succession planning process. In this phase preliminary recommendations are made and the business owner is allowed to consider the ramifications of planning decisions. The written Preliminary Plan will assess the current situation relative to your goals and objectives. In this phase you should receive a cash flow/financial analysis, relative to Ownership Transition, Financial Security, Leadership Development and Estate Tax Provisions. The written material will include a summary of the findings and in some cases alternative, or second-best, recommendations.

4 Final Plan

A final plan should really be referred to as a "working" final draft. A succession plan must remain dynamic. It's only final until the next review when components are refined to better achieve an owner's goals. In the early stages of the process you'll get a lot of things right. You'll implement changes that will fortify the operation, ensure personal financial security and start the transition to new owners. As you wade through the process and learn more about the value of succession you're in a position to refine your goals and implement strategies that will further improve efficiencies.

A final plan, including the four elements of a comprehensive plan, will incorporate an explanation supporting the planning rationale and outlining various recommendations. The meat of the final plan is an implementation schedule with actionable steps to achieve your succession goals.

5 Implementation

Without action, everything is for naught. Implementation is the process of writing the legal documents, creating the financial instruments, adopting the accounting practices and learning the leadership practices (for a smooth transition). In the implementation phase, each respective professional is included and responsible for completing their respective discipline in the plan. By this point a business owner, the family (if applicable) and a buyer are very comfortable with a multidisciplinary team of advisors, and they're working with them to ensure compliance with the plan recommendations.

6 Annual Review

As stated earlier, a succession plan must remain fluid to ensure successful outcome in the long term. It must adapt to the changing legislative landscape, business environment, societal structures, familial responsibilities and growing capabilities of a new leader. A plan must be applicable to a growing operation and provide for opportunities.

Meeting for the annual review will allow all interested parties to review the entire planning process and involve basic succession principles, methods and techniques. It will ensure that the process adheres to all the components of a comprehensive plan including the Ownership Transition, Financial Security, Leadership Development and Estate Tax Provision. The transitioning owners will renew their specific succession objectives and implement corrective recommendations.

Twelve months after full implementation is an ideal time to evaluate progress and update your succession objectives. The key to a successful transition is good communication, clear objectives, readiness, a planning model/process and action. If an ownership transition is in your future, if your financial security is dependent on equity from the operation, and if you'd like to realize a return on a lifetime of work, follow a comprehensive planning model and adhere to a defined planning process. ■

Kevin Spafford serves as Farm Journal's succession planning expert. His firm, Legacy by Design (Legacy-by-Design.com), works with farm families from coast to coast, guiding them through the succession process. He has a lifetime love of farming and flying. For questions: (877) 523-7411 or legacyproject@farmjournal.com.

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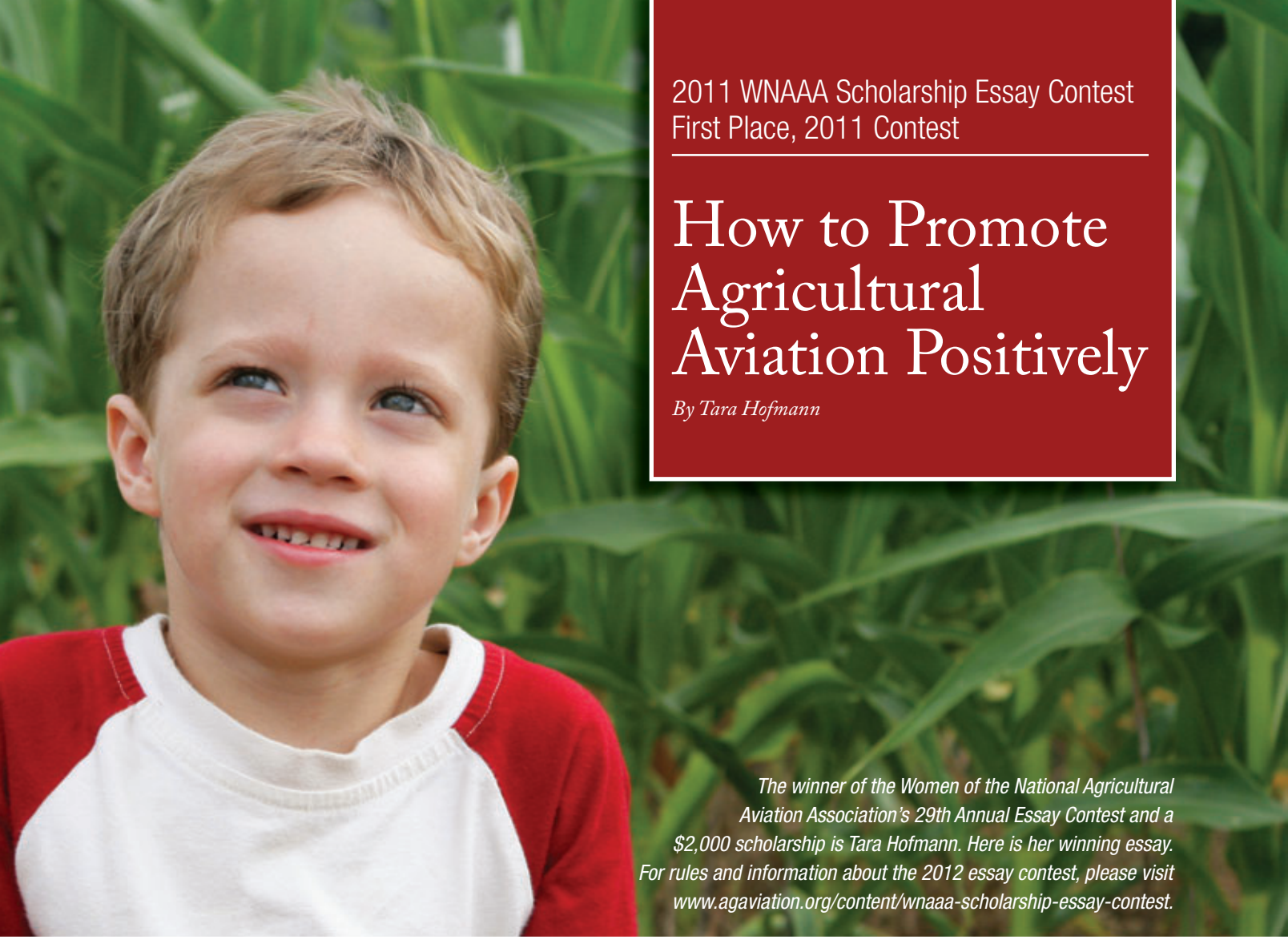

2011 WNAAA Scholarship Essay Contest
First Place, 2011 Contest

How to Promote Agricultural Aviation Positively

By Tara Hofmann

The winner of the Women of the National Agricultural Aviation Association's 29th Annual Essay Contest and a $2,000 scholarship is Tara Hofmann. Here is her winning essay. For rules and information about the 2012 essay contest, please visit www.agaviation.org/content/wnaaa-scholarship-essay-contest.

What child isn't amazed by an aerial applicator flying over a nearby field? A child exclaims with excitement, "Look! Look! An airplane! He is going up and down! What is he doing?" Kids are in awe of what appears to be the acrobatic flying of aerial applicators. If kids understood how much impact aerial applicators had on their day to day life, they would be even more in awe of the job of an aerial applicator. How do we ensure that children know the impact and importance of aerial applicators? How do we ensure that adults know the impact and importance of aerial applicators? How do we promote agricultural aviation? We educate them.

Agricultural aviation has been a big part of my life, since I grew up on a farm and was raised by an aerial applicator. Watching the "spray plane" go by the window was routine, and hearing it take off at 5:30 a.m. on a summer morning was also routine—which interfered with my teenage sleeping in summers. However, not many people are aware of the impact and purpose of agricultural aviation.

As a classroom teacher, a great way to promote anything is to reach our kids. In my classroom, I welcome outside speakers to give my students firsthand accounts of careers and professionals in our area. One of the programs that visited my classroom was on Farm Safety. Since I live in a rural state, I think that an Ag Aviation program would be one way to positively promote agricultural aviation. Students could be taught about the positive impact that aerial applicators make, especially in our food supply. Along with our current science curriculum in schools, an Ag Aviation program could inform students that without aerial applicators, our cost of food would rise an estimated 50 percent, since there would not be as much yield per acre for farmers. An Ag Aviation program would also support the social studies curriculum when talking about different countries and their growing populations. Ag in the Classroom and Provider Pals are two resources available for use in the classroom. I believe that by promoting agricultural aviation in the classroom, our students will share their knowledge with their parents.

I think that an Ag Aviation program would be one way to positively promote agricultural aviation. Students could be taught about the positive impact that aerial applicators make, especially in our food supply.

As far as promoting agricultural aviation directly to adults, our aerial applicators need to be visible and answer the communities' questions by attending the local Ag Days, County and State Fairs, as well as being visible to the public with them sharing the hard work they do with the community. In the past few years, I have noticed a billboard along the interstate, "Aerial Applicators: Helping to provide safe food for America's tables" and commercials on the local television station during state basketball tournaments, which is a step in the right direction.

Two of the big hurdles I see concerning agricultural aviation are the debate over organic food and the safety of the pilots. Just as we do with kids, we need to educate adults on both issues.

People will always have the choice of buying organic food. Despite the common misconception, pesticides are used in organic foods. If we didn't use pesticides in both conventional and organic production, our food supply would greatly decrease; therefore, sending food prices skyrocketing. In order for our farmers to keep up with the growing demand for food, we need to have aerial applicators that can efficiently and effectively apply these pesticides to give farmers the high yields they need to continue to feed our world. It is predicted that food production will need to double by 2050. Our population continues to grow and we will need aerial applicators to help our farmers achieve the high yields necessary to provide the food needed. These yields cannot be obtained as efficiently or effectively with ground equipment.

Application done aerially doesn't leave wheel tracks which destroys potential crop yield. If people choose and can afford to buy organic food, they will be able to continue to make those choices. However, we need to ensure that there is affordable and abundant food for all people, and aerial applicators help make that happen. Whether people choose to buy conventional or organically grown food, agricultural aviation is promoted positively.

The other issue that concerns people is the safety of aerial application. Through the PAASS Program, safety is promoted and supported by providing pilots with the knowledge they need to make better decisions. The PAASS Program has a goal to reduce the number of aviation accidents by improving the aerial applicator's decision making skills. By having informed pilots making better decisions, these pilots not only help with their safety, but they are more effective with each aerial application. Some of the PAASS information is used by the WNAAA's Athena Program and is presented to the women's group at the National Convention.

If we promote agricultural aviation in a positive way, hopefully the next time a child, or adult, sees a pilot doing his pseudo-acrobatic moves with the airplane, they will know the positive impact that pilot is making on our food supply. Both the child and adult will know the pilot has safety in mind as he uses his skills to help provide our world with a safe and abundant food supply. ■

Tara Hofmann is married to Adam Hofmann and is the mother to two boys, Gage and Drew. Her parents are Brian and Elly Rau of Medina Flying Service, Medina, N.D. She has been a Reading Coach in Bismarck, N.D., for the past two years. Before that, she was a 5th grade teacher for nine years. Tara has a Bachelor's Degree in Elementary and Early Childhood Education and a Master's Degree in Elementary Education. She is currently working on her Doctorate Degree in Educational Leadership through the University of North Dakota.

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NAAREF and the PAASS Program express sympathy to all those who have lost loved ones or friends this past year. 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.

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AAT Applied Research Summary

Impact of Active Ingredients on Applied Spray Droplet Size

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Research Objective

Determine the impact that active ingredients and adjuvants have on spray droplet size under aerial application conditions. Additionally, the results were used to determine whether product-specific spray nozzle models would be required.

Research Methods

Aerial applicators spray many different combinations of active ingredients and spray adjuvants in their daily operations and need to know how different combinations of products affect spray droplet size. Spray atomization tests were conducted in a high speed wind tunnel using a herbicide (PowerMax®, Monsanto Company, St Louis, Mo.) mixed with several spray adjuvants, including a non-ionic surfactant, crop oils, emulsions and polymers using 40-degree flat fan nozzles. The different tank mixtures were analyzed for droplet size across different combinations of nozzle orifice and angle, spray pressure and airspeed. Additional droplet size measurements were made using a water plus a non-ionic surfactant (NIS) solution, which is the solution used in the present USDA-ARS spray atomization nozzle models.

Research Results

The herbicide-only solution consistently lowered the overall droplet sizes by 5–10% as compared to the water+NIS solution. For example: at 160 mph, the volume median diameter decreased from 230 µm[1] with the water+NIS solution to 190 µm with the herbicide solution. Correspondingly, the portion of the spray volume contained in droplets less than 100 µm (those susceptible to off-target movement) increased from 0.4% with the water+NIS solution to 0.6% with the herbicide solution. The addition of the different spray adjuvants had minor effects on the measured droplet size as compared to the PowerMax only tank mix as a result of minor changes in the spray mixtures' physical properties and the dominance of the high speed air shear on the atomization process. These results do point to the need for updated, product-specific models, but not the need for product-plus-adjuvant-specific models.

[1] µm = micrometer

Research Application

- The addition of any active product or adjuvant to your spray mixture will change the physical properties of the spray solution and, as a result, will affect the droplet size of the spray. Therefore, applicators can use the current USDA spray atomization nozzles to guide them in selecting spraying operational conditions and know that the addition of the herbicide will lower droplet size by 5–10%.
- Since the selected herbicide already contains a proprietary blend of adjuvants, the addition of other spray tank adjuvants had minimal impact on measured droplet as a result of minor changes in physical properties and the dominance of the strong atomization of spray droplets under high airspeeds (120+ mph).
- These results highlight the caution that applicators need to exercise when switching to a new product that they have not used before to avoid making a poor application. ■

Date	City	State	Aircraft Type	N #	Injury	Description of Accident
10/26/11	McAlpin	FL	AT-301	3196C	None	Hit power line–visibility restricted by spray on windshield

Test Your Knowledge Answers

Continued from pg. 27

1. The correct answer is B. Federal regulations set the format for pesticide labels and prescribe what information they contain. Applicators should be familiar with the section titled "The Pesticide Label" from the study guide. (Aerial Applicator's Manual: A National Pesticide Applicator Certification Study Guide [AA Manual], pgs. 12-13)

2. The correct answer is A. Answer A is the most correct because the goal of the state pesticide regulation agency's written test is to test the applicant's competency. He or she must demonstrate practical knowledge of the principles and practices of pest control and safe pesticide use and handling. B, C and D are FAA regulated concerns except in the case where the application height is specified on the pesticide label. (AA Manual, pg. 11)

3. The correct answer is A. Pesticide labels provide first-aid instructions for use in treating pesticide exposure by people handling or exposed to the product. The label is also a valuable reference for emergency personnel responding to a pesticide exposure incident. (AA Manual, pgs. 26 and 29)

4. The correct answer is C. ASABE Standard S-572.1 defines droplet spectrum categories for the classification of spray nozzles relative to the specified reference fan nozzle. Purple is the color code chosen as an industry standard for nozzles in the extra fine spectrum category. (AA Manual, refer to chart on pg. 37)

5. The correct answer is C. The interior baffles in tanks limit the sloshing of liquid during flight and dampen the effect of load shift on the aircraft's stability. (AA Manual, pg. 45)

6. The correct answer is C. The main reason for calibration is to ensure the ability to apply the correct, label-recommended rate of pesticide and carrier to the target site. This results in a legal application which will give effective pest control while protecting the environment and preventing waste of resources. (AA Manual, pg. 64)

7. The correct answer is C. Using the information given in Sidebar 5, multiply the pints per acre by the acres per tank to arrive at the total chemical used in pints. 1.5 pints/acre x 14 acres/tank = 21 pints of chemical required. The example shows division by 8 pints/gallon, but it is not needed since that step converts the answer to gallons of chemical. (AA Manual, pg. 70)

8. The correct answer is D. Maintaining a constant speed over the target area is important to maintain uniform coverage and rate unless you are using an electronic flow controller to compensate for speed differences. Flying crosswind or at a 45 degree angle to the crosswind minimizes the adverse effect of the head- and tail-wind. Beginning on the downwind side of the field and working crosswind also has the added benefit of minimizing flying through suspended spray particles from previous swaths. (AA Manual, pg. 87)

Trivia Answers

9. The lead arsenate applied was a powder or "dust" which was not gravity-fed into a vane type spreader utilizing the venture principle like many of today's dry material spreaders. The developer of the application equipment, Etienne Darmoy, went along in the rear seat to control the sliding gate and turn a hand crank to crank the insecticide out. The propeller slipstream distributed the dust over the catalpa grove with amazing success. (Information from Low & Slow by Mabry I. Anderson)

10. Operation S.A.F.E. was developed by NAAA in 1981 to combine education with professional analysis of aerial application patterns to reduce spray drift and increase efficacy. S.A.F.E. stands for Self-regulating Application and Flight Efficiency, contrary to the belief held by some that its name comes from being only a safety program.

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NAAREF President's Message

Rod Thomas

It Takes a Village to Raise a Child

I always hated the statement "It takes a village to raise a child" because I don't remember anyone in my "village" helping to raise my kids. I didn't get any help when it was time to buy them braces for their teeth, cars, college, etc. As I remember, their mother and I covered it all. That having been said, I will readily admit that certain teachers, coaches and other adult mentors helped shape their young minds and make them the great girls they have grown to be. With our fourth daughter a senior in college and soon to be off the "payroll" I won't need that "village" to help us much longer.

You might be wondering at this point, "Where is he going with all of this?" I mention the statement above because as much as we would like to believe we are capable of doing everything by ourselves, it is seldom possible. A perfect example is volunteers, contributors and staff it takes to do the work of NAAREF. Elsewhere in this magazine you will see a list of donors that gave money or time to NAAREF and/or its programs. We couldn't do it without them. Right now we are charging $90 per attendee for our award-winning PAASS Program. Quality doesn't come cheap and I can report that it takes nearly double that amount to write, film, produce and deliver that product to our audience.

Maybe it does take a village because without those folks whose names appear on pgs. 52–53 we couldn't afford to deliver PAASS at the current price. Contributions to NAAREF have also allowed us the financial flexibility to film and distribute a spill response video that was sent to all 137 Certificate holders. This is a valuable tool that you can showcase to your local first responders so they can act knowledgably in the event of an ag aircraft accident. It would have been much cheaper to send that video to only NAAA members who are paying the bill, but in the hopes of saving lives, NAAREF voted to send that priceless instrument to everyone regardless of membership status.

It might take a village to raise a child, but most of the time, as parents we handle the duties. As ag pilots and operators in the United States the work we do is "our child." Make sure the village doesn't have to raise your child and please step up to the plate as a parent and join NAAA and then contribute to NAAREF if you are able. (It is now possible to do that all at once on the website if you choose.) As federal dollars that have been contributed to the program become more scarce and difficult to obtain, outside donations to NAAREF enabling PAASS to be provided at a reduced price will become more and more needed and appreciated. Thank you to those who are paying the bills to raise "your child" now. ■

History lesson: *For anyone unfamiliar with the term I used in this article, a little background is in order. In 1996, then First Lady Hillary Rodham Clinton wrote a book titled "It Takes a Village." The complete term which includes the reference to children is attributed to an African proverb originating from the Nigerian Igbo culture.*

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