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PUBLIC HEALTH PROTECTORS

Aerial Applicators Are Biting Back Against Mosquitoes

- in Texas, where a deadly West Nile virus epidemic rages
- in Massachusetts, where Eastern equine encephalitis emerged
- and in other localities where mosquito-borne illnesses may strike

ALSO INSIDE:

- HONEYBEES AND AGRICULTURE: A BUZZING CONTROVERSY?
- CHARTING A CONFIDENT COURSE TO SAVANNAH
- APPLICATOR HELPS ZONING COMMISSION SEE THE LIGHT

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President's Message

Mark Hartz

Summer Challenges and Opportunities

As I write this, a drought that has plagued the Southwest for several years is now plaguing the South and Midwest, putting the much anticipated "corn run" in the Midwest in jeopardy due to the lack of rainfall that has parched most of the country. But opportunities sometimes arise from adversity. The extreme dry conditions bring the possibility of an unprecedented outbreak of insects that will require treatment by agricultural aircraft. Timely applications by aerial application can minimize crop loss by insect damage and also not inflict damage to the crop in the way ground application does.

Play Nice, Fly Safe

"Crisis" outbreaks can bring in an influx of aircraft to deal with the problem at hand. Areas that seldom see an aircraft, much less an ag aircraft, are seemingly inundated overnight. We must exercise not only good stewardship practices but also some sensitivity for the general population and avoid events that generate complaints to the regulatory agencies.

> While the effects of the drought may cause a decrease in demand for aerial application services in some areas, the need for a strong advocate for agricultural aviation will only increase.

In Arkansas the FAA has reported an increase in complaints from low flying ag aircraft. Complainants cite ag aircraft flying directly over dwellings at very low altitudes as the reason for their complaints. As an industry, we have numerous entities and people against our very existence. We should take great pains to not add people to that list. Please be aware of the impact of your operations on those on the ground.

The increase in activity as the season has progressed also has led to a disturbing uptick in accidents in our industry, particularly in Arkansas. Almost all of these accidents were preventable, and several resulted in fatalities. I doubt there is anyone in this business who hasn't experienced the loss of someone they either were very close to or at least knew to some degree. Friends, the loss of a human life due to an accident is a tragic and traumatic event, but to lose someone to an accident that was preventable is, well, is just unforgivable. The costs of accidents like these are just too high. The consequences to the families affected, the business itself and to the industry as a whole have ripple effects that travel throughout our community of aerial applicators.

In talking about the accident situation with your Vice President, Leif Isaacson from Idaho, he mentioned that he found himself in a situation where winds had kept him from making applications and he had fallen seriously behind in getting his work done. He knew his dedicated group of pilots would pull out the stops to catch up when favorable spraying conditions returned. Before that happened Leif called a meeting with all of his pilots and reminded them that while they were behind on the schedule, they should keep safety and stewardship foremost in their mind and not to take undue risks in trying to catch up on the schedule. By doing so Leif took the pressure off of the pilots to catch the schedule up at the expense of safety. I hope others out there have or would do just as Leif did. Atta boy, Leif!

As mentioned, the drought has brought conditions that favor the development of intense insect pressure that will require treatment with insecticides. Hopefully, ag aircraft will be utilized to apply them. The unprecedented heat has had a profound effect and takes its toll not only on aircraft performance, but your performance as a pilot and the ground crewmen loading the aircraft. Be sure to account for the decreased performance of the aircraft, your physical needs and that of the ground crew.

News From Inside the Beltway

As work continues on the next Farm Bill for agriculture, H.R. 872 was included in the House Ag Committee's version of the Farm Bill. If this resolution survives the process it will exempt pesticide applications from the onerous and unnecessary required NPDES permits. Please make time to speak with your legislators to let them know how important their support of this issue is not only to you as an applicator but to agriculture as a whole. The President needs to sign a Farm Bill with this exemption language included and you can play a part in seeing that it happens.

Progress on the new NAAA headquarters is moving rapidly. Demolition has been completed and new construction is well on the way. Hopefully NAAA operations will be in place at the new Alexandria, Va., facility and functioning by late August. If you have never seen the current NAAA office, Executive Director Andrew Moore has taken video of the current office. He has also been taking videos of the progress of the construction at the new office which can be seen in the June 27th and July 12th eNewsletters, found under the News & Publications tab of *www.agaviation.org*. The new office will be a more efficient and comfortable work space for our staff members and will pay dividends in the future in regards to the efforts NAAA puts forth on behalf of the agricultural aviation industry.

While the effects of the drought may cause a decrease in demand for aerial application services in some areas, the need for a strong advocate for agricultural aviation will only increase. The entire industry benefits from the policy and regulatory issues the Association influences. The entire industry benefits from the public relations campaigns that counter the misinformation that paints aerial application in a negative light. The entire industry benefits from the existence of the PAASS Program, the premiere safety program administered by the National Agricultural Aviation Research and Education Foundation, NAAA's sister organization. The entire industry benefits from the fuel tax credit NAAA secured for the entire industry.

While some operations may be experiencing hard times, failing to renew your NAAA membership should not be where you try to cut corners on your expenses. NAAA is the one and only organization out there every day fighting to ensure agricultural aviation remains a viable enterprise to serve the agricultural industry that feeds not only the U.S. but much of the world. NAAA needs a strong membership base to allow it to have the resources needed to fund all of its endeavors that promote agricultural aviation.

To all of our members, thank you for supporting NAAA. If you aren't a member, please consider joining NAAA because it is working for you whether you are a member or not. Don't ride the coattails of others. The National Agricultural Aviation Association is doing its fair share, and it's only fair you do yours. ■

Executive Director's Message

Andrew Moore

Observing the Sesquicentennial of Lincoln's Legacy to Agriculture

Probably the single biggest event of 2012, other than the outcome of the presidential election, occurred this summer in Washington, D.C., when the United States Supreme Court ruled 5-4 to uphold the Affordable Health Care Act.[1] It is difficult to say at this point how history will judge this major piece of legislation since many of the key provisions of the bill do not go into effect until 2014, and it will take many more years after that for indications that it delivered what its authors promised in controlling health care costs, reducing federal debt and providing adequate health care services to most Americans. One thing that does seem fairly certain is that reactions to the law underscore Americans' ambivalence to government—an ambivalence that has existed since our existence as a nation, which was defined and motivated by taxation by a distant authority without representation when we were a British colony.

This year marks the sesquicentennial or 150th anniversary of a number of key government programs that have helped U.S. agriculture expand and evolve and, as a result, help people in agriculture achieve the American Dream.

Time magazine recently ran a great cover story by Pulitzer Prize winning author, commentator and historian John Meacham about the status of the American Dream and how in many effects a silent, but integral partner in helping Americans achieve this dream was the government, even though we don't much like acknowledging the public sector.

With that said, this year marks the sesquicentennial or 150th anniversary of a number of key government programs that have helped U.S. agriculture expand and evolve and, as a result, help people in agriculture achieve the American Dream "of a better, richer and happier life." Some have been controversial, some have had their flaws, but overall, history has shown those are overshadowed with benefits to the agriculture industry. Signing all these statutes in place was our 16th President, Abraham Lincoln.

In 1862 Lincoln signed the law creating a new Department of Agriculture—a small independent agency with a mandate "to acquire and diffuse … information on subjects connected with agriculture." The establishment of such an agricultural agency was not without controversy. Before President George Washington left office in 1796 he recommended the creation of a government board of agriculture to disseminate information on ag production, but Americans and their legislators were wary of a centralized government body overseeing farmers. It took the secession of the Union in 1861 to remove enough opposition to see the establishment of the USDA.

In the same year Lincoln signed into law the Morrill Act of 1862, which established the nation's first federal land grant colleges for the teaching of agriculture and engineering. The Morrill Act funded educational institutions by granting federally controlled land to the states for the states to develop or sell to raise funds to establish and endow "land-grant" colleges. The mission of these institutions as set forth in the 1862 Act is to focus on the teaching of practical agriculture, science and engineering. Later, the Hatch Experiment Stations Act established agricultural experiment stations at the land-grant colleges.

Much has evolved in government agricultural research and dissemination of that research in 150 years, but

1 For more information on how the Affordable Health Care statute will affect the aerial application industry visit: http://news.agaviation.org/naaa/issues/2012-07-03/1.html.

the seeds were sown in 1862. What has grown includes research benefiting the aerial application industry under the auspices of USDA's Agricultural Research Service. This includes the development of new and innovative product delivery systems; software taking into account application equipment types and settings to create the optimal droplet size; and expert opinions from scientists in the field of agriculture that have been used to counter efforts to burden aerial application with either security and/or environmental regulations.

The land grant universities created by the Morrill Act have also delivered much to our industry. Some of the universities created by this system include the University of Arkansas, the University of Illinois at Urbana-Champaign, Kansas State University, and Texas A&M University, that have provided this industry the likes of Dr. Dennis Gardisser, Dr. Scott Bretthauer, Dr. Bob Wolf and Dr. Clint Hoffman, respectively, among others. Expert scientists like these have been instrumental in leading calibration clinics helping to set up our application equipment for maximum effectiveness; have helped create curriculum for our PAASS educational program to augment our environmental stewardship, safety and security; and have generally presented and made available to us information to keep our operations, equipment and techniques at the cutting edge of efficiency and effectiveness.

Another one of President Lincoln's remarkable achievements in 1862 is the Homestead Act, a law he signed providing pioneers 160 acres of free undeveloped federal land west of the Mississippi for farming, further increasing agricultural production in the U.S. It also saw the enactment of the Pacific Railroad Act which established a transcontinental railroad in the U.S. to transport agricultural commodities throughout the land.

Since the establishment of the USDA, the Morrill, Homestead and Pacific Railway Act 150 years ago, the number of acres under cultivation has more than doubled in the U.S. to more than one billion acres of crop and pasture land. Crop yields per acre, thanks to advances in science from the USDA and our land grant universities, have skyrocketed. For example, in 1870 less than 29 bushels could be yielded from an acre of corn. In 2011 USDA estimated, on average, 146.7 bushels were yielded from an acre of corn. Our agricultural advancements have resulted in agriculture being one of our largest exporting industries.

We should give thanks to Mr. Lincoln and wish the USDA and these other key agricultural statues a Happy Sesquicentennial! They have and continue to help our lives and livelihood. They are examples of what we can do right as a people and a country when we work together. They are examples of our excellence and what makes us proud to be part of this 236-year-old experiment in republican government. ■

WNAAA President's Message

Kathy Diehl

The Case for Female Agricultural Aviation Advocates

Reading the Executive Director's Message in the last issue on "Positive Trends in the Media and Tools to Further the Cause" made me think about what an important role the WNAAA plays in this organization. Per our bylaws, one of the main objectives of the WNAAA is to "work toward gaining greater recognition and respect for the agricultural aviation industry and its contribution to agriculture and society." The NAAA staff does a great job of representing us in these areas, but we all know there are many issues out there which are becoming very time-consuming. The national office can tell our story, but we add credibility and strength to NAAA's efforts when we speak about agricultural aviation at the local level.

Considering that 98% of Americans have no connection to agriculture, sharing our story with the public is becoming more and more important. An article in *AgriMarketing* stated that there is a serious disconnect between what the public thinks about agriculture and the message proponents of modern agriculture want to get across. One expert who was quoted in that article gave this piece of advice: "*Messaging related to farming and food production should focus on educating and appealing to the mother—who is purchasing food to feed her family—and ensuring she is comfortable with how the food was produced.*"

The women of the WNAAA include the mothers and wives of operators and pilots who work long hours every day to help produce an abundant supply of grains, fruits and vegetables that are safe for consumption by their own families as well as the general public. We are as concerned as anyone about the health and well-being of our families. As such, we are a tremendous asset when promoting the industry.

As members of the WNAAA we have a wide array of resources available to help us talk about our industry and educate the public. NAAA's updated media relations kit provides a wealth of information about the industry that we can use to communicate more effectively with our customers, our communities, the media and state and local government. Too often, articles about agricultural aviation can be very one-sided and contain inaccurate and misleading information. That may never change completely, but we have great information to help us communicate true and accurate facts.

If you have not done so I would urge each of you to examine the media relations kit. Subject-specific fact sheets are available at *www.agaviation.org/content/naaa-media-relations-kit*. Make copies for yourself and share them with your pilots and other employees in your operations. Each person in your organization has a stake in this industry

and should have the ability to make a positive statement about their profession.

In another positive development, now WNAAA members can apply for admission into the NAAA/Syngenta Leadership Training Program. The program trains participants on how to communicate effectively with the public, media and government about the important role aerial application plays in the production of our country's agricultural products. One applicant will be chosen to represent the WNAAA each year. This opportunity came about at the behest of Syngenta because it recognizes the value in having strong female agricultural advocates. Texas member Sue Stewart went through it in 2011-2012, and South Dakota member Brittany Kerr has been selected for the 2012-2013 class starting in October. To apply for a future opening, look for our Leadership Training Program application at *www.agaviation.org/content/wnaaa*.

> We are as concerned as anyone about the health and well-being of our families. As such, we are a tremendous asset when promoting the industry.

The WNAAA participates in many worthwhile activities to educate and promote agricultural aviation *(see sidebar)*, and I would encourage all women in the industry to take an active role in our organization.

Whether we work with our husbands in the business, stay at home with our children or work in a different career, we can and should be strong advocates for the agricultural aviation industry. It is becoming increasingly clear that we must help deliver the message that aerial application plays a necessary role to ensure a safe and abundant food supply for our children, our grandchildren and a growing world population. ■

WNAAA Road Show

One of the WNAAA's primary means of outreach is exhibiting at major ag conventions. Each year, the WNAAA buys booth space at the Commodity Classic, the FFA Convention and the National Agriculture in the Classroom Conference.

The **Commodity Classic** enables WNAAA representatives to market aerial application directly to current and potential aerial application customers. More than 6,000 attendees attended the 2012 Commodity Classic, which is presented annually by the National Corn Growers Association, the American Soybean Association, the National Association of Wheat Growers and the National Sorghum Producers.

Exhibiting at the **National FFA Convention & Expo** allows the WNAAA to interact with potential future ag pilots and aspiring farmers who could become future aerial application customers. Hosted by the National FFA Organization (a.k.a. Future Farmers of America), nearly 55,000 FFA members and guests attend the FFA Convention each year to learn about careers in agriculture and compete for scholarships.

Agriculture in the Classroom is a national conference for agricultural science teachers, extension educators and elementary and secondary ag educators, among others. Agriculture in the Classroom programs are implemented by state-operated programs, and the goal is to improve agricultural literacy among Pre-K–12 teachers and their students. The best part about Ag in the Classroom is the chance to educate agricultural educators about the importance of aerial application. Although small in size (approximately 400 teachers and agricultural leaders go), the information shared at the conference about the benefits of aerial application has the potential to reach a wider audience once the educators return to their communities and classrooms.

Representatives from the WNAAA and NAAA typically attend on the industry's behalf. If you would be interested in serving at one of these conventions in the future, please contact Jane Barber at *bretjane@venturecomm.net.*

Washington Report

Honeybees and Agriculture: A Buzzing Controversy?

Approximately one-third of all crops in the United States require insect pollination, and honeybees are an essential part of the pollination process. Almonds alone are entirely dependent on honeybee pollination, and many other specialty crops, like apples and cherries, are highly dependent as well. The United States Department of Agriculture (USDA) estimates pollination is responsible for $15 billion in added crop value annually. It is no surprise then that the rapid decline of honeybees over the last several years is generating quite the buzz among beekeepers and agriculturalists alike. The controversy involving bees results from trying to explain just why the losses have occurred and how best to ensure the viability of honeybees in the future.

According to the Environmental Protection Agency (EPA), some beekeepers across the country began reporting colony losses as high as 30–90% in 2006. Since the inception of this higher-than-average loss of honeybees, termed colony collapse disorder (CCD), the hunt has been on to determine the cause. While many believe CCD is a new phenomenon, this may not be the case. Jamie Ellis, an assistant professor with the University of Florida, states it may not be a new disorder, but in fact one that has been around for the last 50–60 years and termed such things as spring dwindle disease, autumn collapse and disappearing disease. While there is no concrete evidence these occurrences are all one in the same, they do share common symptoms with today's CCD. In general, collapsed colonies have a loss or absence of adult worker bees with few or no dead bees in or around the colony, a "capped" brood where only the queen and young remain, and sufficient honey and pollen reserves.

Pollinator protection can indeed pose a sticky situation for beekeepers and agriculturalists to navigate, but it is a necessity for the overall health and well-being of agriculture as whole.

Not surprisingly, many are pointing the finger at pesticides when it comes to assigning blame for CCD. As aerial applicators can attest, pesticides are an easy target and while the facts should always dictate the truth, a few subtle omissions or misrepresentations certainly make for a juicy news story. In May *NBC Nightly News* aired a story on bee deaths linked to pesticides with the basis for its reporting centering on a Purdue University study indicating neonicotinoid insecticides, typically on corn and soybean seeds, as a common factor in CCD. The seeds of many annual crops are coated with neonicotinoid insecticides, known as seed treatments, to reduce potential risks to workers, minimize potential runoff and overall reduce the amount of insecticide applied in the environment. Because the coatings used are sticky, the seeds are mixed with talc to ensure even seed dispersement during planting, and it is the neonicotinoid and talc dust combination released into the environment that is causing the uproar.

While the peer-reviewed Purdue study and EPA alike have concluded pesticides may be one of a number of factors affecting bee health, EPA, unlike *NBC Nightly News*, has yet to determine to what extent pesticides' role exactly is in the phenomenon. Bayer CropScience, the largest manufacturer of neonicotinoids, weighed in on the NBC story and stated the evidence was not sufficient to link neonicotinoids to CCD. Additionally, the EPA has declared that "based on the available research there has been no correlation between pollinator declines in general and the use of any pesticides or class of pesticides." And as for the appearance of dead bees, the EPA has specifically stated that dead bees do not predicate CCD. Among the many potential factors the Agency attributes CCD to besides pesticides are: the varroa mite (a pest

By Danna Kelemen,
Manager of Government & Public Relations

of honeybees); new or emerging diseases such as Israeli Acute Paralysis virus and the gut parasite Nosema; bee management stress; foraging habitat modification; inadequate forage/poor nutrition; and potential immune-suppressing stress on bees caused by one or a combination of factors aforementioned.

Early on the USDA took the lead in the effort to determine the causes contributing to CCD and threatening honeybee pollination for crops. In June 2007 a CCD Action Plan was developed by a CCD Steering Committee comprised of federal program leaders and Land Grant University scientists and administrators. As part of this strategy, the Office of Pesticide Programs (OPP) at EPA became involved in 2011 with the formation of a pollinator protection workgroup with the goals of protecting pollinators through improved product label language, training and promotion of best management practices (BMPs). NAAA is fortunate to have Scott Schertz, owner of Schertz Aerial Service Inc. in Hudson, Ill., as a member of this workgroup.

The pollinator protection workgroup reported on its recommendations in May and emphasized the need for simplified and consistent labeling, standardized definitions, the need to communicate success stories to pesticide users, as well as better recordkeeping and improved bee kill incident reporting. Currently, the workgroup suggests the next logical steps to be taken consist of the following: (1) document and disseminate case studies of success stories and associated BMPs; (2) consider how to incorporate a pollinator segment into every current appropriate training course; (3) develop specialized training for inspectors for reported incidents; and (4) draft standardized pollinator protection language and include eventually in the Label Review Manual.

While these suggestions are practical and necessary to ensure honeybee vitality, they necessitate everyone involved in the application of pesticides, from the manufacturer to the farmer to the applicator, to heed caution. For as the PAASS credo so aptly states, "Upon the performance of each rests the fate of all," and if honeybees are not aptly protected from pesticide applications and there is evidence that aerial applications are a cause label restrictions in the form of large buffers around hives and pollination activity may be a result.

Impact on Aerial Application

So what does all this mean for aerial applicators? The status of honeybee health must be monitored closely in each state as well as nationwide. Beekeepers have reported frustration with the extreme variability in how seriously state lead agencies (SLAs) take beekeeper requests for investigations of possible pesticide-related bee kills, so the aerial application industry certainly does not need to give beekeepers a reason for investigation.

Additionally, ag aviation must continue to highlight its excellent drift reduction technologies and commitment to mitigating drift, especially when it comes to fields surrounding or bordering areas where bees are pollinating.

Another useful tool for applicators to utilize is Driftwatch™ (*www.driftwatch.org*) whereby managers of ecologically sensitive areas and owners of commercial fields and apiaries are able to register so that pesticide applicators can easily locate registered sites before they spray using a Google Maps interface. The Driftwatch program began in Indiana in 2008 and eight states (Colorado, Illinois, Indiana, Michigan, Minnesota, Montana, Nebraska and Wisconsin) are participating for the 2012 crop season.

These available tools and technologies become extremely significant in light of the OPP, in collaboration with Canada's Pest Management Regulatory Agency and the California Department of Pesticide Regulation, scheduled to propose a new process of "quantified risk assessment for honeybees" to EPA's FIFRA Scientific Advisory Panel this fall. Furthermore, on a national level the USDA and EPA are jointly planning a national stakeholder meeting in October to focus on threats to honeybees as well as issues related to pollinator health. The outcome of such

will undoubtedly influence pollinator protection across the board and have repercussions for the future of aerial application that could likely include strict labeling requirements.

Pollinator protection can indeed pose a sticky situation for beekeepers and agriculturalists to navigate, but it is a necessity for the overall health and well-being of agriculture as whole. While the USDA-Agricultural Research Service (ARS) states that indeed CCD has created a serious problem and could threaten the pollination industry if it becomes more widespread, there were no problems with the number of honeybees needed to pollinate crops this past spring.

Aerial applicators must continue to do their part to help protect pollinators and ensure colony collapse disorder and the decline of honeybees do not become a full-blown crisis for agriculture. The ag aviation industry plays an important role in helping our nation's growers feed the world, and we must work to protect beneficial species like honeybees who are a vital contributor to this process. ■

Communicating Agriculture's Message to EPA

NAAA joined a number of representatives from national agricultural groups to dialogue with top EPA officials about crop protection product issues facing American agriculture. From right to left: Andrew Moore, NAAA; Nathan Bowen, National Association of State Departments of Agriculture; Jim Jones, EPA Acting Assistant Administrator for the Office of Chemical Safety and Pollution Prevention; Stephen Bradbury, EPA Office of Pesticide Programs Director; Beau Greenwood, CropLife America; Rod Snyder, National Corn Growers Association.

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PUBLIC HEALTH PROTECTORS

Aerial Applicators Are Biting Back Against Mosquitoes

- in Texas, where a deadly West Nile virus epidemic rages
- in Massachusetts, where Eastern equine encephalitis emerged
- and in other localities where mosquito-borne illnesses may strike

As the United States staggers through the worst drought in half a century—during one scorching stretch, fully two-thirds of the country were pegged as having exceptional or extreme drought conditions—the collateral damage continues to mount in expected and unanticipated ways.

Widespread crop losses and higher food prices that will result as a consequence commanded headlines and have been on the minds of budget-conscious Americans. Water restrictions have been in effect in many towns. Considering the dearth in precipitation, you wouldn't think mosquitoes would be high on the list of repercussions to worry about, but in fact, a surge in mosquito-borne diseases—from Dengue Fever to West Nile virus to Eastern equine encephalitis—has been documented in 2012.

That doesn't surprise mosquito experts such as Dr. Edward Walker, a Michigan State University entomologist and microbiologist who has worked on mosquito-borne diseases since the late 1970s. "West Nile virus is at its riskiest when it's hot and dry and mosquito populations are noticeably absent," he said.

Those hot, dry conditions have spawned the worst outbreak of West Nile virus in the United States since 1999 when it first entered the country. By mid-August 26 people had died from West Nile virus this year, including 10 in Dallas County, Texas, alone. Half of the approximately 700 human infections in the U.S. have been in Texas, and nearly 200 cases of West Nile illness have occurred in Dallas County.

Desperate times call for creative measures. The mayor of Dallas turned to a time-tested solution that had not been used inside the city since 1966: aerial application.

Controlling Public Nemesis No. 1

Aerial applicators take a great deal of pride in the role they play helping farmers produce a safe, affordable and abundant supply of food, fiber and bio-fuel, but applying crop protection products isn't the only vital job they perform. The work they do to protect public health is less well known, but aerial applicators engaged in mosquito control and other efforts to reduce disease and pest infestations get a similar sense of satisfaction knowing they are keeping their communities comfortable and safe.

> "I hope that our political leaders will have the political will to allow us to keep our guard up, because if we drop our guard we're going to get punched in the nose or worse by these problems."
>
> *–Michigan State University entomologist and microbiologist Edward Walker, on the potential for a deadly mosquito outbreak to take hold in the United States*

Mosquito control has two purposes. "One is to manage pest mosquito populations and the other is to manage disease-carrying mosquito populations to hopefully reduce the potential for people and animals to become infected by mosquito-borne pathogens," Walker said.

Mosquitoes transmit a dizzying array of diseases. According to the American Mosquito Control Association, they cause "more human suffering" than any other organism. The Michigan Mosquito Control Association says mosquitoes are "by far the most dangerous animals on earth."

Thanks to robust mosquito control efforts nationwide that include the use of aerial application, it may be difficult for Americans to comprehend the fact that more than one million people die from mosquito-borne diseases each year. West Nile virus, Eastern equine encephalitis, Japanese encephalitis, La Crosse encephalitis, St. Louis encephalitis, Western equine encephalitis, Dengue Fever, Malaria, Rift Valley Fever and Yellow Fever are some of the deadly diseases mosquitoes spread.

Residents in the United States are much more likely to encounter nuisance mosquitoes, but when cases of West Nile virus or Eastern equine encephalitis (EEE) are reported, it triggers a rapid response that usually involves aerial application. It happened in Massachusetts too this summer when officials declared a state of emergency over EEE.

"When you have a real public health threat, you don't often see a heavy reliance on ground-based equipment. You go to aerial spraying," said Dr. Grayson Brown, director of the Public Health Entomology Laboratory at the University of Kentucky (UK) and this year's president of the Entomological Society of America.

Not all mosquitoes are cut from the same cloth, of course. Today there are more than 200 species of mosquitoes in North America, all with different life spans and different biologies.

"Some would never bite a human. There's even one species that only bites frogs," Walker said. "We have some that would only be pest mosquitoes, even though they can be extremely numerous. We have others that are

carriers of pathogens. Sometimes pest mosquitoes are also disease-carrying, but oftentimes they're not."

The challenge for mosquito control agencies is coming up with the appropriate response because there is no one-size-fits-all approach.

Spring Fever

In Michigan and most of the northern-tier states, spring Aedes mosquitoes are a recurring problem. The combination of spring rainfall and snowmelt forms pools of water known as seasonally flooded woodlots. The spring Aedes mosquitoes hatch as larvae in the water formed by the melted snow and spring rains starting in February and emerge as adult mosquitoes in May, Walker said.

Walker has worked together with NAAA members Al and Mike Schiffer of Al's Aerial Spraying, LLC, Ovid, Mich., on mosquito abatement research and applications. Al's Aerial Spraying has a contract with the Saginaw County (Mich.) Mosquito Abatement Commission (SCMAC) to make its aerial applications and has been doing so since the late '80s.

Walker has worked with the Schiffer brothers on formulation analysis and research to determine how effective *Bacillus thuringiensis israelensis* (Bti), a naturally occurring bacterium, is at controlling spring Aedes mosquitoes. They found that a single aerial application of Bti "completely eliminates the problem," Walker said.

Each year, the Schiffers treat 45,000 acres of flooded woodland habitat in Saginaw Country. The application is typically applied in early April when the mosquitoes are still in the larval stage and leaves have yet to grow back on the barren woodland trees. Those conditions are perfect for a well-targeted application of Bti because it penetrates the non-existent canopy and reaches the targeted seasonally flooded woodlots.

Al Schiffer of Al's Aerial Spraying makes a mosquito adulticiding application in an AT-400. The Ovid., Mich.-based company has six Air Tractor 400s and 502s altogether.

Due to the life cycle of the spring Aedes mosquitoes, there's only a small window to make successful control applications. "Aerial application is the only method to achieve coverage for this many acres in such a short time period," SCMAC Director Randy Knepper said. "Any other method would only allow us to larvicide about 10% of the 45,000 acres we currently control."

Eliminating the floodwater mosquitoes early on also means less spraying later because there would be no need to apply an ultra-low volume application of synthetic insecticides since the mosquitoes never reached the adult stage. "It's a very, very good system," Walker said. "We've also monitored to see if the mosquito populations develop resistance to the material and they haven't."

Saginaw County does extensive monitoring to measure the efficacy of its larviciding program and has seen a consistent trend over the last 20-plus years. "We have been averaging 87% reduction in mosquito larvae under very difficult conditions," Knepper said.

Mississippi Flooding Warrants Aerial Response

When the Mississippi River overflowed causing massive amounts of flooding in May 2011, the governor of Kentucky asked the UK's Brown to help coordinate a response to deal with the influx of mosquitoes in western Kentucky. The disaster-response task force collaborated with Clarke Mosquito Control and NAAA member Dynamic Aviation, Bridgewater, Va., and came up with a plan to treat more than 700,000 acres of the flood-ravaged portion of the state with Duet™, a new product marketed by Clarke.

Sumithrin is the principle adulticide applied by air in the United States. Duet combines sumithrin with prallethrin, an irritant that volatizes quickly. "The insecticides that are used from aircraft are non-residual, so in order to kill a mosquito the droplet has to come in contact with mosquito body in the air. It can't just land on a leaf and have the mosquito walk across it—it has to catch them," Brown said. "Prallethrin is an irritant, and it makes the mosquito get up and fly in the cloud of insecticide, which greatly, greatly improves its effectiveness."

The results were dramatic, Brown said. "We were applying four ounces per acre last year, and depending on the mosquito species we got up to 95% suppression. We were really impressed."

To put that into perspective, he said mosquito control experts generally consider 80% reduction in measured landing rates in a five-minute period to be acceptable.

Last year in western Kentucky they observed landing rates of about 30 per minute prior to treatment.

"Landing rates are almost equal to bite rates, so we were talking about human biting rates in excess of 25 per minute prior to treatment," Brown said. "After [applying Duet] there was a lot of twos and less. With just the sumithrin by itself, you would be looking at five [bites per minute] or less. Five or less sounds high, but we generally accept that as being something that can be tolerated with repellents and protective clothing."

NAAA's Public Health Protectors

Forestry and mosquito spraying work represent a sizable amount of the Schiffers' business, with the rest devoted to agricultural aviation. In addition to larvicide applications in the spring, Al's Aerial Spraying also does adulticide applications, although it has been a few years since they last did so. "Typically we only do that if they have an Equine encephalitis or a West Nile encephalitis outbreak," Mike Schiffer said.

Al's Aerial Spraying works across the country, not just in Michigan. One such job could be classified as more of a public nuisance than a threat to public health. Three years ago the Schiffers treated 70,000 acres within the city limits of Charlotte, N.C., with BT (*Bacillus thuringiensis*) to combat the Fall Cankerworm, a notorious tree defoliator. "It's an older city that has some gorgeous areas, and they want to keep it that way," Schiffer said.

Former NAAA President Rick Reed, owner/operator of Reed's Fly-On Farming in Mattoon, Ill., has been spraying adult mosquitoes for various municipalities off and on for 30 years. He works directly with his local municipalities, not a mosquito control district. Several towns get treated on a regular basis and Reed said there are times when he has to make multiple applications over the course of the season.

Whereas a great deal of mosquito spraying across the country is done in large blocks, Reed does the opposite. "We do several small towns. The smallest town I do is only 140 acres," he said. "So the product we use is a water-soluble product so I can add a little volume to it. Large acreage would allow us to apply an oil-based product at .5 ounces per acre. At that rate, I would have to load over 1,800 acres of product before the pump would even prime. With the water-based product, I apply 10 ounces per acre and still maintain a droplet spectrum of about 50 microns."

Same Aircraft, Different Setups

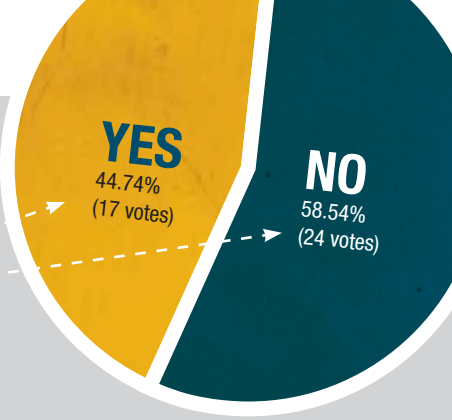
Coincidentally, Reed had sprayed mosquitoes the evening before I spoke with him. Earlier that day, his crew had been spraying soybeans. When the day's work was finished they prepped the Air Tractor for the mosquito mission. Reed says it takes about an hour to convert the aircraft for mosquito spraying. The bulk of that time is spent cleaning the hopper and switching out the booms.

"We clean the inside of the hopper using a hot-water, high-pressure washer. We use a different set of booms with Micronair nozzles, which are designed for creating those small droplets, but it's the same system, the same pump and everything."

Reed waits until dusk to spray for adulticide mosquitoes because that's when they emerge. Although the aircraft is the same, mosquito spraying is different than making an agricultural application. Ag applications typically occur just a few feet above the crop canopy. Mosquito applications are done 200 to 300 feet above ground level (AGL). Perhaps the biggest difference, though, is that the pilot is expecting a significant swath displacement.

"When you're spraying crops you are very targeted and you are very drift conscious, and you're looking for a specific target area," Reed said. "When we're doing mosquitoes we're flying higher, and we are manufacturing tiny 50-micron droplets that we want to float down, not drop. It's not coming

If you are an Aerial Applicator, do you make mosquito abatement applications?



Survey Says…

How many aerial applicators engage in mosquito applications? A little less than half, according to an NAAA eNewsletter poll. Although the results are unscientific, the poll results are an indication that mosquito abatement work is available to aerial applicators if they are interested in it.

* Results from a poll question in the Aug. 10, 2012, NAAA eNewsletter. Aerial applicators who have not yet taken part in the poll may do so at *http://news.agaviation.org/naaa/issues/2012-08-10/6.html*.

down directly under the aircraft. Instead, the air movement will determine the final effective swath width and area treated in the application."

Despite working for several small, rural towns, ironically Reed has never been able to convince his own town to hire him. "They have full-time people and they've got equipment. They prefer to go out with foggers and do sections of the city at a time, because that's what they've done for years. When I tell them I can do the whole town in 40 minutes when it takes them five evenings to treat about 30% of it, you'd think that would be a real boost.

"There's nothing any more efficient than an airplane in treating mosquitoes. The foggers have to stay on the roads and they're going up and down essentially through a grid work of roads. Is it going to drift? Is it going to get to the center of the block? Maybe, maybe not. We're knocking mosquitoes out of the air from 200 AGL clear down to the ground. But they think it's too expensive to have us."

Reed doesn't do mosquito abatement work for the money, though. In fact, he thinks he may be the only ag operator in Illinois who still does mosquito work. There's more risk for the aerial applicator now thanks to the NPDES pesticide general permit requirements that went into effect earlier this year.

"A lot of applicators just simply don't want the hassle and potential liability," he said.

Reed and other aerial applicators engaged in mosquito spraying derive satisfaction from doing their part to protect public health. One time Reed was at a farewell party for a friend. During the course of the evening two of the guests approached him. "He said, 'You're the guy who sprays for mosquitoes, aren't you?' I said, yeah, and he said, 'We really appreciate it. We haven't noticed any mosquitoes and the kids can play outside.'"

> "When you have a real public health threat, you don't often see a heavy reliance on ground-based equipment. You go to aerial spraying."
> *–Dr. Grayson Brown, director of the Public Health Entomology Laboratory at the University of Kentucky*

Although a certain segment of the public will never fully embrace aerial applicators, by and large, the public seems more accepting of aerial mosquito applications than they may be of crop-specific applications to treat a plant disease or control insect pressures. Mosquito control is less mysterious to the general populous than the crop protection products and methods used in agricultural applications are. That reality isn't lost on ag pilots who also engage in mosquito control. The question is whether that goodwill is transferrable in any way. The hope is that it can lead to greater understanding and appreciation of the ways aerial applicators help farmers keep a growing nation and world fed and clothed.

"It's not necessarily directly [linked in the public's mind], but it is a great education opportunity," Schiffer said. "When our Air Tractors are flying over Saginaw County, 99.9% of people are tickled to death they're there. … I think it does help the agricultural industry to make sure people understand we do all of that."

Emerging Threats

Although treating for nuisance mosquitoes is more common than disease-carrying mosquitoes in the United States, Brown and Walker are less concerned about complaints associated with garden-variety pest mosquitoes. What worries them are the emerging threats disease-bearing mosquitoes could introduce.

"We have the ecological conditions in place for these viruses to come in, and once they get going sometimes they're here to stay," Walker said. "Certainly, that's true for West Nile virus—it didn't invade and then leave, it's invaded and established."

"Our biggest concern right now is dengue fever coming up from the Caribbean or the [Florida] Keys," Brown said. "It wouldn't be a big public health threat, but it would cause a big public reaction."

Last year, *Time's* Bryan Walsh reported on the reemergence of dengue fever in the far southern reaches of the U.S. The first native cases of dengue fever in Florida in more than 70 years began appearing in Key West in 2009. Dengue is considered a threat to public health in Hawaii, south Texas and other Florida counties besides Key West's Monroe County.

In terms of "actual public health threats," Brown says he's more concerned about chikungunya virus entering the United States. "It's one that would move across the U.S. very quickly. It would be a lot like West Nile virus if it came in. We would be basically powerless to stop it, but unlike West Nile virus it would cause much higher levels of mortality."

Despite these clear and present dangers, Walker is apprehensive about the chilling effect tighter restrictions and possible lawsuits by citizen's action groups could have on future response efforts. "Hopefully it won't interfere with the practices that are currently

in place, which I think are good management practices," he said.

The new NPDES permits have already raised the cost of mosquito abatement treatments for various municipalities. Meanwhile, some aerial applicators have ended their mosquito contracts and decided to no longer offer mosquito spraying as a service due to the uncertain climate the NPDES PGP has created.

"We have to have a long-term view," Walker said. "Nobody would ever have predicted that West Nile virus would show up in New York City in 1999, but it did and spread across the continent and reached California by 2004. Don't we really need to be ready for events like that and have systems and mechanisms in place for the unpredictable?"

It could happen again, Walker cautioned. "Now we have Dengue emerging in South Florida. There's a lot of concern about chikungunya virus coming in, there's a lot of concern about Rift Valley fever virus invading North America—all mosquito-borne viruses. So, I hope that our political leaders will have the political will to allow us to keep our guard up, because if we drop our guard we're going to get punched in the nose or worse by these problems."

When You Need an Air Force, Not an Army

Aerial application clearly protects the public health and plays an essential role in keeping mosquito-borne diseases at bay. "There are some things we do that aren't going to happen any other way," Schiffer said. "We treat 45,000 acres in four to five days in Saginaw County, and it's little seasonally flooded woodlots scattered over an entire county. You couldn't come in with an army and treat that many woodlots by hand or by truck or any other way."

You won't get an argument from public health officials in Texas about that.

"That's the only way you can cover that kind of acreage to protect enough people to make it worthwhile," Schiffer said. "We're just more effective and faster than any other method." ■

The entomologists interviewed for this article are members of the Entomological Society of America. Grayson Brown is the ESA's current president and Edward Walker is vice president of its medical, urban and veterinary section.

46TH ANNUAL NAAA CONVENTION & EXPOSITION

December 3–6, 2012
Savannah, Ga.

Savannah, the Sequel

How do you top NAAA's blockbuster 2010 show during its Savannah debut? By planning an even **BIGGER** sequel

By Jay Calleja
Manager of Communications

NAAA is "Charting a Confident Course" toward Savannah, Ga., as preparations ramp up for 46th Annual NAAA Convention & Exposition Dec. 3–6. Rooms at NAAA's official hotels are filling fast, companies are gobbling up booth space like a grasshopper consumes leaves, and NAAA is assembling a stellar lineup of speakers to help aerial applicators chart an effective course to survive and thrive in an environment that is becoming not just more complex, but more complicated in which to operate.

From a bevy of booths to a cavalcade of concurrent sessions to a litany of Live Auction items, NAAA has BIG plans for the sequel to our highly successful debut in Savannah at the 2010 Convention & Exposition. With three months to go, here's how things are shaping up.

Astronaut Story Musgrave

NAAA Convention Confidential

Theme: "Charting a Confident Course"

2012 NAAA Convention: Dec. 3–6

AgAv PAC Golf Tournament: Dec. 1–2

Cutoff for NAAA Room Block: Nov. 8

NAAA Convention Pre-Registration Deadline: Nov. 21

Blast Off with an Astronautical Kickoff Speaker!

For a convention boasting a buffet of programming, exhibits and networking, NAAA has whipped up the perfect starting dish to whet your appetite: the 2012 Kickoff Breakfast.

This year's Kickoff Speaker personifies NAAA's convention theme, "Charting a Confident Course," in the extreme. **Story Musgrave** has charted a remarkable course throughout his life and career—so much so that Dos Equis ought to seriously consider patterning its Most Interesting Man in the World commercials after *him*.

2012 CONVENTION SCHEDULE

GOLFERS, DON'T FORGET:
AgAv PAC Golf Tournament

Saturday, Dec. 1	Calcutta	6:30 p.m.
Sunday, Dec. 2	Tee Time	8 a.m.

Sunday, Dec. 2

- Aircraft into the Hall ..... TBA
- Pratt & Whitney Canada PT6 Seminar ..... 9 a.m.–4 p.m.
- CD Aviation – TPE 331 Engine Maintenance Training ..... 8 a.m.–5 p.m.
- Compaass Rose ..... 4 p.m.–6 p.m.
- NAAA Board Meeting ..... 4 p.m.–6 p.m.

Monday, Dec. 3

- Exhibitor Setup ..... 8 a.m.–8 p.m.
- Kickoff Breakfast ..... 8 a.m.–9:45 a.m.
- ASABE Technical Session ..... 10 a.m.–12 p.m.
- Canadian Board of Directors .... 10a.m.–5 p.m.
- Concurrent Session ..... 1:30 p.m.–6 p.m.
- Welcome Reception ..... 6:30 p.m.–7:30 p.m.

Tuesday, Dec. 4

- CP Products Breakfast ..... 7 a.m.–8:30 a.m.
- Exhibitor Setup ..... 8 a.m.–11:30 a.m.
- Business Meeting ..... 8:30 a.m.–9:30 a.m.
- General Session ..... 9:45 a.m.–12 p.m.
- Trade Show Hours ..... 12 p.m.–6 p.m.
- Auction & Reception ..... 5:30 p.m.–7 p.m.

Wednesday, Dec. 5

- Concurrent Sessions ..... 8:15 a.m.–9:45 a.m.
- Allied Industry Meeting ... 8:30 a.m.–9:30 a.m.
- Trade Show Hours ..... 10 a.m.–4 p.m.
- Silent Auction Closes ..... 3 p.m.–4 p.m.
- Exhibitor Teardown ..... 4 p.m.–10 p.m.

Thursday, Dec. 6

- Concurrent Sessions ..... 8 a.m.–4 p.m.
- Com*paass* Rose ..... 1 p.m.–2:30 p.m.
- Farewell Reception ..... 5:30 p.m.–6 p.m.
- Farewell/Awards Banquet ..... 6 p.m.

An astronaut with agricultural roots, Musgrave is a true renaissance man. He spent more than 30 years as a NASA astronaut and flew on six spaceflights. He performed the first shuttle spacewalk on the Challenger's first flight, conducted two classified DOD missions and served as the lead spacewalker on the Hubble Telescope repair mission.

Musgrave morphed from a young man who quit school to join the Marines to a person in need of a double-sided business card to account for all his academic accolades. Some students graduate with a double major—Musgrave has *seven* graduate degrees in math, computers, chemistry, medicine, physiology, literature and psychology, as well as 20 honorary doctorates.

Today, he operates a palm farm in Orlando, Fla., a production company in Sydney, Australia, and a sculpture company in Burbank, Calif. As if that weren't enough, Musgrave is also a landscape architect, a concept artist with Walt Disney Imagineering, an innovator with Applied Minds Inc. and a professor of design at Art Center College of Design in Pasadena, Calif.

Between the breakfast buffet and stories from Musgrave's astronomical life and career, NAAA's Kickoff Breakfast is sure to satisfy your physical and intellectual appetite. There are two ways to register for this event. Tickets for the Kickoff Breakfast and Farewell Banquet are included in the "with banquets" registration package. Anyone with a "without banquets" package can purchase tickets à la carte.

General Session: Aerial Application on Trial!

This year's General Session is one that every applicator ought to attend. The law firm of Anderson, Riddle & Kuehler LLP (ARK) will present a mock trial with actual jurors from the community.

The attorneys in ARK have been representing aerial applicators in all types of matters for nearly 20 years. Geff Anderson handled his first drift claim in 1993. The firm has supported NAAA and several other aerial applicator professional organizations for more than 10 years. The firm has successfully tried and appealed aerial application cases in the State and Federal Courts across the nation. Both Anderson and Guy Riddle are recognized as "Super Lawyers" by *Texas Monthly* magazine. Other members of the firm have been recognized as Rising Stars by *Texas Monthly* and as Top Attorneys in

General Session Speakers

Geff Anderson

Guy Riddle

Raven Atchinson

Fort Worth by the *Fort Worth, Texas* magazine. The firm is based in Fort Worth, Texas.

Geffrey W. Anderson and **Guy H. Riddle**, partners in ARK, along with **Raven Atchison**, an ARK associate attorney, will try an actual case in front of the NAAA membership. Unlike other mock trial demonstrations, this mock trial will, in fact, be real. The facts of this trial will be taken directly from a case that ARK tried for one of NAAA's members in 2009. Over the 75-minute presentation, NAAA members will observe opening statements, direct and cross examinations of the key witnesses and the closing arguments that were given in the case. At the conclusion of the evidence, the NAAA membership will then watch actual jurors deliberate on the facts and come to a verdict through closed circuit observation. The juror deliberations will have already been taped at a previous presentation of the facts.

The case that will be presented involved an application of 2,4-D within two miles of $750,000 worth of cotton, making the potential loss almost $1,000,000, a number far in excess of the applicator's policy limit. As a result of the loss of yield, one of the farming entities filed for bankruptcy.

In this case, the presence of 2,4-D on the cotton was indisputable. The only real, undecided matter was the source of the 2,4-D contamination. The applicator's records did not provide the exact time when two of its aircraft made the application on an extremely large amount of acreage. Instead, the records indicated that the application occurred at two different times with different weather conditions. One record indicated that the application had been made in the morning with a wind blowing away from the cotton fields. The other record indicated that the application occurred in the afternoon with a wind blowing directly toward the cotton

Rooms Going Fast at NAAA's Convention Hotels

It's Nov. 9 and you've registered for NAAA's Convention. Do you know where you are staying?

Take it from us—you don't want to wait until November to find out the answer to that question because you may not like the results. With three months to go, NAAA's room block at the Westin Savannah is already full. Aside from its terrific facilities and customer service, the Westin's coveted location next door to the convention center appealed to many early planners.

Business has been brisk at NAAA's two city-side convention hotels, but the Savannah Housing Bureau still has rooms available at the Hyatt Regency Savannah and the Savannah Marriott Riverfront. The Hyatt and Marriott are in the heart of the entertainment district and just steps away from great shops, restaurants and attractions.

Regardless of which side of the river you're staying on, crossing it will be quick and easy. The Westin, Hyatt and Marriott each have their own ferry docks, and a free ferry service will shuttle attendees across the river throughout the day and evening. This worked extremely well in 2010.

In addition, a free shuttle bus service will be available to transport guests at the Hyatt and Marriott to and from the convention center, and attendees at the Westin to and from the entertainment district.

The Savannah Housing Bureau is handling NAAA's hotel arrangements and has created a dedicated website for attendees to book their stay at NAAA's official hotels at *https://resweb.passkey.com/go/46thNAAA*. NAAA's hotel-registration website lets you book, modify or cancel your hotel reservations at any time. Booking through this secure website is required to receive NAAA's group rate. Standard rooms are $114 per day, plus tax, at all three hotels. Questions about hotel reservations should be directed to the Savannah Housing Bureau at 912-644-6465. Please do not call the hotels directly. The individual hotels cannot match NAAA's group rate or reserve a room in NAAA's housing block.

NAAA's three primary convention hotels are in proximity to the convention center and Savannah's entertainment district. A free ferry service will shuttle attendees across the river throughout the day. The Westin, Hyatt and Marriott each have their own ferry docks.

Three's Company

~~**Westin Savannah Harbor Golf Resort & Spa**~~ **SOLD OUT!**
~~One Resort Drive~~
~~Savannah, GA 31421~~

Hyatt Regency Savannah
Two West Bay Street
Savannah, GA 31401

Savannah Marriott Riverfront
100 General McIntosh Boulevard
Savannah, GA 31401

NAAA Room Rate: $114/night + tax (single or double)

Cutoff for Block Rate: Nov. 8, 2012

Savannah Housing Bureau: 912-644-6465

NAAA Hotel-Registration Website: *https://resweb.passkey.com/go/46thNAAA.*

Savannah's Historic District showcases some of the country's oldest and most well-kept mansions.

fields. The conflict in the records arose from a lack of attention to detail.

When presented with these facts, which version will the jury believe?

The format selected by ARK for this mock trial will provide convention attendees with an actual look into the real world of a lawsuit and should generate some consideration into exactly how the public views aerial applicators and their role in the stewardship of agriculture. The facts will demonstrate how small mistakes may create the appearance of unprofessional conduct on the part of the applicator in the eyes of the public.

Actual mock trials such as the one that will be presented are used by plaintiff's attorneys, defense attorneys and insurers to gauge the value of a case and to examine what types of presentations may be persuasive to a jury. This tool usually costs in excess of $100,000. Through the generosity of ARK, several members of NAAA and a jury research consulting firm, NAAA will provide the presentation to attendees at a far lower cost. The lessons learned during the mock trial will assist each applicator in avoiding the costs associated with having to finance a similar mock trial based upon his own conduct and reduce the risk of drift litigation.

Other Educational Opportunities

New ASABE Format: The format for the ASABE Technical Session is changing this year. Rather than focusing on specific research projects, members of ASABE's Aerial Application Committee will address high-interest topics, including volume applications, the effects of active products and adjuvants on droplet size, booms setups for optimal performance and using models to improve applications.

"Our challenge this year is to push ourselves to not only to present what scientific research has to say about each of these topics, but to go beyond that and actually interpret these results and provide guidance on how to apply them in the field," said organizer Brad Fritz of the USDA-ARS Aerial Application Technology Group. "Our hope is that over the next several years this session can evolve and grow into something applicators will see as a unique resource, providing them knowledge and tools that they can

actually use." *(Some states allow CEUs for this session.)*

Concurrent Sessions: Several educational sessions are on tap throughout the week, including programming focused on application technology, chemicals, engine performance and maintenance, security and FAA regulations, helicopters and airframe sessions with Air Tractor and Thrush. The PAASS presenters—our roving safety instructors—moderate Com*paass* Rose, an information-sharing session geared toward low-time and prospective ag pilots. Audience members will have an opportunity to discuss ideas and philosophies about the business and interact with some of the industry's top operators.

NAAA Trade Show: The Planes, The Planes!

The world's largest agricultural aviation trade show keeps growing even … well … *larger*. Last year, a record-setting 155 exhibitors displayed their cutting-edge goods and services at the trade show in Las Vegas. That was an 8% increase over the previous high of 143 exhibitors at NAAA's 2010 Convention in Savannah, which had topped the then-high-water mark of 124 exhibitors set in Reno in 2009. As of Aug. 3, 117 exhibitors had signed up for the 2012 Trade Show *(see pg. 26)*.

Between NAAA's 44th and 46th convention the Savannah International Trade and Convention Center installed extra-large doors for the express purpose of appealing to NAAA and its aircraft exhibitors. Instead of being on display in the oval driveway in front of the convention center, as was the case in 2010, NAAA's aircraft display will be on the trade show floor along with every other exhibitor this year. That, combined with the ability to land on a makeshift landing strip on the Westin Savannah's adjacent property, means attendees are in for one of NAAA's biggest airshows ever.

Ten aircraft at least will be on display at this year's trade show.

Whether you plan on upgrading your GPS and GIS hardware and software, are in the market for a new aircraft or simply want to investigate new crop protection products from different chemical companies, you'll find it and more at the world's largest agricultural aviation trade show.

Southern Hospitality

Between the Kickoff Breakfast, Welcome Reception, Live Auction, Pratt & Whitney Canada Reception, Farewell Banquet, private functions and informal get-togethers, there will be no shortage of opportunities for socializing and networking with friends and business acquaintances. It all adds up to what promises to be an unforgettable convention.

Set your coordinates for Savannah, and join us Dec. 3–6 as we come together for the agricultural aviation event of the year. We hope to see y'all real soon! ■

NAAA Trade Show Space Going Fast

The 46th Annual NAAA Convention & Exposition is off to a great start. Booth space started flying off the shelf immediately after NAAA's exhibit registration website opened July 17. Companies snapped up 65 booths within the first two hours, and 75% of the total booth space had been filled inside of three days.

This year's return to Savannah, Ga., is on track to be one of our largest shows ever with 10 airplanes and three helicopters on display inside the Savannah International Trade & Convention Center. As of Aug. 3, 117 exhibitors were on board (see list below).

If you haven't yet registered to exhibit, visit *www.agaviation.org/content/trade-show* to access NAAA's Exhibitor Registration Website. From there you will be able to review the floor plan, contract your booth and register booth personnel. For more information and to discuss additional sponsorship opportunities, please contact **Marshall Boomer at 800-501-9571, Ext. 123**.

2012 NAAA Trade Show Exhibitors

(as of 8/3/12)

- ACES Dynamic Instruments
- Action Aero Inc.
- Aero-Engines Inc.
- AeroFlow System
- Ag Air Turbines Inc.
- Ag Container Recycling Council
- AgAir Update
- AgLasers LLC
- Ag-Nav Inc.
- Agrinautics Inc.
- AgriSmart Information Systems LLC
- AgSync Inc.
- Air Repair Inc.
- Air Tractor
- Airwolf Aerospace
- AmSafe Inc.
- Application Management LLC
- APS Brakes
- Auto Cal
- Av-DEC
- Aventech Research Inc.
- BASF
- Battlefords Airspray
- Bayer CropScience
- CapMan Inc.
- Cascade Aircraft Conversions
- Chartis Aerospace Insurance Services Inc.
- Compton's Flying Service
- Covington Aircraft
- CP Products Co. Inc.
- Curtis Dyna-Fog
- Dallas Airmotive Inc.
- Davidon Inc.
- Davidson Solid Rock Insurance
- Davis Aviation
- Desser Tire & Rubber Co. Inc.
- Dromader USA LLC
- DuPont Crop Protection
- DynaNav Systems Inc.
- Eagle Vista LLC c/o Laviasa
- Falcon Insurance Agency Inc.
- Farm Air Inc.
- Fire Boss
- First Pryority Bank
- Flight Grip LLC
- FliteTek
- FMC Corporation
- Frost Flying
- Garrco Products Inc.
- GE Aviation
- Gibson & Barnes
- Hartzell Propeller Inc.
- Hatfield/Turbine Conversions
- Helicopter Savannah City
- Hemisphere GPS
- Heupel Farms Inc.
- Hunter Agri-Sales Inc.
- Isolair Helicopter Systems
- Johnston Aircraft Service Inc.
- Kansas Aviation
- Kawak Aviation Technologies
- Kimmel Aviation Insurance Agency Inc.
- Kugler Company
- Lane Aviation Inc.
- Leading Edge Associates
- Loveland Products Inc.
- Merit Apparel Co. Inc.
- Micronair Sales & Service Inc.
- Mid-Continent Aircraft Corp.
- Midwest Turbine Service
- Millennium Enterprises Inc.
- NAAA
- NationAir Aviation Insurance
- National Flight Services
- OctaFlex
- PARMA
- Pickett Equipment Co. Inc.
- PIM Aviation Insurance
- Pratt & Whitney Canada
- Precision Accessories and Instruments
- Precision Laboratories Inc.
- Premier Turbines
- Prime Turbines Inc.
- ProAir
- Queen Bee Air Specialties Inc.
- Reabe Spraying Service
- Red River Specialties Inc.
- Rocky Mountain Propellers Inc.
- RT Turbines
- S & T Aircraft Accessories Inc.
- Scott's Bell 47
- SIFCO Minneapolis
- Simplex Aerospace
- Sky-Tractor Supply
- Southeastern Aircraft Sales & Service
- Spectrum Electrostatic Sprayers Inc.
- Starr Aviation
- StollerUSA
- Sutton James Inc.
- Syngenta
- Tennessee Aircraft Company Inc.
- The Trend Group
- Thrush Aircraft
- Timken Bearing Inspection
- TracMap Aviation
- Transland
- Tulsa Aircraft Engines Inc.
- Turbine Installation LLC
- Turbines Inc.
- United Turbine Corp.
- Valley Air Crafts
- Weber Aviation Insurance
- WinField Solutions
- Wings Insurance
- WNAAA
- World Fuel Services

46th Annual NAAA Convention & Expo

Savannah, Ga. ◊ Dec. 3–6, 2012

Pre-registration must be received by Wednesday, Nov. 21, 2012. Use this form and register today!

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

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

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

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

Banquets: Kickoff Breakfast and Farewell/Awards Banquet

EXTRA BANQUET/RECEPTION TICKET FEES:

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

Monday, Dec. 3	Kickoff Breakfast	$45/each	# needed ___
Monday, Dec. 3	Welcome Reception	$45/each	# needed ___
Thursday, Dec. 6	Farewell Reception	$30/each	# needed ___
Thursday, Dec. 6	Farewell Banquet/Awards	$80/each	# needed ___

REGISTRANT: First Name _____ MI _____ Last Name _____

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

Company _____ Phone _____

Address _____ City _____ State_____ Zip _____

Country _____ Fax _____ Email _____

SPOUSE REGISTRANT: _____

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

ADDITIONAL REGISTRANTS:

First _____ MI ___ Last _____

First _____ MI ___ Last _____

First _____ MI ___ Last _____

First _____ MI ___ Last _____

PAYMENT:

Registrant Fee $_____ Credit Card _____ or Check # _____

Spouse Fee $_____ Card# _____

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

NAAA Dues $_____ Address_____

Banquet Tickets $_____ City _____ State _____ Zip _____

TOTAL DUE $_____ _____

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

Mail payment and registration form to: NAAA – 1440 Duke Street – Alexandria, VA 22314
Print registration form at www.agaviation.org – Fax 202-546-5726 – Questions? Call 202-546-5722
E-mail information@agaviation.org. Online registration opens July 9 at www.agaviation.org.

Savor Something Olde and Something New at the WNAAA Convention

By Phyllis Howard and Nancy Turnquist, WNAAA Convention Committee

Far from being a good old boys club, the 2012 convention in Savannah will be replete with events tailored to the women of the industry. All spouses, guests and business employees are welcome to participate in WNAAA Convention activities.

You will get a heavy dollop of Southern hospitality, starting with our Meet and Greet on Dec. 3, the WNAAA President's Open House Dec. 4 and a special limited-engagement luncheon Dec. 5. We are very pleased to announce that the first 75 women to sign up for lunch at The Olde Pink House on Dec. 5 will enjoy a menu of fried tomato BLT salad, crab cake or lobster roll on us!

While space constraints prohibit the WNAAA from treating all of its friends, everyone is invited to the President's Open House where our specialty will be "Southern Tea."

Your participation in all the WNAAA activities as well as any of the NAAA programs you might be interested in is our biggest asset. We are busy planning so you will have a great time! To register for the lunch, please email Phyllis Howard at *iflyag@bellsouth.net* or Nancy Turnquist at *nturnquist@yahoo.com*.

WNAAA Convention Schedule

Monday, Dec. 3

10 a.m.–12 p.m..... Meet and Greet

Tuesday, Dec. 4

1 p.m.–3 p.m.....President's Open House
(theme: Sunflowers & Tumbleweed)

Wednesday, Dec. 5

9:30 a.m.–11:30 a.m..... Athena Program

12 p.m. .....Lunch at The Olde Pink House

Southern Cooking!

The WNAAA Convention Committee cordially invites you to a special luncheon engagement at The Olde Pink House December 5 at 12 p.m.

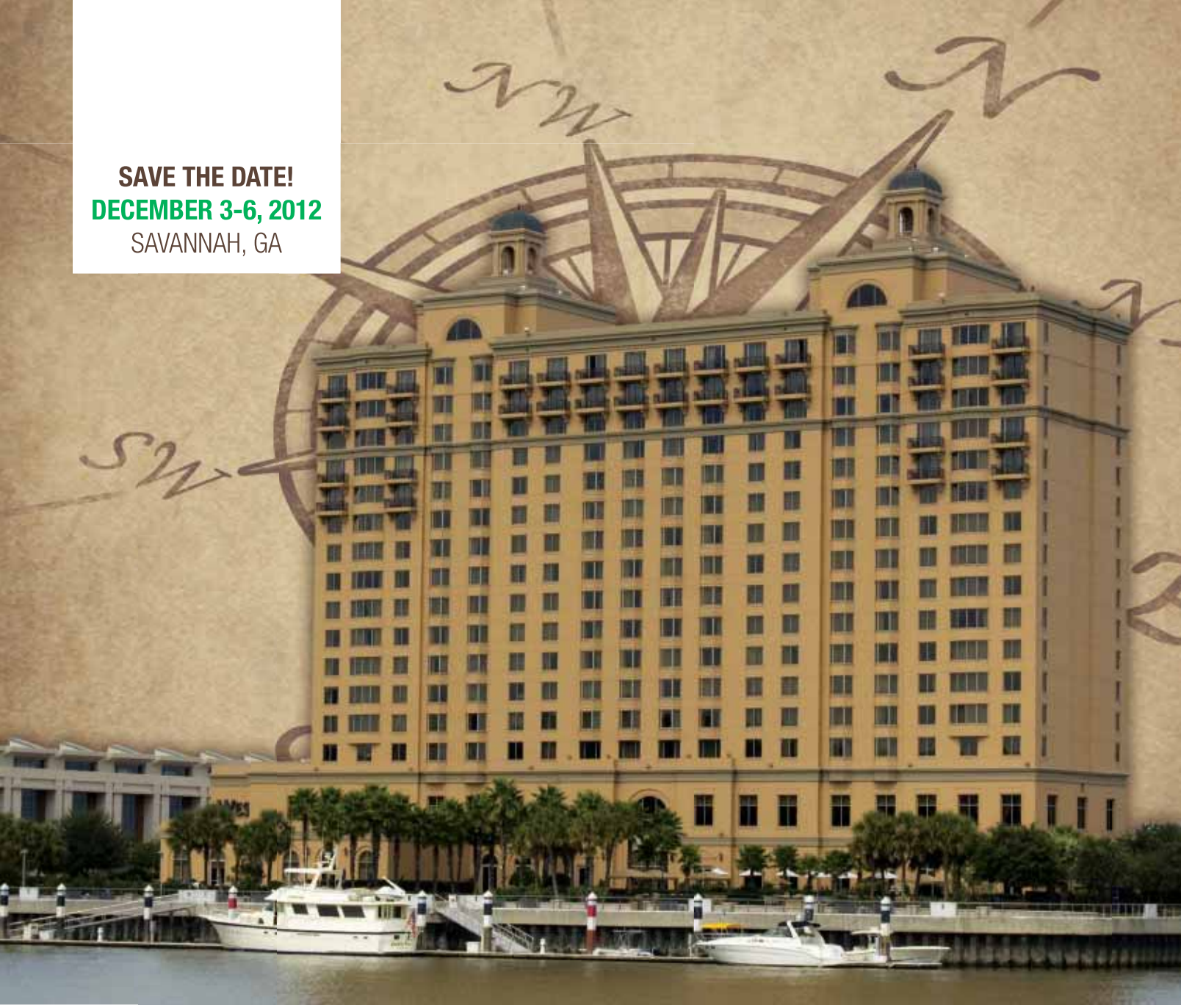
Lunch provided courtesy of the WNAAA, but space is limited to the first 75 women who sign up.

To RSVP, please contact:

Phyllis Howard at iflyag@bellsouth.net,

—or—

Nancy Turnquist at nturnquist@yahoo.com



NAAA 46TH

ANNUAL CONVENTION & EXPOSITION

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Prospects and clients abound for you and your company at the world's largest trade show for agricultural aviation!

Unlimited networking opportunities and a great lineup of speakers and events makes NAAA's 46th Annual Convention & Expo an experience you won't want to miss.

Getting Down to Bid-ness:
NAAA Seeks Auction Items Big and Small

With preparations for the 46th Annual NAAA Convention & Exposition ramping up, several Allied Industry members have stepped forward with generous donations to NAAA's Live Auction. The always entertaining Live Auction continues to be one of the Association's most popular and successful fundraisers, but NAAA could not accomplish this without the support of our many friends and allies.

Last year's Live Auction raised more than $372,000, nearly $200,000 of which came from auctioning a couple of Hot Section Inspection credits from Pratt & Whitney Canada (P&WC). Al and Mike Schiffer of Al's Aerial Spraying in Ovid, Mich., came out on top in the bidding for the credits for OEM parts and maintenance services associated with one small and one large PT6A AG engine. Pratt & Whitney Canada was so pleased with the response from the Schiffers and other bidders that it has decided to make the same auction pledge again this year! *(See sidebar for more details.)*

NAAA is very appreciative of the generosity shown by Pratt & Whitney Canada and likeminded Allied Industry companies, our State Associations and aerial applicator backers. Their contributions support the aerial application industry's long-term livelihood by providing income for association projects and programs.

With 2012 being an election year resources are needed to ensure support of aerial application issues and educate new government officials about the important role our industry plays in agricultural production and public health protection. Furthermore, in light of recent and continued budget-cutting efforts by the federal government, fundraising from within the industry is critically important since federal funding for programs vital to the aerial application industry is no longer assured.

All auction donations, big or small, are greatly appreciated. As the list of items available for bid grows, we will continue to highlight the companies and individuals who contribute to this important fundraising endeavor in *Agricultural Aviation*, the NAAA eNewsletter and on the website. The earlier you come forward, the more exposure you'll get.

To make a donation or inquire about the auction, please contact NAAA at (202) 546-5722 or convention co-chair Randy Hardy at 1-800-721-6733 or Randy@HardyAviationIns.com. An Auction Donation Form is available at *www.agaviation.org/content/auction-donation-form*. ■

SAMPLING OF AVAILABLE AUCTION ITEMS

COMPANY	AUCTION ITEM
Pratt & Whitney Canada A United Technologies Company	2 certificates of credit of OEM parts and labor related to Hot Section Inspection parts (HSIs)applicable at either an HSI, repair or overhaul shop visit—one for small PT6 AG Engine, one for large PT6 AG Engine. Includes parts (e.g., new OEM CT blades, new OEM CT shroud segments and new OEM CT shroud housing) and labor. HSI parts valid for five-year period and transferrable upon sale of aircraft. For more details, see sidebar, next page.
Ag-Nav Inc.	2 (two) $1,000 gift certificates for any repair or Ag-Nav product; 1 (one) Ag-Nav Guia GOLD complete, for helicopter or fixed-wing certificate/display
AgAir Update	Lifetime subscription to AgAir Update; 1 (one) pen & ink drawing by Richard DeSpain
Phoenix Aviation Managers Inc.	Framed, signed, numbered print of "Leland's Legacy," by aviation artist San Lyons
Southwest Turbine	1 (one) Part Number 3103496-1 Turbo Maxx Crossover Duct
StandardAero	TPE331 engine maintenance discount. 10% discount up to $10,000 on any future TPE331 scheduled or unscheduled maintenance event. (Valid for one year after date of auction)
Tulsa Aircraft Engines	R-1340 radial engine outright (no exchange required), zero time since overhaul, new pistons, newly reconditioned cylinders with new barrels including a 1,200-hour warranty against skirt failure, new brass magneto gears and corrosion-resisting cylinder barrel and head sealer

Thank you to our contributors! If your company has something of value to add, consider contributing it to the NAAA/WNAAA auctions. For additional information, contact NAAA at (202) 546-5722. To donate an auction item, complete the Auction Donation Form at *www.agaviation.org/content/auction-donation-form*.

A Contribution So Nice They're Giving It Twice

P&WC OFFERS TWO MORE PT6 MAINTENANCE CREDITS TO NAAA'S AUCTION

Pratt & Whitney Canada
A United Technologies Company

ENCORE, ENCORE! *After auctioning two PT6 engine maintenance certificates of credit in 2011, Pratt & Whitney Canada has generously agreed to contribute two more Hot Section Inspection credits this year.*

Pratt & Whitney Canada (P&WC) has done it again. After contributing a new PT6 engine that sold for $350,000 in 2010 and two Hot Section Inspection certificates of credit that collectively sold for nearly $200,000 in 2011, the engine manufacturer has stepped up with an identical offer for this year's Live Auction. P&WC once again will be auctioning two certificates of credit of OEM parts and labor* related to Hot Section Inspection parts (HSIs) that can be applied at either an HSI, repair or overhaul shop visit. One certificate of credit is for a small PT6 AG Engine; the other one is for a large PT6 AG Engine. The certificate of credit includes parts (e.g., new OEM CT blades, new OEM CT shroud segments and new OEM CT shroud housing) and, if a P&WC-designated facility is used, labor. These HSI parts are valid for a five-year period and transferable upon sale of your aircraft.

The certificate of credit for the small PT6 engine OEM parts is good for up to $70,000. The credit for the large PT6 engine is good for up to $125,000. Winners of either will be able to choose between a P&WC-approved maintenance facility and a facility of their own choice. Either way, the parts are 100% P&WC.

*** It's your choice**

- *P&WC covers the cost of parts, if you choose your own facility.*
- *P&WC covers the cost of parts and labor, if you choose among 30 P&WC-owned and -designated overhaul facilities.*

Designated engine models

- PT6A small AG engines: PT6A-11AG, PT6A-15AG, PT6A-34AG
- PT6A large AG engines: PT6A-60AG, PT6A-65AG, PT6A-67AG

Al and Mike Schiffer of Al's Aerial Spraying, LLC, in Ovid, Mich., were the top bidders for both PT6 HSI credits last year. The Schiffer brothers have a fleet of Air Tractor 400s and 502s, and all six planes are powered by a PT6 engine. That's a selling point in the Congested Area Plans Mike has to write for the mosquito abatement work Al's Aerial Spraying does.

"The Air Tractor, coupled with Pratt & Whitney's PT6, is a great, great combination for the kind of work we do," Mike Schiffer said. "What I base the bulk of our safety on in my Congested Area Plans is the airplane and the power plant that we have. They're really tremendously well-designed and time-proven pieces of equipment, and I'm not sure I would want to do what I do without them."

Tee Up for the 2012 AgAv PAC Golf Tournament

The 46th Annual NAAA Convention & Exposition in Savannah, Ga., is just around the corner, and that means it's time for the NAAA AgAv PAC Golf Tournament. With 2012 poised as one of the most significant presidential and congressional election years in recent history, your donation to help strengthen NAAA's influence in Washington, D.C., and support candidates friendly to our industry is more important now than ever. What better way to do this than by having fun on the links with your fellow aerial applicators? So dust off your clubs and help support the ag aviation industry!

This year's tournament will again be held at the legendary 18-hole championship Club at Savannah Harbor which is part of the Westin Hotel and on its grounds. The Westin is one of the host hotels for the NAAA Convention. The lush course was designed by renowned architect Robert Cupp and golf legend Sam Snead. It features unparalleled views of pristine wetlands, the river and downtown Savannah, and in 2010 also provided AgAv PAC players with the unique perspective of ag planes landing adjacent to the course during play. The Club is the host site of the PGA Tour's Champions Tour Liberty Mutual Insurance Legends of Golf and listed as one of the top 100 golf courses in America by *Conde Nast Traveler* magazine.

The Westin Savannah Harbor Golf Resort & Spa is home to the 18-hole Robert Cupp/Sam Snead Championship Golf Course.

The 2012 NAAA Golf Tournament will consist of a four-member team scramble on Sunday, Dec. 2, with an 8 a.m. shotgun start. NAAA recommends players plan to arrive in Savannah in time to attend the Calcutta on Saturday, Dec. 1, at 6:30 p.m. The Club at Westin Savannah Harbor has clubs for rent (brand-new Callaway Razrs + 6 logoed balls) for $50. If you will need to rent clubs, please contact the pro shop at (912) 201-2240.

The NAAA Golf Tournament Registration Form below is required for each entrant.

NAAA AgAv PAC Golf Tournament Registration Form

Golf Package:

Name: _____

Phone: _____ Email: _____

Golf Handicap* (your golf score on a 72-par golf course): _____

*Required for registration

*Please register in advance and no later than **Nov. 21, 2012**. Advance registration is required to set the 4-member teams. Teams will be matched according to handicaps, and players cannot register as a foursome.

Meal Package:

Name: _____

Payment:

Amount: _____ Chose one: Check _____ Credit Card: _____

Card #: _____ Exp. Date: _____

Name on Card: _____

(signature gives permission to bill)

Please Make Checks Payable to AgAv PAC

All proceeds go directly to the AgAv PAC. Federal law requires all donations to be personal contributions. Corporate contributions are prohibited. PAC donations are not tax deductible. Payment can only be made by personal check or personal credit card only.

Tournament Schedule:

Saturday, Dec. 1
- 6:30 p.m. – Reception & Calcutta

Sunday, Dec. 2
- 7:15 a.m. – Continental Breakfast
- 8 a.m. – Tee Times Begin
- 1 p.m. – Lunch & Awards

Package Costs

$220 – Golf Package (per player)
Includes greens fee, Saturday reception and Sunday breakfast and lunch.

$110 – Meal Package (non-player/attendee)
Includes Saturday reception and Sunday breakfast and lunch.

Send entry forms and payment to NAAA by fax at (202) 546-5726 or email at information@agaviation.org

Test Your Knowledge

The Test Your Knowledge quiz in this issue of *Agricultural Aviation* marks the last of the chapter review questions from the Aerial Applicator's Manual: A National Pesticide Application Certification Study Guide. Our thanks to the National Association of State Departments of Agriculture Research Foundation (NASDARF) for permission to reprint selected questions from the chapter review questions from the manual.

The Aerial Applicator's Manual is now available in electronic format on NAAA's website at *www.agaviation.org/content/aerial-applicators-manual.* The manual can be found by scrolling 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 links to other organizations and publications frequently needed by aerial applicators.

See pg. 57 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. **In addition to the actual pesticide label, which of the following is part of the pesticide labeling?**

A. Any product sales brochures.
B. The job work order.
C. Worker Protection Standard provisions.
D. The Material Safety Data Sheet.

2. **Chances of pesticide exposure greatly increase if a pesticide handler fails to:**

A. Read the Statement of Practical Treatment on the pesticide label.
B. Take frequent breaks during handling activities.
C. Drink adequate water during handling activities.
D. Wear the required personal protective equipment.

3. **The droplet size at which spray drift becomes a concern is:**

A. 50 microns and below.
B. 100 microns and below.
C. 200 microns and below.
D. 300 microns and below.

4. **Ram-air spreaders can:**

A. Compromise fixed-wing aircraft performance.
B. Improve fixed-wing aircraft performance.
C. Reduce aerodynamic drag on the aircraft.
D. Reduce the aircraft's power requirements.

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

5. **For airplane pilots: What forces act on an airplane causing a left-turning tendency on takeoff (assuming a standard clock-wise propeller rotation when viewed from the cockpit)?**

6. **For helicopter pilots: What is the normal direction of rotation of main rotor blades when viewed from the cockpit?**

See answers on pg. 57

ACTIVE COMMUNITY PARTICIPATION CAN OVERCOME TOWERING ISSUES

BY PERRY HOFER
DOLAND AERIAL SPRAYING, DOLAND, S.D.

AERIAL APPLICATOR HELPS COUNTY ZONING COMMISSION SEE THE LIGHT

As a farmer and aerial applicator, I have seen firsthand how technology has advanced dramatically within the last several years. However, these advances come with financial costs and potential hazards. In the past 10 years alone, within a seven-mile radius of my farm and private airstrip, two cell communication towers and one Real Time Kinematic (RTK) tower (a sub-inch-accurate ground-based guidance system for ground rigs) have been added near an already standing water tower of 20 plus years.

On June 13, 2012, I was notified by the Spink County (S.D.) Planning & Zoning Administrator that a public hearing was scheduled for June 26 to discuss a variance application and special exemption for the construction of a 190-foot free-standing wireless Internet tower two and a half miles north of my farm and airstrip. Little did I know that by attending the hearing at the Spink County Courthouse my actions would influence the outcome of the proposed tower construction.

At the public hearing representatives from the Northern Electric Company (the proposed tower company owners) stated that the proposed free-standing tower would be painted according to FAA marking standards. The tower would not be lighted, since it was less than 200 feet in height and therefore did not fall under FAA lighting requirements.

During the discussion portion of the hearing, I thanked Northern Electric for painting the tower according to FAA recommendations and stated that a strobe light on top would enhance visibility of the tower for all pilots. The lawyer representing Northern Electric

once again stated lighting was not required according to FAA standards.

One of the commission members noted the proposed location was close to the fatal accident site of a medevac helicopter about 10 years prior. Medivac flights often pass close to the proposed tower site en route to Sioux Falls, S.D., from Aberdeen, S.D. As the commission member's discussion continued, one of the comments centered on how a 190-foot tower cannot require a light, yet a 200-foot tower needs to be lighted. This is a question I have asked myself, as an ag pilot, for years.

Upon further discussion, the planning and zoning commission ultimately voted to approve the variance for construction of a 190-foot tower, with appropriate paint schemes *and* lighting, as long as the FAA does not object.

Later that same evening after the hearing, one of the commission members dropped by my farm and stated the reason the tower will be lighted is because I had attended and because of the informed responses I gave to commission member's questions. For this I have to thank NAAA and the South Dakota Aviation Association (SDAA) for the education and information to deal with situations like this as best as possible. As a result of the hearing the commission member also asked for information from SDAA and NAAA on tower marking requirements to possibly work toward a requirement for all towers constructed in Spink County to be marked.

Previously I had met with the zoning commission regarding tower marking when SDAA was working to get a law passed requiring marking of meteorological evaluation towers (METs). Legislation was passed in South Dakota and signed by Gov. Rounds in 2010 to mark all MET towers (S.D. House bill 1155), although no action was taken by the local board on a Spink County Tower Marking Ordinance at that time to mark any kind of towers. Perhaps with different commission members and increased construction of towers by the communications, GPS and wind energy industry, the time may now be right to get a county ordinance passed.

An aerial view of a real time kinematic (RTK) tower illustrates the diminished visibility of the tower for low-level aviation given certain atmospheric conditions in conjunction with power lines and various other distractions on the perimeter of the field. As Perry Hofer demonstrated, aerial applicators can work toward safer tower siting, marking and lighting by making their case before local Planning and Zoning Commissions on the effect of towers on aviation safety.

While I did not think my voice mattered much, it truly did make a DIFFERENCE in my local community and will hopefully help to save lives in the future with the marking and lighting of towers.

Based on my recent experience I would encourage all aerial applicators to become involved with your local planning and zoning commission. While I did not think my voice mattered much, it truly did make a difference in my local community and will hopefully help to save lives in the future with the marking and lighting of towers. NAAA helped with strong supportive documentation of the need for better marking. You too can make a difference. ■

ONE PILOT'S TRANSITION FROM AG PILOT TO PART 137 OPERATOR

By John J. Thomas
Crop Air Support,
Shenandoah, Iowa

Thomas landed his first seat as an ag pilot thanks to R.E. Pettis, and now his mentor has helped him become an operator.

The 1982 Cessna Ag Husky John Thomas purchased underwent its Part 137 inspection in March, in time for Crop Air Support's first season of operation.

AS A RELATIVE NEWCOMER

to the industry I had honestly never put much thought into becoming a Part 137 Operator. I was focused solely on becoming a safe, efficient and effective ag pilot with a solid reputation, but that was about to change.

Midway through my second season I remember driving around with my boss, Mr. R.E. Pettis of Shenandoah Flight Service, Atlantic, Iowa. We were checking fields when he started talking about how many employee pilots have bought out their operator bosses and acquired the business or a portion of the business. At this point I simply thought it was an interesting conversation but irrelevant to me since I was just trying to survive my second season as a pilot.

Over the next year these conversations became more frequent and I found myself seriously considering taking the next step up the ladder and trying to become an operator. Over the past two seasons Mr. Pettis and I had developed a mutual trust and respect for one another. This is why I believe he felt comfortable offering to sell one of his locations and an aircraft to me. However, as my third season approached, Mr. Pettis and I both agreed to postpone any business transaction until after the season; neither of us were ready to move forward with the season right around the corner.

Each and every year I continued to gain invaluable experience and insights into this complex and challenging industry. No matter how well I thought I was progressing at the time, I know now that I would have been ill prepared to step out on my own after only two seasons. There was still so much to learn, and much of it would only come from experience and keeping my eyes and ears open as well as asking questions of mentors and other folks in the business. That hasn't changed—I still have a lot to learn.

In August of 2011 I began to lay the groundwork for starting my own business. I established a sort of checklist where I had to ensure completion, or at least the likelihood of completion of each step before moving on to the next step.

Step 1: Secure funding for an aircraft and business purchase. Mr. Pettis offered to sell me the very aircraft

I had exclusively flown for the past three seasons, a 1982 Cessna Ag Husky. He also generously offered to finance a portion of the aircraft. Knowing in advance the probable difficulty I would face in obtaining an ag aircraft loan from my local bank, I wanted to work with the same bank Mr. Pettis had gone to for 20 plus years because they would understand the risks and benefits of the aerial application industry.

Mr. Pettis introduced me to the president and vice president of his bank and I filled out a credit application. Within 48 hours I was approved for a loan. Step 1 was on the way to completion.

Step 2: Obtain a Part 137 certificate. I contacted the local FSDO and inquired about the process. The FSDO was very receptive and eager to assist me throughout the process. He emailed me a copy of AC-137-1A dated 10-10-2007 and said to use it as a study guide for both the written and flight test despite having a logbook entry stating I had demonstrated the required "knowledge and skills" for 137 operations. Additionally, he wanted to see an example of what I would be using for recordkeeping as well as how I would verify that hired pilots had received their knowledge and skills endorsement and if they hadn't, as an operator, I could administer my own test. The FSDO also recommended that each non-local pilot be given a local area safety/operations brief (i.e., what to do in case of a spill, traffic pattern procedures, etc.). We discussed a December date for the inspection.

Step 3: Obtain insurance. After talking with several operators in the local area, I decided to support a local aviation insurance agent extremely familiar with ag aviation. After a brief phone call to the agent, and filling out an application, the insurance was lined up.

Step 4: Form a legal business entity. My wife and I formed a Limited Liability Company to protect ourselves and our personal assets. Although it is possible to form an LLC over the Internet, I wanted the assurance my family would be protected so I hired a trusted lawyer to ensure the proper details were covered. This was relatively painless, inexpensive and only took a few days.

All that was left to do was tie everything together. Mr. Pettis had agreed to annual the aircraft just prior to the transaction, but due to several unforeseeable events, we pushed the Part 137 inspection date off until March 2012. I called the FSDO I had been working with and set a firm date. With the date locked in, all the loose ends began to fall into place. The

Why Just Any Logbook Endorsement Isn't Enough

As he did, you may be wondering why John Thomas needed to do a knowledge and skills test even though he already had a logbook endorsement. John posed the following question to Harrison McNaughton, his FSDO inspector: "Is the requirement for a knowledge and skills test black and white in the FAR/AIM or open for interpretation and may vary from FSDO to FSDO?" Here is the explanation the Aviation Safety Inspector gave in response.

The knowledge and skills test is a requirement for anyone to be qualified as a Chief Supervisor, and all commercial operators are required to have either the qualifications of a Chief Supervisor or have, in their employ, someone who is qualified as a Chief Supervisor. What is not extremely clear is that it is only valid if administered by an Aviation Safety Inspector (ASI) employed by the FAA. A logbook endorsement by a 137 school such as Flying Tiger Aviation does not qualify you as a Chief Supervisor, only the FAA can do this. It is a one-time endorsement, however, so once you have it in your logbook, you may serve as the Chief Supervisor for any ag operation that you may be employed by.

The requirement for this is not in the FAR/AIM, it is in FSIMS (http://fsims.faa.gov), which is a public document. The reference for this is FAA Order 8900.1 Flight Standards Information Management System (FSIMS). Specifically, the reference for the requirement of a Chief Supervisor is in the 8900 in Vol. 2, Chapter 8, Section 1, Paragraph 2-969(A)(2)(b) and it states, "The applicant for a commercial operator certificate must have the appropriated knowledge and skills or have the services of a Chief Supervisor of agricultural operations who has the appropriate knowledge and skills."

The knowledge and skills test is only valid for the Chief Supervisor if administered by an Aviation Safety Inspector (ASI) employed by the FAA.

The requirement for the Chief Supervisor to be qualified by an FAA ASI is referenced in the 8900 order in Vol. 2, Chapter 8, Section 1, Paragraph 2-980(A) and states, "You may accept a letter of competency or a logbook endorsement by an FAA inspector as meeting the requirement for a knowledge and skill test for the Chief Supervisor. A Chief Supervisor who has a letter of competency or logbook endorsement may administer tests to other agricultural pilots." The last sentence refers to the Chief Supervisor being able to qualify his/her own company pilots as Pilots-in-Command in ag operations. **The guidance is the same for all FSDOs.**

Harrison "Mac" McNaughton is a Principal Operations Inspector with the Des Moines, Iowa, Flight Standards District Office (FSDO).

banker, insurance agent and lawyer all worked together to ensure their responsibilities were addressed as far as the paperwork went.

About a week prior to the inspection I called Brian Wilcox, the president of the Nebraska Aviation Trades Association (Nebraska's aerial application association), to ask him for advice in preparing for the actual inspection. Brian was very helpful and put me in touch with Brian Gradert, owner of Crop Dusters LLC of Ireton, Iowa, who had recently gone through an inspection with the same FSDO office I was working with. I called Brian and he was eager to help out in any way. In a nutshell, he said to ensure the logbooks were dead-on accurate because the inspectors had gone through his with a fine-tooth comb.

I arrived at the airport about an hour ahead of the scheduled inspection time, organized the office for the inspection and waited. Although I was expecting three inspectors only two showed up. One introduced himself as the person I had been working with over the phone, while the other one walked directly to the airplane and started a walk-around inspection. He pointed out several missing fasteners and had some questions about some aftermarket equipment, but was satisfied overall with the airworthiness of the aircraft. The primary inspector handed me a copy of a 25-question

written test which I was able to complete in about 20 minutes. The inspectors then sat down and poured over the logbooks while I readied the aircraft for the flight test. I was told to fill the hopper with the maximum weight that I would carry during a given season being mindful not to exceed maximum gross weight or safe operating weight for the current weather and airport conditions.

With the logbook inspection complete I started the aircraft, made a simulated short field takeoff, followed by three passes of spraying water on the runway, followed by a final pass requiring a water dumping demonstration, followed by a landing and shutdown.

That was it. The inspector was satisfied with all aspects of the inspection and said to expect a certificate in the mail within the week.

This water dumping exercise was one of the maneuvers Thomas had to perform during the flight portion of his Part 137 knowledge and skills test.

My experience with this FSDO was very positive. I commented to him that my impression from the very beginning was that he wanted me to succeed and he was there to help me. Many people seem to have an innate fear or distrust of the "government" due to their regulatory and enforcement capabilities. To the contrary, I was lucky to get a supportive FSDO and a person who uses a common-sense approach. In any case, he could require no more than what is spelled out in the FAR/AIM and he didn't.

Note: The entire requirement for certification as a Part 137 operator is found in the inspector's guidance materials available online at Flight Standards Information Management System (FSIMS) at http://fsims.faa.gov.

With adequate preparedness, the acquisition of the 137 certificate was relatively painless and fast as far as dealing with the FAA went. I am grateful to Mr. Pettis and many others for their support and guidance; each provided crucial mentorship throughout the process! ■

John Thomas is a regular contributor to Agricultural Aviation. He will share some of the lessons he learned during his first summer as an operator in an upcoming issue of the magazine.

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Happy 15th Birthday, PAASS

The industry's premier safety education program has come a long way; here's what's in store for the 2012–2013 season

By Ken Degg
NAAA Director of Education & Safety

The PAASS Program is celebrating its 15th birthday of safety education presentations with the 2012–2013 season. We have come a long way from the original program, which was presented by a single person hired for the sole purpose of presenting our safety message to state and regional convention attendees. It was a lot of traveling and hotel rooms for one person to present the program in 20 locations across the U.S., plus once in Canada.

The second PAASS season was the beginning of the successful concept of having trained ag industry personnel present the program. Audiences immediately accepted this idea because the discussions were being led by their peers who had the experience of actually working in the industry and knew the pressures placed on operators and pilots. The early programs used a slide projector or overhead projector to illustrate some of the concepts discussed. These early programs evolved with the use of PowerPoint programs, which could do a better job of making illustrations more graphic.

With the 2003–2004 program, we added a new dimension by introducing the use of videos and computer programs. If a picture is worth a thousand words, seeing the information presented in motion adds much to the enjoyment, desire and ability to absorb the message presented. The advent of smaller, cheaper and more dependable cameras, which could be mounted on the aircraft, gave attendees a view of application equipment not available before.

The PAASS Program Development Committee (PDC) is looking forward to the next advancement in technology and is always searching for new ways to make your PAASS presentations even more enjoyable and informative. Here's a basic overview of what the PDC has planned for this year's PAASS Program.

Ag Airfield Watch Security Module

It is always important to maintain a secure facility for business reasons, but also so as not to lend credence to public perception that aircraft, especially ag aircraft, could be used for terrorism purposes. In addition to reminders of the Ag Airfield Watch Program, PAASS will outline a plan that state and regional associations can use to contact their members with information that needs quick dissemination. The plan is a modern update from the well-known "phone tree" and the more modern email blast.

Human Factors Module

PAASS will again address the potentially deadly subject of stall/spin accidents from a new prospective. Former ag operator and celebrated aerobatic pilot Wayne Handley and ag operator and aeronautical engineer John "Dusty" Dowd will discuss the flying situations encountered while performing ag operations with Rod Thomas, NAAREF President and longtime PAASS presenter.

Today's turbine aircraft are a wonderful tool for the ag operator and pilot, but we should understand the adverse characteristics that may come along with these advanced machines.

Given the altitudes within which an ag pilot operates, the most important lesson instead of recovery is to avoid the situation in the first place. A spin entered because of uncoordinated flight is made worse by the weight of fuel out in the wings and the long nose with the propeller at a great length from the center of rotation.

As a side note, the importance of stall/spin training was immediately brought home by an event that coincided with the filming of this segment. After the filming, everyone involved was gathering to go to the airport for their return flights home when Wayne received a phone call. It was from a third-generation ag pilot who had just completed Wayne's aerobatic course on recognizing and properly reacting to the aircraft's unexpected attitude changes. While in a turn, the pilot failed to remain in coordinated flight and the aircraft stalled and started to roll inverted. Having been taught to handle this situation, the pilot was able to save himself and the aircraft. The results could have been catastrophic if he had not been prepared by Wayne's instruction to handle the situation!

Spray Drift Mitigation Module

Dr. Scott Bretthauer and our team of subject matter experts will tackle the problem of chemical movement out of the target area. With the assistance of the wind tunnel equipment at the Agricultural Research Service in College Station, Texas, the program will demonstrate the effect the aircraft's speed and nozzle pressure has on the droplet's physical properties and its propensity to drift. It will demonstrate the way to minimize chemical drift when making passes along the edge of the field being treated, and the team will also explain, through videos and pictures, the effect different adjuvants have on the properties of the droplet.

Hangar Flying Module

The Hangar Flying Module serves as the PAASS Program's venue for informing and educating attendees about accidents that occurred during the 2012 ag season and comparing them to accident trends in past years. In-depth studies of accidents in the five-year period of 2007–2011 will be presented and explained.

The PDC learns a lot from the feedback attendees provide. For example, a number of attendees have asked for more familiarization on the Federal Aviation Regulations applicable to ag aviation. They also felt they could use a refresher on basic aeronautical skills—concepts they were required to learn to become licensed pilots. PDC has developed a fun and informative session called "Are you smarter than a student pilot?" We hope this way of re-introducing pilots to aviation skills will make learning enjoyable and entertaining.

The 2012–2013 PAASS Program promises to have something for everyone. Please plan to attend at one of the state or regional association conventions coming up this fall and winter. ■

PAASS-ING MARKS

The PAASS Program reached almost 2,000 ag operators and pilots (1,959 attendees) during the 2011–12 season, when 24 sessions were offered. Here are some other high-water marks.

305 Number of times PAASS has been offered at state/regional conventions since its 1998–99 debut

25,315 Registered attendees throughout the first 14 years of PAASS

1,808 Average number of attendees at PAASS each year

Identifying Liability Threats

By John "JT" Helms, on behalf of the NAAA Insurance Committee

I learned to fly on someone else's dime flying helicopters in the U.S. Army. Fort Rucker, the home of Army aviation, is nestled in lower Alabama, an area known for several things: 1) great fried chicken and biscuits 2) peanut farms and 3) chicken farms. This last item reminds me of the no-fly zones we had in the area. Apparently, chickens don't lay eggs when they're upset, and hearing helicopters overhead seems to distress them. The peanuts didn't seem to mind so much.

While learning to fly, we kept very detailed low-level maps marked with the many no-fly zones in the area to help us avoid various danger zones including those chicken farms. We would add new farms as they were identified in an effort to preserve our relationship with the community, but especially for farmers with a history of shooting at helicopters or spotlighting them during night training missions.

Many of you know of potential problem areas to avoid in your territory. You likely share this information with other ag pilots working with you or whom you know in the area. Perhaps those could be areas where a farmer is predisposed to shoot at you or more likely just sue you simply because they saw a yellow airplane with spray coming out of it! Or perhaps those are areas you know to be growing multi-year crops (such as orchards) or which are highly sensitive to chemicals.

Everyone knows minimizing your claims severity and frequency will help lower your insurance rates, but lowering the amount of claims industry-wide can also positively affect your insurance rates.

The highest dollar value claim of which I am aware involved herbicide drift onto blueberries. The claim ended up at nearly $1.5 million. I'm not an agronomist, but I now understand that blueberries don't fruit until the plant matures for five years. Thus, there is potential for a larger liability claim than from just damage to a single-harvest crop.

Other large drift claims I know of through personal experience as an ag aviation underwriter as well as through industry legend include herbicide drift onto fruit/nut tree orchards, herbicide drift onto decorative trees and landscaping due to the high cost of replacement, insecticide drift onto honeybees and incidents where grower or state mandates require an entire crop be destroyed if chemical drift contacts even a small part of an organic crop.

Everyone knows minimizing your claims severity and frequency will help lower your insurance rates, but lowering the amount of claims industry-wide can also positively affect your insurance rates. My advice, then, is threefold. First, know the area you operate in and watch for potential problem areas for liability claims. Second, if you plan on working in an unfamiliar area, work with a local operator to gain information about local threats before you start the job. Finally, freely share your wealth of information with other operators industry-wide to help reduce claim frequency and severity and improve the industry reputation. ■


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THE AGDISP AERIAL SPRAY APPLICATION SIMULATION MODEL

THE INSIDE STORY ON THE HISTORY OF AGDISP AND HOW APPLICATORS CAN OBTAIN IT

BY HAROLD THISTLE, *USDA Forest Service, Morgantown, W.Va.,*
and **MILTON TESKE,** *Continuum Dynamics Inc., Ewing, N.J.*

FOR THE RECORD: *In my previous article "Introduction to AGDISP," published in the July/August 2012 issue, a number of misleading pieces of information were included. Chief among them was the implication that AGDISP is not freely and openly available to the public. As you will see in the following article, while there were some security concerns in the past, as a results of 9/11, these have lessened and the model can easily be obtained through the contact provided. It is also anticipated that there will be a number of web links available to download the model in the coming months. There was also a statement made that indicated the Spray Drift Task Force played a role in AGDISP's development. This model was in fact a product of the USDA Forest Service. In response to my previous article, Dr. Harold Thistle of the USDA Forest Service has prepared a more detailed history of the development and use of the AGDISP model that provides a great background into the research and technological advances incorporated into this model. I apologize for these inconsistencies and hope I have not discouraged you from obtaining and working with AGDISP.*

–Brad Fritz, USDA-ARS Aerial Application Technology Group

AGDISP is a computer model that simulates the location and amount of deposition of aerially applied pesticide sprays. This model is a USDA Forest Service technology development product and is generating substantial interest from applicators and regulators alike. The AGDISP model has been developed almost exclusively with public funding and is completely in the public domain and available to the public. Currently, the model is distributed on CD by contacting the author of this article (*bthistle@fs.fed.us*) and providing a mailing address. In the near future, we are anticipating distribution will be web-based.

As this readership is well aware, after the 9/11 attacks, there was some concern that aerial application equipment, methods, etc. would be available to terrorists who might be inclined to use them to inflict harm. As part of this concern, the AGDISP model was designated as sensitive technology and it was requested that distribution be screened. These concerns have lessened and though we currently do keep track of who we have sent the model to, we encourage use of this tool by the public with an emphasis on use by aerial applicators themselves.

Introduction

Over the last 30 years, the USDA Forest Service (FS) has been pursuing the development of computer models to predict the deposition of aerially released spray material. As a steward of more than 190 million acres of forest and range land, as well as responsibility to advise on management of many additional millions of acres of state and privately held land, the FS recognized early on the need for management tools that allow treatment of huge areas quickly and safely. This treatment needs to be done with concern for human safety and in a way that avoids unintended environmental impacts.

As the need to control drift and be more efficient in aerial spray releases has increased over the years, so too has the effort to construct computer models to simulate the behavior of these released materials. This process has resulted in the development of the AGDISP (AGricultural DISPersal) droplet deposition model (Bilanin et al., 1989, Teske et al., 2003). AGDISP is currently used by EPA in risk assessment of aerial spraying of pesticides and is the parent model of AgDRIFT (Bird et al., 2002), which was established as an EPA risk assessment tool, based on AGDISP, after passing an EPA Scientific Advisory Panel (SAP) review around the turn of the millennium.

History

In 1979 the National Aeronautics and Space Administration (NASA) supported the initial development of a Lagrangian droplet trajectory model. The development of this technology was made technically feasible by previous research directed at understanding the physics of vortex wakes behind aircraft. The vortex wake research was stimulated by the introduction of the jumbo jetliner in the 1960s, and the suspected hazard to other aircraft associated with the generated vortex wake, particularly on takeoff and landing (behavior close to the ground, where aerial spraying is conducted). A simple vortex wake model, patterned after the approach suggested by Reed (1953), and the subsequent development of a closure technique to recover the effect of atmospheric turbulence on the variance of the spray material about its mean trajectory, led to the development of the AGDISP model.

Reed first applied the equations of motion to material released from nozzles on an agricultural aircraft, using a Lagrangian approach, whereby differential equations are solved for the mean motion of the droplet. His insight was the realization that the

wingtip vortices play a significant role in the subsequent behavior of the released spray material. His model integrated the equations governing the trajectory of single droplets in a flow field modeled as two counter-rotating line vortices placed at the wingtips. The strength of his model rested in its simplicity. The equations he solved included equations for droplet position, as well as velocity, and opened the door for incorporating concepts regarding droplet behavior, atmospheric effects, evaporation, canopy deposition and the spatial growth of the spray cloud.

The FS served on the NASA review panel for the completed work and saw the potential for AGDISP to act as an aircraft wake model and as a stand-alone program capable of using the vortex wake simulation to describe droplet movement and point of deposition. As a result, the FS began a model development program[1] that began to focus on AGDISP as a near wake calculation tool and then to develop AGDISP as a stand-alone model[2].

Model Inputs

AGDISP has been developed as an applied, user-based model. There are dozens of input variables the user can access but, to facilitate use, almost all of the required inputs can be selected from model libraries. Alternately, default inputs can be used. The following discussion is modified from Teske et al., 2003[3]. *[Ed. Note: All references are listed at the end the article.]*

Fig. 1. *Main screen of the AGDISP model. Note the buttons lead to options allowing more detailed descriptions. The model is very useful in training since simply reading the input screens gives some insight as to what variables are important in determining where spray material lands.*

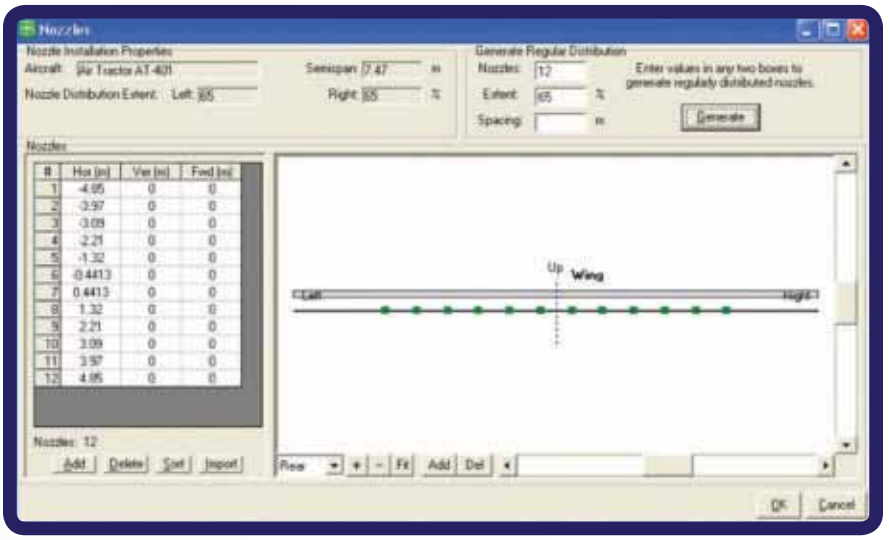

Fig. 2. *Nozzle Positioning Screen from AGDISP 8.26. In this case the positions were generated automatically by inputting the number of nozzles and the extent of the wingspan to be considered.*

To make an accurate prediction of deposition and downwind drift, AGDISP 8.26 (look for 8.27 soon) requires a consistent set of inputs representing the aircraft and its flight condition, the nozzles and the drop size distributions they create, spray material properties, surface features and ambient meteorology. These inputs drive the various elements of the model used to approximate the physics within the

[1] Teske M.E., H.W. Thistle, W.C. Schou, P.C.H. Miller, J.M. Strager, B. Richardson, M.C. Butler-Ellis, J.W. Barry, D.B. Twardus and D.G. Thompson. 2011a. *A review of computer models for pesticide deposition prediction. Transactions of the American Society of Agricultural and Biological Engineers, 54(3): 1-14.*

[2] Teske M.E., H.W. Thistle, J.W. Barry, B. Richardson, R.B. Ekblad, W.C. Schou, J.M. Strager and D.B. Twardus. 2011b. *A retrospective look at aerial spray model development by the USDA Forest Service. USDA Forest Service, FHTET-11-09. Morgantown, WV.*

[3] Teske M. E., H. W. Thistle and G. G. Ice. 2003c. *Technical advances in modeling aerially applied sprays. Transactions of the ASAE 46(4):985-996.*

wake behind the spray aircraft and into the local environment. The complete list of inputs may be grouped within several broad areas of classification, relating to a description of the aircraft and its power plant (rotor or propeller), the nozzles on the spray boom and the drop size distribution they create, spray material details, ambient meteorology, surface features and other needed field information:

- **Aircraft characteristics** include the fixed-wing semispan (or helicopter rotor radius), typical speed during spraying, weight and helicopter rotor RPM. Engine characteristics (for propeller-driven aircraft) include the planform area, propeller RPM, propeller blade radius and spatial location of the blade hub relative to the tip of the trailing edge of the wing. The aircraft type is selected from the model library and the model then obtains the above variables from the library description of the aircraft. These values may be customized by the user.
- **Spray system characteristics** include the spatial location of the spray boom relative to the centerline of the aircraft and the vertical distance to the tip of the trailing edge of the wing (or the rotor plane of the helicopter), the spacing along the spray boom of the nozzle locations and identification of nozzle type.
- **Drop size distributions** can be entered by size category (Very Fine, Fine, etc.). In more detailed modeling, drop size may be obtained from wind tunnel studies, or estimated from empirical interpolation of the data.
- **Spray material characteristics** include the flow rate, specific gravity, nonvolatile fraction (that portion of the tank mix that will not evaporate), active fraction (that portion of the tank mix that constitutes the nonvolatile active ingredients), and evaporation rate of the tank mix. These data are typically estimated or model defaults are relied upon.

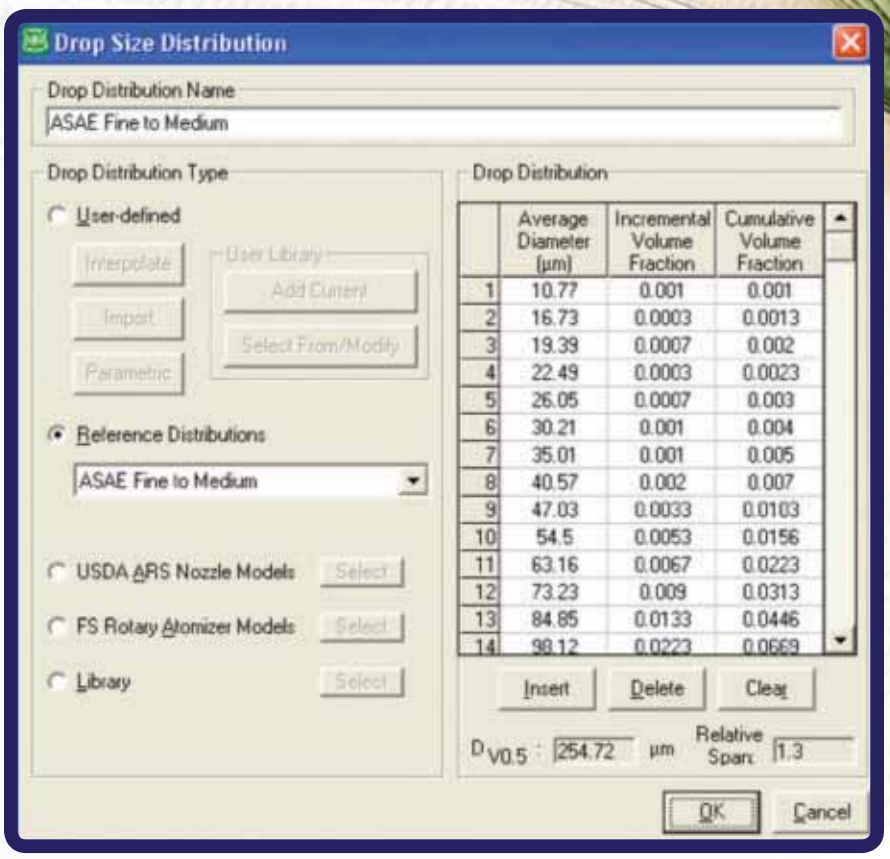

Fig. 3. *Droplet Size Distribution (DSD) Screen in AGDISP. In this case the distribution was generated by selecting a reference distribution. Note details of the distribution in tabular format on the right. The large number of options and sophistication of the DSD input reflects the importance of this variable in determining where the spray lands.*

- **Meteorological characteristics** include wind speed, wind direction, temperature, atmospheric stability and relative humidity. Surface meteorology is extrapolated to represent the air layer where spray release, settling and drift occur.
- **Canopy characteristics** can include plant height, the size of the leaf, capturing spray material and a description of the stand. For low crop spraying and certain other applications, the model can be run without a canopy or with only a canopy height specified.

Other inputs into the model include the release height, the number of flight lines, swath width, swath displacement and simple terrain upslope and sideslope angles.

All model inputs are further constrained by sensible lower and upper limits, beyond which validation of model performance is not available or degradation of model predictions would occur. Units in the program may be specified in metric or English.

The AGDISP model is completely in the public domain and available to the public. Currently, the model is distributed on CD by contacting the author of this article at hthistle@fs.fed.us and providing a mailing address.

A Toolbox Tab may also be chosen to perform various specific calculations.

Considerations

The basic AGDISP model does a good job predicting deposition of larger droplets near the swath (within 800 feet downwind of the flight line the model is consistently within a factor of two of data). Finer droplets are more difficult to model, and modeling at longer distances requires use of the Toolbox option entitled "Gaussian Extension," which the very fine material that might still be airborne as a plume or cloud.

Model limitations are primarily found in the extent of the physics upon which the model is based and the extent of the field data against which the model has been evaluated.

The AGDISP 8.26 "near-wake" model is applicable to the region in which the aircraft wake is expected to have influence over the behavior of the released spray material; beyond this region, the Gaussian Extension needs to be invoked as described above.

Beyond the near-field, other physical effects come into play that are beyond the scope of the near-wake model, or that lead to a breakdown in the assumptions made to generate the model. The model focuses on the near-wake region of the aircraft, simulating a point vortex near each wingtip. The treatment of background meteorology in the model is trivial, using only a single-point wind speed as input for transport, and

temperature and relative humidity for evaporation. Thus, the model is a very simple representation of the actual atmospheric transport beyond the distance to vortex decay. Other sources of uncertainty include point vortex assumptions and along-flight-line variability, onset of droplet evaporation effects and limitations on the applicability of drop size distributions taken from labels or generated in the wind tunnel. The most common misuse of the model is to perform calculations using the near-field model at distances where the Gaussian Extension should be used.

Conclusions

The AGDISP model is a tool that allows evaluation of aerial spraying scenarios cheaply with reasonable accuracy. It is an effective way to train applicators on the effect of changing operational parameters (release height, etc.) or conditions (wind speed, etc.). The model is available to all and we encourage its use. ■

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Putt-ing the "Fun" into Fundraising

Golf Tournament Benefiting Ag Aviation Museum and NAA Hall of Fame Tees Off Oct. 19–21

Get your putters out and help put the *fun* into fundraiser at the 31st Annual National Agricultural Aviation (NAA) Museum & Hall of Fame Golf Tournament Oct. 19–21 in Olive Branch, Miss. Proceeds benefit the National Agricultural Aviation Museum in Jackson, Miss., which is dedicated to preserving the history of the aerial application industry. This fun-raiser/fundraiser has fostered friendships and amassed more than $240,000 for the NAA Museum over the years.

The Whispering Woods Conference Center will host this year's festivities once again, with all golf activities happening at the Cherokee Valley Golf Club. Besides chipping and putting, a number of non-golf events are on tap, starting with a cocktail party and dinner on Friday, Oct. 19. A silent auction runs Saturday to Sunday. To donate an item, call organizer Lou Stokes at 870-792-7474.

A schedule of events appears below. We hope to see you there!

National Agricultural Aviation Museum & Hall of Fame Golf Tournament Schedule and Registration Form

Golfer's name:_____

Address:_____

Email address or Fax #:_____

Golfer's name:_____

Address:_____

Email address or Fax #:_____

Social Functions only:_____

Address:_____

Email address or Fax #:_____

Golf Fee $190_____ (Includes golf & meals) Social only Fee $90_____ (meals only) Donation_____

Call Lou Stokes at 870-792-7474 to make your hotel reservations and request a tee time for Saturday. Hotel rate is $95 per night. Hotel reservation cutoff date is Sept. 20, 2012; room rate rises thereafter. When you call to reserve your room, a credit card will be needed to hold the room.

Send entry form & check to:
NAA Golf Tournament • c/o Lou Stokes • 1373 Hwy 149 S • Earle, AR 72331

NAAA Golf Tournament Schedule:

Friday, Oct. 19
5 p.m. – Registration
5:30 p.m. – Cocktail Party (front bldg)
6:30 p.m. – Dinner at the Pavilion (bldg)

Saturday, Oct. 20
9:30 a.m. – Qualifying Rounds Start
6 p.m. – Happy Hour
7 p.m. – Dinner at the Pavilion Putting Contest and Silent Auction

Sunday, Oct. 21
9 a.m. – Shotgun start Scramble
Awards luncheon after golf at Cherokee Village

All evening events will be in the front building at Whispering Woods Conference Center.

MEMBERSHIP APPLICATION
NATIONAL AGRICULTURAL AVIATION ASSOCIATION

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Company: _____

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Cell Phone: _____ Fax: _____

E-mail: _____ Web site: _____

Spouse:_____

OPERATORS/PILOTS: List State Associations you belong to
OTHER THAN YOUR HOME STATE ASSOCIATION:_____

PILOTS, AFFILIATED OPERATORS/AFFILIATED ALLIED:
List member companies you work for._____

ALLIED INDUSTRY: Indicate your division: __ Airframe __ Application Technology __ Chemical __ Dealer/Parts __ Insurance __ Propulsion __ Support

MEMBERSHIP CATEGORIES: (please select one)

National Agricultural Aviation Association Bylaws require Operator and Pilot members to be members of a state/regional agricultural aviation association or to pay the additional dues for the Participating Operator or Participating Pilot categories.

☐ **Operator**	$500, plus $100 per aircraft for every aircraft over one	Operator of Aerial Application Business (must belong to state/regional Association)
☐ **Extra Aircraft Over One**	$___	$100 per aircraft for every aircraft over one (per Operator)
☐ **Affiliated Operator**	$200	Operator Partner, Stockholder, or Non-Pilot Employee
☐ **Participating Operator**	$1,000, plus $100 per aircraft for every aircraft over one	Operator not belonging to any State/Regional Association
☐ **Extra Aircraft Over One**	$___	$100 per aircraft for every aircraft over one (per Participating Operator)
☐ **Pilot**	$200	Pilot employed by Aerial Application Business (must belong to state/reg. Association)
☐ **Participating Pilot**	$380	Pilot not belonging to any State/Regional Association
☐ **Allied (1–10 employees)**	$500	Any Industrial Organization or Firm closely allied to the Agricultural Aviation Industry
☐ **(11–50 employees)**	$750	
☐ **(51–100 employees)**	$950	
☐ **(101–500 employees)**	$1,100	
☐ **(500+ employees)**	$1,900	
☐ **Affiliated Allied**	$200	Partner, Stockholder, or Employee of an Allied Industry Member
☐ **Associate**	$95	Person interested in promotion of Aerial Application but not active in industry
☐ **International**	$250	Aerial Applicators & Pilots residing outside the USA
☐ **State/Regional Association**	$750	Organization Membership
☐ **WNAAA**	$200	Individual promoting NAAA-WNAAA Objectives

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

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

Welcome to New Members

As of July 24, 2012

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Brent Bonnema
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Marine Corps
Jacksonville, NC

Peter Brawn
Coronado, CA

Dan Gingold
BRD Production Group
Sherman Oaks, CA

Rachel Hill
Trade-A-Plane
Crossville, TN

Tom Hudson
NTH/Works
Louisville, KY

Danny Kopp
Hoxie, AR

Louis Sorrentino
ICF SH&E
Jupiter, FL

Drew Spidahl
Ag-Tech Air LLC
Lena, IL

John Von Kaenel
Clemson, SC

INTERNATIONAL

Rick Heard
Abbey, SK
Canada

OPERATOR

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Precision-Air LLC
Gilbert, LA

Wade Condrey
Delta Dusters LLC
Lake Providence, LA

Paul Reynolds
Reynolds Aerial
Services LLC
Mansfield, IL

AFFILIATED OPERATOR

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Escott Aerial LLC
El Reno, OK

PILOT

Robert Hollingsworth
Montezuma, KS

Jon-David Hurst
DKD Flying LLC
Paragould, AR

Garrett Moore
Shaw Aerial Spraying
Higginsville, MO

Zachary Odom
Odom's Flying Service
Enterprise, AL

Andy Paulson
Wilbur-Ellis
Lillion, AL

AL-SUPPORT #1

Jane Barber
Star-Flex
Onida, SD

CLASSIFIEDS

Date	City	State	Aircraft Type	N #	Injury	Description of Accident
05/07/12	El Campo	TX	AT-502B	5016P	None	Unable to get airborne, aborted takeoff too late
05/19/12	Humnoke	AR	AT-602	85239	None	Touched down short of the runway
05/23/12	Clear Lake	SD	S2R	30951	Serious	Hit unseen lower wires on powerline
05/24/12	Royal City	WA	S2R	8468V	None	Hit irrigation pipe in field
05/25/12	Delavan	MN	Hughes 369HS	11ZX	Serious	Hit powerline
05/25/12	Alicia	AR	S2RHG-T65	40475	None	Lost control on landing, hit another aircraft on ground
05/25/12	Alicia	AR	AT-802A	389LA	None	Hit by landing aircraft while awaiting takeoff
05/26/12	Dansville	NY	Ce A188B	9629G	Minor	Power loss–hit treeline on forced landing
05/27/12	Wilton	CA	G-164A	8380	None	In-flight fire while applying sulfur powder
05/30/12	Burbank	WA	Bell 206B	106TV	None	Power loss–loose air line on Power Turbine Governor
06/03/12	Riverton	WY	G-164A	5291	None	Lost control on landing
06/04/12	Kenmare	ND	AT-401	4547Q	None	Aborted takeoff and ground looped
06/07/12	Higginson	AR	G-164	779EF	None	Power loss–cracked cylinder
06/11/12	Riverton	WY	S2R-G6	70WY	None	Power loss–fuel control failed to respond
06/15/12	Ipswich	SD	AT-502	45379	None	Unable to get airborne, ran off end of runway
07/10/12	Cheyenne	WY	Ce A188B	4831R	Serious	Hit power line guy wire
07/13/12	Darksville	MO	G-164A	6846Q	FATAL	Hit tree, crashed into field and burned

Test Your Knowledge Answers

Continued from pg. 33

1. **The correct answer is C.** Some labels refer to other documents, such as endangered species area protection maps or the Worker Protection Standard (WPS) provisions of the Code of Federal Regulations (CFRs) applicable to agricultural operations (40 CFR part 170). These and other documents referred to on pesticide labels become part of the pesticide labeling. (Aerial Applicator's Manual: A National Pesticide Applicator Certification Study Guide [AA Manual], pg. 12)

2. **The correct answer is D.** The risk of pesticide exposure greatly increases if the handler fails to wear required personal protective equipment (PPE) when handling pesticides. (AA Manual, "Protecting People and the Environment," pgs. 19–22)

3. **The correct answer is C.** Research has proven there is a rapid decrease in the drift potential of droplets larger than about 200 microns, and conversely, droplets smaller than 200 microns are very prone to drift. (AA Manual, pg. 35)

4. **The correct answer is A.** Characteristics of the use of ram air spreaders generally include higher engine power requirements and increased aerodynamic drag, which decrease aircraft performance and maneuverability. (AA Manual, pgs. 58–60)

Trivia Answers

5. **The three main forces acting on the airplane causing it to turn left on takeoff are corkscrewing effect of the slipstream, p-factor and torque.** The *rotating slipstream* created by the propeller will strike the left side of the rudder causing it to move to the right thereby causing the nose of the aircraft to move left. Right rudder is needed to overcome this tendency. This turning tendency is minimized in cruise flight by vertical stabilizer and rudder being installed at a slight angle to align with the airflow.

   P-factor results on takeoff when the relative wind is horizontal and the nose is raised so the angle of the propeller axis causes the blade's positions to have a slightly different angle of attack to the relative wind. The down-going blade on the right side will have a slightly higher speed and create more lift causing the airplane to turn to the left.

   Torque is explained based on one of Newton's Laws—for every action there is an equal and opposite reaction. On takeoff, the force opposite the propeller rotation causes more weight and thus drag on the left landing gear and a left-turning tendency.

   A fourth factor, *gyroscopic precession*, which is more prominent in tailwheel-type aircraft, occurs as the tail is raised during the takeoff roll. When a force is applied to a rotating gyroscope (the propeller disk) the resulting force is 90 degrees ahead of, in the direction of rotation and in the direction of application causing the aircraft to turn left. The magnitude of the force will vary directly with the abruptness with which the tail is raised.

6. **Most helicopter main rotors made in the U.S. rotate clockwise when viewed from the cockpit below.** This question is a little tricky because helicopter designs from Germany, the United Kingdom, U.S. and Canada rotate clockwise and all others rotate counter-clockwise.

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NAAREF President's Message

Rod Thomas

How Safe Are We?

By the time you read this my hope is the busiest part of your season is safely behind you and you are enjoying the benefits of having flown carefully all summer. As of this writing, we have not gotten off to a very good start in terms of accidents.

We have always been able to brag (since the inception of PAASS) that the "human factors" portion of our total accident number has been a lower percentage than all of General Aviation. We can go back any number of years and find that about 75% of all accidents in small non-commercial "people planes" can be attributed to "human factors" (read, pilot error). Ag aviation during this same period has stood much closer to 55% and seldom over 65% of the total accidents in any given year. This year might not end that way if the beginning is any indication. During the first half of 2012, 71% of our accidents have been due to human factors, according to preliminary NTSB reports. We can and must do better.

It is important to note that as much as we would like to see zero accidents we fly in a very challenging environment and accidents, sadly, will always be a part of doing business. For example, when you look at helicopter accidents for almost any year they are very close to 75% for human factors, and that isn't because they are flown by poorly trained or sloppy pilots. I submit the number ends up being higher than anyone would like because the aircraft by its very design begs to do unique and challenging work. Sling, EMS, ag, power line cleaning, etc.—all expose the pilots and helicopters to a greater chance of pilot error. The same is true for ag aviation in any type of aircraft, since our work puts us in proximity to solid objects that hurt or kill when we hit them.

What is the answer? I don't think more paper or regulation will solve this problem, but the FAA has put *all* of General Aviation on notice that it doesn't like our accident numbers and points to the airlines, rail and even autos as examples of improving statistics. I think the answer is rooted squarely in the middle of the ears of the person who looks back at you in the mirror every morning. We are the masters of our own destiny when it comes to most of the aviating decisions we make every day—how much we put in the hopper, how much fuel we carry, the direction we fly the field, the weather in which we fly and many more.

Let's take out of the equation accidents we seemingly have no control over, such as catastrophic equipment failures at the wrong time, and look at only failures to make the right decision. A good example is we still seem to have plenty of engine failures even while a good portion of the fleet is now turbines. Seems those engines need fuel to keep making noise and will fail if they aren't fed that substance. Silly example? I don't think so based on our review of engine failures, many of which were pilot caused. Hard to blame a design that can and will run if operated correctly.

Let's give ourselves some credit but also commit to doing better. We are busier in our cockpits now than ever with GPS, flow control, radios, etc., and most of us are flying in a more challenging environment than in years past. With all that said, even though we have had a rough patch of multiple human factor accidents for the first six months of this year, we are doing much better than when ag airplanes were simpler and flew much slower. I attribute that to a better mindset as a result of education and training. PAASS is but one example of an opportunity in a non-threatening environment where we can learn to make better decisions.

On pg. 42 you will read about the latest PAASS Program subject matter we have been hard at work readying for this 2012–2013 winter circuit. In short, it will be yet another attempt to get you to do the right thing, so we can keep our accident numbers at the lowest possible figure. Yes, one accident is too many, but even worse are those we find out were the result of a poor decision. Let's show the NTSB, the FAA, our industry and our loved ones just how safe we can be by thinking all the way through every flight decision we make. ■


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