



AIR TAP Briefings

A publication of the Airport Technical Assistance Program of the Center for Transportation Studies at the University of Minnesota

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Special Double Issue: This issue of AirTAP *Briefings* features extended coverage of AirTAP Fall 2015 events.

Policymaker forum offers insight, education on UAVs

On December 7, 2015, the Airport Technical Assistance Program joined with the Center for Transportation Studies at the University of Minnesota to hold a special forum on unmanned aerial vehicles (UAVs) for Minnesota state legislators and their staff on the U of M campus.

The forum's goal was to provide attendees with a greater understanding of the challenges and opportunities—as well as the policy and regulatory implications—of operating UAVs in Minnesota.

The user perspective

The event opened with a panel discussion that explored the perspectives of different UAV user groups, including retailers, law enforcement personnel, and hobbyists.

Jay Redding, an attorney with Larkin Hoffman Attorneys, said that as a hobbyist, it's fascinating to see how UAV technology has evolved. "Drones are the Internet of the beginning of the 21st century because of the potential they have to change the economy and the way we work and interact."

Demoz Gebre-Egziabher, co-director of the U of M's UAV Laboratories and associate professor in the Department of Aerospace Engineering and Mechanics, offered his views on the benefits and challenges of UAVs as a researcher, pilot, and educator.

"[UAVs] provide a huge potential for all kinds of applications," Gebre-Egziabher said. "At the same time, I happen to be a pilot, so I'm on the other side as well. There are some things I see about how drones are operated that kind of scare me. So our research is looking at the technologies that are going to be required to make these devices safe."

Speaking as a retailer of UAVs, Mike Hiltner, senior director of government affairs for Best Buy, said his company has always considered it a responsibility to not only bring innovations to the consumer, but also to educate them. Best Buy has begun partnering with the Academy of Model Aeronautics (AMA), the premier organization for educating and training recreational and hobbyist UAV users. Best Buy has started offering AMA memberships and copies of its "Know before you fly" brochures in their stores to drone purchasers. Additionally, all employees who sell them are required to take and pass a test in drone education, Hiltner said.

In addition to education, rules and regulations will play a role in ensuring safety. Gebre-Egziabher emphasized that regula-

tions for UAVs will likely not be one-size-fits-all, since UAVs span such a wide spectrum of sizes and capabilities. In addition, he and other panelists expressed hope that future regulations will take the educational value of UAVs—including their ability to interest young people in aviation, engineering, and technology—into account.

"Drones have been a boon for education," Gebre-Egziabher said. "I'm hoping that in coming years we have a clear picture of how to deal with this technology and make sure we have rules and laws that foster the education aspect and also protect safety."

Speaking for the use of UAVs in law enforcement, James Franklin with the Minnesota Sheriffs Association said he would urge caution in creating rules without also considering how they'll be enforced. "I think it's absolutely critical that the FAA get this right. When people are dissatisfied they run to the legislature to get a rule change. This doesn't make for good public policy...No one is going to call the FAA with their drone complaint, they're going to call 911."

David Prall is CEO of Unmanned Experts, which focuses on drone use for infrastructure inspection, surveying and mapping, and public safety. He said that rather than create numerous new laws, in many cases existing laws—such as those concerning reckless endangerment—could be used to deal with some of the incidents related to drones.

"We're really at a crossroads," Redding said. "We can give kids the education and opportunities they need to fly safely... or we can take the route of closing it off, having onerous requirements." As a hobbyist, he said he'd prefer the former. "Seeing people push this technology, seeing that passion develop, I think is important for the future of aviation."

"My hope is we can look back and see that we all stepped up to do our part, but that the pendulum didn't swing so far that it stifled the marketplace," Hiltner added.

Safety and integration

Kicking off a session on UAV safety and integration, moderator Rick Brauning with the Minnesota Department of



Transportation Office of Aeronautics said the primary drone safety concern is potential injury caused by operators not understanding the capabilities of their vehicles, leading to crashes with stationary objects (such as towers), birds, or other aircraft. Those crashes can then cause injuries to people on the ground.

Mark Kimberling, legislative liaison with the National Association of State Aviation Officials (NASAO), noted that increased state legislation on UAVs has raised questions about federal preemption and jurisdiction relating to governing drone use. Many state lawmakers contend that the FAA's proposed rules and its authority are too limited to address all UAV operations, particularly recreational-use drones, he said. States, counties, and municipalities are increasingly getting involved in regulating drone use, citing the need to protect health and safety. "In 2015, 45 states considered almost 170 bills related to UAVs. That's a marked increase over the previous two years," he said. Rather than broadly prohibiting UAV applications—as had been the case previously—state legislatures are honing in on use of drones for specific applications, such as operating drones in proximity to critical infrastructure, at public events, or for their use in hunting, Kimberling said.

Privacy around drone use is also a growing concern, and recently two states have extended their existing voyeurism laws to make certain illegal UAV operations a felony. Beyond restrictive issues, several task forces are studying how they can grow the industry.

UAVs are a new arena, and the FAA needs to take the time to get rules right, Kimberling said. But in the meantime, states will take steps to fill what they perceive as a regulatory void. "I expect 2016 to be an equally busy year with respect to UAVs in state legislatures," he said.

UAVs continued on page 3

Airports get tips on creating, submitting plans at Fall Forum

The 2015 AirTAP Fall Forum, held December 8 at the Crow Wing County Highway Department in Brainerd, Minn., drew airport personnel and experts from across the state.

The opening session gave a thorough overview of airport layout plans (ALPs) and master plans from a state and federal perspective.

An ALP is a planning document showing existing and future airport facilities. This includes uses and conditions, airport data, building area layout, airspace, land use and zoning, and property ownership.

Minnesota has 135 publicly owned airports; 97 are part of the National Plan of Integrated Airport Systems (NPIAS), meaning they are significant to national air transportation and so are eligible to receive federal grants under the Airport Improvement Program (AIP); 38 are non-NPIAS airports. In the Minnesota State Aviation System Plan (SASP), how these airports are classified determines how often they need to update their ALPs, explained Bob Burrell with the Minnesota Department of Transportation (MnDOT) Office of Aeronautics. “Key” airports must do so every 7 years and “intermediate” every 15, while landing strips need only have an ALP on file. Burrell noted that 11 key airports have outdated ALPs, while 19 intermediate airports have outdated plans and 2 are not on record with any ALP, and 10 landing strips lack an ALP.

Burrell said MnDOT has been approving an average of 10 ALPs each year for the last five years. He estimates the office will need to complete 12 or 13 just to maintain the system.

To help airports comply, MnDOT is in the process of updating guidelines for preparing and submitting ALPs, particularly for providing direction for the zoning plan, property maps, and non-NPIAS ALP submittal, Burrell said.

Ryland Juran, also with MnDOT Aeronautics, discussed what the agency’s planning section looks for in an ALP when it reviews it. “If there are MnDOT roads in your runway protection zone, for instance, we actually route it to district to make sure there’re not highway expansions planned or other incompatible highway things going on,” he said.

Although reviewers look at the entire ALP, they focus on a few key areas: the SASP recommendations, any approaches that are planned, and land use and zoning, Juran continued. The SASP spells out a number of system objectives for each of the airport classifications: One example for key airports is that a runway of 5,000 feet requires a precision approach. Other things may not be required but should be considered, such as perimeter fencing. “Those are on sort of a case-by-case basis,” he added.

Reviewers pay particular attention to an airport’s approaches, since approaches are closely connected to off-airport land use and zoning, Juran said. “An approach should provide a great utility to the airport, and

obstacles identified should have some sort of disposition...when those will be cleared, what timeframe—something specific you’re waiting for to make that happen.”

The land-use-drawing component of the ALP is usually used as a planning tool to help identify incompatible land uses near the airport. “The idea is that it can be used by the community and the airport sponsor to make sure that everything planned around [the airport] is compatible,” he said. Finally, the purpose of the zoning sheet is to show the existing zoning compared with the zoning required by the proposed development on the airport. “We want you to protect all planned infrastructure that’s not currently known,” he said.

Following Juran, Gina Mitchell, a community planner with the Federal Aviation Administration (FAA), addressed airport master plans and ALPs from the FAA perspective, including differences between master plans and ALPs, situations that require one or both to be submitted to the



FAA, and what the FAA can help fund.

The master plan is a comprehensive study of an airport, usually describing the short-, medium-, and long-term development plans to meet future aviation demand, Mitchell explained. The FAA has approval authority of aviation forecasts, critical design aircraft, and the ALP.

A master plan typically includes a report and an ALP drawing set. When airport sponsors accept financial assistance from federal grant programs, they are legally required to meet certain obligations, called grant assurances, pertaining to use of the airport. A current FAA-approved ALP is a prerequisite for receiving a grant for airport development, and grant assurances require the airport sponsor to keep the ALP up-to-date at all times. FAA approval is required for any updates, revisions, or modifications to the ALP.

The FAA wants to work with airports from the time they scope a project through each step “so that we get a good understanding of what you’re trying to achieve, and we have an opportunity to share other info we might want you to consider,” Mitchell said. The FAA has created a draft ALP standard operating procedure (SOP No. 2) that establishes uniform procedures for the agency’s review and approval. “It’s a good checklist to make sure you have graphically represented on the ALP everything that needs to be there.”

Mitchell addressed what might trigger the need for an airport master plan. “Typically what we find is that changes are going on adjacent to the airport, or [there’s] a new user that has different needs that can’t be accommodated, or the airport needs more hangar space,” she said. Another trigger may be that previous planning efforts were incomplete—for instance, the vision for future airport development is illustrated on the ALP, but alternatives to meet the aeronautical need were not effectively studied, she said.

In some cases, such as a taxiway connection or apron pavement, a minor revision to an ALP may suffice rather than a more detailed planning study, Mitchell said. She recommends airports contact their program manager for guidance.

The FAA can fund a master plan study or update if the agency determines it is necessary and justified and approves the scope of work. The FAA cannot issue a grant to update an ALP that the sponsor has not kept current or to update an airport’s capital improvement plan (costs are only eligible as part of a master plan). Examples of elements not allowed in an FAA-funded master plan or as a stand-alone project plan include business plans, information technology, economic benefits studies, and marketing studies (a complete list can be found in Appendix E of the FAA’s AIP Handbook).

“Current themes we’re having conversations around have to do with airports wanting to be creative with how they can fund activities with their supporting revenues. We can’t participate in those types of activities,” Mitchell said.

In general, contact the FAA when you want to propose airport development that is different from what is shown on your ALP or conduct a planning study.

“We really do want to be at the table with you. We want to make sure that we’re partnering and sharing ideas so that at the end of the day we can support the planning process,” Mitchell said.

In a follow-on session, Mitchell and Matt Lebens of MnDOT Aeronautics offered advice for airports creating an Exhibit A: Airport Property Inventory Map. The Exhibit A property map, which forms the basis for the ALP, provides information on the acquisition and identification of all land parcels that make up the dedicated airport property and are generally unavailable for any other use.

For more information

- Standard Procedure for FAA Review and Approval of Airport Layout Plans: faa.gov/airports/resources/sops/
- Standard Operating Procedure for FAA Review of Exhibit ‘A’ Airport Property Inventory Maps: faa.gov/airports/resources/sops/
- *Airport Improvement Plan Handbook*, Appendix E: faa.gov/airports/aip/aip_handbook/

Donald Mark, an attorney specializing in aviation matters, described the high-profile 2014 Pirker case, in which the National Transportation Safety Board (NTSB) ruled that the same FAA rules that apply to manned aircraft apply to unmanned aircraft. With that ruling, the FAA administrator made it clear that illegal activities will be prosecuted, and violators of the FAA prohibition on commercial UAV use are subject to civil penalties up to \$10,000.

Mark suspects many illegal operations occur regularly but aren't prosecuted because of a lack of resources to do so.

Serious safety concerns arise not only from this lack of enforcement, but also from a lack of education and understanding on the part of some UAV operators, he continued.

“What happens to an airplane engine designed to handle a bird ingestion if it ingests a UAV? The damage [a UAV] could cause...is a frightening thing.”

The FAA-proposed rules for small UAVs (under 55 pounds) conducting non-recreational operations would limit flights to daylight and visual-line-of-sight operations, among other things. The key points, Mark said, are that there's no requirement of an airman's certificate, “and the line of sight will be a limitation that the Amazons of the world will work hard to overcome.”

Kevin Morris, with the Minneapolis Flight Standards District Office of the FAA, also referenced the Pirker case and how it opened the door for the FAA to regulate the UAV industry. Morris emphasized that his primary job is to ensure the safety of people in the air and on the ground. The FAA's goal is to integrate UAVs into the national airspace, not keep them out—but in a way that will protect everyone involved. Since the UAV industry has grown so fast, the FAA is playing catch-up, he said.

Minnesota currently has 45 authorized UAV commercial operators. “For every one that's authorized we have three doing it illegally,” he estimated. The FAA is enlisting help from law enforcement to identify violators—“not to arrest, not to confiscate,” he said, “but to follow up.”

The FAA's jurisdiction over a UAV starts at “grass-level”—in other words, as soon as it leaves the ground outdoors. Morris also outlined the three types of UAV operations recognized by the FAA: public, civil (which includes commercial), and the hobby operator. “Everyone thinks they're in the hobby [category], even when they're doing commercial [work]. It's all about the purpose of the flight—not who's flying it,” he said.

Economic impacts

During a panel on the economic impacts of the growing UAV industry, speakers Daniel Johnson of Sensurion Aerospace and Jerry Johnson of Aglytix Corporation discussed

how drones are a “game changer” for the agriculture industry, in terms of the data they can provide farmers. “All production-level farmers are going to have UAVs in five years,” Jerry Johnson predicted. Besides the military and agriculture, drones have great potential for use in other early-adopter areas such as oil and gas exploration, critical infrastructure monitoring, training, and public safety, he said.

Looking forward, Dan Johnson said he would encourage investment in infrastructure that would help the UAV market flourish in Minnesota—“not only the airspace side of infrastructure, but also the ground-side.” One example would be considering

how an airport could be dual-use, serving manned and unmanned aircraft; another is creating the physical infrastructure to attract new operators, whether hangar space, laboratory space, or

airspace to more freely test technologies, he said. Jerry Johnson added that he'd like to see more broadband to assist with transferring all the big data captured in the field by UAV sensors.

Privacy and ethics

Benjamin Feist of the American Civil Liberties Union (ACLU) of Minnesota was joined by Franklin and Prall to discuss privacy and ethics issues related to UAVs. Franklin said it will be key to find a balance that considers rules already established by US courts and the growing threat of terrorism and other threats to safety and security. Prall said the biggest challenge he sees in his industry concerns the individual in the private sector—“the person who's out on a paddleboard on a lake being irritated by someone hovering a drone right next to them.” Feist noted that the ACLU is primarily focusing on law enforcement's use of UAV technology and getting the legislature to act before UAVs “are cluttering up the skies...and generally concerning the population,” he said. “I think we can sort of speculate—show what technology exists now and offer a reasonable way to go forward that should work for all purposes.”

Closing remarks

Scott Dibble, chair of the Senate Transportation and Public Safety Committee, noted the many potential applications of UAVs—including precision agriculture, package delivery, and bridge inspection—and the need to consider a wide range of perspectives when thinking about regulations, resource allocation, and privacy issues.

“We don't know what the future holds,” Dibble said. “We're in a learning mode, and we invite everyone to participate in this conversation—to bring ideas and to present real-world opportunities for what we might be doing in terms of economic development, transportation, and public safety.”

The FAA's jurisdiction over a UAV starts at "grass-level."

Getting the lead out: changes to aviation fuel

The AirTAP Fall Forum included a panel discussion on the coming transition in the aviation industry from leaded fuel to a lead-free alternative. Driven by the Environmental Protection Agency, the FAA and industry are working together under the Piston Aviation Fuel Initiative (PAFI) to identify, evaluate, and deploy the most promising unleaded replacements for the current fuel: 100 low lead (LL). 100LL avgas is the only gasoline that still contains lead, a toxin known to have harmful effects on the environment and human health.

In a multiyear effort, the FAA has selected four fuels from three suppliers for testing. Full-scale engine and aircraft testing began in January 2016. Chung-der Young, an engineer with the FAA, said the agency will not pick a fuel but rather will qualify the best fuels for use, which it plans to do by 2018.



Young said the unleaded gas will be as much as 10 to 12 percent heavier per gallon than 100LL. Avgas is sold by volume at the airport; therefore, the weight of the new fuel will be heavier for the same volume, which may have implications for airports. However, the performance of the unleaded gas is expected to be within 2 percent of 100LL fuel, he added.

Young said a goal is to keep the unleaded avgas compatible with existing aircraft and airport infrastructure such as fuel tanks. A threshold may be required between 100LL and unleaded avgas co-mingling. For example, the airport fuel storage tank may need to be dispensed to a certain level before adding a new kind of fuel.

Rick Braunig of MnDOT Aeronautics voiced a concern from a pilot and aircraft owner perspective. “As a pilot...I know if the price of fuel goes up, [pilots] will vote with their feet,” meaning they'll seek other less-expensive options such as diesel and JetA fuel. Because the amount of 100LL that's processed is a small part of the aviation fuel market, if current 100LL users look to different fuels, the market for the 100LL alternative may become so small that a national distribution network

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An airport's story: Morris Municipal Airport

Located three miles west of Morris, a town of about 5,000 in western Minnesota, the Morris Municipal Airport—Charlie Schmidt Field averages about 115 aircraft operations per week—primarily transient and local general aviation.

The Morris Municipal Airport opened in March 1942. Since then, airport operations have been mainly agricultural. However, the city has a rapidly growing industrial presence, which has greatly influenced operations over the past decade.

The airport features one 14/32 paved runway (4007 x 75 feet) and one 4/22



Morris Municipal Airport

crosswind turf runway (2610 x 145 feet). Additional airport facilities include an arrival/departure building with a pilot lounge, conference area, and aviation weather center. The airport also has two t-hangars and two heated multi-storage hangars.

Last spring, the Morris Airport won the first-ever Project of the Year award at the Minnesota Council of Airports Conference in the Business Development/ Non-Aeronautical category for the construction of an 8,800 square-foot fixed-base operator hangar designed to accommodate the aircraft needs of Superior Industries. Headquartered in Morris, Superior Industries manufactures and supplies bulk material processing and handling systems. The company recently acquired several aircraft, including a King Air 350 aircraft.

“Superior Industries is growing in leaps and bounds,” says Morris city manager Blaine Hill. “To facilitate their business travel, and to bring their customers and employees here to Morris to look at their operations and to train, they needed improved airport resources.”

Hill says the City of Morris invested about \$100,000 in the project, with the

remaining costs covered by state and federal aviation funds. Superior Industries currently leases the hangar to help offset construction costs.

In addition to Superior Industries' aircraft, the airport also houses a number of agricultural aerial spraying planes and several planes owned and flown by local flyers and flying clubs.

Hill says the main focus over the past five years has been expansion, which he hopes will continue. Construction will begin in 2016 on a \$2.6 million project to construct a parallel taxiway. Airport officials also plan to conduct a study on potentially extending the paved runway by up to 1,000 feet. This runway extension could expand landing capabilities and possibly facilitate small corporate jets.

The city is also considering building another new hangar at the airport using private funds from local flyers. A new hangar would open up more storage and possibly allow for the hiring of a full-time mechanic at the airport.

Expanding airport operations and facilities is essential to meeting the needs of an increasingly mobile society and a growing local economy, Hill says.

“The unique thing about our airport is that the economic activity is growing. A lot of small communities out here on the prairie are fading away,” Hill says. “We are holding our own because of the local businesses that are using the airport.”

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becomes overwhelmingly expensive, Braunig said.

However, Young noted that keeping the cost of the alternative comparable to 100LL is another major goal of the initiative. “If a new fuel would be too expensive, then [this project] will be a failure,” Young said.

Elaine Croft McKenzie, Cambridge Systematics, urged airports to think about



and plan for safety, costs, distribution and supply, capital planning, and timing. Specifically, if changes in infrastructure or operations are needed, airports need to plan for those and need to know when information will be available. “The FAA has put together an aggressive timeline... But what happens after that?” she said. “I think this is a good process—the more we can keep talking about this, the smoother transition and better off we’ll be.”

[For more on this topic, see the Summer 2015 issue of *Briefings* at airtap.umn.edu/publications/briefings/2015/documents.]

Plan to attend the 2016 MN Airports Conference in Brainerd!

The 2016 Minnesota Airports Conference will be held April 20–22 at Madden's on Gull Lake in Brainerd, Minn. Don't miss this chance to learn from aviation experts in sessions on airport emerging technology, minimum standards, zoning, sustainability, lease agreements, and many more topics. Highlights this year include astronaut Robert "Hoot" Gibson speaking at the opening luncheon and a special meet-and-greet social with Adam Thielen of the Minnesota Vikings and former Twins great Jack Morris. As in past years, award-winning airport projects will be recognized and attendees will have ample opportunities for networking with colleagues and conference exhibitors.

More information and registration is available online at www.airtap.umn.edu/events. The conference brochure will be mailed in early March.



Photo courtesy Brad Thornberg

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