

The Biggest Obstacles Confronting Agricultural Aviation

Since the inception of agricultural aviation, concerns such as urban expansion, wind towers, and weather have become increasingly challenging for the industry's flight operations, especially in my area of eastern South Dakota along with the entire Midwest. However, what sets agricultural aviation apart is its proactive approach to addressing these challenges through dedicated organizations, such as the National Agricultural Aviation Association (NAAA), along with various state associations, that play a crucial role in mitigating the impact of obstacles like wind towers by advocating for safe flight practices and promoting dialogue between stakeholders. Additionally, they work to navigate the complexities of urban expansion by advocating for sensible regulations in addition to strengthening understanding between urban and rural communities. These associations also provide valuable resources to the challenges ag pilots face by offering guidance on risk management strategies and technological advancements to enhance safety as well as efficiency. Through these collective efforts, the agricultural aviation industry continues to adapt and innovate, ensuring its resilience in the face of evolving challenges to sustainable agricultural practices worldwide.

One of the biggest obstacles in the eastern South Dakota and all across the Midwest is urban expansion. By definition, urban sprawl is "the spreading of urban developments (such as houses, dense multi-family apartments, office buildings and shopping centers) on undeveloped land near a more or less densely populated city." Urban expansion presents a constant challenge for agricultural aviation, impacting both current operations and future viability. As urban areas encroach upon traditional agricultural regions, the available airspace for low-flying airplanes diminishes, constraining the flight paths and maneuverability of aerial applicators. In addition to urban sprawl consuming airspace, it also presents another risk: the proximity of residential areas to agricultural fields which raises safety concerns regarding potential pesticide drift, necessitating the implementation of more stringent

regulations and buffer zones. Additionally, urban expansion results in the fragmentation of farmland, leading to smaller field sizes and irregular shapes, which can hinder pilots in effectively treating crops. According to producer.com, urban sprawl encroaches on so much farmland which eliminates the opportunity for farming in that area. According to the NAAA website, aerial applicators treat 127,000,000 acres of farmland each year, not to mention millions of acres worth of pasture and forest land and as urban sprawl continues, that number will continue to decrease. One thing to note about urban sprawl is that when newcomers in search of a “simple” life move to the Midwest, they create more challenges when they try to live “organically” and don't understand our farming practices, all of which creates more challenges and obstacles for ag aviation operations. In regions like eastern South Dakota, where urbanization is on the rise, educating the public about agricultural aviation practices becomes crucial. Outreach efforts, such as providing credible information via dialogue, posts and videos, can help bridge the gap in understanding between urban newcomers and the agricultural industry, while addressing concerns as well as highlighting the importance of aerial application in ensuring food production. Although we can't stop urban sprawl, there are many ways of mitigating the problems that come with it. One way to overcome this challenge is by talking to that community of people to help them understand what we, as aerial applicators, do. By providing this type of information to the public, hopefully they will become more respectful of our industry and have a better understanding that by applying various crop protection products, we are helping to provide them with a healthier and abundant food supply.

Another significant obstacle in agricultural aviation is the proliferation of wind towers across rural landscapes. These tall structures intersect with the flight paths of agricultural pilots, complicating operations and necessitating adjustments to avoid collisions, all of which can lead to the elimination of aerial application as an option. The NAAA did a study that proved it takes at least 1.82 miles or 9,147 feet for an AT-802A going 145 mph to make its turns, and the wind farm companies are projecting it to be 500 feet, so they are eliminating space for ag pilots to safely operate. The presence of wind turbines

introduces additional complexity, as the spinning blades generate unpredictable air currents and turbulence, posing challenges to pilots' ability to efficiently complete their tasks. Additionally, landowners with ground operations may see a reduction in tillable acres due to the loss of land used where they stand and all the network of roads to each turbine. Landowners may also see their farming efficiency decrease because placing turbines in fields causes a nice quarter of land to turn into three triangle fields. While wind energy is gaining popularity in rural areas, it's essential to encourage informed decision-making regarding the placement of wind towers. Education campaigns done through local operations and national or state associations can highlight the potential drawbacks of wind tower installation. Things such as disrupted flight patterns and increased operating costs for agricultural aviation operations are things that need to be addressed to wind farm companies and the public. By raising awareness about the long-term implications of wind tower placement, including environmental considerations such as decommissioning and disposal, stakeholders can make more informed choices regarding their land use. The NAAA even encourages “anyone considering leasing their wind rights to seriously think about the potential upsides and downsides before signing an agreement”. By raising awareness in your community, you can create dialogue with collaboration between the agricultural and renewable energy sectors, ultimately promoting sustainable development practices in rural communities. Wind towers are a problem that is becoming more and more common in rural communities; therefore, ag operations should reach out to their local farm operations to educate them on all the potential negative effects to hopefully encourage them to reject one-sided agreements that come from these wind farm companies.

Adverse weather is one of the most formidable and unpredictable obstacles for ag pilots, not just in my region, but all across the nation. Wind, rain, and visibility are the primary challenges faced by pilots when conducting aerial spraying operations. According to David George in a *Vertical* article wind speed is a critical factor, as even the slightest breeze can cause herbicide drift, endangering nearby crops and

necessitating the suspension of spraying fields. When wind speeds exceed 10 mph, pilots often choose to halt operations for the day, leading to disruptions in their workload. Rainfall poses another significant risk, not only to aircraft safety but also to the efficacy of spraying efforts. Pilots avoid spraying during precipitation events due to the danger posed to aircraft and the reduced effectiveness of chemical applications. David George said in the *Vertical* article, “too much rain can ‘wash off’ the product.” Most chemicals applied need a couple hours to “dry” to ensure the plants absorb the product. If the rain were to come in right after you sprayed, you face the risk of the chemicals “running off” into a field of crops that can't necessitate those types of chemicals. Low visibility, often caused by fog, further compounds the challenges, making navigation difficult and increasing the risk of accidents. Fog can also exacerbate drift issues, heightening the likelihood of off-target damage to crops and neighboring properties. The fog almost acts like a barrier, and it stops the chemical from reaching the crops and carries it wherever the fog goes, which can cause an extreme amount of damage. The unpredictable nature of weather patterns complicates field planning and scheduling, resulting in delays in applications. To mitigate the impact of weather dependency, pilots rely on accurate weather forecasts and real-time weather monitoring systems to make informed decisions about spraying schedules. The biggest challenge with trying to overcome weather obstacles is the constant change in forecast. When the weather is variable, most pilots will stay grounded, because you don't want to load a large batch just to not be able to spray the intended field and risk having to land the airplane with a load, which is not an easy task for the pilot. Fortunately, pilots have adapted their practices by exploring night spraying options, capitalizing on calmer nighttime winds to conduct operations safely. Another way to overcome this challenge and stay organized is a method my current boss practices. He created a “wind tower” and organizes maps based off what fields need what winds and he works based off the weather conditions. There are many ways you can adapt to the changing weather; you just need to assess what will work best for your business and your area. Despite these challenges, agricultural pilots demonstrate resilience, continuously adapting

their approaches to navigate the ever-changing weather conditions to ensure the timely and effective application of chemicals to support global food production.

Agricultural aviation encounters a multitude of challenges, including urban expansion, wind towers, and weather, each presenting formidable obstacles for all ag aviation operations. Yet, the resilience of both pilots and the industry itself shines through in the face of adversity. Constantly adapting and innovating, agricultural aviation remains committed to ensuring the safety and efficacy of its work. Through advocacy for safe flight practices, creating dialogue among stakeholders, and promoting informed decision-making regarding land use and wind tower placement, the industry strives to optimize operational efficiency and effectiveness. Technological advancements and robust risk management strategies further secure these efforts, enabling pilots to navigate the complexities of their environment with confidence. Despite these complicated challenges, the unwavering resilience and dedication of pilots all across the industry underscore their indispensable role in helping food security and advancing agricultural practices worldwide.

Works Cited:

- Aerial Application of Crop Protection Products Is An Essential Tool For American Farmers*. National Agricultural Aviation Association. (n.d.). <https://www.agaviation.org/about/about-ag-aviation/industry-facts-faqs/>
- Brotak, E. (2017, September 25). *Growing Pains*. verticalmag.com. <https://verticalmag.com/features/growing-pains/>
- Division of Agriculture Research and Extension. (n.d.). *Urban Encroachment: An Overview*. nationalaglawcenter.org. <https://nationalaglawcenter.org/overview/urban-encroachment/#:~:text=Despite%20the%20efforts%20to%20preserve,to%20survive%20in%20close%20proximity.>
- McClelland, J. (2014, December 17). *For Crop-Duster Pilots, Wind Towers Present Danger*. nor.org. <https://www.npr.org/2014/12/17/370406766/for-crop-duster-pilots-wind-towers-present-danger#:~:text=For%20Crop%2DDuster%20Pilots%2C%20Wind%20Towers%20Present%20Danger%20Short%2C,markings%20and%20other%20safety%20improvements.>
- NAAA. (n.d.). *Wind Turbines*. agaviation.org. <https://www.agaviation.org/policy/wind-turbines/>
- NAAA. (2020, July 23). *NAAA Provides Proof of Distance Needed to Safely Turn an Ag Aircraft to Refute Claims Made by Wind Farms, Towers, Other Obstructions*. news.agaviation.org. <http://news.agaviation.org/naaa/issues/2020-07-23/index.html>
- Urban Sprawl*. Wikipedia The Free Encyclopedia. (2024, June 10). https://en.wikipedia.org/wiki/Urban_sprawl
- White, E. (2024, June 5). *Losing farmland to urban sprawl receives little attention*. The Western Producer. <https://www.producer.com/markets/losing-farmland-to-urban-sprawl-receives-little-attention/>