Date: October 6, 2025

To: Docket Operations, M-30
U.S. Department of Transportation
1200 New Jersey Avenue SE
Room W12-140, West Building Ground Floor
Washington, DC 20590-0001

Subject: Comments on the Notice of Proposed Rulemaking for Normalizing Unmanned Aircraft Systems (UAS) Beyond Visual Line of Sight (BVLOS) Operations.
Docket Number: FAA-2025-1908.

To Whom it May Concern,

The National Agricultural Aviation Association (NAAA) appreciates the opportunity to comment on the above referenced subject.

U.S. Aerial Application Industry Background

NAAA represents the interests of the 1,560 manned operators, 2,028 non-operator pilots, and 1,082 unmanned operators conducting 14 CFR Part 137 aerial application operations throughout the United States, using aircraft to enhance the production of food, fiber and bioenergy; protect forestry; protect waterways and ranchland from invasive species; and provide services to numerous urban agencies and homeowner groups for the control of mosquitoes and other health-threatening pests.

Within agriculture and other pest control situations, manned aerial application is an important method for applying pesticides, for it permits large areas to be covered rapidly—by far the fastest application method of crop inputs—when it matters most. It takes advantage, more than any other form of application, of the often too-brief periods of acceptable weather for spraying and allows timely treatment of pests while they are in critical developmental stages, often over terrain that is too wet or otherwise inaccessible for terrestrial applications. Aerial application treats above the crop canopy, thereby not disrupting the crop and damaging it. Aerial application has greater

productivity, accuracy, speed, and lack of damage to the crop compared to ground application.[1] Although the average manned aerial application company is comprised of but six employees and two aircraft, as an industry these small businesses treat nearly 127 million acres of U.S. cropland each season, which is about 28% of all cropland used for crop production in the U.S.[2] In addition to the cropland acres, aerial applicators annually apply to 5.1 million acres of forest land, 7.9 million acres of pasture and rangeland, and 4.8 million acres for mosquito control and other public health concerns.

Data from a Texas A&M University economics study[3] and the 2019 NAAA industry survey[2] were used to calculate that the value of the aerial application industry to farmers, input suppliers, processors, and agricultural transportation and storage industries for corn, wheat, cotton, soybean, and rice production in the U.S. is estimated to be about $37 billion.[4]

The aerial application of crop protection products results in greater harvest yields of crops. This in turn results in less land being used for agricultural production, preserving more wetlands for natural water filtration, forest ecosystems for carbon sequestration and habitat for threatened and endangered species. The Texas A&M study revealed that the total area of cropland needed to replace the yield lost if aerial application was not available for corn, wheat, soybean, cotton, and rice production is 27.4 million acres, an area roughly the size of Tennessee. Aerial applicators seed 3.8 million acres of cover crops annually.[4] This means that aerial applicators are responsible for helping to sequester 1.9 million metric tons of CO_2 equivalent annually, which according to the EPA would be the equivalent of removing approximately 412,000 cars with carbon-combustion engines from the roads each year.

The aerial application industry is also actively involved in education and research efforts to improve the accuracy and safety of aerial applications. The National Agricultural Aviation Research and Education Foundation (NAAREF) is a non-profit organization dedicated to promoting research, technology transfer and advanced education among aerial applicators, allied industries, government agencies and academic institutions. NAAREF's Professional Aerial Applicators' Support System (PAASS) program is a four-hour course offered annually at all state and regional agricultural aviation association conventions. The curriculum is brand new every year and a minimum of two hours of PAASS is focused on aviation safety. Leveraging the knowledge of industry veterans, academics and governmental authorities, the PAASS aviation safety curriculum is tailored exclusively to Part 137 operators and pilots. Avoiding low-altitude obstacles, avoiding inadvertent

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[1] Kováčik, L., and A. Novák, 2020. "Comparison of Aerial Application vs. Ground Application." *Transportation Research Procedia* 44 (2020) 264–270.
[2] National Agricultural Aviation Association. May 2019. "2019 NAAA Aerial Application Industry Survey: Operators." https://www.agaviation.org/2019-naaa-operator-survey/
[3] Dharmasena, S. 2020. "How Much is the Aerial Application Industry Worth in the United States?" Research presented at the 2020 Ag Aviation Expo, Savannah, GA. https://www.agaviation.org/education/resources/aerial-application-technology-research-sessions/
[4] Dharmasena, S. 2021. "Value of the Agricultural Aerial Application Industry in the United States" Research presented at the 2021 Ag Aviation Expo, Savannah, GA. https://www.agaviation.org/education/resources/aerial-application-technology-research-sessions/

instrument meteorological conditions, turning safely and inter-aircraft communication to avoid midair collisions are some of the aviation safety topics that have been covered in PAASS. In recent years PAASS has progressively incorporated content directed to the growing sector of unmanned Part 137 operators.

Five years after PAASS became part of the aerial application annual curriculum in 1999, there was a 26% drop in drift incidents according to Association of American Pest Control Officials drift surveys. In addition, ag aircraft accidents have also significantly declined. From 1999 to 2010, the accident rate per 100,000 hours flown dropped by 21.6% compared to pre-PAASS accident rates. From 2011 to 2019, the accident rate dropped even more—30.8%—compared to pre-PAASS accident rates. Each year we continue to see a drop in our accident rate since pre-PAASS days, but now it declines more incrementally. This reduction in accidents proves PAASS has had, and continues to have, a significant positive impact on the aerial application industry.

Another NAAREF program is Operation S.A.F.E. (Self-regulating Application & Flight Efficiency). The primary component of Operation S.A.F.E. is a fly-in clinic. At a S.A.F.E. fly-in, aerial applicators can have their aircraft calibrated and application patterns (both liquid and dry) measured and evaluated for accuracy and uniformity. Spray droplet size is also measured at a fly-in to ensure the agricultural aircraft is creating the droplet size required by the labels for products to be applied by the aircraft. Many of the concepts used mitigate the risk of drift from agricultural aircraft have originated from ideas first tested at Operation S.A.F.E. fly-ins. S.A.F.E. is increasingly being utilized by unmanned aerial applicators, who have reported new and unique challenges with sub-optimal nozzle choices and unrealistic productivity claims made by the UAS manufacturers.

In 2023, NAAA created a professional certification program for the aerial application industry named C-PAASS for Certified Professional Aerial Application Safety Steward. To be certified under C-PAASS, aerial applicators must take the PAASS program annually and Operation S.A.F.E. biennially, in addition to belonging as a member to their state/regional agricultural aviation association and the NAAA. This year, C-PAASS professionals are required to take and be tested on additional aviation safety and environmental stewardship curriculum offered online through NAAA. The purpose of C-PAASS is to enhance professionalism in the aerial application industry as our statistics show that those that participate in our educational programs are safer from both an aviation and environmental perspective.

Extent of Low-Altitude Airspace Utilization by Aerial Application

Aerial application operations occur, by necessity, very near the surface. For agricultural applications, aircraft maintain level flight as low as 10 feet above ground level (AGL), depending on the product type and target crop, as they are dispensing crop protection products. Between each dispensing pass across the field, the aircraft must safely exit the field, make a turn and re-enter the field at the target application height. This involves a rapid climb (up to 1,000 feet AGL for some

aircraft/situations) on the way out and a rapid descent on the way back in. An aircraft might make dozens of passes over a single application site, with a commensurate number of maneuvering turns.

The previously cited 2019 Aerial Application Industry Survey indicates that 127 million acres of US cropland are annually treated by aerial application, with an average field size of 166 acres. Using an average 70-foot effective swath width in each pass, it is estimated that agricultural aircraft fly 14.8 million miles in application passes annually — and again, this is just for cropland, not the 5.1 million acres of forests, 7.9 million acres of pasture and rangeland, and 5.2 million acres for mosquito abatement and public health treated every year by aerial application.

Since 2016, NAAA has partnered with Mississippi State University's (MSU) Raspet Flight Research Laboratory (RFRL), a core member of FAA's Center for Excellence for UAS Research – Alliance for System Safety of UAS through Research Excellence (ASSURE) program, to build a nationally representative dataset of manned aerial application GPS flight logs. As of 2025, over 30,000 individual flight logs have been (and continue to be) donated by aerial applicators across the country to fuel this effort. Put simply, this data demonstrates and defines the airspace occupation of manned aerial application. Utilizing this dataset, MSU RFRL conducted an aerial application aircraft performance data analysis in 2020,[5] which showed that the average altitude of an aerial application aircraft during the application passes and turns is 38 feet above ground level (AGL) and the average horizontal distance covered in each turn outside of the target area is around 1,750 feet. Combining this information with the 2019 survey data, it is estimated that aerial application aircraft travel 9.6 million miles in turns. Adding this to the 14.8 million miles in application passes, it is estimated that aerial application aircraft fly a combined industry total of 24.4 million miles annually at an average altitude of 38 feet. Again, this is just for cropland and does not include ferrying to and from each application site.

As the goal of an agricultural application is to treat the entirety of a field, passes are intentionally made up to field edges and around obstacles such as powerlines, structures and tree lines. Due to the prevalence and proximity of these obstacles around and within application sites, aerial application aircraft routinely fly very close to them. To quantify this frequency and closeness to obstacles, the University of North Dakota (UND) conducted an ASSURE-sponsored study on shielded areas which combined both quantitative aerial applicator survey data and empirical evidence to conclude that aerial application aircraft regularly fly within 25 feet of powerlines when descending into a field or climbing out over them.[6] In arriving at this conclusion, the MSU RFRL dataset was utilized to calculate curves representing average aircraft trajectory when traversing

[5] Mississippi State University Raspet Flight Research Laboratory. 2020. "Characterization of Agricultural Aircraft Performance Using Flight Log Data." https://www.raspet.msstate.edu/sites/www.raspet.msstate.edu/files/2022-04/20200825%20Ag%20Data%20Model.pdf

[6] ASSURE: University of North Dakota. September 2024. "A45-Shielded UAS Operations: Detect and Avoid (DAA): Final Report." https://www.assureuas.org/wp-content/uploads/2021/06/A45_Task7_Final_Report_v5_FINAL.pdf

over powerlines. The resultant curve for climb out, shown in Figure 1, estimated horizontal and vertical distances on the order of 3-6 feet from the powerline. The resultant curve for descending into a field, shown in Figure 2, estimated horizontal and vertical distances on the order of 10-15 feet from the powerline. In both figures, the two-dimensional curve fit is provided in (a) and a three-dimensional perspective is provided in (b). In (a) blue dots represent aircraft locations and the red line indicates the fitted curve. In (b) the red dots indicate aircraft locations, the green line indicates the fitted curve and the blue line indicates the powerline.

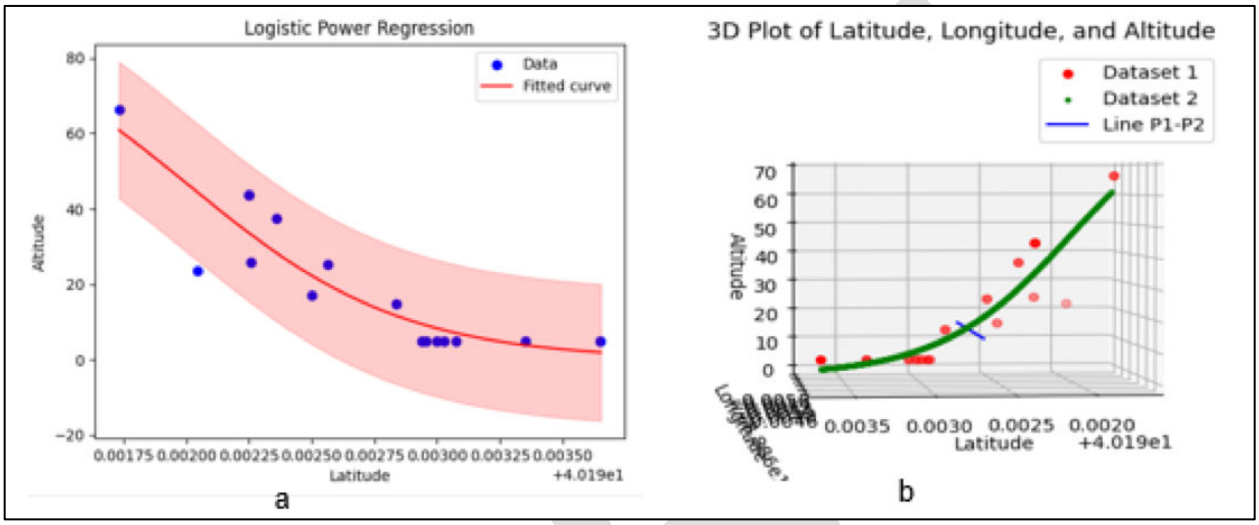

Figure 1 - Aerial Application Proximity to Powerlines, Climbing from Field[6]

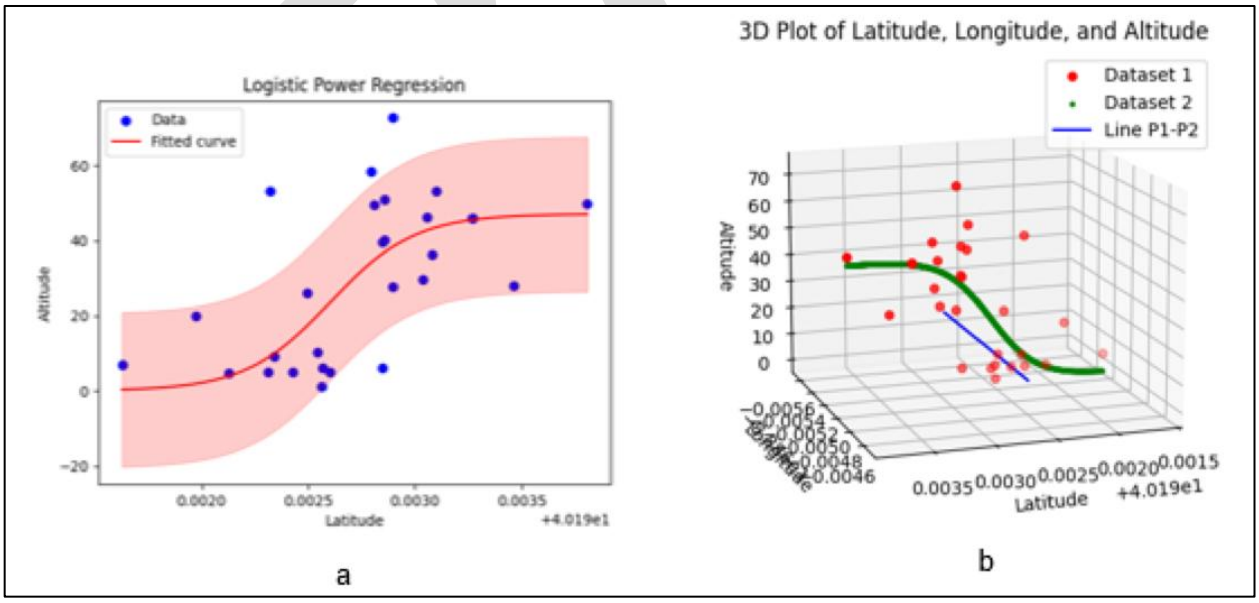

Figure 2 - Aerial Application Proximity to Powerlines, Descending into Field[6]

The above FAA-sponsored information and statistics are provided to show that aerial applicators clearly and typically operate in the part of the national airspace (NAS) below 400 feet AGL wherein the proposed Part 108 UAS operations, explicitly including "shielded" operations, would take place.

Difficulty in Detecting and Avoiding UAS

Aerial applicators are aware of the possibility for a UAS in their working airspace, yet they also know that by the time they see one in their flight path, it will likely be too late to avoid a midair collision. The operational flight patterns and performance (in both speed and rates of climb/descent) of manned aerial application aircraft result in high closure rates, limiting the time available for detection, decision and evasive action. FAA's 2016 Advisory Circular (AC) 90-48D advises the following:

> *Research has shown that the average person has a reaction time of 12.5 seconds. This means that a small or high-speed object could pose a serious threat if some other means of detection other than see and avoid were not utilized, as it would take too long to react to avoid a collision. This is particularly important with small Unmanned Aircraft Systems (sUAS).*[7]

This AC, however, has been cancelled and replaced by AC 90-48E in 2022, which advises:

> *Avoiding Collisions With Unmanned Aircraft Systems (UAS). Pilots should remain vigilant of UAS at or below 400 feet in uncontrolled airspace and at all times in visual meteorological conditions (VMC). All pilots should remain vigilant of all aircraft if they are able to see them, and take measures to avoid them.*[8]

The 2016 AC tells the evident truth: pilots are generally incapable of seeing a UAS in time to avoid a midair collision. The 2022 AC appears to more cynically couch this truth, advising *if you can see them, avoid them*.

The probability of a manned aircraft seeing a UAS in time to avoid it has been examined, documented and made evident to the FAA over recent years. One study conducted at Embry-Riddle Aeronautical University determined that there is a very low probability of the manned aircraft pilot ever detecting the UAS, even in optimal conditions.[9] Figure 3 depicts the probability of detecting UAS of various sizes, while at increasing airspeeds, in time to avoid a collision. As illustrated in the figure, at a common aerial application airspeed of 125 kts (~145 mph), a pilot has a less than 10

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[7] FAA. 2016. Advisory Circular 90-48D, Pilots' Role in Collision Avoidance. Accessed 8/18/25: https://www.faa.gov/documentlibrary/media/advisory_circular/ac_90-48d_chg_1.pdf.
[8] FAA. 2022. Advisory Circular 90-48E. Pilots' Role in Collision Avoidance. Accessed 8/18/25: https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_90-48E.pdf.
[9] Woo, G.S. 2017. Visual Detection of Small Unmanned Aircraft: Modeling the Limits of Human Pilots. Accessed 8/18/25: https://assureuas.com/wp-content/uploads/2022/03/ERAU-External-Research.pdf.

percent chance of detecting a large UAS and a near zero chance of detecting a small UAS in time to avoid a collision.

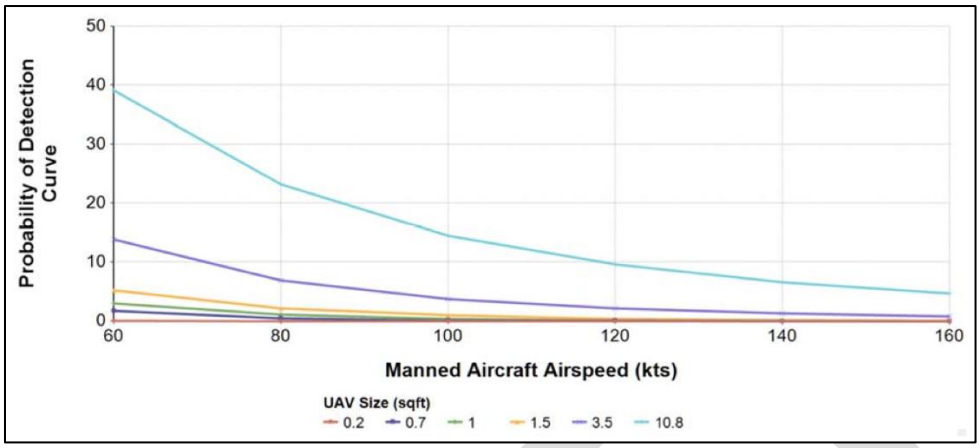

Figure 3 - Probability of UAS Detection Graph[9]

The near futility of efforts to visually detect UAS in order to avoid them is precisely the reason for which UAS and their operators must play an active role in collision avoidance. For BVLOS UAS operations where no person is visually assessing airspace, one method for this would be to make UAS electronically conspicuous to manned aircraft. However, ADS-B Out for UAS has been explicitly prohibited and no other efforts on this have been realized. Because these BVLOS UAS cannot be visually detected, nor electronically detected by other aircraft, their role in collision avoidance must not only be active, but the dominant role.

While NAAA comprehends FAA's plan to impose ADS-B Out (or EC) requirements upon manned aircraft as a means to facilitate the role UAS will play in collision avoidance, that plan also includes "shielded" areas, in which it is understood that it will be manned aircraft pilots' responsibility to see and avoid UAS. Put simply, no amount of vigilance on the part of the manned aircraft pilot will mitigate the collision risk this will pose.

Summary of NAAA Regulatory Engagement on UAS and BVLOS

NAAA has a shared goal with the FAA of augmenting aviation safety – in particular, safety in the nation's low-altitude airspace. To this end, NAAA has engaged extensively on the topic of UAS over the past decade through advocacy in the statutory process and active participation in the regulatory process. Regarding the latter, NAAA has remained steadfast in asserting the safety of pilots in the air. This has included numerous comments on UAS petitions for exemption back when these were truly case-by-case up through the current paradigm of precedent-setting exemptions and summary grants. Table 1 lists the past several years of these comments (2020-2025), all of which implore the FAA to consider the safety of manned aerial application operations in their disposition of the respective exemptions and corresponding conditions and limitations. Many of

NAAA's comments specifically and repetitively address concerns with UAS BVLOS operations with respect to manned aerial application operations.

Notice Date	Docket ID	Exemption Sought Summary	NAAA Comments
5/12/25	FAA-2021-0649	(Part 137) BVLOS with VO-VLOS	NAAA Comments
4/9/25	FAA-2018-0768	Imaging - Pilot Certificate, Medical	NAAA Comments
1/15/25	FAA-2023-0699	(Part 137) No NOTAM	NAAA Comments
9/4/24	FAA-2023-1385	BVLOS rural predator control	NAAA Comments
7/22/24	FAA-2020-0499	VFR in IMC for BVLOS	NAAA Comments
7/1/24	FAA-2023-0901	(Part 137) No Medical	NAAA Comments
3/10/24	FAA-2022-0319	(Part 137) Limited BVLOS	NAAA Comments
11/15/23	FAA-2022-0077	(Part 137) MTOW 645 lb., Night, No VO, Medical	NAAA Comments
11/15/23	FAA-2022-0268	Pipeline Insp., proprietary DAA for BVLOS	NAAA Comments
10/12/23	FAA-2023-1833	(Part 137) Swarm 3:1, Night, No VO	NAAA Comments
10/2/23	FAA-2018-0835	ADS-B for DAA for BVLOS	NAAA Comments
8/15/23	FAA-2019-0573	Proprietary DAA for BVLOS	NAAA Comments
6/22/23	FAA-2022-1737	Light show - individual registration	NAAA Comments
6/22/23	FAA-2023-0471	Light show - one registration to many sUAS	NAAA Comments
5/25/23	FAA-2019-0628	Proprietary DAA for BVLOS	NAAA Comments
5/25/23	FAA-2020-0499	Proprietary DAA for BVLOS	NAAA Comments
5/24/23	FAA-2022-0921	BVLOS, Pilot Certificate	NAAA Comments
5/24/23	FAA-2023-1827	BVLOS Linear Infrastructure Inspection	NAAA Comments
9/14/22	FAA-2022-0063	(Part 137) No VO	NAAA Comments
8/25/22	FAA-2022-0501	Research - gravitational measurements	NAAA Comments
4/20/22	FAA-2021-1205	BVLOS Imaging	NAAA Comments
4/1/22	FAA-2021-1044	(Part 137) Swarm 2:1	NAAA Comments
3/21/22	FAA-2021-1022	BVLOS solar farm inspection	NAAA Comments
3/1/22	FAA-2019-0573	Pilot Certificate, Medical	NAAA Comments
2/16/22	FAA-2021-1095	Part 135 Package Delivery	NAAA Comments
12/30/21	FAA-2018-0857	Up to 1,200 ft AGL, up to 130 lbs.	NAAA Comments
11/19/21	FAA-2021-0043	(Part 137) Swarm 2:1, Night	NAAA Comments
9/28/21	FAA-2021-0231	(Part 137) Swarm 3:1	NAAA Comments
9/28/21	FAA-2020-0765	(Part 137) Night	NAAA Comments
9/13/21	FAA-2021-0327	(Part 137) Night	NAAA Comments
9/13/21	FAA-2021-0643	(Part 137) Swarm 2:1, Night	NAAA Comments
1/5/21	FAA-2020-0596	BVLOS infrastructure inspections	NAAA Comments
12/31/20	FAA-2020-0620	Swarm 5:1, BVLOS, Night	NAAA Comments
10/15/20	FAA-2018-0263	Use of 107 pilots, ops over moving vehicles	NAAA Comments
2/24/20	FAA-2020-0035	(Part 137) BVLOS, Swarm, Night	NAAA Comments

Table 1 - NAAA Comments on UAS Exemption Petitions, 2020-2025

NAAA has not, however, always been invited by the FAA to participate in the regulatory process. The UAS BVLOS Aviation Rulemaking Committee (ARC), chartered in June 2021, was formed with the explicit intent to inform FAA's formulation of Part 108. In its charter[10], its objectives were stated, in part, *"At a minimum, the ARC's recommendations must clearly address requirements to support the following concept of operations: long-line linear infrastructure inspections, industrial aerial data gathering, small package delivery, and precision agriculture operations, including crop spraying."* Considering that regulations for "crop spraying" was a direct objective of the ARC, it is disconcerting that no representative from NAAA, nor the aerial application industry was invited to participate. Had that opportunity been afforded, obviously misplaced assumptions regarding the extent of manned aerial application activity in the low-altitude airspace could have been corrected. As an example, the March 2022 UAS BVLOS ARC final report[11], while outlining proposed "shielded" areas, states in part *"The ARC considers the likelihood of UA-GA encounters to be minimal in shielded airspace because manned aircraft typically do not conduct operations near obstacles..."* As has been previously explained in these comments, with citation to ASSURE's own study regarding shielded areas, this is patently not true for aerial application operations.

Upon release of the UAS BVLOS ARC final report, NAAA was quite shocked at many of its recommendations and deeply concerned for the ramifications, namely the lives of aerial applicators, should these recommendations eventually be codified. Thus, NAAA sent a letter in May 2022 to FAA Administrator Billy Nolen detailing the flaws in premise, disregard for low-altitude manned aviation and other misrepresentations either by oversight or intention contained within the UAS BVLOS ARC final report[12]. First, air traffic control radar was used to assess the frequency of low-altitude aviation – this is an inadequate method for detecting aerial application aircraft operating below 500 feet AGL (the minimum height covered effectively by radar[13]). The ARC focused on a study conducted within the Mode C veil, which is not a typical operating airspace for aerial application aircraft. While the ARC did use studies with ADS-B data to assess aircraft down to 50 feet AGL, at the time these studies were being conducted, roughly only 10% of the aerial application fleet had ADS-B out[2]. As such, it is clear the ARC did not have a realistic picture of aerial applicators' presence in the airspace they ultimately proposed operations within. The same misrepresentation is true regarding the ARC's proposed use of obstacles such as powerlines and tree lines as "shielded" areas, with their reasoning that "crewed aircraft typically do not conduct operations near obstacles." This has been disproven here and in prior letters/comments to the FAA from NAAA. The extent of NAAA's concern over the UAS BVLOS ARC recommendations was such

[10] FAA UAS BVLOS ARC. June 2021. "UAS BVLOS ARC Charter." https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/UAS%20BVLOS%20ARC%20Charter%20%28eff.%206-8-2021%29.pdf
[11] FAA UAS BVLOS ARC. March 2022. "UAS BVLOS ARC Final Report." https://www.faa.gov/regulations_policies/rulemaking/committees/documents/media/UAS_BVLOS_ARC_FINAL_REPORT_03102022.pdf
[12] NAAA. May 2022. "Letter to FAA Regarding UAS BVLOS ARC." https://www.agaviation.org/20220510-naaa-faa-letter-uas-bvlos-arc/
[13] Underhill and Weinert. 2021. "Application and Surrogacy of Uncorrelated Airspace Encounter Models at Low Altitudes". Journal of Air Transportation. Vol. 29, No. 3, July-September 2021.

that NAAA sent another, similar letter in November 2022 to Peter Buttigieg, Secretary of Transportation to ensure that its aforementioned concerns were registered[14].

NAAA was not alone in its deep concerns with the ARC's final report, as shown by the many letters of dissent provided by ARC voting members supporting their non-concurrence with the final document[15]. A common refrain in these letters is an expression of frustration with ARC proceedings being dominated by UAS industry representatives with little interest in discussing challenging questions, considering potential downsides or addressing the current realities of manned aviation. Notably among the dissenting members of the ARC, AIA, AOPA, ALPA, GAMA, HAI (VAI), and PACI submitted a coalition letter of dissent in addition to their own individual letters of dissent. This coalition letter highlights a structural lack of transparency and fairness offered to ARC members, wherein verbal and written comments and dissents were ignored, not offered full plenary discussion and adjudication, or given inaccurate representation. Given the concerns with the substance and quality of the final report, the ARC's dominance by financially motivated members, and in consideration of the ARC's routine dismissal of concerns from members outside the UAS industry, FAA should reconsider the representativeness of the ARC's final report. Under scrutiny, it is less of an inclusive cross-aviation-stakeholder consensus and more of a UAS-industry request list.

In November 2022, NAAA sent another letter to FAA Administrator Billy Nolen, this time regarding safety concerns to manned aircraft from the issuance of waivers to §107.31 allowing BVLOS operations wherein the remote pilot in command (RPIC) or the visual observer (VO) would merely monitor the surrounding airspace when the UAS is in flight[16]. NAAA asserted that these types of operations had not been tested against manned aerial application operations; specifically, if the RPIC or VO cannot see the UAS due to terrain, structures or general visibility problems, they may not be able to see low-flying aircraft at 10-20 feet AGL.

In May 2023, the FAA published a request for comments addressing how advances in technology, standards, and operational strategies to safely demonstrate UAS BVLOS operations can be applied without adversely affecting safety. This was done in concert with the publishing of four precedent-setting exemption petitions to conduct several types of BVLOS operations for public comment. NAAA's comments on the latter are documented in Table 1 and its comments on the former[17] stressed that comprehensive detect and avoid (DAA) systems should be a prerequisite for all UAS BVLOS operations, and these systems should be certificated/approved by the FAA as effective

[14] NAAA. November 2025. "Letter to Secretary of Transportation Regarding UAS BVLOS ARC." https://www.agaviation.org/uas-letter-to-dot-sec-buttigieg-re-safety-concerns-on-uas-bvlos-arc-20221129/
[15] FAA. March 2022. "UAS BVLOS ARC Final Report Appendix F – Combined Voting Ballots." https://www.faa.gov/sites/faa.gov/files/advisory_rulemaking_committees/APPENDIX_F-Combined_Voting_Ballots_03242022.pdf
[16] NAAA. November 2025. "Letter to FAA Regarding §107.31 Waivers for BVLOS. https://www.agaviation.org/20221125-letter-to-faa-107-bvlos-waivers/
[17] NAAA. June 2023. "NAAA Comments for FAA-2023-1256." https://www.regulations.gov/comment/FAA-2023-1256-0295

against both cooperative and non-cooperative aircraft. In addition, NAAA's comments spelled out the deep concerns with codifying shielded areas, as has been discussed herein.

In October 2023, the FAA hosted several general aviation stakeholders, including NAAA, in a listening session to present the concepts under consideration by the agency for the (then) upcoming BVLOS rulemaking. While the FAA memo summarizing this session posted in this docket[18] states that "FAA representatives didn't note any substantial recommended changes to our approach to regulating BVLOS," this would seem to be a mischaracterization. NAAA, among others, did vociferously oppose the FAA's approach to granting UAS right-of-way over manned aircraft as a method to enable routine BVLOS. As a result of that session, NAAA worked with a coalition of general aviation associations including the Aircraft Owners and Pilots Association (AOPA), General Aviation Manufacturers Association (GAMA), Vertical Aviation International (VAI), and the National Business Aviation Association (NBAA) to collate and summarize points of concern. This culminated in a December 2023 letter[19] to Brandon Roberts, Executive Director, Office of Rulemaking for the FAA in which several key concerns were outlined including: (1) the foundational responsibility for compliance with right-of-way rules not changing based on location of the pilot, (2) opposition to imposing any aircraft equipage mandate in order to enable BVLOS operations, (3) DAA meeting industry standard(s) effective against cooperative and non-cooperative aircraft as a prerequisite to BVLOS, and (4) that any consideration of "shielded" areas in future rulemaking should be grounded in the tangible, physical shielding of a UAS operating within these zones, rather than a mere proximity to obstacles.

The totality of NAAA's regulatory engagement on this topic underscores its importance to the safety of the aerial application industry. More specifically, the hazard borne from this rulemaking's adoption of "shielded" areas and the lack of a requirement for comprehensive DAA technology in all airspace for BVLOS operations presents an unacceptable risk to manned aerial applicators due to their inevitable exposure while conducting routine low-altitude operations.

NAAA's Highest Concern – Proposed Part 108 Shielded Areas Must Not Be Codified

The combination of proposed §108.195 and §108.205 define shielded areas and would give right-of-way to Part 108 aircraft over all other aircraft in these shielded areas. They read as follows:

> ***§ 108.195 Operation near aircraft; low altitude right-of-way rules.***
> *(a) Unless operating in a shielded area as specified in § 108.205, each operator of an unmanned aircraft must yield the right-of-way to all aircraft—*

[18] FAA. October 2023. "Memorandum: Summary of Listening Session Regarding Normalizing Beyond Visual Line of Sight Operations." https://www.regulations.gov/document/FAA-2025-1908-0015
[19] NAAA et. al. December 2023. "GA Coalition Letter to FAA Regarding October 11, 2023 BVLOS Listening Session. https://www.regulations.gov/document/FAA-2025-1908-0016

(1) departing from or arriving at an airport or heliport; or

(2) equipped and broadcasting their aircraft's location using—

(i) ADS-B Out equipment that meets the design and performance requirements of § 91.227 of this chapter; or

(ii) Electronic conspicuity equipment that broadcasts a signal on Universal Access Transceiver Operating on the Radio Frequency 978 Megahertz, containing the following information, in a message format that meets the requirements of § 91.227 of this chapter. For the purposes of this paragraph, the definitions from § 91.227 are used:

(A) An indication of the aircraft's latitude and longitude

(B) An indication of the aircraft's geometric altitude

(C) An indication of the aircraft's velocity

(D) An indication of the aircraft assigned ICAO 24-bit address, except when the pilot has not filed a flight plan, has not requested ATC services, and is using a TSO-C154c or TSO-C154d self-assigned temporary 24-bit address

(E) A Navigation Integrity Category value of less than 0.5 nm

(F) A System Design Assurance value of <1 × 10^−3 per flight hour

(G) A Source Integrity Level (SIL) value of <1 × 10^−3 per flight hour or sample

(b) When yielding right-of-way, the unmanned aircraft may not pass over, under, or ahead of the aircraft being yielded to unless at a safe distance. Safe distance must be determined in accordance with a method acceptable to the Administrator.

§108.205 Operation in shielded areas.

No operator may operate an unmanned aircraft as a shielded operation except in areas where no manned aircraft are expected to operate. Shielded areas include—

(a) Areas within 50 feet of powerlines and substations, railroad tracks, bridges, and pipelines, when permission from the infrastructure owner is obtained; or

(b) Any other area designated by the Administrator.

Shielded Areas: Reliance Upon Incomplete and Insufficient Data

FAA states, in section VI.J of the NPRM, its decision to adopt the UAS BVLOS ARC's recommendations related to giving UA right-of-way over all other aircraft in shielded areas. As previously detailed in these comments, the ARC's recommendations were based on airspace occupancy studies which largely omitted aerial application; their only rural, low-altitude data was ADS-B based, and at the time only 10% of aerial application aircraft were equipped with ADS-B Out. Because this recommendation from the ARC was based on categorically incomplete data, and

because subsequent research has documented the regularity of manned agricultural aircraft operating within shielded areas[6], FAA should not adopt it.

Shielded Areas: Lack of Transparency for FAA's "Risk-Based" Approach

FAA has gone to great lengths to cite, within the NPRM and elsewhere, its use of risk-based decision-making to integrate BVLOS UAS operations into the NAS.[20] This is found in the form "risk-based approach," "risk-based criteria," and "risk-based analysis," among others throughout the NPRM. What seems to be missing is an explanation of what FAA's "risk-based approach" consists of, and how it was materially used to identify, quantify, mitigate and accept the risk which will be borne from the normalized BVLOS operations as proposed in the NPRM. As this new set of regulations would be a Planned Change trigger for applying Safety Risk Management (SRM), it is assumed that FAA has undertaken and completed the UAS SRM Process as its guidance prescribes.[21,22] The resultant SRM document(s) were not provided within the docket, so the details of the Safety Risk Assessment (SRA) are not publicly available. However, NAAA believes that there may have been several misplaced assumptions and miscalculations when SRM was applied to the proposed shielded area operations.

In the third step of applying SRM to the hazard of shielded area operations, *Analyze Safety Risk*, FAA would have relied upon internal stakeholder and subject matter expert input to determine the severity and likelihood of the hazard's outcomes. The severity of the hazard's outcome is clearly spelled out as Level 2 – Hazardous in FAA Order 8040.6A, Appendix C:

> *"Typically, in class G airspace under 400', an UAS is likely to encounter GA aircraft so a collision could be considered hazardous as they typically carry one to two passengers."*

FAA's determination of the likelihood of the hazard's outcomes, or the estimated probability of frequency, is cited in section VI.L of the NPRM as Remote, or expected to occur one time every one to ten years:

> *"[I]n determining if the UA operation should be considered shielded, FAA must consider the remote possibility of a helicopter air ambulance, helicopter, manned agricultural aircraft, or another type of manned aircraft operating close to infrastructure and in the same area as the UA."*

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[20] Per statutory authority including 49 U.S.C. §44807 and §44811
[21] FAA. 2023. Order 8040.4C: Safety Risk Management Policy. Accessed: 8/19/25. https://www.faa.gov/documentLibrary/media/Order/FAA_Order_8040.4C.pdf
[22] FAA. 2023. Order 8040.6A: UAS Safety Risk Management Policy. Accessed: 8/19/25. https://www.faa.gov/documentLibrary/media/Order/Order_8040.6A.pdf

What is unclear is FAA's quantitative basis and rationale for this Remote likelihood determination. In other words, what data, research or lines of thought were involved? (See Shielded Areas: Lack of UAS Operator Data Supporting FAA's Risk Assessment)

FAA concludes that requiring permission from the infrastructure owner for an operation to be considered shielded would be the best way to mitigate this risk, since they would be in the best position to know what types of operations are being conducted.

NAAA takes issue with both the likelihood of occurrence analysis by FAA and the proposed deconfliction strategy. As has been shown previously in these comments, aerial application aircraft are routinely present in these shielded areas conducting work around powerlines and railroad tracks. Further, the presumption that the infrastructure owner, such as an electric utility or railroad corporation, would be aware of aerial application operations treating each field abutting that infrastructure seems extremely unlikely. If the infrastructure owner's permission constitutes part of the authorization for shielded Part 108 operations, what mechanism are they expected to use to notify other operators of this, and what would be their incentive for doing so? NAAA finds that obtaining owner permission for shielded Part 108 operations would in no way mitigate any risk to manned operations occurring in shielded areas. Unless a mechanism is provided for infrastructure owners to make low-altitude operations aware of planned/in-progress shielded operations, FAA should not consider owner permission as a risk mitigation factor for shielded operations.

Shielded Areas: Lack of UAS Operator Data Supporting FAA's Risk Assessment

The issues with the BVLOS ARC data supporting shielded operations have been detailed herein, but NAAA also finds that FAA's internal data is insufficient to adequately assess the associated risk with these operations. As detailed in a June 2025 report by the DOT Office of Inspector General[23], the UAS Integration Office does not receive all the UAS data FAA requires from operators because different lines of business have historically been responsible for different components of UAS data collection. Operators submit small UAS rule and §44807 exemption data sets to FAA's Flights Standards Office, while COA data is submitted to FAA's Air Traffic Organization. Thus, the UAS Integration Office does not receive small UAS rule and COA data UAS operators submit, and until September 2023, also did not receive §44807 exemption data.

The UAS Integration Office uses an internal spreadsheet that lists and tracks data queries between the UAS Integration Office and other FAA lines of business. These data exchanges are upon request only and not recurring. According to the spreadsheet, of the 50 requests made between February 2021 and May 2024, only four were specifically for the BVLOS rulemaking team, and the available data was limited. For example, in January 2023 the BVLOS rulemaking team requested the number

[23] DOT Office of Inspector General. June 2025. Report AV2025034. https://www.oig.dot.gov/sites/default/files/library-items/FAA%20BVLOS%20Drone%20Operations%20Final%20Report_6.30.2025.pdf

of BVLOS miles flown by companies involved in linear infrastructure inspections and whether those operators encountered manned aircraft traffic. The UAS Integration Office was able to provide total flight counts and hours but noted that if the operations were using a visual observer who detected manned aircraft traffic that required the operator to implement a safety mitigation, the office would not know as they do not collect that data.

The June 2025 DOT Office of Inspector General report also highlighted concerns with FAA's data input and validation process, noting several discrepancies in BVLOS flight data. On this, the report concluded that:

> *"[U]ntil the Agency can adopt enhancements to automate its data input and validation processes, FAA officials cannot be certain that they have accurate and comprehensive data to inform rulemaking efforts…"*

NAAA continues to support FAA's reporting requirements for UAS operators, whether it be in Part 107 waiver provisions, §44807 exemption conditions and limitations, or codified in the proposed Part 108. However, this data must be used effectively to inform regulatory activity and should be publicly shared in an aggregated format to support any such regulatory activity. Regarding the proposed shielded areas specifically, NAAA respectfully requests that FAA disclose a summary of the data which underpins its risk assessment(s).

Shielded Areas: Aerial Applicators Routinely Operate Here

In establishing 50 feet as the shielding radius, section VI.L explains that this is consistent with the risk accepted based on prior waivers granted and recommendations made from industry. FAA further reasons that this:

> *"…strikes a balance between allowing an adequate distance away from infrastructure for the safety of the UA and general camera and imaging equipment capabilities, while also providing an appropriate safety margin from other potential manned aircraft operations."*

NAAA takes issue with what it perceives as FAA's prioritization of the safety of the UAS and its equipment over that of people and maintains that the safety of persons in the air and on the ground should be the priority. Section VI.L goes on to state that:

> *"Manned operations should be operating far enough away from powerlines that a 50-foot limit should provide enough of a separation distance from the UA operating under part 108 and manned aviation operations in the vicinity of the UA operation."*

NAAA has demonstrated herein that this is not the case. FAA's own ASSURE-sponsored study showed that manned aerial application aircraft regularly fly within 25 feet of powerlines when descending into a field or climbing out over them. [6]

Shielded Areas: Repercussions

If manned aerial application aircraft are required to yield right-of-way to UAS in shielded areas, there is also the basic, yet demonstrably difficult issue of seeing the UAS. Aerial application pilots operate in an extremely task-saturated environment; they are continuously avoiding powerlines and other low-altitude obstacles, managing their dispersal equipment, and maintaining alignment with the GPS system, all while making precision aerial applications at 10-20 feet AGL. This does not leave a pilot with sufficient bandwidth to also continuously scan for UAS. Moreover, even if an aerial application pilot does spot a UAS in a shielded area around powerlines, they may not be functionally able to give right-of-way to that UAS without causing an accident. Aerial application aircraft, when loaded, are not very maneuverable. They are also in a very vulnerable state when entering or exiting the field over or under powerlines. To illustrate this, consider this example: An aircraft is making a pass through a field at 15 feet AGL then goes to climb out of the field over powerlines perpendicular to its flight path. If a shielded UAS flying 30 feet above and along the powerlines is spotted as the aircraft starts its climb, what option does the pilot have? The result would likely be a split second no-win decision between a midair collision, controlled flight into terrain or a hard pullup into an unrecoverable stall.

Shielded Areas: Manned Aircraft Still Have Right-of-Way

It is clear to NAAA that little consideration was given to low-altitude aerial operations such as aerial application in the formulation of the proposed shielded area provisions of this NPRM. This is demonstrated in the apparent contradiction of right-of-way rules in shielded areas. §108.195 would absolve a Part 108 aircraft from yielding right-of-way in § 108.205-defined shielded areas, however, under the proposed §91.113(h), a Part 91 (and thereby, Part 137, etc.) aircraft would still have right-of-way in these areas if they are broadcasting their location using ADS-B or electronic conspicuity (EC). In effect, neither aircraft is expected to yield right-of-way.

Because of this special shielded area carveout, that Part 108 UAS conducting BVLOS powerline inspections from the example above is likely neither equipped, nor its flight coordinator prepared to detect, let alone avoid a cooperative aircraft conflict in a shielded area. More to the point, it is very disconcerting that they would not even be required to, as the proposed §91.1(g) would exempt them from the §91.113(b) bedrock requirement that *"vigilance shall be maintained by each person operating an aircraft so as to see and avoid other aircraft."*

NAAA implores FAA to remove §108.205 and amend §108.195 in any final rule to eliminate any provision for shielded area operations. The hazard this would pose combined with respective exposure to manned aerial application operations demonstrated herein will bear out a major safety risk to pilots in the aerial application industry.

Comprehensive DAA Should Be Required in All Low-Altitude Airspace

The proposed §108.195, previously quoted herein, in concert with the proposed §91.113(h) effectively grants right-of-way to Part 108 aircraft over all other aircraft in Class G airspace, unless that aircraft is departing from or arriving at an airport/heliport or is broadcasting its location using ADS-B Out or EC.

There are several points FAA should be commended on. NAAA appreciates that this NPRM does not contain a mandate for ADS-B equipage for aerial application operations in uncontrolled airspace. Similarly, NAAA finds the proposed §91.225(f)(3) provision to enable operators to turn off ADS-B Out if used solely to meet the conspicuity requirements of the proposed §91.113(h)(2) to maintain right-of-way over Part 108 aircraft to be a positive. Finally, NAAA sees the addition of EC as a promising option for manned aircraft to maintain right-of-way from both a cost and privacy standpoint.

However, as FAA acknowledges in section VI.J, *"ADS-B Out systems may occasionally fail to meet the performance requirements of §91.227."* NAAA is especially concerned with how performant ADS-B will be between a manned aircraft and UAS, both at very low altitude. NAAA is similarly concerned with the real-world reliability of portable EC devices in aerial application operations. For larger fixed-wing aerial application aircraft specifically, the effective installation options for portable EC devices are limited, and even when mounted optimally, the signal is attenuated significantly toward the nose of the aircraft, reducing its effective range.[24]

To NAAA's knowledge there has been no study to date which has demonstrated that ADS-B or EC can solely function as a robust DAA technology against the unique nature of manned aerial application operations in the low altitude environment. Until such evidence is provided, NAAA asserts that a comprehensive DAA system, proven effective against both cooperative and non-cooperative aircraft, be required for all airspace. The reasoning for this would not be to discourage ADS-B or EC adoption, but to provide another layer of safety in the event that terrain, structures or other interference at very low altitudes renders these systems unreliable. The proposed rule would already require comprehensive DAA in Class B or C airspace, with the stated reasoning in section VI.G that aircraft could be operating in this space without ADS-B or an EC device. This acknowledgement of risk and associated mitigation should extend to all airspace.

Assumption of Risk in Aerial Application Operations – Manned vs. Unmanned

Based on FAA's reliance upon the UAS BVLOS ARC final report in formulating this NPRM, NAAA finds it necessary to assert several points regarding the report's claims in how the transition of traditionally manned aerial application operations to BVLOS UAS operations will improve safety in

[24] FAA. September 2024. Final Report – Ground Assessment of Electronic Conspicuity Devices. https://uavionix.com/wp-content/uploads/2025/06/Electronic-Conspicuity-Final-Report-v9.0-Dec-16-2024-signatures_ssh_ss.pdf

the low-altitude airspace. In justifying their recommendations to the right-of-way changes and introduction of shielded areas, the ARC claims that the recommendations provide the greatest overall safety benefit for the expected mix of manned and unmanned aircraft in the NAS because:

> *"...The short-term minimal risk of a UA-GA collision in Low Altitude and Shielded airspace is far outweighed by the long-term reduction of the high risk of fatal accidents involving crewed aircraft conducting low altitude missions..."*

Aerial Application Aircraft / UAS Collision Risk – Neither Short-Term, Nor Minimal Risk

First, NAAA takes issue with the "short-term" and "minimal risk" aspects of the possibility of a collision between a manned aircraft and UAS under the proposed rules. While the number of aerial application UAS is certainly growing rapidly, the timeline for UAS being collectively capable of assuming the work currently performed by the US fleet of manned aerial application aircraft is by no means short-term, nor certain. NAAA is finding that the introduction of aerial application UAS is more complimentary than competitive to manned aircraft. The agronomic utility of aerial application is weighted heavily upon its ability to treat millions of acres of a particular crop precisely when it is required, often with a window measured in days rather than weeks. From an efficiency standpoint, eighty 10-gallon capacity UAS cannot replace one 800-gallon capacity manned aircraft; this is due to factors such as airspeed and reloading frequency. Further, the logistics and personnel required to continually reload eighty UAS would be exponentially less cost effective. In this vein, anecdotal feedback NAAA has received from growers and UAS aerial applicators suggests that the acres treated per hour productivity claims provided by the UAS manufacturers are not being met. While this NPRM aims to address the scale of UAS aerial applications in enabling greater quantities of aircraft (through a simpler regulatory framework), there is still a long way to go on the technological and logistical fronts for these aircraft to viably replace all manned aircraft.

Given then, that the risk of a manned aerial application aircraft collision with a UAS is not short-term, it is also unequivocally not a "minimal" risk. This is demonstrated by an Alert Bulletin released by NASA's Aviation Safety Reporting System (ASRS) in September 2024 on the UAS near midair collision (NMAC) threat in agricultural operations.[25] The Alert Bulletin outlined three reported NMAC events between agricultural UAS and manned aircraft and underscores the interactions of manned aircraft maneuvering over adjacent fields in which UAS may be operating within. In 2024 alone, ASRS reports five NMAC and airborne conflict events between agricultural pilots and UAS (see Table 2).

[25] NASA ASRS. September 2024. Alert Bulletin 2024:23/9-1 UAS/Drone NMAC Threat in Agriculture Operations. https://ntrs.nasa.gov/api/citations/20240014227/downloads/UAS%20for%20ICASS.pdf

Event Date	ACN	Synopsis
August 2024	2152026	Agricultural pilot reported a NMAC with a UAS while both were performing crop-spraying operations in adjacent fields.
August 2024	2149772	Agricultural pilot reported a NMAC with a UAS while both were performing crop-spraying operations. The pilot took evasive action to avoid a collision and experienced a ground wingtip strike in the process.
July 2024	2145580	Agricultural pilot reported an airborne conflict with a UAS that was crop-spraying in a nearby field. The pilot took evasive action to avoid a possible collision.
July 2024	2141022	Agricultural pilot reported a NMAC with a UAS that was crop-spraying in a nearby field. The pilot stated the UAS operator appeared to not have visual contact with their UAS while flying it and did not adjust the UAS flight path to avoid the fixed wing aircraft.
July 2024	2139716	Agricultural pilot reported they were informed by a company pilot of an airborne conflict with a UAS while both were performing aerial applications. Both aircraft were operating in and around the same fields.

Table 2 - ASRS Reported NMAC and Airborne Conflict Events Between Agricultural Aircraft and UAS, 2024

To further evince aerial applicators' exposure to this hazard, NAAA's 2024 End of Season Operator Survey found that 16% of Part 137 operator respondents reported that either a pilot of theirs or they personally had an unsafe encounter with a UAS while operating an ag aircraft in 2024.[26]

In a hypothetical future where the proposed rule is codified, some aerial application aircraft will not be equipped with ADS-B or EC and all aerial application aircraft will be regularly operating in and around shielded areas; in both cases the manned aircraft would be required to see and avoid UAS which, as has been previously discussed in these comments, they would very likely be unable to reliably perform.

UAS Proliferation Does Not Predestine Improved Safety

Second, NAAA disputes that a future wherein most or all aerial application work is conducted by UAS would lead to a "long-term reduction in the high risk of fatal accidents." This would seem to imply that UAS are inherently safer because no crew member is aboard the aircraft. As previously stated, this is certainly not true for other users of the low-altitude airspace. It is also not necessarily true for UAS operation personnel on the ground.

NTSB has reported three Part 137 UAS accidents in the last year (between August 2024 and August 2025), two of which resulted in serious injury.[27,28] This is in addition to other, more high-profile

[26] NAAA. Winter 2024. "2024 Industry Survey: A Decent Year for Some Operators, but a Less Productive Year for Others." Agricultural Aviation Magazine. https://www.agaviationmagazine.org/agriculturalaviation/library/item/winter_2025/4244449/
[27] NTSB. CEN24LA380 – August 7, 2024 – Francisville, IN. https://data.ntsb.gov/carol-repgen/api/Aviation/ReportMain/GenerateNewestReport/195293/pdf
[28] NTSB. CEN25LA316 – August 12, 2025 – Depew, IA. https://data.ntsb.gov/carol-repgen/api/Aviation/ReportMain/GenerateNewestReport/200778/pdf

accidents involving UAS such as the December 2024 Orlando, FL light show in which multiple UAS lost control with one seriously injuring a child and the January 2025 Los Angeles, CA midair collision which put a Canadair CL-215 firefighting aircraft temporarily out of commission. While the latter is being investigated by the FBI, the light show accident's preliminary report by NTSB disconcertingly reveals that, because of the high levels of automation involved, when many of the UAS started colliding with each other and falling out of the sky or toward the audience, the RPIC determined that pausing the show would be too difficult and the safest course of action was to let the show proceed. This overreliance on automation, to the point that manual intervention to avert an accident or injury is impractical, is a concern for the proposed BVLOS operations as well.

In summary, the ARC's claim is that the proposed changes to right-of-way and introduction of shielded areas will have a long-term benefit to safety which outweighs any short-term risks (to manned aerial application pilots) borne from them. NAAA disagrees and finds that there is insufficient evidence to suggest that there will be any net positive benefit to safety in aerial application as a result of these changes. Further, NAAA recommends that FAA consider only the current makeup of manned/unmanned utilization of the low-altitude airspace in its assessments of risk, rather than any theoretical future mix wherein there may be a different ratio of manned to unmanned aircraft.

Ability to Identify Hazards to Persons on the Surface in BVLOS Agricultural Operations

NAAA has previously registered its general concerns with BVLOS agricultural operations to FAA through its recent comments to precedent-setting exemptions (See Table 1, specifically NAAA's comments on FAA-2021-0649). FAA has proposed §108.445(f) and §108.575(d) to mirror the current requirement of §137.37 to not dispense any substance from an aircraft in a manner that creates a hazard to persons or property on the surface. However, as NAAA has pointed out in its above-referenced prior comments, the ability to comply with this requirement when an aircraft is operated BVLOS is unclear. A simple preflight survey is not sufficient, as there may be persons and vehicles unexpectedly entering the application site at any time.

The ability to see persons on the surface is also critical for operators to comply with the EPA's Application Exclusion Zone (AEZ) Rule[29]. AEZ is a recent addition to EPA's Worker Protection Standard (WPS), which is intended to protect agricultural workers and members of the general public from the dangers of unintentional pesticide exposure. In-essence, the AEZ is a 100-foot circular area moving with the application system; when *any* person enters the AEZ, the pesticide applicator must immediately suspend the application. Thus, the operator would need to show the

[29] EPA. 2024. Final Rule - Pesticides: Agricultural Worker Protection Standard, Reconsideration of the Application Exclusion Zone Amendments. https://www.regulations.gov/document/EPA-HQ-OPP-2022-0133-0068

ability to see persons within 100 feet of any application to know if they must immediately cease dispensing.

As FAA is not proposing any technological or personnel requirements to ensure vigilance is maintained to identify incursions to the application site, NAAA finds it unlikely that either the UAS or flight coordinator will be separately or collectively equipped to uphold this requirement, particularly in large fields with a tall crop such as corn (when it is typically applied to) or in hilly terrain. This would put UAS aerial applicators at odds with another federal rule and potentially open UAS aerial applicators to lawsuits from exposure cases. NAAA encourages FAA to gather data in this regard, as this is a truly fundamental, yet simple, issue. NAAA would gladly assist FAA in initiating discussions with the appropriate EPA officials to resolve what would be a regulatory conflict.

Specific Comments on Select Proposed Regulations and Amendments

§91.113 Right-of-way rules: Except water operations

NAAA maintains that manned aircraft should retain right-of-way over unmanned aircraft. For reasons extensively detailed above, NAAA opposes all proposed changes to this regulation.

§91.225 Automatic Dependent Surveillance-Broadcast (ADS-B) Out equipment and use

NAAA supports the allowance for an aircraft's ADS-B Out signal to be turned off at the discretion of the operator if it is used solely to meet the conspicuity requirements in §91.113(h)(2).

§108.40 Operator recordkeeping requirements

NAAA supports the proposed recordkeeping requirements and appreciates §108.40(a)(3)(viii) and §108.40(e)(2)(iv) which are specific to agricultural operators and would provide an equivalency to the requirements of §137.71.

§108.45 Operator reporting requirements

NAAA appreciates the proposed robust reporting requirements outlined in this section and urges FAA to maintain these in any final rule. While NAAA understands that Part 108 operators are also required to report accidents and serious incidents per 49 CFR 830, this may not be common knowledge to UAS operators as new entrants in the NAS. Anecdotal reports from the aerial application industry suggest that many UAS aerial application accidents are going unreported. As such, NAAA recommends that FAA consider adding language in any final rule which would clarify this applicability/responsibility to Part 108 operators.

§108.110 Unmanned aircraft lighting

NAAA applauds the required equipage of an anti-collision lighting system and mandate for it to be used during all (day and night) operations. FAA's rationale for permitting the flight coordinator to reduce the intensity of or turn off this lighting at their discretion is stated as a measure to maintain their night vision during takeoff and landing at night. NAAA agrees that, in this specific case, this will improve safety. However, NAAA finds that §108.110(c) affords too broad an opportunity to misuse this discretion, which may compromise safety. Consequently, NAAA recommends the following change to §108.110(c):

> *(c) The flight coordinator may reduce the intensity of, or turn off the unmanned aircraft lighting* ***during takeoff or landing****, if the flight coordinator determines that, because of operating conditions, it would be in the interest of safety to do so.*

§108.115 Registration

NAAA supports requiring a Part 47 registration (i.e. an N-number) for all Part 108 aircraft and recommends that FAA not consider allowing registration under Part 48, nor imposing standalone registration requirements in Part 108 itself. NAAA's rationale for this is to ensure consistent, robust tracking of aircraft in a preexisting, vetted framework.

§108.120 General operating requirements

NAAA recommends the following change to §108.120(c), in line with the language of §108.555, to clarify that items in required subpart H or elsewhere in this part for specific operations must be operative:

> *(c) Except for operations conducted under a flight test permit under § 108.470 or in accordance with § 108.555, operations must be conducted with properly installed and operational instructions and equipment that are identified as being required by* ***—*** ~~*the manufacturer's operating instructions.*~~
>
> ***(1) The manufacturer's operating instructions;***
> ***(2) Subpart H of this part; or***
> ***(3) Specific operations under this part.***

§108.125 Careless or reckless operation

NAAA is unsure how a Part 108 operator will be able to operate BVLOS under the proposed right-of-way rules, including in shielded areas, while still complying with §108.125(c):

> *(c) No person may operate an unmanned aircraft in a manner that creates a collision hazard with persons, an aircraft with one or more persons on board, vehicles, structures, other unmanned aircraft, or the property of another.*

Considering any manned aircraft in a shielded area, or any non-cooperative manned aircraft elsewhere; this aircraft would not be required to be detected by a Part 108 UAS, much less avoided. Would this not be the inevitable creation of a collision hazard? While NAAA supports the language as written, it seems that BVLOS operators, particularly in shielded areas, would have no way of knowing when/where they are creating a collision hazard.

§108.175 Operating Restrictions

While §108.175(a) would generally limit Part 108 operations to 400 feet AGL, §108.175(a)(2) would permit higher operations in Class G airspace within 400 feet of structures – up to 400 feet both above and away from said structures. This is a concern for aerial application operations, where aircraft regularly ferry between 500 and 1,000 feet AGL and routinely overfly cellular towers and wind turbines which themselves can be several hundred feet tall. §108.175(a)(2) could then easily put UAS above 800 feet AGL. While these UAS would be required to yield right-of-way to cooperative aircraft, non-cooperative aircraft will now need to be on the lookout for UAS at much higher altitudes than the general 400-foot ceiling for Part 108 UAS. To mitigate this risk, NAAA recommends that any Part 108 operations above 400 feet be required to employ comprehensive DAA, effective against both cooperative and non-cooperative aircraft.

§108.195 Operation near aircraft; low altitude right-of way rules

As previously discussed at length in these comments, NAAA strongly opposes the §108.195(a) provision absolving any right-of-way obligations in shielded areas and urges FAA to remove this carve-out from any final rule. The impact to the safety of manned aerial application operations, were this to be carried out, would be existential.

Regarding EC specifically, while FAA has stated their plan to define new requirements for portable EC (via a Technical Standard Order (TSO) or other form of approved specification) it is unclear whether this will be published alongside any final rule. NAAA asserts that, due to its role underpinning the proposed right-of-way changes, release of applicable specifications and guidance for EC should be a prerequisite for any final rule. In effect, this would ensure timely commercial availability of these devices to operators of aircraft not equipped with ADS-B, and thereby broader saturation of these devices to mitigate collision risk.

As NAAA has also made the case for in these comments, comprehensive DAA should be a prerequisite for Part 108 operations in all airspace. This would improve safety for non-cooperative aircraft as well as cooperative aircraft in areas/situations where ADS-B Out or EC performance is degraded. As such, NAAA recommends that the DAA requirement of §108.180(b) be extended to all airspace.

§108.205 Operation in shielded areas

NAAA has extensively detailed, citing FAA-sponsored studies, that manned aerial application aircraft regularly operate in, around and through the proposed shielded areas. Further, any operations in these areas that are not actively participating in see/detect and avoid will present an unmitigated collision risk. Because of this, NAAA implores FAA to remove this and any provision for shielded areas in any final rule.

§108.315 Personnel knowledge and training

NAAA appreciates the requirement for operations personnel to have general and aircraft-specific aviation knowledge and skills as it relates to their respective roles and understands that permit/certificate holders would be responsible for ensuring their personnel are appropriately trained. While certificate holders would be required to develop and implement a training program (§108.540) and to include the training program in their application for the certificate (§108.505(b)(10)), FAA does not propose requiring permit holders to do the same, reasoning that permitted operations would be less complex and not necessitate that more formalized approach. NAAA disagrees with this reasoning. While permitted operations may involve fewer personnel and be less complex, those factors do not diminish the importance of ensuring adequate personnel training with respect to safety of others in the NAS. It is understood that permitted operators would still be required to comply with §108.315, however, if they are never required to produce documentation to this effect, how would FAA (or the operator themself) know that the training program is compliant with §108.315?

In Part 108's overall shift to a corporate responsibility model, FAA has placed a great deal of weight on operators in ensuring their personnel meet the requirements of subpart C. While this may organizationally fit well for larger certificated operations, many smaller permitted operations, such as those in agriculture, will surely have only a handful of individuals wearing the many hats required to check the applicable boxes. FAA also anticipates that a vast majority of Part 108 operators will be permitted operators. It is precisely these smaller operations which will need oversight most, and it should start with an FAA-approved training program. As such, NAAA recommends that FAA impose upon permitted operators materially similar requirements to §108.540 for developing and implementing a training program and §108.505(b)(10) for including that program in their application for a permit.

§108.400 Operations under a permit

In alignment with FAA's reasoning in section VIII.A and the proposed §108.400(e) would limit an operator to one permit per type of operation, NAAA is also concerned that an individual may attempt to operate multiple permitted businesses (conducting the same type of operation) to circumvent §108.400(e). NAAA therefore recommends that FAA additionally include language that

would prohibit any §108.305 operations supervisor from serving in this role in more than one operation simultaneously.

§108.405 Applications for operating permits

As previously stated, NAAA recommends FAA additionally require submission of a training program per §108.315 in any permit application.

§108.445 Agricultural operations [Permitted]

NAAA has registered its general concerns with BVLOS agricultural operations previously in these comments, particularly in regard to the ability to comply with §108.445(f). That aside, NAAA questions why §108.445(a) does not use the same definition of agricultural operations as §108.575 (which itself mirrors §137.3); both permitted and certificated agricultural operations should use the same definition of agricultural operations.

NAAA also finds the following edits to §108.445(i) necessary to mirror §108.575(g):

> *(i) Operators conducting agricultural operations under this subpart must have and keep current a comprehensive training program that is tailored for their proposed operation and contains, at a minimum~~:~~ **–***
>
> *(1) Steps to be taken before starting operations, including survey of the area to be worked~~.~~**;***
>
> *(2) Safe handling and storage of economic poisons and the proper disposal of used containers for those poisons~~.~~**;***
>
> *(3) The general effects of economic poisons and agricultural chemicals on plants, animals, and persons, with emphasis on those normally used in the areas of intended operations; and the precautions to be observed in using poisons and chemicals~~.~~**;***
>
> *(4) Primary symptoms of poisoning of persons from economic poisons, the appropriate emergency measures to be taken, and the location of poison control centers~~.~~**;***
>
> *(5) Performance capabilities and operating limitations of the unmanned aircraft to be used~~.~~**; and***
>
> *(6) Safe flight and application procedures.*

In addition, NAAA notes that FAA does not define the term *Economic Poison* in §108.5 definitions, as it does in §137.3, and recommends that this be added.

§108.555 Inoperative Equipment

NAAA appreciates that §108.555(a)(1)(ii) would explicitly prohibit any Part 108 operations to occur with inoperative equipment required by subpart H (e.g. anti-collision lighting). This section is within

subpart E, as FAA only intends to afford certificated operators an allowance to operate with certain inoperative equipment using FAA-approved procedures submitted with their application per §108.505(b)(14). However, NAAA recommends the following change to §108.555(a) to clarify this sections applicability to only certificated operations:

> *(a) No operator may conduct an operation under this **sub**part with an unmanned aircraft system with inoperative equipment or equipment that has failed its initial performance checks unless all the following requirements are met:*

§108.575 Agricultural operations [Certificated]

While §108.805(b) sets a maximum UAS weight of 1,320 pounds for airworthiness acceptance generally, and §108.445 sets a maximum of 1,320 pounds for permitted agricultural operations, §108.575 prescribes no maximum weight for certificated agricultural operations. This is surely an oversight, as §108.140(b) specifies that operations must be conducted at a weight equal to or less than specified for the type of permit or certificate operated. NAAA recommends that language be added to §108.575 to specify the maximum weight for certificated agricultural operations.

§108.830 Anti-collision lighting

NAAA supports this design requirement for airworthiness acceptance, consistent with prior comments. While NAAA has recommended changes to the proposed operational requirements in §108.110, no changes are recommended to §108.830.

§137.1 Applicability

Because of the proposed non-applicability of Part 137 to Part 108 agricultural operations, NAAA finds that the following requirements of Part 137 would still be applicable, are not present in the proposed Part 108 and should be integrated into Part 108 for permitted and certificated agricultural operations to maintain parity.

> **§137.23 Carriage of narcotic drugs, marihuana, and depressant or stimulant drugs or substances.** NAAA recommends that engagement by a Part 108 permit or certificate holder in any operation that the holder knows to be in violation of §91.19(a) should be a basis for suspending or revoking the holder's permit or certificate. This is not adequately satisfied by the proposed §108.325, which only applies to personnel use of drugs rather than physical carriage of these products on the aircraft.

§137.40 Employment of former FAA employees. Consistent with the 2011 final rule on post-employment restrictions for flight standards service aviation safety inspectors[30], NAAA recommends that language be added equivalent to that in §91.1050, §137.40, etc. to meet the criteria of that rule for both permitted and certificated Part 108 operators. The restrictions imposed by this rule are necessary to prevent potential organizational conflicts of interest which could adversely affect aviation safety.

Conclusion

NAAA continues to support the measured and most importantly safe integration of UAS into the NAS. To this end, it has extensively participated in the regulatory process on this subject as previously detailed in these comments. It has also closely followed and interacted with FAA on guidance changes to 8900.1 related specifically to unmanned aerial application operations.

Concurrently, and to more effectively inform its involvement in these matters, NAAA formally established its Uncrewed Aerial Application Systems (UAAS) committee, which is comprised of a diverse group of stakeholders including UAAS manufacturers, UAAS operators, academics and manned aerial application operators. This committee's first recommendation to NAAA, which was adopted by the association's board of directors, reads as follows:

> *It shall be NAAA policy to require:*
> *(1) UAS give right of way to crewed aircraft in all cases*
> *(2) Crewed aircraft be advised to perform a clearing descending turn (circle the field) before entering the application site.*

In line with this policy and in examination of the regulations proposed within this NPRM, NAAA finds that certain aspects of the NPRM, if codified in a final rule, would unacceptably compromise the safety of manned aerial application operations.

First and foremost, the proposed definition of shielded areas and the total discharge of responsibility for UAS to yield right-of-way in these areas must be removed. NAAA has extensively documented its reasoning for this in these comments, but this can be distilled down to the following: Manned aerial application aircraft routinely operate in the areas proposed to be shielded and they typically cannot see UAS to avoid them. This would be, in effect, codification of an unmitigated collision risk, and the consequences to aerial application pilots would be grave.

Second, NAAA finds that FAA has not sufficiently demonstrated the sole use of ADS-B or EC as an effective DAA method against cooperative aircraft in the very low altitude airspace wherein aerial

[30] FAA. 2011. Final Rule – Restrictions on Operators Employing Former Flight Standards Service Aviation Safety Inspectors. https://www.regulations.gov/document/FAA-2008-1154-0010

application operations take place. Until such evidence is made available, comprehensive DAA which does not solely rely on ADS-B or EC should be required in all airspace.

Finally, NAAA notes the paradigm shift away from individual certification for pilots and mechanics to the corporate responsibility model wherein the operator is responsible for verifying all personnel competency. While FAA's reasoning for this (i.e. highly or fully automated UAS, reliance on systems vs. people, diversity of platforms, etc.) is logical, a great deal of risk mitigation underpinning the proposed Part 108 operations rests on the abilities and performance of each operations supervisor. While certificated operations would impose more direct oversight and guard rails to ensure an operation is aligning with all the requirements of Part 108, permitted operations would leave an operations supervisor with much less of this FAA oversight in both the initial application and through regular surveillance. Combining this with the expected ratio of many permitted operators to few certificated operators, NAAA is concerned that the combined risk pool for all part 108 operations will be comprised primarily of operations with insufficient oversight. As such, NAAA has recommended an increase in oversight for permitted operators, specifically with regard to personnel knowledge and training.

The totality of the regulatory changes proposed in this NPRM would represent not one, but several monumental shifts in access to the nation's airspace, and it will have an impact on every user. NAAA implores FAA to scrutinize these comments and consider the recommendations herein through a lens focused on ensuring the safety of manned aerial application pilots.

Thank you for the opportunity to comment.

Sincerely,

Andrew D. Moore
Chief Executive Officer