



Fact Sheet on Unmanned Aircraft Systems (UAS)

A potential non-tower, safety-jeopardizing obstacle on the immediate horizon for aerial applicators is that of unmanned aircraft systems (UAS). Today's unmanned aerial vehicles range in size from small hand-launched radio-controlled aircraft to highly sophisticated vehicles like the military's Predator and Global Hawk that are capable of staying in the air for 24-48 hours and are equipped with high-tech sensor systems and missiles. The commercial use of UAS for activities such as border patrol, tracking fugitives and shooting aerial scenes by filmmakers has already been occurring, albeit illegally in some cases, but now public law is mandating that federal officials regulate and oversee this rapidly developing industry. While there are indeed many positive uses for the technology, there are drawbacks to the aerial application industry from a safety standpoint and for small UAS to do the application jobs effectively.

NAAA UAS Safety Concerns and NAAA Recommendations

NAAA is concerned that the widespread use of UAS without proper safe integration, will result in conditions ripe for low-level aviation accidents.

UAS present a hazard to low-level pilots similar to that presented by birds and other low-level obstacles such as other aircraft and towers. According to a joint report by the FAA and the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (USDA-APHIS), between 1990 and 2012 over 131,000 wildlife strikes occurred with civil aircraft, 97 percent of which were the result of collisions with birds, with 25 producing fatalities. Accident records maintained by NAAA, as taken from NTSB accident reports, show there were 10 collisions between aircraft, in which at least one of the aircraft was an ag aircraft during the last 10 years (2004-2013) and since 2004 there have been 12 accidents between ag aircraft and towers—a number of which were unmarked, resulting in 7 fatalities.

NAAA is urging members to report any near-misses or impacts to the FAA and NAAA to ensure safety information is properly documented to the FAA.

In 2012 Professor Todd Humphreys of the University of Texas at Austin was able to successfully hack a UAS signal utilizing simple off the shelf components. By utilizing this signal "spoofing" technique, Humphreys was able to gain complete control of the aircraft and change its route. This experiment, along with others shows that the relatively simple ability to hack a UAS signal presents not only a safety concern, but also a national security concern as these aircraft can be rerouted to cause damage to structures, along with manned aircraft.

A fundamental safety principle is the ability to see and avoid obstructions and other aircraft in the airspace in which they operate. While this principal is the backbone of safety for our industry and all air traffic operating under visual flight rules (VFR), it can only be utilized effectively when other aircraft do their part in avoiding collisions and making their whereabouts known. Requiring UAS to be identified and well-marked visually will considerably increase the likelihood that a manned aircraft will avoid a collision with a UAS.

In brief, NAAA believes that the following safety precautions would significantly reduce the likelihood of UAS collisions with manned aircraft, and is advocating these positions to the FAA and Congress:

- UAS should be equipped with ADS-B Out surveillance technology or an equivalent aircraft identification technology, in which an aircraft determines its position via satellite navigation and periodically broadcasts it, enabling it to be tracked,
- UAS and support vehicle should be equipped with strobe lighting
- UAS pilots should be required to have a private pilot certificate in order to demonstrate proper knowledge of the National Airspace System (NAS), as well as a Class 3 medical certificate and demonstrate their ability to operate a UAS
- UAS pilots should have an equally qualified non-flying observer to ensure the UAS operation remains clear of manned operations
- UAS should be certified airworthy by the FAA prior to having permission to fly in the NAS
- UAS should be painted in readily distinguishable colors, such as aviation orange and white, to increase visibility
- NOTAMs should be filed 48 – 72 hours prior to UAS flights (required under granted Sec. 333 exemptions)
- UAS should be required to be registered with the FAA and have a "N – Number" as required by manned aircraft under Part 45 (required under granted 333 exemptions and proposed small UAS rule).
- UAS should be required to land immediately if the observer or operator see a manned aircraft within two miles of the UAS
- The training and licensing of UAS operators who intend to spray chemicals should be equally as stringent as that for aerial application pilots in terms of obtaining commercial pesticide licenses; ensuring compliance with state regulations, 14 CFR Part 137 regulations, and EPA regulations
- Commercial UAS operators should also be required to carry liability insurance and ensure their UAS is properly maintained

UAS Federal Policy Background

The FAA Modernization and Reform Act of 2012 (also known as the FAA Reauthorization Act) provided the first delineation since a 1981 advisory circular (AC 91-57) on the difference between unmanned aircraft and model aircraft. Section 336 of the Act defines model aircraft as an unmanned aircraft capable of sustained flight, flown within visual line of site of the person operating the aircraft, and flown for hobby or recreational purposes. The section also prohibits the FAA from regulating unmanned aircraft if the aircraft is used for hobby or recreational use (not commercial purposes) that are operated within the guidelines of a community based or national organization; limited to 55 pounds or less; operated in a manner that does not interfere with manned aircraft; and, if within 5 miles of an airport, the operator notifies the airport operator and the air traffic control tower (if the airport is towered).

The reauthorization also requires the FAA to provide for the safe integration of commercial, unmanned aircraft systems into the national airspace system as soon as practicable, but not later than September 2015 (2014 for UASs weighing less than 55 pounds). Under the requirements of the FAA Reauthorization Act, the agency has faced difficulty in reaching many of the deadlines, with several being missed. It has been acknowledged by the Administrator and other federal officials that the September 2015 deadline is unlikely to be met.

FAA Small UAS Rulemaking

The FAA announced its long awaited, proposed, small UAS rule in February 2015 and much to NAAA's disappointment, the measure contained lax safety provisions and ignored many of NAAA's recommendations, as well as the few safety measures the FAA required when granting its own Section 333 approvals for specific UAS operations. While the FAA accepted NAAA and other manned aviation groups' recommendations calling for registration of aircraft and granting the right-of-way to manned aircraft, many of our most critical recommendations as stated are ignored. The NPRM has no mention of ADS-B Out tracking systems, strobes, or orange and white painting aiding an aerial applicator to sense and avoid a UAS. Further, the rule has no requirement for any

(See reverse side for more information)

manned aviation experience, or experience operating the UAV. Only a simple written test is required. Further, despite requiring operators to maintain visual contact with a small movable object, no medical requirement is imposed by the FAA. The rule also requires no airframe certification, and permits UAS use at 500 feet, an altitude which a number of other manned aircraft fly, not just aerial applicators and other low-level aircraft. NAAA filed comments (available under the UAS section of www.agaviation.org). Among the provisions NAAA requested be included to the final UAS rule were:

- ADS-B Out-like tracking technology, strobe lighting, high visibility contrast marking, airframe certification and pilot certification
- A fireproof name plate and data plate requirement.
- Elaboration on what connotes flying over any non-participant: NAAA will suggested not flying within 100 feet in any direction of any non-participant.
- In addition to a written test, NAAA suggests suggested an operational test; operators should have to demonstrate they can control their aircraft.
- NAAA will urged that the secondary UAS observer be a requirement, not an option.

UAS Court Cases

In March, 2014 an administrative law judge ruled in the case of *Pirker v. Huerta* that the FAA did not have the authority to regulate UASs regarding careless and reckless use of a UAS. The FAA appealed the decision with NAAA being the only aviation organization supporting the Agency in the form of an amicus brief. In November, 2014 the National Transportation Safety Board (NTSB) ruled unanimously that the agency had the authority to regulate all aircraft, manned and unmanned and was in its rights applying the careless and reckless standard to Pirker.

Current Federal Regulatory Actions Concerning UAS

The FAA Reauthorization Act contains a Section 333 “Certain Rules for Special Unmanned Aircraft Systems.” Beginning in spring of 2014 various companies and organizations wanting to use UASs commercially filed petitions with the FAA under Sec. 333. The section requires the FAA to “determine if certain unmanned aircraft systems may operate safely in the National Airspace System before completion of [final rulemaking].” As of May, 2015 the FAA has received over nearly 1,000 of these petitions. NAAA has been, and will continue to comment on these petitions (when they are available for comment), stressing that many of the exemptions these entities have requested—which include exemption from aircraft certification requirements—should not be allowed. In its comments, NAAA has also pushed for aforementioned UAS safety integration requirements that include equipping the UASs with strobes, ADS-B Out and operation only within line of sight. Further, NAAA encouraged the FAA to require a pilot certificate for commercial operation of UASs, an “N number” to aid in identification of the aircraft in the event of an incident or accident, and, as aforementioned, for the FAA to establish airworthiness standards and require an airworthiness certificate before permitting UAS use for commercial flight. The FAA has approved nearly 400 of these petitions and while not granting all of NAAA’s requests, the FAA did add a requirement, based on NAAA’s safety concerns, requiring the UAS operators to file NOTAM 48 hours prior to flight. Additional requirements included requiring an “N-number,” private pilot certificate, line of sight operation, and preflight inspection. The FAA also announced that the UASs would be limited to daytime operation until nighttime visibility concerns are adequately addressed. Unfortunately, many of these safety requirements are absent in the FAA’s proposed small UAS rule.

Concerns with UAS Efficiency Statements

One statistic frequently cited by the UAS industry regarding the potential for UAS in the National Airspace System (NAS) is that 90 percent of crop protection in Japan is done utilizing one UAS, the Yamaha RMAX. What many UAS proponents fail to mention is the fact that the average farm size is 3.7 acres in Japan compared to 441 acres in the United States. Further, the RMAX has a chemical capacity of 4.25 gallons of liquid compared to 300+ gallons in a manned agricultural aircraft and operates at 15 miles per hour compared to a 160 mph for a manned ag aircraft. Another point to consider when making an effective aerial application to protect a crop is that the amount of air pushed down to the crop canopy—either from a rotor or from a fixed wing—is exactly proportional to the weight of the aircraft that the air is holding up. A small aircraft—manned or unmanned—does not displace much air. While there are UASs that could likely be retrofitted to perform aerial application operations now and in the future, they are the larger, military grade, and more expensive aircraft that can cost millions to build and maintain compared to a manned ag aircraft costing between hundreds of thousands of dollars to \$1.5 million for the largest fully equipped models. Given these limitations, it is unlikely UAS will be utilized for mass aerial application in the US in the near future; however NAAA does acknowledge that UAS may be cost-effective in certain niche circumstances, such as small-scale vineyards and specialty crop situations, along with sensory applications, also of which are conducted by manned agricultural aircraft.

NAAA Actions Regarding UAS

NAAA has been active in the discussion surrounding UAS, as the ability of ag pilots to see and avoid other aircraft and hazardous obstructions is paramount to ensuring the safety of low-level aircraft pilots. As such, NAAA has met several times with both the FAA Obstruction Evaluation Group (OEG) as well as the UAS Integration Office. The Association has submitted correspondence to both offices documenting low-level concerns as well as comments to the FAA regarding UAS test sites. Additionally, NAAA was contacted by the NextGen Institute and has participated in interviews regarding UAS and its impacts on agricultural aviation. NAAA has been in communication with FAA Administrator Huerta urging the implementation of low-level marking, lighting and database development solutions for locating ground affixed and UAS obstacles. In addition, NAAA requested the FAA require strobe lighting and stand-out painting for UAS, making them easily visible to pilots of manned aircraft via a variety of forums, including in response to Section 333 petitions (discussed above). NAAA has also been in contact with a number of congressional offices about its UAS concerns as well as the UAS trade association the Association for Unmanned Vehicle Systems International (AUVSI) and shared NAAA’s safety recommendations via numerous forums and symposia. NAAA also serves on the FAA Aviation Rulemaking Advisory Committee on Beyond Visual Line of Sight UAS. NAAA is aware of the important functions which can be accomplished by UAS, including those to agriculture, but protecting the safety of current and future users of the NAS is mandatory and top of mind for the agricultural aviation industry.

Recent Congressional Action

Notwithstanding the positive hype and publicity surrounding UAS and its multitude of potential uses, the technology must still jump through several privacy and safety hurdles at the FAA and now possibly within Congress before full integration is possible. Safely incorporating unmanned aircraft systems into the national airspace is undoubtedly of utmost importance for manned aerial applicators since we will likely be working at similar altitudes. As aforesaid, NAAA has made our concerns known to the FAA and requested that to ensure safe coexistence, UAS will need to be well lit, marked and have their operational activities made known to manned pilots of low-level aircraft via ADS-B Out technology. NAAA is committed to working in tandem with UAS interests to ensure ag aviators are able to continue performing their jobs without the additional concerns of unidentified unmanned aircraft occupying the same airspace and potentially and unnecessarily endangering the safety of low-level ag pilots.

NAAA represents over 1,900 members in 46 states. NAAA member operator/pilots are licensed as commercial applicators that use aircraft to enhance food, fiber and bio-fuel production, protect forestry, and control health-threatening pests. Furthermore, through its affiliation with the National Agricultural Aviation Research & Education Fund (NAAREF), NAAA contributes to research and education programs aimed at enhancing the efficacy and safety of aerial application.

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Updated May 2015

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