



In the matter of the petition of

HYLIO INC.

For an exemption from §§ 61.3(a)(1)(i), 91.7(a), 91.119(c), 91.121, 91.151(b), 91.403(b), 91.405(a), 91.407(a)(1), 91.409(a)(1), 91.409(a)(2); 91.417(a), 91.417(b), 137.19(c), 137.19(d), 137.19(e)(2)(ii), 137.19(e)(2)(iii), 137.19(e)(2)(v), 137.31, 137.33, 137.41(c), and 137.42.

of Title 14, Code of Federal Regulations

Exemption No. 22003
Regulatory Docket No. FAA-2023-1833

GRANT OF EXEMPTION

By letter dated August 17, 2023, Mr. Nick Nawratil, Chief Operating Officer, Hylio Inc. (Hylio or “petitioner”), 1020 Agnes Road, Richmond, TX 77469, petitioned the Federal Aviation Administration (FAA) to provide relief from Title 14, Code of Federal Regulations (14 CFR) §§ 61.3(a)(1)(i), 91.7(a), 91.119(c), 91.121, 91.151(b), 91.403(b), 91.405(a), 91.407(a)(1), 91.409(a)(1), 91.409(a)(2); 91.417(a), 91.417(b), 137.19(c), 137.19(d), 137.19(e)(2)(ii), 137.19(e)(2)(iii), 137.19(e)(2)(v), 137.31, 137.33, 137.41(c), and 137.42. The proposed exemption, if granted, would allow Hylio to operate up to three Hylio AG-230 (AG-230) unmanned aircraft systems (UAS) weighing over 55 pounds (lbs.), simultaneously, by a single Pilot in Command (PIC) without the services of a visual observer (VO), during night Visual Line of Sight (VLOS), in visual meteorological conditions, providing commercial agricultural-related services in the United States.

Petition for Exemption

Hylio supports its request with the following information:

Hylio proposes to conduct agricultural aircraft operations similar to those covered in Exemption No. 18413A¹ with some differences. In contrast to DroneXum, the petitioner seeks to conduct multiple UAS operations at night without a VO. Petitioner proposes to operate the AG-230 UAS weighing over 55 lbs., but no more than 165 lbs., for various agricultural operations including carriage and release of hazardous cargo.

¹ See Exemption No. 18413A, issued to DroneXum, LLC.

Unmanned Aircraft Systems (UAS)

Hylio states that the AG-230 unmanned aircraft (UA) is a “fully autonomous”², electric, eight-rotor UAS platform designed and manufactured by Hylio Inc. It contains an array of features to both enhance safety and assure its ability to effectively conduct the mission. It is designed with many redundant systems and safety features, including redundant navigation systems, flight control computers, and an obstacle avoidance system.

Hylio requests relief from 14 CFR §§ 91.7(a), *Civil aircraft airworthiness*, 91.403(b), *General*, 91.405(a), *Maintenance required*, 91.407(a)(1), *Operation after maintenance, preventive maintenance, rebuilding, or alteration*, 91.409(a)(1)(2), *Inspections*, and 91.417(a) and 91.417(b), *Maintenance records*.

Since no airworthiness certificate will be issued for the UAS, Hylio seeks an exemption from 14 CFR § 91.7(a), which requires that a civil aircraft be in an airworthy condition to be operated. Hylio states while the UAS will not have an airworthiness certificate, consistent with the FAA’s determination in Exemption No. 11448³, the pilot may determine the aircraft is in an airworthy condition prior to flight. Hylio asserts that this is achieved through adherence to the routine pre-flight checklist, regularly scheduled maintenance, and the enhanced pilot training requirements of Hylio’s Pilot Training Program.

Section 91.403(b) prescribes in pertinent part, that no person may perform maintenance on an aircraft other than as prescribed under 14 CFR § 91.403. Hylio states the regulation makes sense for manned aircraft that are certified; however, it does not make sense for UA which do not have airworthiness certificates. Hylio references previous relief from this section provided in Exemption No. 17744⁴ and Exemption No. 11448B⁵.

Hylio states that an equivalent level of safety will be achieved because maintenance, inspections, and records handling will be performed in accordance with the manufacturer’s manuals, including any required manufacturer safety or service bulletins. Hylio states that the PIC will conduct a pre-flight inspection of the UAS and all associated equipment to account for all discrepancies or inoperable components, and maintenance performed to address any conditions affecting the safe operation of the UAS. Hylio further states the preflight checklists, the petitioner’s Pilot Training Program, and a routine maintenance program, guarantee an equivalent level of safety is met.

Sections 91.405(a), 91.407(a)(1), 91.409(a)(1)(2), and 91.417(a) and 91.417(b) address maintenance, operation after maintenance, inspections, and maintenance records. Hylio again references Exemption No. 11448 and subsequent amendments where the FAA granted relief

² The UAS for which the petitioner requested relief requires human involvement and, therefore, is not “fully autonomous”, as the petitioner states.

³ See Exemption No. 11448, issued to Yamaha Motor Corporation, U.S.A.

⁴ See Exemption No. 17744, issued to Leading Edge Associates, Inc.

⁵ See Exemption No. 11448B, issued to Yamaha Motor Corporation, U.S.A.

from these regulations for the Yamaha RMAX helicopter UAS. Hylio explains that during the exemption⁶ process the FAA articulated that UAS operators need to request relief from the aforementioned sections of Part 91 because they apply to aerospace vehicles that are certificated. Hylio seeks the same relief granted to other UAS operators.

Hylio states they have developed the AG-230 over several years operating permissively to support farmers in Central America. Hylio asserts that these experiences have enabled Hylio to develop detailed operations and maintenance instructions and procedures. Hylio will conduct their operations, in accordance with the guidance and applicable conditions of this exemption, to include pilot verification prior to each flight that the vehicle is safe to operate in the National Airspace System (NAS). As with the conditions of other grants of exemption from these regulations, Hylio will conduct functional test flights under Part 107 basic rules at least 500 feet from any non-participating people following replacement or maintenance of any flight critical components. All flights will only be conducted after ensuring that any conditions affecting the safety of flight of the vehicle have been properly addressed in accordance with maintenance guidance. Hylio states they will follow the Hylio guidance for recurring inspection and time change items on the vehicle. Hylio states other attributes of the company's operation will serve to mitigate risks to the NAS, such as by flying operations that are short in duration, using only the minimum altitude required for mission accomplishment and always in a position to land in a matter of seconds should the need arise. For these reasons, Hylio believes it can achieve an equivalent level of safety to other vehicles and conduct operations without adding risks to users of the NAS.

UAS Pilot in Command (PIC)

Hylio requests relief from 14 CFR § 61.3(a)(1)(i), *Requirement for certificates, ratings, and authorizations*, which requires a pilot certificate issued under Part 61 and in accordance with 14 CFR § 61.19 for a person to serve as a required pilot flight crewmember. Hylio states they will conduct operations under Part 91, which presumes the PIC holds an airman certificate under Part 61. Hylio states the FAA has previously determined granting exemption from the requirement of 14 CFR § 61.3(a)(1)(i) to require a person holding a remote PIC certificate (with the appropriate training and demonstration of knowledge and skills required by exemption) to conduct the operations described in Hylio's petition will ensure safety.

In Hylio's petition, Hylio quoted FAA analysis from previous exemptions granting a remote pilot certificate based on the specific requirements imposed by the remote PIC certificate; the petitioner's hiring, training and testing protocols; the knowledge and skill requirements in 14 CFR § 137.19; the remote, controlled locations; and extremely low-altitude operating environment.

Hylio states the FAA has previously determined that a remote pilot certificate issued under Part 107 provides the FAA sufficient assurance of the pilots' qualifications and abilities to perform the duties related to the operations authorized under similar exemptions. Hylio states the remote PIC certificate confirms the petitioner's eligibility, secures Transportation Security

⁶ The petitioner used the term "waiver"; however, the appropriate avenue for requesting relief is by exemption. 49 U.S.C. 44701(f)

Administration (TSA) vetting, and ensures the PIC has the requisite aeronautical knowledge for operating the UAS within the NAS. Additionally, Hylio emphasized that their pilots would abide by aeronautical knowledge and skill requirements specific to agricultural aircraft operations under Part 137.

Hylio states their PIC will hold a current Part 107 remote pilot certificate and at least a second-class medical certificate. Hylio asserts that the FAA has determined maintaining a medical certificate ensures the pilot does not have any physical or mental condition that would interfere with the safe operation of the UAS.

UAS Operating Parameters

Hylio requests relief from 14 CFR §§ 91.119(c), *Minimum safe altitudes: General*; 91.121, *Altimeter settings*; and 91.151(b), *Fuel requirements for flight in VFR conditions*.

14 CFR § 91.119(c), Minimum safe altitudes

Hylio seeks relief from 14 CFR § 91.119(c) which requires that no person operate an aircraft over other than congested areas below 500 feet above ground level (AGL) or, in sparsely populated areas, within 500 feet of a person, vessel, vehicle, or structure. Hylio seeks relief to the extent necessary to allow UAS operations over other than congested areas at altitudes lower than those permitted by rule. Hylio also requests relief to operate closer than 500 feet from vessels, vehicles, and structures.

Hylio states that during operations with the AG-230 the average altitude will not be more than 10 feet in order to apply the agricultural products effectively. Hylio also states that due to the configuration of some farms the crop land can be within 500 feet of buildings. Hylio states an equivalent level of safety for users of the NAS can be achieved because the AG-230 will be operated at speeds below 30 mph over the target treatment area within VLOS of the PIC. Hylio states, by keeping the altitude ultra-low and slow during these missions in remote rural, controlled access areas, with the immediate ability to land in a matter of seconds these operations will not add risks to other users of the NAS. Hylio states it is plausible that on many flights the vehicle may never need to fly above 30 feet AGL in order to complete the mission. Hylio states they will only fly at a higher altitude when exercising caution and issuing a return-to-launch (RTL) command, which causes the UAS to ascend to a normal altitude of 20 feet AGL before returning home. Hylio states that when flying multiple aircraft, a separation of 10 feet is required; therefore, three aircraft would RTL at 20, 30, and 40 feet respectfully.

Hylio asked to exclude Condition and Limitation No. 27(c), as included in Exemption No. 18413A⁷, which states:

⁷ Although the petitioner referenced DroneXum, Exemption No. 18413A, the FAA interprets this to mean Condition and Limitation No. 27(c) as found in Exemption No 18009 issued to Powers Flight Group.

27. All flight operations must be conducted at least 500 feet from all persons who are not directly participating in the operation, and from vessels, vehicles, and structures, unless when operating:
- c. Near vessels vehicles and structures. Prior to conducting operations, the operator must obtain permission from a person with the legal authority over any vessels, vehicles or structures that will be within 500 feet of the UA during operations. The PIC must make a safety assessment of the risk of operating closer to those objects and determine that it does not present an undue hazard.

In addition, Hylio states they will be utilizing the same proven technologies and mitigations the FAA has already accepted and approved in that exemption. Hylio states they intend to follow the conditions and limitations found in this exemption as well as other internal protocols. Hylio asserts that the proprietary manuals outline these protocols and should provide the support necessary to grant the exemption and demonstrate how an equivalent level of safety is achieved. Hylio states a section can be found in these documents with reference to the under 500-foot operation limitation.

14 CFR § 91.121, Altimeter settings

Hylio seeks relief from 14 CFR § 91.121, which requires a person operating an aircraft to maintain cruising altitude or flight level by reference to an altimeter that is set to the elevation of the departure airport or an appropriate altimeter setting available before departure.

Hylio states that other petitioners⁸ have been exempt from the requirement to maintain cruising altitude through the use of a barometric altimeter set to the elevation of the departure field contained in 14 CFR § 91.121 because the PIC has access to more accurate altitude or equivalent information from other systems. Hylio states that the AG-230 uses three systems to measure and report altitude to the operator. The primary method is a radar altimeter which reports altitude AGL. Hylio explains that this is much more germane to the low altitude missions of this UAS because maintaining a specific distance from the crop canopy ensures the desired pesticide coverage. Further, UAS restrictions are measured in AGL not mean sea level (MSL) so the most appropriate method of determining UAS altitude is a radar altimeter. Hylio explains that, in the event of a radar altimeter failure, the UAS uses a barometric measurement in conjunction with the three-dimensional Global Positioning System (GPS) location solution to ensure the UAS executes the preloaded flight plan. Hylio further explains that these systems are also used by the geofencing feature to ensure the UAS remains in the target treatment zone and successfully returns to the designated landing area at the appropriate time. Additionally, Hylio states that flights will be limited to a maximum altitude of no more than 200 feet AGL and spraying will normally be flown at average altitudes of 10 to 20 feet AGL or less, over private controlled access agricultural areas.

14 CFR § 91.151(b), Fuel requirements for flight in VFR conditions

Hylio seeks relief from 14 CFR § 91.151(b), which requires rotorcraft under visual flight rules (VFR) conditions contain enough fuel to fly to the first point of intended landing and to fly

⁸ See, Exemption No 18009 issued to Powers Flight Group.

after that for at least 20 minutes. Hyllo states that due to the close proximity of the target treatment field and the launch site the ferry distances for these UAS operations are measured in seconds and feet rather than minutes and miles. Additionally, Hyllo states that hexacopter UAS can land in a matter of seconds especially when they are operating over cropland; the greatest risk of an unscheduled landing would be over treatment of a part of the field and potential damage to a couple of the millions of plants in a field. Hyllo states that most flights flown by this UAS will be shorter than 20 minutes. For battery powered vehicles like the AG-230, Hyllo states that the FAA has previously approved exemptions to the minimum fuel requirement replacing it with a 5-minute reserve or the manufacturer's recommendation. Hyllo states that they plan to implement "the safe approach" if an exemption is approved to achieve an equivalent level of safety to Section 91.151.

Part 137 Agricultural Aircraft Operator Certificate

Hyllo requests relief from 14 CFR §§ 137.19(c), 137.19(d), 137.19(e)(2)(ii), (iii), and (v), *Certification requirements*; 137.31(a) and (b), *Aircraft requirements*; 137.33(a) and (b), *Carrying of certificate*; 137.41(c), *Personnel*, and 137.42, *Fastening of safety belts and shoulder harnesses*.

Hyllo states that relief from these 14 CFR rules are necessary because the provisions are either not compatible with, or are unnecessary, in the context of the proposed UAS operations.

Section 137.19(d) requires that the applicant have at least one certified and airworthy aircraft. Hyllo states that small UA operated under Part 107 do not have any aircraft certification requirements. Hyllo also states that under Part 107, the remote PIC is responsible for determining if the aircraft is airworthy. The requirements contained in the manufacturer's manuals, the requirement in Part 107 for the remote pilot to conduct pre-flight inspections of the aircraft, and the requirement that the agricultural aircraft operator certificate be obtained prior to flight will be, in total, sufficient for determining the airworthiness of the aircraft, providing an equivalent level of safety as the regulations for agricultural aircraft operations. Furthermore, Hyllo states that because these small UA are very limited in size and will carry a small chemical payload and operate only in restricted areas for limited periods of time, the risk to the public is lower. Moreover, Hyllo asserts that they are the one best suited to maintain the aircraft in an airworthy condition to provide the equivalent level of safety as the regulations.

Hyllo states that although this aircraft is not within the guidelines of Part 107, it is very similar and will not have a certificate of airworthiness as described in 14 CFR § 91.7(a). Without a certificate of airworthiness, the above argument for UAS under Part 107 should stand just the same for Hyllo UAS.

Hyllo states that in Exemption No. 17261⁹, the basis for relief from certification requirements was that DroneSeed's remote PICs would comply not only with the requirements of Part 107, subpart C, but also with the additional knowledge and applicable skill requirements in 14 CFR §§ 137.19(e)(1), 137.19(e)(2)(i), 137.19(e)(2)(iv), and 137.19(e)(2)(vi). The relief was also

⁹ See, Exemption No. 17261, issued to DroneSeed, Co.

based, in part, on DroneSeed's compliance with the training requirements in its operating documents.

Hylio states 14 CFR §§ 137.19(e)(2)(ii), 137.19(e)(2)(iii), and 137.19(e)(2)(v), which require the applicant or chief supervisor of agricultural aircraft operations show that they have satisfactory knowledge and skill regarding the operations, are unnecessary and not applicable for UA. Hylio references FAA's statement in Exemption 17261, "the FAA has determined that demonstration of the skills described in these paragraphs is not necessary because they are not compatible or applicable to agricultural aircraft operations with multi-rotor unmanned aircraft."

Hylio states that while the proposed operations in this petition for exemption involve the operation of UAS weighing 55 lbs., or more, the proposed operations are otherwise identical to that previously approved by the FAA in Exemption No. 17261. Consistent with the FAA's prior analysis, compliance with the requirements of Part 107, subpart C, the additional knowledge and applicable¹⁰ skill requirements in 14 CFR §§ 137.19(e)(1), 137.19(e)(2)(i), 137.19(e)(2)(iv), and 137.19(e)(2)(vi), and the training requirements in Hylio's operating documents, will ensure that an equivalent level of safety will be achieved.

Section 137.31(a) provides that no person may operate an aircraft unless it meet the requirements of § 137.19(d), which requires that the part 137 applicant must have at least one certificated and airworthy aircraft. Hylio states that the FAA granted relief from 14 CFR § 137.19(d) in Exemption No. 17261. Consistent with Exemption No. 17261, while Hylio's UAS will not have an airworthiness certificate, Hylio states it will be capable of ensuring that the UAS are in a condition for safe operation based upon a thorough pre-flight inspection and compliance with the operating documents. The UAS and associated components have conducted over 15,000 flights spraying in excess of 50,000 acres. Hylio believes that the AG-230 contains multiple advanced safety features such that operations will not adversely impact safety.

Sections 137.31(b) and 137.42, respectively, require an aircraft to be equipped with shoulder harnesses and fastening of safety belts and shoulder harnesses by the pilot before operation of an aircraft. Hylio states that an exemption from these requirements is warranted because the petitioner's UAS do not have an onboard pilot and these regulations are intended to ensure the safety of the onboard pilot during manned agricultural aircraft operations. For this reason, Hylio states that granting the requested relief from 14 CFR §§ 137.31(b), and 137.42 will not adversely impact safety.

Section 137.41(c) requires the PIC to hold a pilot certificate and rating prescribed by 14 CFR § 137.19(b) or 137.19(c). Hylio states an equivalent level of safety can be obtained by requiring the remote pilot to have a valid remote pilot certificate, requiring Hylio to obtain an agricultural aircraft operations certificate prior to operations, and requiring that operations must be done under the proposed restrictions of this petition. Hylio states that, consistent with

¹⁰ The FAA notes that 14 CFR §§ 137.19(e)(2)(i) and 137.19(e)(2)(vi) do not apply to multi-rotor UAS. The applicable test of skill for multi-rotor UAS is 137.19(e)(2)(iv) swath runs.

Exemption No. 18579¹¹, Hylio’s training and certification program described in the operating documents provides the remote PIC with the necessary skills to safely operate the UAS.

Hylio asserts the following conditions and limitations as found in Exemption No. 18413A should not be applied to this exemption:

A. Operation with Multiple UAS by a Single Pilot in Command

Condition and Limitation No. 9 prescribes, in part, that: “The PIC may manipulate flight controls in the operation of no more than one unmanned aircraft at the same time.”

Hylio seeks to operate three UA at the same time by one PIC. Hylio believes that an equivalent level of safety will be achieved by following additional protocols. The proprietary manuals outline these protocols and should provide the support necessary to grant the exemption and demonstrate how an equivalent level of safety is achieved. A section can be found in these documents with reference to the multi-UAS operation limitation. Protocols for multiple aircraft operations are based on extensive commercial flight operations in El Salvador, Honduras, and Guatemala, between 2018 and 2020, where the AG-230 flew 15,000 flights (3000 flight hours) servicing over 50,000 acres of farmland. Many of these flights were conducted at night between the hours of 6:00 PM and 6:00 AM beyond visual line of sight (BVLOS) of the pilot-in-command.

B. Operation without a Visual Observer

Condition and Limitation No. 7 prescribes, in part, that: “All operations must utilize the services of at least one or more visual observers (VO). The VO must be trained in accordance with the operator’s training program.”

Hylio seeks to operate without a VO. This request is in combination with the request for operation of three UA at a time by one PIC.

Hylio believes that an equivalent level of safety can be achieved by following additional protocols, as outlined in the training and operations of Hylio’s AgroDrone ground control station (GCS) software that was designed specifically for multi-UAS operation. It contains many safety features to ensure both deconfliction and efficient operation. The proprietary manuals outline these protocols and should provide the support necessary to grant the exemption and demonstrate how an equivalent level of safety is achieved. A section can be found in these documents with reference to the VO operation limitation. Additionally, a Pre-Mission Risk Management Review Worksheet is included in the Hylio Risk and Mitigation Manual. The comprehensive worksheet assists the PIC when planning flight operations and identifies when the pilot or UAS Supervisor can, or the Owner-Operator must, make the launch decision. Hylio’s request is consistent with the optional use of a VO as noted in 14 CFR § 107.33, and the training, operational requirements, and conditions/limitations meet and exceed the requirements in Section 107.33.

¹¹ See, Exemption No. 18579, issued to Branch Enterprises, Inc.

C. UAS Night Operations

Condition and Limitation No. 17 provides, in part, as follows:

17. UAS operations may not be conducted during night, as defined in 14 CFR § 1.1. All operations must be conducted under visual meteorological conditions (VMC). Operations may not be conducted under special visual flight rules (SVFR).

Hylio seeks to conduct certain limited night operations. Hylio believes that an equivalent level of safety will be achieved by following additional protocols as well as complying with existing rules for operation at night under Part 107.

Hylio understands that Part 107 does not apply to aircraft weighing over 55 lbs. However, Hylio believes it may be used as a starting point for night operations over 55 lbs., with the addition of internal protocols. The existing Part 107 rule requires the use of anti-collision lighting visible for at least 3 statute miles. This anti-collision lighting is an optional addition for the AG-230 aircraft and will be used at all times when flying during night. In addition to this lighting, internal protocols for night operations will be followed. The proprietary manuals outline these protocols and should provide the support necessary to grant the exemption and demonstrate how an equivalent level of safety is achieved. A section can be found in these documents with reference to the night operation limitation. Examples include, but are not limited to, crewmember training for night-time missions, including normal and emergency operating procedures, operating only in remote access-controlled environments, pre-flight inspection of the operating area, and when operating multiple UAS at night, the rear position lights must be configured to match each UAS's color in the ground station software. This will allow the pilot to easily distinguish between UAS at night.

Public Interest

The petitioner states that they are a diversified provider of agricultural services and are utilizing their experience in agriculture to expand into missions well suited for UA weighing over 55 lbs., to reduce risk, improve efficiencies, and provide benefits to the public. Hylio plans to provide a wide array of services in agricultural markets where UAS fit the mission better and safer than manned aircraft. The major benefits to the general public of granting relief for the proposed UAS agricultural operations are:

- Hylio will be utilizing technology developed and manufactured in the USA, helping to advance the local UAS industry.
- UAS may be used in the event that there is no other way to safely spray a certain land area. This will reduce the chance of manned aircraft attempting to spray certain dangerous areas. The result will be reduced risk for pilots and the public.
- UAS are significantly smaller and lighter than manned aircraft. In the event of a crash, the UAS poses a greatly reduced threat to the public. UAS also have much smaller propellers, reducing the risk of injury to the public in the event of a crash.
- UAS are much quieter than manned airplanes. UAS will create much less noise pollution than manned aircraft. This is especially important for near-urban aerial applications.

- UAS use batteries for power, which is not as flammable and explosive as the fuel used for the majority of manned aircraft. There will also be a reduction in air pollution.
- UAS operate at much lower altitudes than manned aircraft. This vertical separation greatly reduces the chance of a mid-air collision and the following catastrophic damage to the aircraft involved, and the public.
- UAS allow for methods of precision spraying that are not possible with manned aircraft. Precision spraying has the potential to increase the efficiency of US agriculture as a whole. These precision applications will greatly benefit the US farmer while operating with equivalent or greater levels of safety compared to manned aircraft.

Other Information Considered

As part of its petition, Hylio provided materials marked as “proprietary.” The FAA relied on this proprietary information in its safety risk analysis to make determinations about Hylio’s capabilities. Accordingly, while the entirety of these materials have not been released, they have been identified in the docket for this exemption.¹²

Federal Register Notice

A summary of the petition was published in the Federal Register on November 6, 2023, Docket No.: FAA–2023–1833; Summary Notice No.–2023–36 (85 FR 3103). Two responses were received. Gregory S. Walden, Counsel to the Small UAV Coalition submitted comments November 2, 2023, FAA-2023-1833-0005. Mr. Andrew D. Moore, Chief Executive Officer, National Agricultural Aviation Association (NAAA) also submitted comments November 2, 2023, FAA-2023-1833-0004.

Discussion of Public Comments:

Gregory S. Walden, Counsel to the Small UAV Coalition submitted comments in favor of Hylio’s operation stating in part, “The Coalition supports allowing pilots who are adequately trained in the drone model and the drone operations to conduct commercial operations, without holding a commercial Part 61 certificate. In sum, the Coalition supports Hylio's petition for exemption in full.”

Mr. Andrew D. Moore, Chief Executive Officer, National Agricultural Aviation Association (NAAA) submitted comments including the U.S. Aerial Application Industry Background, General Safety Concerns with Uncrewed Aircraft Systems (UAS) BVLOS Operations, as well as comments on FAA-2023-1833. The FAA response is limited to the NAAA comments on Hylio operations as described in docket FAA-2023-1833.

The NAAA supports the petitioner’s proposed risk mitigations for operating less than 500 feet (from vessels, vehicles, and structures) (but not closer than 100 feet), and the proposed relief to mirror the language for operation of small UAS at night (14 CFR § 107.29), essentially requiring use of visual strobe lighting visible for at least 3 statute miles. However, the NAAA requested the FAA require use of such anti-collision lights at the top and bottom of the

¹² See Attachment 1.

vehicle as an additional means for collision mitigation that are operable and on for all (day and night) flight operations. The FAA evaluated the design and size of the AG-230 and found that a single anti-collision light mounted on the side adjacent to the battery connector will provide adequate visibility above and below the aircraft. Furthermore, dispensing operations will be conducted at very low altitudes averaging ten to thirty feet AGL in VLOS conditions. Therefore, the FAA believes a side mounted anti-collision light, visible for at least three statute miles provides an equivalent level of safety to 14 CFR § 91.209 *Aircraft lights*.

The NAAA does not support Hylio's request to operate without a VO. The NAAA states that this is contrary to Hylio's self-accepted conditions in Section IV(12). The NAAA also comments that while the petitioner mentions "Ag BVLOS" in Section IV(12), Section V(D) does not specify whether the petitioner is requesting relief of the VO requirement for VLOS or BVLOS operations."

The FAA notes Hylio requests relief in Section V. Conditions & Limitations (E), Combined Advanced Operations, "to not only conduct all four advanced operations individually, but also simultaneously, in any combination." The FAA interprets this to mean, although Hylio petitioned for relief from the requirement for use of a VO, the company may optionally use a VO to relieve the PIC during periods of heavy workload. Accordingly, the FAA has included conditions and limitations¹³ to strengthen flight safety and ensure consistency with previous grants of exemption for UAS operations. Regarding BVLOS operations, Hylio provided the FAA with a Use Case History that includes BVLOS operations "legally at that time outside of the United States between 2018 and 2020." The FAA has included Condition and Limitation No. 8 that states, in part, the aircraft must be operated within VLOS of the PIC at all times.

The NAAA referenced a typographical error stating, "the petitioner repeated this: "THE COMPANY believes that an equivalent level of safety will can [sic] be achieved by following additional protocols." NAAA further states, "Because the referenced supporting material is proprietary, NAAA is unable to assess its adequacy in maintaining existing levels of safety for crewed Part 137 aerial application operations." In conversations with Hylio, the company acknowledged the error and stated the intent was that "an equivalent level of safety will be achieved." Section 552(b)(4) of Title 5 requires the Federal Government to protect proprietary information submitted in support of a petition for exemption.

The NAAA expressed concern "with the proposed multi-UAS and without VO operations." "There is no discussion of any comprehensive detect and avoid (DAA) system which could mitigate the risk borne from this relief." The AG-230 (2 Series) incorporates an upgraded Obstacle Avoidance system that incorporates five avoidance radars facing front, back, left, right, and up. According to Hylio, the radars can detect stationary as well as moving objects, and actually more effective in detecting moving targets. Details of the AG-230 Obstacle Avoidance system are considered proprietary.

Further, the NAAA states "the gravity of dispensing economic poisons should not be forgotten. Specifically, NAAA cites 14 CFR § 137.37 as prohibiting a person from dispensing any material from an aircraft in a manner that creates a hazard to persons or property on the

¹³ See Condition and Limitation Nos. 13, 17, 23, 26, 28 and 29 below.

surface. NAAA questions the extent to which a single PIC can fulfill this obligation when tasked with operating 3 aircraft, potentially at night and without visual observers.” The FAA understands the importance of ensuring a person engaging in agricultural operations fully understands the nuances of dispensing economic poisons, and the FAA requires knowledge and skill tests to be satisfactorily completed prior to issuance of an agricultural aircraft operator certificate. The 14 CFR § 137.19 knowledge tests include, but are not limited to, the safe handling of economic poisons and the proper disposal of used containers for those poisons; the general effects of economic poisons and agricultural chemicals on plants, animals, and persons; and adherence to product labels. The skills test includes specific flight maneuvers necessary for compliance with 14 CFR §§ 137.19(e)(2)(iv), *Swath runs*, 137.37, *Manner of dispensing*, and 137.39, *Economic poison dispensing*.¹⁴ To ensure PIC proficiency on these subject areas, Condition and Limitation No. 24, requires in part that the PIC complete the applicable knowledge and skill requirements for agricultural aircraft operations outlined in part 137,¹⁵ documentation of which must be provided to the FAA upon request.” Additional assurances include licensing requirements by the individual State’s Environmental Protection Agencies prior to conducting agricultural aircraft operations.

The FAA’s Analysis

Hylio is requesting relief to operate up to three AG-230 UAS weighing over 55 lbs., simultaneously, by a single PIC to provide commercial agricultural-related services. Hylio states their proposed operations are similar to the agricultural operations conducted by DroneSeed Co., Exemption No. 17936, DroneXum, LLC Exemption No. 18413A, and Yamaha Motor Corporation, U.S.A. Exemption No. 11448. However, unlike DroneSeed, DroneXum, and Yamaha, the petitioner also proposes to conduct operations without the services of a VO, during night VLOS meteorological conditions, and with a single pilot controlling up to three aircraft. Due to these differences, the FAA needed to further analyze the operational risks associated with Hylio’s proposed operations.

After reviewing the petitioner’s novel request and supporting materials, and as discussed in further detail below, the FAA has determined that safety would not be adversely affected by permitting the petitioner to conduct its UA operations with up to three AG-230 UAS weighing over 55 lbs., by a single PIC without the services of a VO, and during night VLOS meteorological conditions. The FAA evaluated the amended concept of operations, and the petitioner’s procedures, and has incorporated certain conditions and limitations as found in Exemption No. 19037B. However, the FAA concludes that revisions to those incorporated provisions (see below Condition and Limitation Nos. 8, 9, 12, 15, 16, and 23), and the addition of Condition and Limitation Nos. 10, 11, 13, 26, 28, 29, 30, 31, 32, 35, and 44, are necessary to enable the requested operations without an adverse effect on safety.

The FAA assessed the petitioner’s risk analysis and proposed safety mitigations, and also performed a safety risk analysis of the petitioner’s proposed operation. The conditions and limitations of this exemption, combined with Hylio’s procedures, and the AG-230 safety

¹⁴ 14 CFR § 137.19(e).

¹⁵ The FAA notes that, under this exemption, a PIC is exempted from the skill elements of 14 CFR §§ 137.1(e)(2)(ii), (iii), and (v) as subsequently discussed herein.

features, reduce the likelihood of these hazards occurring, thereby lowering the risk so that operations under this exemption will pose no undue hazard to manned aircraft, persons, or property. The FAA notes that it has added Condition and Limitation No. 1 to emphasize that the relief contained in this exemption applies only to Hyllo and its personnel.

As part of its safety risk analysis, the FAA relied on materials marked as “proprietary” by the petitioner to make determinations about AG-230 capabilities. Accordingly, while the entirety of these materials have not been released, they have been identified in the docket for this exemption.¹⁶

For the reasons stated above, the FAA’s analysis of Hyllo’s petition in this exemption is limited to: (1) permitting operations with or without a VO; (2) permitting operations at night; (3) permitting operation of up to three UAS by a single PIC and (4) consideration of the public interest justification provided by the petitioner. The FAA also addresses relief from airman medical certificate requirements in this exemption.

Operation without a Visual Observer

The petitioner seeks to operate without the services of a VO while performing commercial agricultural services.¹⁷

The VO requirement has been added as a safety mitigation to all commercial agricultural UAS exemptions to date. With implementation of Part 107, the VO requirement was made optional for small UAS operations, including those to be conducted under Part 137.

To date, there have been no reported near mid-air collision (NMAC) or mid-air collision (MAC) incidents involving small or large UAS operating under Part 137 while performing commercial agricultural services.¹⁸ The FAA notes that large UAS agricultural operations are typically limited to below 200 feet AGL, and, therefore, are not in the same airspace utilized by most manned aircraft. The exceptions to this are manned aircraft potentially conducting agricultural operations nearby or helicopter air ambulance (HAA) emergency operations if nearby. Both of these exceptions would be mitigated by the Notice to Air Missions (NOTAM) published by the petitioner, the UAS PIC’s responsibility to see and avoid manned aircraft (VLOS operation), and the extremely low altitude when applying a product (typically 10 feet or less above the crop height).¹⁹

Additionally, most agricultural operations, have a limited duration and distance due to limitations of the UA. Similarly, exemptions granted to agricultural operators require that the UA stay within VLOS of the PIC. Therefore, the FAA has determined that, while use of a VO is a beneficial mitigation, use of a VO is not required to ensure that the safety of the NAS is not adversely affected by the proposed agricultural operation. However, despite this determination, the FAA has determined that a modification of the Condition and Limitation

¹⁶ See Attachment 1

¹⁷ See Exemption No. 18413A, issued to DroneXum, LLC.

¹⁸ A search of UAS Part 137 operation accident data for NMAC and MAC incidents yielded no results.

¹⁹ See, Condition and Limitation Nos. 7, 8, and 13

No. 7, as applied in other exemptions, is appropriate and, as applied to Hylio, has been changed to Condition and Limitation No. 12.

The FAA closely evaluated Hylio's training and operational procedures for the AG-230 to determine if two persons, the PIC and a VO, were a sufficient number of crewmembers for operations to be conducted safely. Key characteristics of the operations under this exemption include: the sparsely populated operational area, the highly automated nature of the AG-230 that facilitates minimal pilot workload, the comprehensive safety features, the ability to identify people and obstacles on the ground,²⁰ and the PIC maintaining VLOS of the AG-230 and simultaneously monitoring the surrounding airspace. Therefore, the FAA concluded that an additional VO is not necessary for operations under this exemption. The FAA further considered whether a VO would be needed in abnormal situations and found that the PIC would only physically control the AG-230 (from a handheld transmitter) in an abnormal event such as motor failure, GPS signal loss, programming data loss, or geofence excursion encountered during flight. Additionally, the FAA reviewed Hylio's training program that covers the PIC's normal and emergency procedures and responsibilities with or without a VO. The FAA finds that training for operations without a VO must address all roles and responsibilities of the VO to be assumed and conducted by the PIC, which must include, at a minimum: factors affecting vision, launch and recovery, flight termination procedures for single and multi-UAS (if appropriate), site survey, and collateral duties without a VO (see Condition and Limitation No. 16). Accordingly, the FAA finds that the PIC could still maintain VLOS of the UA and monitor the surrounding airspace without the assistance of a dedicated VO. This is similar to previous exemption, Exemption No. 20445.²¹

Condition and Limitation No. 12, as applied to Hylio in this exemption, provides the petitioner with the flexibility to choose whether or not to use a VO in its operations. Condition and Limitation No. 12 will continue to set forth the requirements for using a VO should the petitioner choose to do so to ensure the VO is sufficiently trained on their duties and responsibilities. Additionally, the FAA is making related updates based on Condition and Limitation No. 12 in Condition and Limitation Nos. 13, 17, 23, 26, 27, 28, 29, 31, and 43(a), to reflect the optional use of the VO.

The FAA is modifying Condition and Limitation No. 8, as applied to Hylio, to include the requirement that the PIC terminate the flight as soon as practicable if the PIC is unable to maintain VLOS of the UA. This is consistent with Condition and Limitation Nos. 12 and 13; however, the FAA has determined that this requirement needs to be included in Condition and Limitation No. 8 to ensure that the PIC understands that this is a requirement when a VO is not being utilized.

UAS Night Operations

The petitioner seeks to conduct commercial agricultural services at night.

²⁰ Condition and Limitation No. 31

²¹ See, Exemption No. 20445, issued to Pyka Inc.

Hylio proposes various methods to mitigate potential hazards associated with night operations. These mitigations include operating only in a closed access environment, pre-flight inspection of the operating area, checking of the perimeter to identify unknown hazards, night-time pilot and VO (when a VO is used) mission training and testing, crewmember night vision adaptation and protection of night vision capability, illumination of the operating area, aircraft lighting, reduced aircraft altitude, and reduced aircraft speed.

While Hylio's operation involves a UAS over 55 lbs., the FAA notes that it has previously examined night operations with respect to small UAS when it issued the 2021 Final Rule, *Operations of Small Unmanned Aircraft Systems Over People*²². In that final rule, the FAA revised the regulations to require, first, additional training to ensure familiarity with the risks and appropriate mitigations for nighttime operations and, second, anti-collision lighting. As it pertains to training, 14 CFR § 107.29 requires that the remote pilot complete a knowledge test or applicable training²³ concerning small UAS operations at night. Additionally, under the revised regulations, applicants who are eligible to obtain a remote pilot certificate must complete an updated knowledge test prior to conducting operations at night. Additionally, the FAA determined that small UAS operations at night have operational needs and safety requirements that differ from manned aircraft operations at night, and, therefore, as the rule also applied the requirement for Part 61 pilots to take the recurrent training in its entirety, including those sections pertinent to night operations, despite having taken manned-aircraft-specific nighttime training for their Part 61 certification. In addition to the training required previously, the 2021 Final Rule updated the Part 107 testing and training to address, collision avoidance during night operations, night physiology, lighting requirements, and night illusions from the perspective of the remote pilot.

The hazards associated with operating a small UAS at night likewise exist for operations of a large UAS (UAS over 55 lbs.), at night. Therefore, there is no differentiation between the mitigations of testing and training for both large and small UAS.²⁴ Consistent with the FAA requirement for a Part 107 pilot certificate to be held by the large UAS operator, the applicable night training must also be required prior to operating at night.

As this exemption provides petitioner relief from 14 CFR § 61.3(a)(1)(i) and includes a condition requiring the PIC to possess a remote pilot certificate with a small UAS rating, issued under Part 107, the FAA has also determined that for night operations, the PIC must have completed an initial knowledge test or training, as applicable, under 14 CFR § 107.65.²⁵ This test or training will ensure familiarity with the risks and appropriate mitigations for nighttime operations.

Additionally, the FAA has evaluated Hylio's training program including prerequisites, course curriculums ground and flight training for operations at night, qualifications, minimum number of training hours, company currency requirements, company airman testing, and normal and emergency procedures specific to the AG-230. The FAA concluded that the

²² 86 FR 4314 (Jan. 15, 2021).

²³ See 14 CFR § 107.65.

²⁴ See Exemption No. 17936, issued to DroneSeed Co.

²⁵ Condition and Limitation No. 21

training program, which is specific to the UA and the operation, and the aircraft lighting on the AG-230 is sufficient to address night operations and does not adversely affect safety. Therefore, Condition and Limitation No. 17, as issued to DroneXum, LLC²⁶, has been revised as reflected in Condition and Limitation Nos. 16, 21, 24, and 27. herein to ensure a PIC is sufficiently trained on the operations approved by this exemption (e.g., night, multi-UAS, without a VO).

Due to the nature of the proposed night operations, the FAA has determined the pilot must have the visual acuity necessary to correctly distinguish the UA's position and orientation at night. Visual acuity is a measure of the ability of the eye to distinguish shapes and the details of objects at a given distance. Human visual acuity is degraded at night. Consequently, it is more difficult for a pilot or VO to visually detect a hazard at night than it is to visually detect a hazard during the day. The FAA analyzed the increased risk caused by the PIC and VO's degraded night visual acuity and ability to detect hazards. Therefore, this exemption provides conditions and limitations to ensure PIC and VO night visual acuity is adequate to safely detect and thereby avoid hazards. The petitioner proposes training to enable the PIC and VO to recognize and overcome visual illusions caused by darkness and understand physiological conditions which may degrade night vision. The FAA agrees that such training is necessary to ensure both the PIC and the VO are capable of recognizing and overcoming these visual illusions and conditions that may degrade night vision. In addition, for night operations, the FAA requires in Condition and Limitation No. 22 that the PIC must not have any night operating limitations on their FAA-issued airman medical certificate, nor any medical condition which interferes with night vision. Similarly, the FAA stipulates in Condition and Limitation No. 28 that the VO must not have any medical condition which interferes with night vision and must be able to perceive those colors necessary to correctly distinguish the UA's position and orientation at night. Additionally, the FAA is requiring the termination of flight operations if the night vision of either the PIC or VO (when a VO is used) is degraded for any reason that causes loss of VLOS, see Condition and Limitation Nos. 8 and 12.

While petitioner did not request relief from Part 91 lighting requirements, operations under this exemption are conducted under Part 91, which has certain aircraft lighting requirements for night operations. The FAA has reviewed the lighting requirements for night operations contained in Part 91, specifically 14 CFR §§ 91.205(c) and 91.209. Based upon its review, the FAA has determined that 14 CFR § 91.205(c) is not applicable to the operations covered in this exemption because it applies only to aircraft with a standard category U.S. airworthiness certificate. Additionally, as discussed below, the FAA has determined that relief from 14 CFR § 91.209(b) is not appropriate and that the UA is required to have lighted anti-collision lighting visible for at least 3 statute miles that has a flash rate sufficient to avoid a collision. However, relief from 14 CFR § 91.209(a)(1) is required because, as explained below, the FAA has determined that the requirement for position lights is applicable to all aircraft. However, the FAA has determined that the operator may meet this requirement by equipping the UA with identification lighting to enable the PIC and VO (if used) to maintain VLOS.

Because human visual acuity is degraded at night, there may be an increased likelihood of a midair collision with another aircraft during night operations. The petitioner states that the

²⁶ Exemption No. 18413A

UA is equipped with navigation and high-intensity strobe lights. The FAA agrees that aircraft lighting is a necessary mitigation for night operations because a manned aircraft pilot is not able to detect a UA at night unless the UA is illuminated. Equipping the UA with anti-collision lighting will enable a manned aircraft pilot to both see and avoid the UA.

Additionally, to provide contrast with background lighting and attract the manned aircraft pilot's attention, the anti-collision lighting should flash or have a stroboscopic effect.

Furthermore, the anti-collision lighting should have sufficient intensity to be seen from a distance, which enables a manned aircraft pilot to easily avoid a collision. Therefore, the operations covered in this exemption are required to have lighted anti-collision lighting visible for at least 3 statute miles that has a flash rate sufficient to avoid a collision and operate in accordance with the requirements of 14 CFR § 91.209(b). Additionally, this petition requires the PIC to verify the anti-collision lighting is operational before flight and to terminate night operations if the lighting malfunctions.²⁷

While the anti-collision lighting flash rate increases the ability of a manned aircraft pilot to see the UA, the flash rate may degrade the ability of the PIC and VO (if used) to maintain VLOS because the lighting is not continuously illuminated. Therefore, anti-collision lighting alone is insufficient for maintaining VLOS. Consequently, the UA must also be equipped with continuously illuminated identification lighting. The identification lighting must be continuously illuminated, always visible to the PIC and VO (if used) regardless of UA orientation, and of sufficient intensity to ensure the PIC and VO are always able to maintain VLOS. The identification lights are not position lights. This exemption does not require the UA to be equipped with position lights. The purpose of position lights is to assist a manned aircraft pilot in determining the direction of another aircraft's orientation and direction of movement. However, because the small size of the UA results in a short distance between the position lights, and because of the UA's slow speed, and ability to hover and rapidly change direction, it is unlikely a manned aircraft pilot would be able to determine UA direction of flight based on lighting configuration and colors. Because the identification lights are not position lights, relief from 14 CFR § 91.209(a)(1) is necessary and appropriate. An equivalent level of safety to the regulation is provided by anti-collision lighting and the UAS PIC's responsibility to remain well clear and give way to all manned aviation operations and activities at all times.²⁸

As previously mentioned, the petitioner states that the UA is equipped with navigation and high-intensity strobe lights. For multi-UAS operations at night, Hyllo is utilizing UAS design and use of position lights configured to match each UAS's color displayed in the ground station software. The FAA believes that this mitigation should be incorporated into the conditions and limitations.²⁹ However, during night operations, these lights may not be adequate for the PIC to visually determine the UA's location, attitude, altitude, and direction of flight in all circumstances. The petitioner states the Hyllo GCS displays the UA's location, altitude, and direction of flight, but does not actively display attitude. However, the GCS does incorporate an attitude threshold that displays an error code to alert the pilot when the UA approaches the preset attitude limit which varies by UAS model. For this reason, the PIC must

²⁷ Condition and Limitation No. 32

²⁸ Condition and Limitation Nos. 30, 32, and 41

²⁹ Condition and Limitation No. 30

have the UA's location, altitude, and direction of flight displayed at the GCS, and the attitude threshold limit alert must be operable prior to night flight operations.³⁰

Identification lighting and anti-collision lighting are not the only risk mitigation in this exemption that reduces the likelihood of a midair collision at night. In addition to the fact that there are fewer aircraft that operate at a low altitude at night compared to daytime operations, the ATO-issued COA³¹ limits operations near airports and this exemption requires the UA to remain well clear and give way to all manned aviation operations and activities at all times.

The petitioner proposes to conduct night-time operations in a closed access environment over rural uninhabited, unoccupied, private, or restricted-access land; to inspect the specific area of operation prior to any flight operation, and to take all precautions for safe flight including checking the perimeter to identify unknown hazards or personnel within the operation area. The FAA agrees that the petitioner's proposed mitigations are necessary to ensure the safety of non-participants because there is an increased likelihood of collision with a ground obstruction during night operations or operating over or near a non-participating person during night operations, due to degraded human visual acuity at night. However, the FAA notes that the petitioner does not indicate whether it will conduct these inspections or checks during daylight prior to night operations, and therefore this exemption specifies, that prior to conducting night operations, the area of operation must be sufficiently illuminated to allow both the remote PIC and VO (if used) to identify people or obstacles on the ground, or the PIC must have inspected the operating area in person during daylight hours in order to assess all potential hazards and include a plan to avoid these hazards, per Condition and Limitation No. 31.

Operation with Multiple UAS by a Single Pilot in Command

The petitioner seeks to conduct commercial agricultural services with multiple UAS at the same time by one PIC.

Specifically, Hylio requests a single pilot to operate up to three AG-230 UAS simultaneously using two completely independent sources of command and control between the drone and PIC. One source is the handheld remote controller (RC), and the other is the laptop telemetry radio. The FAA has analyzed the petitioner's proposed safety mitigations contained in their petition for exemption and supporting documents. The FAA found that the petitioner did not request relief from a specific regulation. Large UAS are operated under Part 91, and, unlike Part 107, there are no Part 91 regulations which expressly address a single pilot operating multiple aircraft as Part 91 regulations are premised upon a one-to-one, pilot-to-aircraft or two-to-one, pilot-to-aircraft ratio, to the extent that these regulations predate UAS and therefore reasonably presume that a pilot cannot be seated at the controls of multiple aircraft at the same time.

The petitioner proposed detailed safety mitigations for operation of multiple UAS and the FAA finds that the petitioner adequately addressed the hazards associated with a single pilot

³⁰ Condition and Limitation No. 44

³¹ Condition and Limitation No. 7

operating multiple UAS simultaneously. Specifically, the petitioner provided a comprehensive safety risk analysis, including risk mitigations and operating procedures that address how a single pilot would control multiple aircraft simultaneously during an emergency or aircraft malfunction. For example, the petitioner utilizes proprietary software that is able to communicate missions and commands to the UAS using a telemetry radio that is plugged in to the laptop's USB port. This radio connection is encrypted and can be configured to communicate with multiple drones. When it is configured as such, multiple UAS will appear in the software for mission upload and control. Furthermore, while the GCS communicates with multiple UAS at a time, there is still one separate RC for each drone as a backup. The RCs display a first-person video feed from each drone on their screens, which helps the pilot know which RC corresponds to which UAS, which the FAA has incorporated with Condition and Limitation No. 10. Additionally, the FAA has added Condition and Limitation No. 10 to ensure compatibility between the GCS, software, and the UAS to be operated and Condition and Limitation No. 35 to mitigate loss of control in operations of multiple UAS.

Additionally, the FAA reviewed the petitioner's training program to ensure cohesion with the software, hardware, and associated procedures for night and multi-UAS operations. The FAA notes commonality across the proprietary documents such as the Concept of Operations (CONOPS), Training Manual and Operations and Safety Manual that include verification of crewmember "night training and eyesight preparation and fatigue" as well as the effects of low-light, night and atmospheric illusions. A requirement for the PIC to "take special care when preparing the ground station and landing location to ensure they are as well-lit as possible, without hindering the PIC's night vision" and a functional check of the aircraft lights was well-thought-out. Operation of multiple UAS (multi-UAS) by a single PIC was also reviewed for consistency and the FAA notes training for multi-UAS operations includes a pre-flight inspection of the operating area, normal and emergency procedures, and for multi-UAS operations at night, pre-flight checks to ensure the aircraft identification lights distinguish each UAS individually as well. Also cited is a PIC precaution to ensure there is room for three UAS to safely operate when selecting and setting up the ground station and operating location. Accordingly, the FAA has modified Condition and Limitation No. 16 to reinforce the importance of these training practices.

As noted previously, a Pre-Mission Risk Management Review Worksheet is included in the Hylio Risk and Mitigation Manual.³² The comprehensive worksheet assists the PIC when planning flight operations and identifies when the pilot, or UAS Supervisor can, or the Owner-Operator, must make the launch decision.

For the reasons stated above, the FAA finds in accordance with Condition and Limitation No. 9, that operation of three AG-230 UAS by a single PIC is safe to operate with additional conditions and limitations detailed below and is otherwise consistent with previous grant of exemption, Exemption No. 17936D.³³

Title 49 U.S.C. § 44807 (Section 44807) provides the Secretary of Transportation (hereinafter

³² See Attachment 1

³³ Although FAA approved DroneSeed for a 1:5 pilot/UAS ratio, the FAA reduced this to a 1:3 ratio as additional mitigation for Hylio's advanced operational procedures, i.e., night, multi-UAS, and no VO operations.

Secretary) with authority to determine whether a certificate of waiver, certificate of authorization, or a certificate under Section 44703 or Section 44704, is required for the operation of certain UAS. Section 44807(b) instructs the Secretary to base their determination on which types of UAS do not create a hazard to users of the NAS or the public. In making this determination, the Secretary must consider the size, weight, speed, operational capability of the UAS, and other aspects of the proposed operation. The Secretary delegated this authority to the Administrator on October 1, 2021. In accordance with the statutory criteria provided in 49 U.S.C. § 44807, and in consideration of the size, weight, speed, and operational capability, proximity to airports and populated areas, and specific operations, a determination has been made that certain aircraft do not create a hazard to users of the NAS or the public.

Thus, in accordance with Condition and Limitation No. 2 below, the operator is approved to operate any UAS under this exemption that have been approved by the Secretary for agricultural operations.³⁴ This list, along with the approved maximum take-off weight (MTOW), which includes the payload weight, can be found on the List of Approved Agricultural UAS under Section 44807. The list, which will be updated periodically, is posted at www.regulations.gov, under docket number FAA-2023-1271. This list is for UAS weighing 55 lbs., or greater including payload that are unable to fly under Part 107 due to the weight of the aircraft.

Public Interest

The FAA finds that a grant of exemption is in the public interest. The enhanced safety achieved using UAS weighing over 55 lbs., with the specifications described by the petitioner and carrying no passengers or crew, rather than a manned aircraft of significantly greater proportions, carrying crew in addition to flammable fuel, gives the FAA good cause to find that the UAS operation enabled by this exemption is in the public interest. The FAA permits manned aircraft engaged in agricultural aircraft operations to operate at night and most agricultural operations, including petitioners, have a limited duration and distance due to limitations of the UA, and are required to stay within VLOS of the PIC. Manned aircraft can weigh thousands of pounds and carry hundreds of gallons of fuel and payload. Conversely, the Hyllo AG-230 and similar UAS weigh much less than a manned aircraft, carry a much smaller payload, carry no flammable fuel, and are slower and more maneuverable. Therefore, the general hazard presented by one or three Hyllo AG-230 or similar UAS is less than that of a manned aircraft. Additionally, because of their size, speed, and maneuverability, UA may be better suited for operations in confined areas where roadways, obstructions, or nearby structures result in increased risk. Furthermore, permitting UA to operate at night during dispensing operations may reduce the exposure of both manned aircraft and property owners to safety risk and is therefore in the public interest.

UAS Pilot in Command (PIC) Medical Certification

³⁴ The UA must be equipped with software enabling multiple operations. Night operations require position lights and strobe light that is visible for 3 nautical miles.

Manned agricultural operations under 14 CFR Part 137 typically would require a second-class airman medical certificate issued under Part 67. Due to the nature of the proposed operations, the FAA has determined maintaining a medical certificate ensures the pilot does not have any physical or mental condition that would interfere with the safe operation of the UAS. While the FAA has traditionally maintained the requirement to hold a second-class medical certificate in exemptions for UAS operations,³⁵ the FAA recently reconsidered the issue. In Exemption No. 18601B,³⁶ the FAA found that the use of pilots holding the minimum of a valid third-class medical certificate would not adversely affect the safety of the petitioner's operation and granted relief from 14 CFR § 61.23(a)(2). The same rationale applies to this exemption.³⁷ Although the petitioner did not request relief from 14 CFR § 61.23(a)(2), the FAA believes relief is necessary. The FAA evaluated the petitioner's operation, which includes controlled-access locations, speed limitations, and low-altitude operating environment, and finds these characteristics are adequate mitigations in the event of a medical incident. Therefore, the FAA has determined that requiring a third-class medical certificate provides reasonable assurance that the pilot does not have any physical or mental condition that would interfere with the safe operation of the UAS (reference Condition and Limitation No. 23 below). Medical certification as it pertains to night operations is discussed in a subsequent section.

Hyllo states they will conduct operations under 14 CFR Part 91, which presumes the PIC holds an airman certificate under Part 61. In previous Exemption No. 18009, the FAA has determined granting exemption from the requirement of 14 CFR § 61.3(a)(1)(i) and, instead, allowing a person holding a remote PIC certificate (with the appropriate training and demonstration of knowledge and skills required by this exemption) to conduct the operations to which this exemption applies will not adversely affect safety (reference Condition and Limitation No. 21 below).

Hyllo also requests relief to operate closer than 500 feet from vessels, vehicles, and structures, noting that the configuration of the crop land on some farms can be within 500 feet of buildings. Hyllo contends that certain factors support its request, including the low spray altitude of 10 to 30 feet AGL and the slow speed, less than 30 miles per hour, necessary for proper application of chemicals. The FAA considered the size, relatively light weight, and slow speed of the aircraft, as well as the controlled location where the operations will occur. The FAA believes the remote and closed-access operating location, and flying at a low altitude, does not pose increased risk to people or property as would larger manned aircraft performing similar activities. Moreover, the petitioner can achieve an equivalent level of safety by operating within the VLOS of the PIC to ensure safety of, and de-confliction with, any persons or property in the air and on the ground. Finally, the FAA considered 14 CFR § 137.49, Operations over other than congested areas, noting that aircraft may be operated over other than congested areas below 500 feet above the surface and closer than 500 feet to persons, vessels, vehicles, and structures, if the operations are conducted without creating a hazard to persons or property on the surface.

³⁵ See, Exemption No. 19398, issued to Phoenix Air Unmanned, LLC.

³⁶ See, Exemption 18601B Correction, issued to Amazon Prime Air, January 5, 2023.

³⁷ Part 137 Unmanned Aircraft Systems (UAS) Certification: N 8900.659.

The FAA finds that the petitioner's reasons for requesting an exemption to operate closer than 500 feet near vessels, vehicles, and structures are similar in all material respects to relief previously requested in Exemption Nos. 18009 and 18413A. Thus, the reasons stated by the FAA for granting Exemption Nos. 18009 and 18413A also apply to the situation the petitioner presents. Specifically, the FAA finds that Exemption No. 18009 contains the FAA's analysis for the relief granted from 14 CFR §§ 61.3(a)(1)(i), 91.7(a), 91.121, 91.151(b), 91.405(a), 91.407(a)(1), 91.409(a)(1), 91.409(a)(2), 91.417(a), 91.417(b), 137.19(c), 137.19(d), 137.19(e)(2)(ii), 137.19(e)(2)(iii), 137.19(e)(2)(v), 137.31, 137.33, 137.41(c), and 137.42. Exemption No. 18413A contains the FAA's analysis for the relief granted from 14 CFR §§ 91.119(c) and 91.403(b).

The FAA's Decision

In consideration of the foregoing, I find that a grant of an exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. §§ 106(f), 40113, 44701 and 44807, delegated to me by the Administrator, Hyllo Inc., is granted an exemption from 14 CFR §§ 61.3(a)(1)(i), 61.3(c)(1), 61.23(a)(2), 91.7(a), 91.119(c), 91.121, 91.151(b), 91.209(a)(1), 91.403(b), 91.405(a), 91.407(a)(1), 91.409(a)(1), 91.409(a)(2); 91.417(a), 91.417(b), 137.19(c), 137.19(d), 137.19(e)(2)(ii), 137.19(e)(2)(iii), 137.19(e)(2)(v), 137.31(a), 137.31(b), 137.33(a), 137.33(b), 137.41(c), and 137.42 to the extent necessary to allow Hyllo to operate UAS weighing 55 lbs., or more to provide commercial agricultural-related services, subject to the conditions and limitations listed below.

Conditions and Limitations

In this grant of exemption, Hyllo Inc., is hereinafter referred to as "the Operator" or "Exemption Holder."

1. This exemption is non-transferrable. Only Hyllo Inc., may conduct operations in accordance with this exemption.
2. The Operator must obtain an agricultural aircraft operator certificate under Part 137 by submitting FAA Form 8710-3 (copy enclosed) and the Operator's exemption number to UAS137Certificates@faa.gov. Please note, the name of person or entity on the 8710-3 application must match the Exemption Holder's name.
3. Prior to operations under 14 CFR Part 137, the Operator may conduct training flights, proficiency flights, experience-building flights, and maintenance functional test flights under this exemption with the understanding that the Operator is conducting these flights for the purpose of obtaining a Part 137 agricultural aircraft operator certificate.
4. Operations authorized by this grant of exemption include any unmanned aircraft system (UAS), along with the approved maximum take-off weight (MTOW) weight, which includes payload, for the respective UAS identified on the List of Approved Agricultural UAS under Section 44807 at regulatory docket FAA-2023-1271 at www.regulations.gov, when weighing 55 pounds (lbs.) or greater including payload. Proposed operations of any

aircraft not on the list, or at different weights than currently approved, will require a new petition or a petition to amend this exemption.

5. This exemption does not excuse the Operator from complying with 14 CFR Part 375. If operations under this exemption involve the use of foreign civil aircraft, the Operator must obtain a Foreign Aircraft Permit pursuant to 14 CFR § 375.41 before conducting any operations under this exemption. Application instructions are specified in 14 CFR § 375.43.
6. The unmanned aircraft (UA) may not be operated at a groundspeed exceeding 30 miles per hour or at a speed greater than the maximum operating speed recommended by the aircraft manufacturer, whichever is lower.
7. All operations must be conducted in accordance with an Air Traffic Organization (ATO) issued Certificate of Waiver or Authorization (COA). A copy of the blanket 49 U.S.C. § 44807 COA is enclosed with this exemption. The Exemption Holder must apply for a new or amended COA if it intends to conduct operations that cannot be conducted under the terms of the enclosed COA. If a conflict exists between the COA and this condition, the more restrictive provision will apply. The COA will also require the Operator to request a Notice to Air Missions (NOTAM) not more than 72 hours in advance, but not less than 24 hours prior to each operation. Unless the COA or other subsequently issued FAA authorization specifies an altitude restriction lower than 200 feet above ground level (AGL), operations under this exemption may not exceed 200 feet AGL. Altitude must be reported in feet AGL.
8. The pilot in command (PIC) must be designated before the flight and cannot transfer their designation for the duration of the flight. In all situations, the Operator and the PIC are responsible for the safety of the operation. The Operator must ensure the PIC follows all applicable conditions and limitations as prescribed in this exemption and ATO-issued COA and operating in accordance with the operating documents as defined in the conditions and limitations in this exemption. The UA must be operated within visual line of sight (VLOS) of the PIC at all times. If the PIC is unable to maintain VLOS with the UA during flight, (including if caused by the inadvertent loss of night vision) the entire flight operation must be terminated as soon as practicable. The PIC must be able to use human vision unaided by any device other than corrective lenses, as specified on the PIC's FAA-issued airman medical certificate.
9. The PIC may manipulate flight controls in the operation of no more than three UA at the same time. Proposed operation of more than three UA at the same time (by one PIC) requires a new petition or a petition to amend this exemption.
10. Unless otherwise authorized by the Administrator, the Ground Control Station (GCS) and software must be designed for, and compatible with, the UAS to be operated. The GCS must clearly display and identify each UAS being operated by the PIC.

11. Operations of multiple UAS by a single PIC must be automated and have a back-up remote control for each UAS being operated. The autopilot system must maintain UAS separation without input from the PIC.
12. All operations may optionally utilize the services of at least one or more visual observers (VO). If utilized, the VO must be trained in accordance with the Operator's training program. For purposes of this condition, a VO is someone: (1) who maintains effective communication with the PIC at all times; (2) who the PIC ensures is able to see the UA with human vision as described in Condition and Limitation No. 8; and (3) coordinates with the PIC to scan the airspace where the UA is operating for any potential collision hazard and maintain awareness of the position of the UA through direct visual observation. The UA must be operated within VLOS of both the PIC and VO (if used) at all times. The VO (if used) must have no collateral duties and is not the PIC during the flight. The VO may be used to satisfy the VLOS requirement as long as the PIC always maintains VLOS capability. The VO (if used) and PIC must be able to communicate verbally at all times; electronic messaging or texting is not permitted during flight operations. The VO (if used) must maintain visual sight of the aircraft at all times during flight operations without distraction. The PIC must ensure that the VO can perform the duties required of the VO. If either the PIC or a VO (if used) is unable to maintain VLOS with the UA during flight, (including if caused by the inadvertent loss of night vision) the entire flight operation must be terminated as soon as practicable.
13. If a VO is not utilized, the PIC must maintain VLOS with the UA during the entire flight operation. Additional support personnel may be used to conduct UA inspections, and servicing, such as changing batteries and refilling or exchanging hoppers. Additional support personnel are not considered to be performing the function of a VO; however, their use is encouraged to ensure the PIC is not distracted with non-essential duties during flight.
14. All documents needed to operate the UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption, are hereinafter referred to as the operating documents. At a minimum, the operating documents must include:
 - a. The Operator's operations manual;
 - b. The Operator's training program;
 - c. The manufacturer's provided flight manual;
 - d. All other manufacturer UAS provided documents;
 - e. This exemption; and
 - f. Any ATO-issued COA that applies to operations under this exemption.

These operating documents must be accessible during all UAS operations that occur under this exemption and made available to the Administrator or any law enforcement official upon request. If a discrepancy exists between the conditions and limitations in this exemption and the procedures outlined in the operating documents, the conditions and limitations herein take precedence and must be followed. Otherwise, the Operator must follow the procedures as outlined in its operating documents.

15. The Operator must have and keep current a comprehensive operations Manual that is tailored for their proposed operation and contain, at a minimum:
 - a. Operations policies, methods, and procedures that address Safety Risk Management (SRM);
 - b. Adverse weather;
 - c. Flight planning;
 - d. NOTAM;
 - e. Aircraft inspection;
 - f. Preflight duties and post-flight duties;
 - g. Normal and emergency flight procedures;
 - h. Crew Resource Management (CRM) and communications,
 - i. Crewmember responsibilities;
 - j. Accident reporting;
 - k. Hazardous material (HAZMAT) handling and stowage;
 - l. UAS maintenance;
 - m. Operation at Night (if operating at night);
 - n. Multi-UAS Operation (if operating multi-UAS);
 - o. Multi-UAS Operation at Night (if operating multi-UAS at Night); and
 - p. Operation without a VO (if operating without a VO).

16. The Operator must have and keep current a comprehensive crewmember training program that is tailored for their proposed operation and contain, at a minimum:
 - a. Knowledge requirements of 14 CFR § 137.19(e)(1),
 - b. Initial and recurrent training;
 - c. Testing;
 - d. Completion standards;
 - e. Ground training;
 - f. Site surveying;
 - g. Flight training;
 - h. Normal and emergency procedures;
 - i. UAS operating limitations;
 - j. Lost-link procedures;
 - k. Multi-UAS;
 - l. Any ATO-issued COA that applies to operations under this exemption;
 - m. HAZMAT handling and stowage;
 - n. Operation at Night (if operating at night), the Training Program must include:
 - o. Elements to ensure crewmembers are personally prepared for night operation, with a focus on eyesight preparation and fatigue;
 - o. Emphasis on the preparation of the ground station and landing location, ensuring it is as well-lit as possible, without hindering the PIC's night vision; and
 - o. Satisfactory functional checks of the aircraft lights.
 - o. Multi-UAS Operation (if operating Multi-UAS), the Training Program must include:
 - o. Satisfactory pre-flight inspection of the GCS and operating area to ensure that three UAS can operate and land safely.
 - p. Multi-UAS Operation at Night (if operating multi-UAS at night), the Training

Program must include:

- Satisfactory pre-flight inspection of the GCS and operating area to ensure that three UAS can operate and land safely; and
 - Satisfactory pre-flight checks to ensure the aircraft identification lights distinguish each UAS individually.
- q. Operation without a VO (if operating without a VO), the Training Program must include:
- All roles and responsibilities of the VO to be assumed and conducted by the PIC.
17. Any aircraft that has undergone maintenance or alterations that affect the UAS operation or flight characteristics (e.g., replacement of a flight-critical component) must undergo a functional test flight prior to conducting further operations under this exemption. Functional test flights may only be conducted by a PIC with a VO (if used) and other personnel required to conduct the functional flight test (such as a mechanic or technician) and must remain at least 500 feet from other people. The functional test flight must be conducted in such a manner so as to not pose an undue hazard to persons and property.
18. The Operator is responsible for maintaining and inspecting all aircraft to be used in the operation and ensuring that they are all in a condition for safe operation.
19. Prior to each flight, the PIC must conduct a pre-flight inspection and determine the aircraft is in a condition for safe flight. The pre-flight inspection must account for all potential discrepancies, such as inoperable components, items, or equipment. If the inspection reveals a condition that affects the safe operation of the UAS, the aircraft is prohibited from operating until the necessary maintenance has been performed, and the aircraft is found to be in a condition for safe flight.
20. The Operator must follow the UAS manufacturer's operating limitations, maintenance instructions, service bulletins, overhaul, replacement, inspection, and life-limit requirements for the UAS and UAS components. Each UAS operated under this exemption must comply with all manufacturers' safety bulletins. Maintenance must be performed by individuals who have been trained by the Operator in proper techniques and procedures for these UAS. All maintenance must be recorded in the UAS records including a brief description of the work performed, date of completion, and the name of the person performing the work.
21. A PIC must hold a current remote pilot certificate with a small UAS rating issued under Part 107. The PIC must meet the requirements of Section 107.65, *Aeronautical knowledge recency*.
22. For night operations, the PIC must not have any night operating limitations on their FAA-issued airman medical certificate, nor any medical condition which interferes with night vision and must be able to perceive those colors necessary to correctly distinguish the UA's position and orientation at night.

23. The PIC must also hold at least a current FAA third-class airman medical certificate. The PIC may not conduct the operation if the PIC knows or has reason to know of any medical condition that would make the PIC unable to meet the requirements for at least a third-class medical airman medical certificate or is taking medication or receiving treatment for a medical condition that results in the PIC being unable to meet the requirements for at least a third-class medical certificate. A VO (if used) or any other direct participant may not participate in the operation if they know or have reason to know of any physical or mental condition that would interfere with the safe operation of the UAS.
24. The PIC must satisfactorily complete the Operator's training program requirements, as described in the training manual; and satisfactorily complete the applicable knowledge and skills requirements for agricultural aircraft operations outlined in Part 137, with the exception of Sections 137.19(e)(2)(ii), 137.19(e)(2)(iii), and 137.19(e)(2)(v), which are not required for the purposes of meeting this condition. The operator or chief supervisor's knowledge and skill tests of 14 CFR § 137.19(e) may be self-administered. Documentation of satisfactory completion of both the training program and the knowledge and skill tests of Section 137.19(e) must include the date of the test, as well as the PIC's name, FAA pilot certificate number, and legal signature. This documentation must be provided to the FAA upon request.
25. PIC qualification flight hours and currency may be logged in a manner consistent with 14 CFR § 61.51(b). However, time logged for UAS operations may not be recorded in the same columns or categories as time accrued during manned flight, and UAS flight time does not count toward total flight time required for any Part 61 requirement.
26. When operating without a VO, the PIC will remain at the ground station at all times while any UAS is in the air. The PIC will not leave the ground station to load or service a UAS on the ground while any UAS is in the air. When operating without a VO, the PIC must land all three UAS before proceeding to load or service.
27. All training operations must be conducted during dedicated training sessions in accordance with the Operator's training program. The Operator may conduct training operations only for the Operator's employees. Furthermore, the PIC must operate the UA not closer than 500 feet to any nonparticipating person while conducting training operations. Training, individually and combined, is required for night, multiple UAS by a single PIC, and operations without a VO.
28. The VO (if used) must not have any medical condition which interferes with night vision and must be able to perceive those colors necessary to correctly distinguish the UA's position and orientation at night.
29. For night operations, the VO (if used) must have completed the night training portion of the Operator's training program requirements, the completion of which must be documented.

30. UAS operations may be conducted during night, as defined in 14 CFR § 1.1. All operations must be conducted under visual meteorological conditions (VMC). Operations may not be conducted under special visual flight rules (SVFR). Night operations require anti-collision lighting that is visible for 3 statute miles and has a flash rate sufficient to avoid a collision as is consistent with 14 CFR § 107.29(b). The aircraft must also be equipped with continuously illuminated identification lighting.
 - a. For multi-UAS operation at night, the UAS must incorporate position lights configured to match each UAS's color displayed in the ground station software.
31. For night operations, the area of operation must be sufficiently illuminated to allow both the remote PIC and VO (if used) to identify people or obstacles on the ground, or the PIC must have inspected the operating area in person during daylight hours in order to assess all potential hazards and develop a plan to avoid these hazards.
32. For night operations, the PIC must verify all aircraft lights are fully functional prior to each operation. Should the lighting system become inoperative, the night operation must cease immediately.
33. The UA may not be operated less than 500 feet below or less than 2,000 feet horizontally from a cloud or when visibility is less than 3 statute miles from the PIC.
34. For UAS operations where a global navigation satellite system (GNSS) signal is necessary to safely operate the aircraft, the PIC must immediately recover or land the UA upon loss of GNSS signal.
35. An individual system failure must not interfere with the operation of other UAS or cause incidents, accidents, or loss of control involving UAS that are the subject of this exemption.
36. If the PIC loses command or control link, the UA must follow a pre-determined route to either reestablish link or immediately recover or land.
37. The UAS must be equipped with a flight termination system. Prior to operations subject to this exemption, the flight termination system must be tested and verified to operate as described in the operating documents.
38. The PIC must abort the flight operation if unexpected circumstances or emergencies arise that could degrade the safety of persons or property. The PIC must terminate flight operations without causing undue hazard to persons or property in the air or on the surface.
39. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough available power for each aircraft involved in the operation to conduct the intended operation with sufficient reserve such that in the event of an emergency, the PIC can land the aircraft in a known area without posing an undue risk to aircraft or people and property on the surface. In the alternative, if the

manufacturer's manual, specifications, or other documents that apply to the operation of the UAS recommend a specific volume of reserve power, the PIC must adhere to the manufacturer's recommendation, as long as it allows the aircraft to conduct the operation with sufficient reserve and maintain power to land the aircraft in a known area without presenting undue risks, should an emergency arise.

40. Documents used by the Operator to ensure the safe operation and flight of the UAS and any documents required under 14 CFR §§ 91.9, 91.203, and 137.33 must be available to the PIC at the GCS of the UAS any time any UA operates in accordance with this exemption. These documents must be made available to the Administrator or any law enforcement official upon request.
41. The UA must remain clear and give way to all manned aviation operations and activities at all times.
42. The UAS may not be operated by the PIC from any moving device or vehicle.
43. All flight operations must be conducted at least 500 feet from all persons who are not directly participating in the operation, and from vessels, vehicles, and structures, unless when operating:
 - a. *Over or near people directly participating in the operation of the UAS.* No person may operate the UAS directly over a human being unless that human being is directly participating in the operation of the UAS, to include the PIC, VO (if used) and other personnel who are directly participating in the safe operation of the UA.
 - b. *Near nonparticipating persons.* Except as provided in subsection (a) of this section, a UA may only be operated closer than 500 feet to a person when barriers or structures are present that sufficiently protect that person from the UA and/or debris or hazardous materials such as fuel or chemicals in the event of an accident. Under these conditions, the Operator must ensure that the person remains under such protection for the duration of the operation. If a situation arises, in which the person leaves such protection and is within 500 feet of the UA, flight operations must cease immediately in a manner that does not cause undue hazard to persons.
 - c. *Closer than 500 feet to vessels, vehicles and structures.* The UA may be operated closer than 500 feet, but not less than 100 feet, from vessels, vehicles, and structures under the following conditions:
 - (1) The UAS is equipped with an active geo-fence boundary, set no closer than 100 feet to applicable waterways, roadways, or structures;
 - (2) The PIC must have a minimum of 7 hours' experience operating the specific make and model UAS authorized under this exemption, at least 3 hours of which must be acquired within the preceding 12 calendar months;
 - (3) The PIC must have a minimum of 25 hours' experience as a PIC in dispensing agricultural materials or chemicals from a UA;
 - (4) The UA may not be operated at a groundspeed exceeding 15 miles per hour;

- (5) The UA altitude may not exceed 20 feet AGL; and
 - (6) The PIC must make a safety assessment of the risk of operating closer than 500 feet from those objects and determine that it does not present an undue hazard.
- d. *Closer than 100 feet from vessels, vehicles and structures.* The UA may operate closer than 100 feet from vessels, vehicles, and structures in accordance with the conditions listed in 43.c. (2) through (6) and the following additional conditions:
- (1) The UAS is equipped with an active geo-fence boundary, set to avoid the applicable waterways, roadways, or structures; and
 - (2) The Operator must obtain permission from a person with the legal authority over any vessels, vehicles or structures prior to conducting operations closer than 100 feet from those objects.
44. The PIC or a VO must be able to determine the aircraft's altitude, attitude, and direction of flight at all times at the GCS or have an attitude threshold limit alert that must be operable prior to night flight operations.
45. All operations shall be conducted from and over predetermined, uninhabited, segregated, private or controlled-access property as described in the Operator's Flight Operations Procedures Manual. The PIC must ensure the entire operational area will be controlled³⁸ to reduce risk to persons and property on the ground, as well as other users of the National Airspace System (NAS). This area of operation will include a defined lateral and vertical area where the aircraft will operate and must be geo-fenced to prevent any lateral and vertical excursions by the operating aircraft. Safety procedures must be established for persons, property and applicable airspace within the area of operation. A briefing must be conducted regarding the planned UAS operations prior to operation at each location of operation in which the Operator has not previously conducted agricultural aircraft operations. All personnel who will be performing duties within the boundaries of the area of operation must be present for this briefing. Additionally, all operations conducted under this exemption may only occur in areas of operation that have been physically examined by the Operator prior to conducting agricultural aircraft operations and in accordance with the associated COA.
46. Any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA must be reported within 24 hours as required by the applicable COA issued by the FAA ATO. Additionally, any incident or accident that occurs, or any flight operation that transgresses the lateral or vertical boundaries of the operational work area, must be reported to 137 UAS Operations Office at UAS137Certificates@faa.gov.

Failure to comply with any of the above conditions and limitations may result in the immediate suspension or rescission of this exemption.

Unless otherwise specified in this grant of exemption, the UAS, PIC, and the Operator must comply with all applicable parts of 14 CFR including, but not limited to, Parts 45, 47, 91, and

³⁸ The Operator will control access to minimize hazards to persons and property in the air and on the ground.

137. In addition, the Operator must comply with all limitations and provisions of the Operator's agricultural aircraft operator certificate, which the Operator must obtain prior to conducting agricultural operations in accordance with 14 CFR § 137.11.

The Effect of the FAA's Decision

This exemption terminates on March 31, 2026, unless sooner superseded or rescinded.

To request an extension or amendment to this exemption, please submit your request by using the Regulatory Docket No. FAA-2023-1833(<http://www.regulations.gov>). In addition, you should submit your request for extension or amendment no later than 120 days prior to the expiration listed above, or the date you need the amendment, respectively.

Any extension or amendment request must meet the requirements of 14 CFR § 11.81.

Issued in Washington, D.C., on February 26, 2024.

Sincerely,

/s/

Hugh J. Thomas
Acting Deputy Executive Director
Flight Standards Service

Enclosure(s)

Attachment 1

Supplemental Document(s)	Information Received
Hylio Concept of Operations (CONOPS)	This manual is intended to capture the operating methods and philosophy of The Operator. It is written to reinforce the policy of The Operator to operate within the constraints of any FAA issued waivers and all other governing law. To do so in respect of others living in the areas near our operations and with proper respect for personal privacy. To do all of this safely and effectively by utilizing sound aviation risk management and mitigation processes.
Hylio Operations and Safety Manual	This manual contains detailed information describing Hylio's procedures for UAS operations. The information includes normal and emergency operating procedures and chemical and environmental procedures.
Hylio Risk Assessment and Mitigation Manual	This document is intended to set the conditions and culture for Hylio to operate safely within the FARs and approved FAA waivers. It outlines how to identify hazards to operations and mitigation strategies. It also serves as guidance for using all available information to craft a mission plan that functions at an equivalent or safer level than FAA rules.
Hylio Training Manual	This manual describes training for Hylio UAS pilots and other crewmembers. The information includes ground and flight training syllabi UAS systems and operations, maintenance/software, regulations, and safety.
Hylio AG-230 Maintenance Manual	This document contains detailed information describing inspection and maintenance procedures for the Hylio AG-230 UAS, including ground and flight testing.
Hylio AG-230 AgroSol GCS Software Manual	Provides guidance to install, activate, and use the AgroSol GCS software. It also provides instruction on setup and use of the cloud-based Flight Simulator feature in GCS that can be used to simulate drones in order to practice spray missions.

Hylío AgroDrone Spray System and Operations Manual	A 92-page manual with detailed instructions ranging from Unboxing the Hylío AgroDrone to assembly, setting flight modes, calibrations, setup and connections for first flight. Recommended and advanced settings are thoroughly covered as well as emergency procedures, warranty and software updates.
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US Department
of Transportation

Federal Aviation
Administration

AGRICULTURAL AIRCRAFT OPERATOR CERTIFICATE APPLICATION

Paperwork Reduction Act Statement: The information collected on this form is required. This form is submitted to determine eligibility for the issuance of the Agriculture Aircraft Operator Certificate. Confidentiality is neither requested nor provided. We estimate that it will take 1 hour to complete the form. Please note that an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control number associated with this collection is 2120-0049. Comments concerning the accuracy of this burden and suggestions for reducing the burden should be directed to the FAA at: 800 Independence Ave. SW, Washington, DC 20591
Attn: Information Collection Clearance Officer, ASP-110.

SUPPLEMENTAL
INFORMATION

Form 8710-3 (12/16)



US Department
of Transportation
Federal Aviation
Administration

AGRICULTURAL AIRCRAFT OPERATOR CERTIFICATE APPLICATION

INSTRUCTIONS
Complete form in its entirety
Submit to the local Flight Standards
District Office

1. APPLICATION FOR	TYPE	FOR DISPENSING <i>(Check one)</i>	ORIGINAL		
	PRIVATE	ECONOMIC POISONS	AMENDMENT		
	COMMERCIAL	OTHER THAN ECONOMIC POISONS	REISSUANCE		
2. NAME AND ADDRESS OF APPLICANT		3. PRINCIPAL OPERATIONS BASE <i>(Airport, City, State)</i>			
TELEPHONE NUMBER		TELEPHONE NUMBER			
4. OPERATING AS	INDIVIDUAL	OTHER <i>(Specify)</i>	5. NAME OF CHIEF SUPERVISOR OF OPERATIONS <i>(Commercial Operations Only)</i>		
	CORPORATION				
	PARTNERSHIP				
		<i>(First)</i>	<i>(Middle Initial)</i>	<i>(Last)</i>	
6. AIRMAN CERTIFICATE HELD			CERTIFICATE NUMBER		
GRADE		RATINGS			
PRIVATE	ASEL	AMES	TYPE RATING(S) <i>(Specify)</i>		
COMMERCIAL	AMEL	HELICOPTER			
AIRLINE TRANSPORT	ASES	GYROPLANE			
7A. DO YOU HOLD A CURRENTLY EFFECTIVE CERTIFICATE OF WAIVER FOR CONDUCTING AGRICULTURAL AIRCRAFT OPERATIONS?			NO		
			YES <i>(Complete 7B)</i>		
7B. WAIVER HELD	DATE ISSUED	EXPIRATION DATE	FAA DISTRICT OFFICE WHERE ISSUED		
8. AGRICULTURAL AIRCRAFT TO BE OPERATED					
MAKE	MODEL	EQUIPPED FOR		TOTAL NUMBER EACH AIRCRAFT OPERATED	REGISTRATION MARK <i>(List a minimum of one)</i>
		LIQUID	SOLID		
9. LIST THE NAME(S) AND AIRMAN CERTIFICATE NUMBER(S) OF AGRICULTURAL PILOT(S) WORKING FOR YOU AT THE PRESENT TIME <i>(Use separate sheet and attach if additional space is needed.)</i>					
NAME	CERT. NO.	NAME	CERT. NO.		
10. REMARKS <i>(if applicable)</i>					
11. CERTIFICATION: I CERTIFY THAT STATEMENTS MADE ON THIS FORM ARE TRUE AND CORRECT.					
DATE	TITLE	SIGNATURE			

INSPECTION REPORT - For FAA Use Only

(To be completed by the General Aviation for Flight Standards District Office)

COMPLIANCE WITH APPLICABLE REGULATIONS

1. PILOTS	NOT REQUIRED	SATISFACTORY	UNSATISFACTORY
A. CERTIFICATES			
B. RATING(S)			
C. KNOWLEDGE TEST			
D. SKILL TEST			
2. AIRCRAFT			
A. CERTIFICATED			
B. AIRWORTHY			
C. EQUIPPED FOR AGRICULTURAL OPERATIONS			

10. REMARKS *(Include an explanation of denial if application is disapproved).*

4. DISTRICT OFFICE ACTION

	CERTIFICATE ISSUED	INSPECTORS SIGNATURES
	APPLICATION DISAPPROVED	
DATE INSPECTION COMPLETED		

DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION CERTIFICATE OF WAIVER OR AUTHORIZATION	
ISSUED TO Any Operator with a valid 49 USC 44807 Grant of Exemption	
This certificate is issued for the operations specifically described hereinafter. No person shall conduct any operation pursuant to the authority of this certificate except in accordance with the standard and special provisions contained in this certificate and such other requirements of the Federal Aviation Regulations not specifically waived by this certificate.	
OPERATIONS AUTHORIZED Operation of Unmanned Aircraft System(s) (UAS) in accordance with the operators' 49 USC 44807 Grant of Exemption in Class G airspace at or below 400 feet Above Ground Level (AGL) in the National Airspace System (NAS).	
LIST OF WAIVED REGULATIONS BY SECTION AND TITLE N/A	
STANDARD PROVISIONS	
1. A copy of the application, made for this certificate shall be attached and become a part hereof. 2. This certificate shall be presented for inspection upon the request of any authorized representative of the Federal Aviation Administration, or of any State or municipal official charged with the duty of enforcing local laws or regulations. 3. The holder of this certificate shall be responsible for the strict observance of the terms and provisions contained herein. 4. This certificate is nontransferable.	
Note: This certificate constitutes a waiver of those Federal rules or regulations specifically referred to above. It does not constitute a waiver of any State law or local ordinance.	
SPECIAL PROVISIONS	
Special Provisions Nos. A to G, inclusive, are set forth on the attached pages.	
This Certificate of Waiver or Authorization (COA) is valid for two years from the issuance of a 49 USC 44807 Grant of Exemption and is subject to cancellation at any time upon notice by the Administrator or his/her authorized representative.	
BY DIRECTION OF THE ADMINISTRATOR	
/S/	
<u>FAA Headquarters</u> (Region)	<u>Joseph Maibach</u> (Signature)
<u>Acting Manager, UAS Policy Team, AJV-P22</u> (Title)	

SPECIAL PROVISIONS**A. General.**

1. Unmanned aircraft have no on-board pilot to perform see-and-avoid responsibilities; therefore, when operating outside of active restricted and warning areas approved for aviation activities, provisions must be made to ensure an equivalent level of safety exists for unmanned operations consistent with 14 CFR Part 91 §91.111, §91.113 and §91.115.
2. The approval of this COA is effective only with an approved 49 USC 44807 Grant of Exemption.
3. This authorization may be canceled at any time by the Administrator, the person authorized to grant the authorization, or the representative designated to monitor a specific operation. As a general rule, this authorization may be canceled when it is no longer required, there is an abuse of its provisions, or when unforeseen safety factors develop. Failure to comply with the authorization is cause for cancellation. The operator will receive written notice of cancellation.

B. Safety of Flight.

1. The operator or pilot in command (PIC) is responsible for halting or canceling activity in the COA area if, at any time, the safety of persons or property on the surface or in the air is in jeopardy, or if there is a failure to comply with the terms or conditions of this authorization.
2. The PIC is responsible:
 - a. To remain clear and give way to all manned aviation operations and activities at all times,
 - b. For the safety of persons or property on the surface with respect to the UAS, and
 - c. For compliance with CFR Parts 91.111, 91.113 and 91.115.
3. UAS pilots must ensure there is a safe operating distance between aviation activities and Unmanned Aircraft (UA) at all times.
4. Visual observer (s) must be used at all times and maintain instantaneous communication with the PIC.
5. The PIC is responsible to ensure visual observer(s) are:
 - a. Able to see the UA and the surrounding airspace throughout the entire flight, and
 - b. Able to sufficiently provide the PIC with the UA's flight path, and proximity to all aviation activities and other hazards (e.g., terrain, weather, structures) to enable the PIC to exercise effective control of the UA to prevent the UA from creating a collision hazard.
6. Visual observer(s) must be able to communicate clearly to the PIC any instructions required to remain clear of conflicting traffic.

7. The operator or delegated representative must not operate in Prohibited Areas, Special Flight Rule Areas or, the Washington National Capital Region Flight Restricted Zone. Operations in the Washington DC Special Flight Rule Area may be conducted in accordance with FDC NOTAM 6/1117. Such areas are depicted on charts available at http://www.faa.gov/air_traffic/flight_info/aeronav/. Additionally, aircraft operators should abide by Notices to Airmen (NOTAMS) that restrict operations in proximity to power plants, electric substations, dams, wind farms, oil refineries, industrial complexes, national parks, the Disney resorts, stadiums, emergency services, the Washington DC Metro Flight Restricted Zone (FRZ), military or other federal facilities.

C. Reporting Requirements.

1. Documentation of all operations associated with UAS activities is required, regardless of the airspace within which the UAS operates. **NOTE:** Negative (zero flights) reports are required.
2. The proponent must submit the following information to 9-AJV-115-UASOrganization@faa.gov on a monthly basis:
 - a. Name of operator, Exemption number, and aircraft registration number
 - b. UAS type and model
 - c. All operating locations to include location city/name and latitude/longitude
 - d. Number of flights (per location, per aircraft)
 - e. Total aircraft operational hours
 - f. Takeoff or Landing damage
 - g. Equipment malfunctions. Reportable malfunctions include, but are not limited to the following:
 - (1) On-board flight control system
 - (2) Navigation system
 - (3) Power plant failure in flight
 - (4) Fuel system failure
 - (5) Electrical system failure
 - (6) Control station failure
 - h. The number and duration of lost link events (control, performance and health monitoring, or communications) per aircraft per flight.

D. Notice to Airmen (NOTAM).

A distant (D) NOTAM must be issued when unmanned aircraft operations are being conducted.

This requirement may be accomplished:

1. Through the operator's local base operations or NOTAM issuing authority, or
UAS Operations 400 feet and below for Civil
Purposes November 2019

2. By contacting the NOTAM Flight Service Station at 1-877-4-US-NTMS (1-877-487- 6867) not more than 72 hours in advance, but not less than 24 hours prior to the operation, unless otherwise authorized as a special provision. The issuing agency will require the:
 - a. Name and address of the pilot filing the NOTAM request.
 - b. Location, altitude, and/or operating area.
 - c. Time and nature of the activity.
 - d. Number of UAS flying in the operating area.
3. The area of operation defined in the NOTAM must only be for the actual area to be flown for each day and defined by a point and the minimum radius required to conduct the operation.
4. The operator must cancel applicable NOTAMs when UAS operations are complete or will not be conducted.

E. Coordination Requirements.

1. Operators and UAS equipment must meet the requirements (communication, equipment, and clearance) of the class of airspace within which the UAs will operate.
2. Operator filing and the issuance of required distance (D) NOTAM will serve as advance ATC facility notification for UAS operations in an area.
3. Coordination and de-confliction between Military Training Routes (MTRs) is the operator's responsibility. When identifying an operational area the operator must evaluate whether an MTR will be affected. In the event the UAS operational area overlaps an MTR, the operator will contact the scheduling agency 24 hours in advance to coordinate and de-conflict. If unable to determine the MTR point of contact, contact the FAA at email address mail to: 9-AJV-115-UASOrganization@faa.gov with the IR/VR routes affected and the FAA will provide the scheduling agency information. If prior coordination and de-confliction does not take place 24 hours in advance, the operator must remain clear of all MTRs. Scheduling agencies for SUAs are listed in the FAA JO 7400.8.

F. Flight Planning Requirements.

1. Operations must be under Visual Meteorological Conditions (VMC) and meet the following conditions and limitations:
 - a. At or below 400 feet AGL, and
 - b. Beyond the following distances from the airport reference point (ARP) of a public use airport, heliport, gliderport, or seaport listed in the Digital - Chart Supplement (d-CS), Alaska Supplement, or Pacific Chart Supplement of the U.S. Government Flight Information Publications:
 - (1) 5 nautical miles (NM) from an airport having an operational control tower; or
 - (2) 3 NM from an airport having a published instrument flight procedure, but not having an operational control tower; or

- (3) 2 NM from an airport not having a published instrument flight procedure or an operational control tower; or
 - (4) 2 NM from a heliport.
2. For all UAS requests not covered by the conditions listed above, the exemption holder may apply for a new Air Traffic Organization (ATO) COA at <https://caps.faa.gov/coaportal>.

G. Emergency/Contingency Procedures.

1. Lost Link/Lost Communications Procedures: If the UAS loses communications or loses its GPS signal, the UA must return to a pre-determined location within the private or controlled-access property and land.
2. Any incident, accident, or flight operation that transgresses the lateral or vertical boundaries defined in this COA must be reported to the FAA via email at: 9-AJV-115-UASOrganization@faa.gov within 24 hours. Accidents must be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: www.nts.gov.

AUTHORIZATION

This COA does not, in itself, waive any Title 14 Code of Federal Regulations, nor any state law or local ordinance. Should the proposed operation conflict with any state law or local ordinance, or require permission of local authorities or property owners, it is the responsibility of the operator to resolve the matter. This COA does not authorize flight within Special Use airspace without coordinating and de-conflicting with the scheduling agency. The operator is hereby authorized to operate the Unmanned Aircraft System in the National Airspace System.