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U.S. Department of Transportation Docket Management System
West Building Ground Floor, Room W12-140
1200 New Jersey Ave, SE
Washington, DC 20590

Re: Petition for Exemption under part 11 of the Federal Aviation Regulations from 14 C.F.R. §§ 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) and (2), 91.417(a) and (b), 137.19(c) and (d), 137.19(e)(2)(ii)(iii), and (v), 137.31(a) and (b), 137.33(a) and (b), 137.41(c), and 137.42.

PETITION FOR EXEMPTION

Dear Sir or Madam:

K&W Farms, LLC ("**Petitioner**"), an operator of the DJI AGRAS T-40 ("**Agras T40**") Unmanned Aircraft System ("**UAS**"), hereby petitions for an exemption from certain sections of 14 C.F.R. 61, 91, and 137 to operate a UAS for commercial agricultural-related services. The relief requested is similar to that granted in Exemption No. 17261 to DroneSeed, Co., because Petitioner intends to operate a UAS weighing more than the 55-pound limit of 14 C.F.R. part 107 for commercial agricultural-related services. Petitioner is in the agricultural industry and seeks to operate a single Agras T40 for agricultural pesticide application under 14 C.F.R. part 137.

Petitioner asks the FAA to grant its petition because (A) granting the request would benefit the public as a whole, and (B) granting the exemption will not adversely affect safety because the exemption will provide a level of safety at least equivalent to the existing rules.

The primary contact for this petition is:

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I. Regulations from which exemption is requested:

- 14 C.F.R. § 61.3(a)(1)(i), *Requirement for certificates, ratings, and authorizations*
- 14 C.F.R. § 91.7(a), *Civil aircraft airworthiness*
- 14 C.F.R. § 91.119(c), *Minimum safe altitudes: General*
- 14 C.F.R. § 91.121, *Altimeter settings*
- 14 C.F.R. § 91.151(b), *Fuel requirements for flight in VFR conditions*
- 14 C.F.R. § 91. 403(b), *Maintenance, preventative maintenance, or alterations*
- 14 C.F.R. § 91.405(a), *Maintenance required*
- 14 C.F.R. § 91.407(a)(1), *Operation after maintenance, preventative maintenance, rebuilding, and inspections*
- 14 C.F.R. § 91.409(a)(1) and (2), *Inspections*
- 14 C.F.R. § 91.417(a) and (b), *Maintenance records*
- 14 C.F.R. § 137.19(c) and (d), *Certification Requirements, Commercial Operator Pilots; Aircraft*
- 14 C.F.R. § 137.19(e)(2)(ii)(iii), and (v), *Certification Requirements; Knowledge and Skill Tests; Approaches to the working area; flare-outs; and pullups and turnarounds*
- 14 C.F.R. § 137.31, *Aircraft Requirements; Certification Requirements; Shoulder Harnesses*
- 14 C.F.R. § 137.33, *Carrying of certificate; Certificate carried on the aircraft; Registration and airworthiness certificates available*
- 14 C.F.R. §137.41(c), *Personnel; Pilot in Command, Commercial Certificate; Demonstration of knowledge and skills*
- 14 C.F.R. § 137.42, *Fastening of safety belts and shoulder harnesses*

II. Business Model

Petitioner is in the agricultural business in Newton, Kansas.

Petitioner is also in the process of obtaining a Commercial Agricultural Aircraft Operator Certificate under 14 C.F.R. part 137 ("**part 137**"). The operations proposed in this Petition for Exemption will increase the safety, pace, and economic benefits of UAS integration into the National Airspace System ("**NAS**").

III. Granting this Petition is in the public interest

1. Petitioner's proposed primary operations are aerial application of fungicides, herbicides, and insecticides in accordance with part 137. Agricultural operations in manned aircraft pose additional risks to the operator and the general public. Manned agricultural aircraft operations present risk of accidents and fatality to the Petitioner's employees, as detailed in FAA report NTSB/SIR-14/01 PB2014-105983:

> 78 accidents [and 10 fatalities] occurred during calendar year 2013 and involved some aspect of agricultural (ag) operations, pilot training, or other crop protection activities.

Replacing manned aircraft agricultural operations with UAS operations in Agras T40, mitigates the

risk of personal injury and fatality because the Agras T40 is remotely operated. Therefore, granting this Petition is in the public interest.

2. A manned aircraft providing agricultural-related services produces significant environmental and noise pollution compared to the Agras T40. The Agras T40 is battery powered, and operating the Agras T40 will result in substantially less environmental and noise pollution to the public when compared to a manned aircraft. This supports the White House's Net-Zero Game Changers Initiative. Therefore, granting this Petition is in the public interest.

3. Unlike most aircraft used for agricultural applications which have a single rotor or propeller, the Agras T40 has multiple rotors. In the unlikely event of a motor or rotor failure, the Agras T40 software will detect a malfunction and correct itself with the compensatory use of the remaining motors. In contrast, a rotor malfunction in a manned aircraft could result in complete or catastrophic engine failure and loss of life and aircraft. Therefore, granting this Petition is in the public interest.

4. A manned aircraft providing agricultural-related services conducts spray operations at higher altitudes and higher rates of speed, increasing the probability of application overspray, off-target movement, as well as increasing the probability of collision. The Agras T40 will conduct its spray operations between approximately 10-25 feet above ground level ("**AGL**") and at a maximum speed of approximately 22mph. Use of the Agras T40 will substantially reduce the likelihood of mid-air collision and drift of economic poisons compared to a manned aircraft. Therefore, granting this Petition is in the public interest.

IV. The exemption will provide a level of safety at least equal to the existing rules.

The Petitioner has organized its safety analysis into three sections: (A) The large Unmanned Aircraft System (UAS); (B) The UAS Pilot in Command (PIC); and (C) The UAS Operating Parameters.

A. Unmanned Aircraft System (UAS)

The Agras T40 is manufactured by DJI, a well-established and world-renowned UAS manufacturer.

Maximum Take Off Weight (spraying)	198.42 lbs (at sea level)
Maximum Take Off Weight (spreading)	222.67 lbs (at sea level)
Maximum Payload	88.18 lbs
Liquid Spray Tank	10.57 gal
Max Flow Rate from 2 Sprinklers	Up to 190.2 gallons per hour

The Agras T40 uses the revolutionary Coaxial Twin Rotor design, with eight foldable rotors positioned on foldable arms. The dimensions of the Agras T40, with arms and blades extended, are 2800 mm × 3150 mm × 780 mm, and the dimensions of the Agras T40 with folded arms are 1125 mm × 750 mm × 850 mm.

The Agras T40 integrates numerous cutting-edge DJI technologies, including the Active Phased Array Omnidirectional/Backward and Downward Radar and Intelligent Agriculture Cloud Platform. The Active Phased Array Omnidirectional/Backward and Downward Radar system incorporates a binocular vision sensor system to provide 360-degree horizontal omnidirectional obstacle sensing. perceives obstacles and surroundings in all environments, weather conditions, and viewing angles, regardless of dust and light interference. This allows the Agras T40 to avoid obstacles automatically and adapt flight functions to ensure safe operations. The Intelligent Agricultural Cloud Platform, along with the Phantom4 Multispectral platform, enable variable spraying and spreading operations with precision based on the farmland's prescription map. As a commercial-off-the-shelf UAS, the Agras T40 has been successfully flight tested by the market for thousands of hours.

1. UAS Risks and Petitioner's Mitigation Measures

Risk 1: UAS Lost Signal, UAS Low Battery, UAS Lost Visual Line of Sight.

Mitigation: The Agras T40 integrates the high-precision Active Phased Array Omnidirectional Radar, which allows a user can plan operations, manage flights in real-time, and closely monitor aircraft operating status, which allows for a safe landing, even in the event of propulsion system failure.

The Agras T40 has onboard safety features that ensure it can operate safely under both normal and contingency operating conditions. These features include automation to increase safety and reduce pilot workload. Examples include the Return to Home ("**RTH**") feature which will navigate the Agras T40 to a certain RTH altitude, then transport the Agras T40 to the takeoff location, unless overridden with a new home location. RTH activates in the case of lost signal or low battery, and the pilot can activate RTH if the pilot or the VO loses visual line of sight or loss of control. The Agras T40 incorporates fly away prevention measures through mission planning software that creates geofencing areas to prohibit flight paths over certain terrain.

Risk 2: Flight over unwanted area.

Mitigation: The DJI RC Plus remote controller is used as a control station. The remote controller and DJI Assistant 2 for MG software, permit Petitioner to create geofenced areas that prohibit flight paths over unwanted terrain. Moreover, the Agras T40 will remain in Visual Line of Sight (***VLOS***); as needed, the operator will manually control the Agras T40 to avoid flight over unwanted areas.

Risk 3: UAS Flyaway

Mitigation: Flyaways can occur for various reasons, most commonly UAS misconfiguration of the compass; lack of following pre-flight checklist, including setting RTH location/home; or operator error. Petitioner mitigates this risk through the ability to take control of the Agras T40 at any time using the DJI RC Plus remote controller.

Flights will be conducted at remote or low-population density agricultural locations. These locations are private property with access restricted to people under Petitioner's control. Additionally, the Agras T40's limited battery life flight time mitigates the risk of flyaway.

Petitioner has a redundant failsafe that takes over in case of a flyaway. For example, two points are programmed into the aircraft's software, creating a geographic fence for the flight computer. The Agras T40 will maintain limits within the determined area. If the Agras T40 falls outside the area, it will stop and hover in the location breached, allowing the PIC to take manual control.

Risk 4: Inclement Weather

Mitigation: The Agras T40 has an IPX6K rating for its core modules, which include the avionics module, radio frequency module, Dual Atomized Centrifugal Sprinkler, and Active Phased Array Omnidirectional/Backward and Downward Radar. This standard is given to a product to endure a minimum of three minutes of powerful jets spraying at least 100 liters of water per minute all over the casing of the product without the water penetrating the product. This standard ensures the core module components are protected from weather during flights in both light rain and heavy rain. If heavy rain occurs, this housing allows the operator to return the Agras T40 home or quickly land, before systems are damaged. Before every flight, Petitioner's pilots check the weather to ensure favorable weather conditions. If the weather is Instrument meteorological conditions ("**IMC**"), flights will not be conducted.

Risk 5: Software error causes operational issue.

Mitigation: The navigational and flight control equipment are original equipment manufacturer ("**OEM**") components from DJI, a large equipment manufacturer selected for being common, well-supported, and safe due to the millions of hours of testing by the manufacturers and iterative improvements caused by users in the field reporting errors (as opposed to being purchased from companies that are selling prototype and initial-run units prone to manufacturing and engineering problems).

Risk 6: Malfunction of spraying equipment (sprinklers, pumps, tubing) causes spray of target that should not be sprayed.

Mitigation: DJI's Dual Atomized Spraying System utilizes a dual atomized spray disc to ensure even droplets and more efficient pesticide usage. DJI's proprietary centrifugal valve prevents leakage, avoids over-fertilization, and reduces pesticide use while protecting the environment. The aircraft will use 2 sprinklers (Model # LX8060SZ) that produce droplets between 50-300 μm. These sprinklers have a maximum width of 36, relative to an operating altitude of 8.2 feet with a flight speed of 23 feet per second.

Risk 7: Failure of mission planner software.

Mitigation: Petitioner's operators can manually take control of the Agras T40 at any given time. Petitioner utilizes a radio controller manufactured by DJI, an industry-standard model that includes a toggle switch to transition from programmed to manual flight control. This

permits operators to observe the Agras T40 in flight and take over for any reason.

2. UAS and UAS Operating Parameters Exemptions Requested

(a) 14 C.F.R.§ 91.403(b), *Maintenance, preventative maintenance, or alterations*; 14 C.F.R. § 91.405(a), *Maintenance required*; 14 C.F.R. § 91.407(a)(1), *Operation after maintenance, preventive maintenance, rebuilding, or alteration*; 14 C.F.R. § 91.409(a)(1) and (2), *Inspections*; and 14 C.F.R. 91.417(a) and (b), *Maintenance records*
(b) 14 C.F.R. § 137.19(d), *Certification Requirements; Aircraft*; and 14 C.F.R. § 137.31(a), *Aircraft Requirements; Certification Requirements*
(c) 14 C.F.R. § 91.7(a), *Civil aircraft airworthiness*
(d) 14 C.F.R. § 91.119(c), *Minimum safe altitudes*
(e) 14 C.F.R. § 91.121, *Altimeter settings*
(f) 14 C.F.R. § 91.151(b), *Fuel requirements for flight in VFR conditions*

(a) 14 C.F.R. §§ 91.403(b), *Maintenance, preventative maintenance, or alterations*; 91.405(a), *Maintenance required*; 91.407(a)(1), *Operation after maintenance, preventive maintenance, rebuilding, or alteration*; 91.409(a)(1) and (2), Inspections; 91.417(a) and (b), *Maintenance records*

Petitioner seeks an exemption from the following maintenance and inspection related Federal Aviation Regulations ("**FARs**"), 14 C.F.R. §§ 91.403(b), *Maintenance, preventative maintenance, or alterations*; 91.405(a), *Maintenance required*; 91.407(a)(1), *Operation after maintenance, preventive maintenance, rebuilding, or alteration*; 91.409(a)(1) and (2), *Inspection*s; and 91.417(a) and (b), *Maintenance records*. These regulations specify maintenance, inspection, and records standards in reference to 14 C.F.R. § 43.6. An exemption from these regulations is needed because FARs part 43 and these sections only apply to aircraft with an airworthiness certificate, which the UAS to be operated under this exemption will not have, and because compliance with these regulatory provisions in the context of UAS operations is not feasible.

An equivalent level of safety will be achieved because maintenance, inspections, and records handling will be performed in accordance with the manufacturer's manual and any required manufacturer safety or service bulletins. Moreover, the PIC will conduct a pre-flight inspection of the UAS and all associated equipment to account for all discrepancies and/or inoperable components. Maintenance will be performed and verified to address any conditions potentially affecting the safe operation of the UAS. No flights will occur unless and until all flight critical components of the UAS are airworthy and in a condition for safe operation. A functional test flight will also be conducted in a controlled environment following the replacement of any flight critical components. As required by the operating documents, the PIC who conducts the functional test flight will make an entry in the UAS aircraft records of the flight. Functional flight tests will not involve the carriage of hazardous materials. In addition, the operator will be required to follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the UAS and its components. By using the preflight checklists, Petitioner's Pilot and Aircrew Training and Procedures Program, and a routine maintenance program, Petitioner believes an equivalent level of safety is met and that equipment at risk of failure can be safely

identified before flights occur.

In the DroneXum Exemption, Exemption No. 18413A, the FAA determined that the proposed UAS operations required an exemption from FARs §§ 91.403(b), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b), and that the achievement of an adequate level of safety required certain conditions and limitations. Petitioner proposes in this Petition several limitations related to maintenance, inspections, and records, which Petitioner believes provide a level of safety at least equivalent to that provided by FARs §§ 91.403(b), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b). For these reasons, and consistent with the exemption granted from these sections in the DroneXum Exemption, Petitioner requests an exemption from these FARs subject to the DroneXum limitations without having to perform the inspections and maintenance items required by FARs §§ 91.403(b), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b).

(b) 14 C.F.R. § 137.19(d), Certification *Requirements; Aircraft* and 14 C.F.R. 137.31(a), *Aircraft* Requirements*; Certification Requirements*

Petitioner requests an exemption from 14 C.F.R. § 137.19(d) because the Agras T40 is not certificated. The Agras T40 components have a proven operational history and contain design safety features such that operations conducted under the requirements of this exemption will not adversely impact safety. In Exemption No. 17261, the FAA granted DroneSeed an exemption to §§ 137.19(d), *Certification requirements*, and 137.31(a), *Aircraft requirements*. Consistent with the FAA's prior analysis in Exemption No. 17261, while Petitioner's UAS will not have an airworthiness certificate, Petitioner will be capable of ensuring that the UAS is in a condition for safe operation based upon a thorough pre-flight inspection and compliance with the operating documents. The UAS components have a proven operational history and contain design safety features such that operations conducted under the requirements of this exemption will not adversely impact safety. Thus, although Petitioner's Agras T40 is not certificated, relief is warranted to the extent necessary to permit the Agras T40 to be operated in commercial agricultural-related aircraft operations.

(c) 14 C.F.R. § 91.7(a), *Civil aircraft airworthiness*

Inasmuch as there will be no airworthiness certificate issued for the UAS, Petitioner seeks an exemption from § 91.7(a) *Civil aircraft airworthiness*, which requires that a civil aircraft be in an airworthy condition to be operated. While the UAS operated by Petitioner will not have an airworthiness certificate, consistent with the FAA's determination in the DroneXum Exemption, the pilot may determine the UAS is in an airworthy condition prior to flight. As described more fully in Petitioner's operating documents, this is achieved through adherence to Petitioner's routine pre-flight checklist, regularly scheduled maintenance, and the enhanced pilot training requirements of the Petitioner Pilot and Aircrew Training and Procedures Program.

(d) 14 C.F.R. § 91.119(c), *Minimum safe altitudes*

Petitioner also seeks an exemption from § 91.119(c) *Minimum safe altitudes,* to the extent necessary to allow UAS operations over other than congested areas at altitudes lower than those

permitted by rule. An equivalent or greater level of safety will be achieved given the size, relatively light weight, and slow speed of the UAS, as well as the controlled location where the operations will occur. The ability to operate at those altitudes is one of the key benefits of using UAS for the proposed agricultural activities.

Generally, Petitioner will maintain an operating altitude of 10-25 feet AGL during its spraying operations. The altitude is only increased when exercising caution and issuing a return-to-launch command to the UAS, which causes the UAS to ascend to an altitude of 100 feet AGL before returning home. In the extremely remote and secure environment where Petitioner operations will occur, flying at a low altitude increases the aircraft's efficiency without posing any increased risk to people or property. Even at these low altitudes, Petitioner UAS operations will be conducted at a level of safety equal to or greater than that achieved by a larger manned aircraft performing similar activities at the altitudes required by § 91.119. Moreover, an equivalent or even higher level of safety can be provided instead by, as provided herein, operating so as to de-conflict with manned vehicles operating above 500 feet AGL, within the VLOS of the PIC with the assistance of multiple visual observers ("**VOs**") so as to ensure the safety of and de-confliction with any persons or property in the air and on the ground, including participating and non-participating personnel as well as the other UAS.

(i) This relief is also now considered a summary grant as there have been previous approvals to petitions seeking the same. See FAA Exemption No. 18852 and FAA Exemption No. 18413A.

Condition and Limitation Number 27c states that:

> 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.

To expedite the FAA's safety assessment of the proposed relief sought, Petitioner's has provided a Safety Risk Analysis as Operating Documentation for this Petition.

(e) 14 C.F.R. § 91.121, *Altimeter settings*

Petitioner also requests an exemption from § 91.121 *Altimeter settings*, 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 barometric pressure. In the DroneXum Exemption, the FAA stated that an equivalent level of safety to the requirements of § 91.121 can be achieved in circumstances where the PIC uses an alternative means for measuring and reporting UA altitude, such as global positioning system ("**GPS**"). The UAS that Petitioner intends to use for performing the proposed operations will be equipped with GPS or other equipment for measuring

and reporting UAS altitude. The PIC will check the unmanned aircraft ("***UA***") altitude reading prior to each takeoff, effectively zeroing the UA's altitude at that point. Consistent with previously granted exemptions, these requirements ensure that an equivalent level of safety will be achieved, and an exemption from the requirements of § 91.121 is therefore appropriate.

(f) 14 C.F.R. § 91.151(b), *Fuel requirements for flight in VFR conditions*

Petitioner seeks an exemption from § 91.151(b), *Fuel requirements for flight in VFR conditions*, which would otherwise require a 20-minute fuel reserve to be maintained. The FAA has previously determined that a requirement prohibiting the PIC from beginning a UAS flight unless (considering wind and forecast weather conditions) there was enough available power for UAS to operate for the intended operational time and to operate after that with the reserve power recommended by the manufacturer which would ensure an equivalent level of safety to the fuel requirements of § 91.151. Petitioner will adhere to the same reserve power requirement, and an exemption from § 91.151's fuel requirements for flight in VFR conditions is therefore appropriate.

B. UAS Pilot in Command (PIC)

Petitioner's Agras T40 pilots will hold Remote Pilot Certifications pursuant to part 107 of the Federal Aviation Regulations. Petitioner requests an exemption from the requirement contained in 14 C.F.R. § 137.19(c) that at least one person holds a current U.S. commercial or airline transport pilot certificate and who is properly rated for the aircraft to be used.

Petitioner has integrated safety elements into the operation of its Agras T40, including comprehensive pilot and visual observer training. These requirements include comprehensive Agras T40 training, which includes theory and practical components; pilot-supervised flight training, including agricultural spraying; completion of Petitioner's Pilot and Aircrew Training and Procedures Program requirements, including minimum flight time requirements; demonstrated practical flying ability for the relevant tasks; and continued periodic training. These requirements provide an equivalent level of safety to that established by the requirements for obtaining a Commercial certificate.

1. PIC Related Exemptions Requested:

(a) 14 C.F.R. § 61.3(a)(1)(i), *Requirements for certificates, ratings, and authorizations*
(b) 14 C.F.R. § 137.19(c), *Certification Requirements*, *Commercial Operator -pilots*
(c) 14 C.F.R. § 137.41(c), *Personnel; Pilot in Command; Commercial*

(a) 14 C.F.R. § 61.3(a)(1)(i), *Requirements for certificates, ratings, and authorizations*

Petitioner will conduct the proposed operations under 14 C.F.R part 91 rather than under part 107. In general, part 91 is predicated on the presumption that the pilot in command conducting an operation under part 91 holds an airman certificate under part 61. As a result,

the FAA has determined granting exemption from the requirement of § 61.3(a)(1)(i) to require a person holding a remote pilot 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 ensure clarity.

The statutory obligation for an airman certificate is codified at 49 U.S.C. § 44711(a)(2). Pilots who conduct operations under this exemption with a remote pilot certificate would comply with § 44711(a)(2), as the FAA described in the Operation and Certification of Small Unmanned Aircraft Systems final rule (81 FR 42064, 42088-89 (June 28, 2016). The general requirements for all airmen include eligibility, aeronautical knowledge, and Transportation Security Administration ("**TSA**") vetting. Because the operation will occur only after airmen who hold a current remote pilot certificate have received specific training, have visited the area of operation, and are fully capable of using the tools available to prepare for the operation, conduct comprehensive preflight actions, and conduct the operation only in a limited geographical area, the FAA has previously determined that a remote pilot certificate issued under 14 CFR part 107 provides the FAA sufficient assurance of the pilots' qualifications and abilities to perform the duties related to the operations authorized under this exemption. The remote pilot certificate confirms the petitioner's eligibility, secures TSA vetting, and ensures the PIC has the requisite aeronautical knowledge for operating the UAS within the National Airspace System.

Remote pilots conducting operations under part 107 must complete a detailed aeronautical knowledge test unless they already hold a certificate under 14 CFR part 61 and meet the flight review requirements specified in § 61.56. As a result, all such pilots will have the requisite aeronautical knowledge that is a key component of safe completion of all operations that will occur under this exemption. In this regard, the FAA addressed the applicable parts of § 61.125, Aeronautical knowledge, in the remote pilot certificate requirements.

For the reasons discussed below, this same rationale espoused by the FAA in previous approved exemptions, combined with Petitioner proposed safety mitigations, also supports a finding that the proposed operations under the requested exemptions can be conducted without adversely affecting safety.

The unique nature of the proposed operations, including the low-risk rural environments in which the operations will occur, will ensure that safety is not jeopardized. While part 107 will not apply to the proposed operations, Petitioner intends to conduct the proposed operations in accordance with part 107 wherever possible. Moreover, all UAS operations that meet the definition of an "agricultural aircraft operation" will be conducted in accordance with those portions of part 137 from which Petitioner is not exempt. In addition to compliance with part 107 and the applicable sections of part 137, Petitioner's proposed operations include the following mitigations:

- Prior to any flight operation, Petitioner will visit the area of planned operation and inspect the terrain and vantage points. Petitioner utilizes a variety of tools available to capture this environmental data and use GPS points to accurately mark the boundaries

for a geofence around the planned flight operating area.

- Petitioner will comply with all state laws regarding the application of pesticides. These include state and local agency notification, mapping, and specified safety procedures.

- The PIC will hold a part 107 remote pilot certificate and be at least 18 years of age.

- Prior to beginning operations, the PIC will take all preflight actions as set forth in the Flight Operations and Procedures Manual.

- At least one visual observer will be used for each aircraft during all operations. Both the PIC and VO will maintain a safe distance from the UAS when it is operating as set forth in the Flight Operations and Procedures Manual.

- Flights will be limited to a maximum altitude of no more than 400 feet AGL and will normally be flown at average altitudes of 10 to 50 feet AGL or less.

- The areas to be flown are remote agricultural sites or other uninhabited agricultural sites, which makes for excellent VLOS conditions.

- All operations will occur in a closed-access environment.

- Petitioner will control all personnel at the site at the time of flying. The Agras T40 shall operate from on-site takeoff/landing locations directly next to the PIC and co-located VO. The PIC and the VO will be able to verbally communicate during all operations or utilize hand-held radios on site. In addition, signage announcing future spraying operations will be posted at the site entrance, warning any customer employees or non-participants that an aerial spraying operation is occurring. This is an industry-standard process.

- The maximum flight time for each UAS flight will be a maximum of 40 minutes, with most agricultural flights lasting approximately 10-20 minutes.

- The Agras T40 will only be flown during daylight hours and in good weather.

(b) 14 C.F.R. § 137.19(c), *Certification Requirements, Commercial Operator— Pilots* and 14 C.F.R. 137.41(c), *Personnel; Pilot in Command; Commercial*

In the previous exemption granted to DroneXum, the FAA determined that relief from § 137.19(c) was necessary to permit persons holding a remote pilot certificate with a small UAS rating to act as PIC for commercial agricultural aircraft operations when utilizing a small UAS to conduct the operations. The basis for the relief was that DroneXum'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 FAR § 137.19(e)(1) and (2)(i), (iv), and (vi). The relief was also based, in part, on DroneXum's compliance with the training requirements in its operating documents.

Petitioner's proposed operations are identical to those previously approved by the FAA in Exemption No 18413A for DroneXum. Consistent with the FAA's prior analysis, compliance with the requirements of part 107, subpart C, the additional knowledge and applicable skill requirements in FAR § 137.19(e)(1) and (2)(i), (iv) and (vi), and compliance with the training requirements in Petitioner's operating documents, will ensure that an equivalent level of safety will be achieved.

The part 107 certificate is intended to permit commercial UAS operations and replace the need for a commercial certificate under part 61 when conducting operations for hire. As explained, the Petitioner is, through its own Pilot and Aircrew Training and Procedures Program, requiring experience and training beyond that required by part 107 to achieve a level of safety equivalent to that of operators holding commercial certificates under part 61. Moreover, Petitioner will demonstrate the applicable practical skills required by part 137 prior to conducting agricultural operations. The following comparison between the commercial pilot requirements contained in part 61 and the requirements contained in part 107 demonstrates why Petitioner should be exempted from the provisions in part 137 that require possession of a part 61 commercial certificate.

Section 61.123 requires commercial pilots to be at least 18 years of age and able to have a level of English competency. Petitioner will require its pilots to be at least 18 years of age. English competency is required by part 107. The following chart addresses each aeronautical knowledge requirement of 14 C.F.R. § 61.125 and explains whether it is relevant to, different from, or addressed by part 107 operations or Petitioner's internal procedures.

part 61.125 Aeronautical Knowledge	**Petitioner's Operations under part 107**
Applicable Federal Aviation Regulations of this chapter that relate to commercial pilot privileges, limitations, and flight operations;	Addressed by part 107.
Accident Reporting	Addressed by part 107.
Basic aerodynamics and the principles of flight	Topics applicable to unmanned aircraft are included in part 107.
Meteorology	Applicable meteorology principles are covered by part 107.
Safe and Efficient Operation of Aircraft	Covered by part 107 and included in Petitioner's Pilot and Aircrew Training and Procedures Program.
Weight and Balance	"Loading and Performance" is addressed in part 107. Petitioner will comply with the weight limitations of part 107 and will ensure that external loads do not negatively impact flight characteristics, as required by part 107.
Performance Charts	Not applicable.

Effects of exceeding aircraft performance limitations	Not applicable. Topics applicable to unmanned aircraft are included in part 107.
Pilotage and dead reckoning	Not applicable.
Use of air navigation facilities	Topics applicable to unmanned aircraft are included in part 107.
Decision making and judgment	Covered by part 107.
Principles and functions aircraft systems	Covered by part 107 and by Petitioner's use of the Flight Operations and Procedures Manual.
Emergency operations	Covered by part 107.
Night and high altitude	Not applicable.
Operating within the national airspace	Covered by part 107.
Lighter than air ratings.	Not Applicable.

Section 61.127 contains flight proficiency requirements for specified aircraft categories. Part 107 contains no flight proficiency requirements. Petitioner will require demonstrated multi-rotor proficiency in preflight preparation; preflight procedures; hovering maneuvers; takeoffs, landings, and go-arounds; performance maneuvers; navigation; emergency operations; special operations; and post-flight procedures.

Section 61.129 contains requirements for aeronautical experience. Petitioner will require its pilots to obtain an appropriate level of aeronautical experience, using 14 C.F.R. § 61.129 as a guide to achieve an equivalent level of safety. Many of the requirements of § 61.129 are either inapplicable or excessive for Petitioner's proposed operations, such as cross-country time or instrument time. Part 107 remote pilots do not need to obtain cross-country flight or instrument flight time. Petitioner's pilots will spend all of their time flying the make and model of multi-rotor aircraft used in their operations. These aircraft are far less complicated than manned aircraft. The pilots can, therefore, achieve a comparable level of experience and safety by requiring 20 hours of total flight time of a multi-rotor system as the PIC with at least 10 takeoff and landings. This will be required by Petitioner's Flight Operations and Procedures Manual and Pilot and Aircrew Training and Procedures Program.

Therefore, the FAA should exempt Petitioner from the requirement in 14 C.F.R. § 137.19(c) that at least one person holds a current U.S. commercial or airline transport pilot certificate and who is properly rated for the aircraft to be used. Because of the relief provided to § 137.19(c), the Petitioner also requests relief to the pilot certificate requirements of § 137.41(c), *Personnel*.

C. UAS Operating Parameters

Petitioner's operating parameters will be limited to agricultural locations. Petitioner will either exercise exclusive control and possession of application areas where the Agras T40 will operate, or Petition will ensure that all persons near the drone operation are authorized to be present and understand that drone operations will occur. Additionally, Petitioner will familiarize itself with

the terrain and vantage points of these areas. Petitioner will ensure all paperwork at the state and local levels will be filed before and after operations, when required. Petitioner will comply with all state laws regarding the application of pesticides, including agency notification, mapping, and specified safety procedures.

All UAS operations will be conducted by Petitioner's pilot(s) holding a Remote Pilot Certificate pursuant to 14 C.F.R. part 107, with a visual observer. The pilot will keep the drone within VLOS, and the observer will monitor the Agras T30 through VLOS. Petitioner will comply with 14 C.F.R. part 107, including, but limited to, the parameters set forth in Section (III)(B)(1)(a). Additionally, all operations of the UAS that meet the definition of an "agricultural aircraft operation" will be conducted in accordance with those portions of 14 C.F.R. part 137 from which Petitioner is not exempted.

1. UAS Operating Parameter Related Exemptions Requested

(a) 14 C.F.R. § 137.19(e)(2)(ii), (iii), and (v), *Certification Requirements; Knowledge and skill tests; skills; approaches to the working area; flare-outs; pullups and turnarounds*
(b) 14 C.F.R. § 137.41(c); *Personnel; Pilot in command; demonstration of knowledge and skills*
(c) 14 C.F.R. § 137.31(b), *Shoulder harnesses*
(d) 14 C.F.R. § 137.42, *Fastening of safety belts and shoulder harnesses*
(e) 14 C.F.R. § 137.33(a), *Carrying of certificate; certificate carried on the aircraft*
(f) 14 C.F.R. § 137.33(b), *Registration and airworthiness certificates available*

(a) 14 C.F.R. § 137.19(e)(2)(ii), (iii), and (v), *Certification requirements; Knowledge and skill tests; skills; approaches to the working area; flare-outs; pullups and turnarounds*

Demonstration of the skills described in those paragraphs is not necessary because they are not compatible or applicable to the operation of the Agras T40 during agricultural-related aircraft operations as described in Petitioner's operating documents and this petition. Petitioner's training and the part 107 certification program provide the PIC with the necessary skills to operate the Agras T40 safely. Granting relief from demonstrating approaches to the working area, flare-outs, pullups, and turnarounds will not adversely impact safety. Therefore, relief is warranted. Petitioner is not requesting exemption from the remaining skill requirements of 14 C.F.R. § 137.19(e)(2.

(b) 14 C.F.R. § 137.41(c), *Personnel; Pilot in Command; demonstration of knowledge and skills*

Because of the relief requested to § 137.19(e)(2)(ii), (iii), and (v), Petitioner is requesting relief from those portions of the associated knowledge and skill test requirements of 14 C.F.R. § 137.41(c).

(c) 14 C.F.R. § 137.31(b), *Shoulder harnesses*

An exemption from the requirements related to the installation and use of a shoulder harness and safety belt is warranted because the Petitioner will be operating an unmanned aircraft with no onboard pilot. This requirement is intended to ensure the safety of the onboard pilot during manned agricultural aircraft operations, and thus relief does not adversely impact safety.

(d) 14 C.F.R. § 137.42, *Fastening of safety belts and shoulder harnesses*

The relief requested and justification, therefore, are identical between §§ 137.31(b) and 137.42. An exemption is requested from both.

(e) 14 C.F.R. 137.33(a), *Carrying of certificate; certificate carried on the aircraft*

Petitioner requests relief from 14 C.F.R. § 137.33(a), *Carrying of certificate*, which requires that a facsimile of the agricultural aircraft operator certificate be carried on the aircraft. The FAA has previously determined that relief from §§ 91.9(b)(2) and 91.203(a) and (b) for the carriage of the aircraft flight manual and aircraft registration onboard the aircraft is not necessary. The FAA applied this same analysis to DroneSeed, Co. in Exemption No. 17261 and should continue that analysis here to exempt Petitioner from the requirements of 14 C.F.R. § 137.33(a). The documents will be kept in a location accessible to the PIC.

(f) 14 C.F.R. § 137.33(b), *Registration and airworthiness certificates available*

Petitioner's aircraft will not have an airworthiness certificate as it is a UAS operated pursuant to part 107. No airworthiness certificate, therefore, can be available for inspection. Relief from that requirement of 14 C.F.R. § 137.33(b) is warranted. The Petitioner will keep registration certificates available for inspection.

V. Operating Documentation

In support of its request for exemption, Petitioner will provide the following documents after receiving a docket number.

(1) Pilot and Aircrew Training and Procedures Program
(2) Flight Operations and Procedures Manual
(3) Safety Risk Analysis
(4) UAS Operations Checklist
(5) DJI Agras T-40 In the Box
(6) DJI Agras T-40 Quick Start Guide
(7) DJI Agras T-40/T-20 Intelligent Battery User Manual
(8) DJI Agras T40/T-20 Disclaimer and Safety Guidelines

Document 1, Petitioner's Pilot and Aircrew Training and Procedures Program, contains the FAA-required Training Program information. Document 2, Petitioner's Flight Operations and Procedures Manual, contains the FAA-required Concept of Operations, Operations Manual, Emergency Procedures, Flight History, and a Safety Risk Analysis. Document 4, UAS Operations Checklist, provides the FAA-required Checklist for operations. The FAA-required Safety Risk Analysis information can also be found above in **Section IV** of this Petition. Document 7, DJI's

Agras T40/T20 Disclaimer and Safety Guidelines, contains the FAA-required Maintenance Manual information.

All of Petitioner's Operating Documentation submitted with this Petition, not to include this Petition, are submitted on a confidential basis under separate cover, pursuant to 14 C.F.R. § 11.35(b), as the documents contain confidential commercial and proprietary information that Petitioner has not and will not share with others. The information in this material is not generally available to the public and is protected from release under the Freedom of Information Act, 5 U.S.C. § 552 et seq.

VI. Conclusion

Petitioner hereby requests exemptions from the regulatory provisions listed above. As set forth in detail above, such exemptions are in the public interest, and granting the exemptions will not adversely affect safety because the exemption will provide a level of safety at least equal to the existing rules.

VII. Summary for the Federal Register

K&W Farms, LLC, as Petitioner, an operator of the Agras T40 Unmanned Aircraft Systems (UAS), is applying for an exemption from 14 C.F.R. § 61.3(a)(1)(i); 14 C.F.R. § 91.7(a); 14 C.F.R. § 91.119(c); 14 C.F.R. § 91.121; 14 C.F.R. § 91.151(b); 14 C.F.R. § 91. 403(b); 14 C.F.R. § 91.405(a); 14 C.F.R. § 91.407(a)(1); 14 C.F.R. § 91.409(a)(1) and (2); 14 C.F.R. § 91.417(a) and (b); 14 C.F.R. § 137.19(c) and (d); 14 C.F.R. § 137.19(e)(2)(ii)(iii), and (v); 14 C.F.R. § 137.31(a) and (b); 14 C.F.R. § 137.33(a) and (b); 14 C.F.R. § 137.41(c); and 14 C.F.R. § 137.42 to operate a UAS, weighing 55 pounds or more, for commercial agricultural related services. The relief requested is similar to that granted to Drone Seed, Co. in Exemption No. 17261.

Respectfully Submitted,

Kali M. Hague

Kali M. Hague
Jetlaw, LLC on behalf of Petitioner