U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., S.W.
Washington, D.C. 20591

July 20, 2015

Exemption No. 12091
Regulatory Docket No. FAA–2015–0702

Ms. Kelly J. Neubecker, Esq.
UASolutions Group, Inc.
2518 Auburn Drive
Cocoa, FL 32926

Dear Ms. Neubecker:

This letter is to inform you that we have granted your request for exemption. It transmits our decision, explains its basis, and gives you the conditions and limitations of the exemption, including the date it ends.

By letter dated March 17, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Farm Crisp Holdings, Inc. (hereinafter petitioner or operator) for an exemption. The exemption would allow the petitioner to operate an unmanned aircraft system (UAS) to conduct precision agriculture operations.

See Appendix A for the petition submitted to the FAA describing the proposed operations and the regulations that the petitioner seeks an exemption.

The FAA has determined that good cause exists for not publishing a summary of the petition in the Federal Register because the requested exemption would not set a precedent, and any delay in acting on this petition would be detrimental to the petitioner.

Airworthiness Certification

The UAS proposed by the petitioner are the UAV Solutions, Inc. Phoenix 60, Phoenix 60LE, Talon 120LE, and DJI Spreading Wings S900.

In accordance with the statutory criteria provided in Section 333 of Public Law 112−95 in reference to 49 U.S.C. § 44704, and in consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation, the Secretary of Transportation

has determined that this aircraft meets the conditions of Section 333. Therefore, the FAA finds that relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*, and any associated noise certification and testing requirements of part 36, is not necessary.

The Basis for Our Decision

You have requested to use a UAS for aerial data collection[1]. The FAA has issued grants of exemption in circumstances similar in all material respects to those presented in your petition. In Grants of Exemption Nos. 11062 to Astraeus Aerial (*see* Docket No. FAA−2014−0352), 11109 to Clayco, Inc. (*see* Docket No. FAA−2014−0507), 11112 to VDOS Global, LLC (*see* Docket No. FAA−2014−0382), and 11213 to Aeryon Labs, Inc. (*see* Docket No. FAA−2014−0642), the FAA found that the enhanced safety achieved using an unmanned aircraft (UA) 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.

Having reviewed your reasons for requesting an exemption, I find that—

- They are similar in all material respects to relief previously requested in Grant of Exemption Nos. 11062, 11109, 11112, and 11213;
- The reasons stated by the FAA for granting Exemption Nos. 11062, 11109, 11112, and 11213 also apply to the situation you present; and
- A grant of exemption is in the public interest.

Our Decision

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. 106(f), 40113, and 44701, delegated to me by the Administrator, Farm Crisp Holdings, Inc. is granted an exemption from 14 CFR §§ 61.23(a) and (c), 61.101(e)(4) and (5), 61.113(a), 61.315(a), 91.7(a), 91.119(c), 91.121, 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b), to the extent necessary to allow the petitioner to operate a UAS to perform aerial data collection. This exemption is subject to the conditions and limitations listed below.

Conditions and Limitations

In this grant of exemption, Farm Crisp Holdings, Inc. is hereafter referred to as the operator.

[1] Aerial data collection includes any remote sensing and measuring by an instrument(s) aboard the UA. Examples include imagery (photography, video, infrared, etc.), electronic measurement (precision surveying, RF analysis, etc.), chemical measurement (particulate measurement, etc.), or any other gathering of data by instruments aboard the UA.

Failure to comply with any of the conditions and limitations of this grant of exemption will be grounds for the immediate suspension or rescission of this exemption.

1. Operations authorized by this grant of exemption are limited to the UAV Solutions, Inc. Phoenix 60, Phoenix 60LE, Talon 120LE, and DJI Spreading Wings S900 when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.

2. Operations for the purpose of closed-set motion picture and television filming are not permitted.

3. The UA may not be operated at a speed exceeding 87 knots (100 miles per hour). The exemption holder may use either groundspeed or calibrated airspeed to determine compliance with the 87 knot speed restriction. In no case will the UA be operated at airspeeds greater than the maximum UA operating airspeed recommended by the aircraft manufacturer.

4. The UA must be operated at an altitude of no more than 400 feet above ground level (AGL). Altitude must be reported in feet AGL.

5. The UA must be operated within visual line of sight (VLOS) of the PIC at all times. This requires the PIC to 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 or U.S. driver's license.

6. All operations must utilize a visual observer (VO). The UA must be operated within the visual line of sight (VLOS) of the PIC and VO at all times. The VO may be used to satisfy the VLOS requirement as long as the PIC always maintains VLOS capability. The VO and PIC must be able to communicate verbally at all times; electronic messaging or texting is not permitted during flight operations. The PIC must be designated before the flight and cannot transfer his or her designation for the duration of the flight. The PIC must ensure that the VO can perform the duties required of the VO.

7. This exemption and 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. The operating documents must be accessible during UAS operations and made available to the Administrator 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. The operator may update or revise its operating documents. It is the

operator's responsibility to track such revisions and present updated and revised documents to the Administrator or any law enforcement official upon request. The operator must also present updated and revised documents if it petitions for extension or amendment to this grant of exemption. If the operator determines that any update or revision would affect the basis upon which the FAA granted this exemption, then the operator must petition for an amendment to its grant of exemption. The FAA's UAS Integration Office (AFS−80) may be contacted if questions arise regarding updates or revisions to the operating documents.

8. Any UAS 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 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.

9. The operator is responsible for maintaining and inspecting the UAS to ensure that it is in a condition for safe operation.

10. Prior to each flight, the PIC must conduct a pre-flight inspection and determine the UAS is in a condition for safe flight. The pre-flight inspection must account for all potential discrepancies, e.g., 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 UAS is found to be in a condition for safe flight.

11. The operator must follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components.

12. Each UAS operated under this exemption must comply with all manufacturer safety bulletins.

13. Under this grant of exemption, a PIC must hold either an airline transport, commercial, private, recreational, or sport pilot certificate. The PIC must also hold a current FAA airman medical certificate or a valid U.S. driver's license issued by a state, the District of Columbia, Puerto Rico, a territory, a possession, or the Federal Government. The PIC must also meet the flight review requirements specified in 14 CFR § 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.

14. The operator may not permit any PIC to operate unless the PIC demonstrates the ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption, including evasive and emergency maneuvers and maintaining appropriate distances from persons, vessels, vehicles and structures. PIC

qualification flight hours and currency must be logged in a manner consistent with 14 CFR § 61.51(b). Flights for the purposes of training the operator's PICs and VOs (training, proficiency, and experience-building) and determining the PIC's ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption are permitted under the terms of this exemption. However, training operations may only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights, all persons not essential for flight operations are considered nonparticipants, and the PIC must operate the UA with appropriate distance from nonparticipants in accordance with 14 CFR § 91.119.

15. 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). Flights under special visual flight rules (SVFR) are not authorized.

16. The UA may not operate within 5 nautical miles of an airport reference point (ARP) as denoted in the current FAA Airport/Facility Directory (AFD) or for airports not denoted with an ARP, the center of the airport symbol as denoted on the current FAA-published aeronautical chart, unless a letter of agreement with that airport's management is obtained or otherwise permitted by a COA issued to the exemption holder. The letter of agreement with the airport management must be made available to the Administrator or any law enforcement official upon request.

17. 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.

18. 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.

19. The PIC must abort the flight in the event of unpredicted obstacles or emergencies.

20. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough available power for the UA to conduct the intended operation and to operate after that for at least 5 minutes or with the reserve power recommended by the manufacturer if greater.

21. Air Traffic Organization (ATO) Certificate of Waiver or Authorization (COA). All operations shall be conducted in accordance with an ATO-issued COA. The exemption holder may apply for a new or amended COA if it intends to conduct operations that cannot be conducted under the terms of the attached COA.

22. All aircraft operated in accordance with this exemption must be identified by serial number, registered in accordance with 14 CFR part 47, and have identification (N−Number) markings in accordance with 14 CFR part 45, Subpart C. Markings must be as large as practicable.

23. Documents used by the operator to ensure the safe operation and flight of the UAS and any documents required under 14 CFR §§ 91.9 and 91.203 must be available to the PIC at the Ground Control Station of the UAS any time the aircraft is operating. These documents must be made available to the Administrator or any law enforcement official upon request.

24. The UA must remain clear and give way to all manned aviation operations and activities at all times.

25. The UAS may not be operated by the PIC from any moving device or vehicle.

26. All Flight operations must be conducted at least 500 feet from all nonparticipating persons, vessels, vehicles, and structures unless:
    a. Barriers or structures are present that sufficiently protect nonparticipating persons from the UA and/or debris in the event of an accident. The operator must ensure that nonparticipating persons remain under such protection. If a situation arises where nonparticipating persons leave such protection and are within 500 feet of the UA, flight operations must cease immediately in a manner ensuring the safety of nonparticipating persons; and
    b. The owner/controller of any vessels, vehicles or structures has granted permission for operating closer to those objects and the PIC has made a safety assessment of the risk of operating closer to those objects and determined that it does not present an undue hazard.

    The PIC, VO, operator trainees or essential persons are not considered nonparticipating persons under this exemption.

27. All operations shall be conducted over private or controlled-access property with permission from the property owner/controller or authorized representative. Permission from property owner/controller or authorized representative will be obtained for each flight to be conducted.

28. 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 to the FAA's UAS Integration Office (AFS−80) within 24 hours. Accidents must be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: www.ntsb.gov.

If this exemption permits operations for the purpose of closed-set motion picture and television filming and production, the following additional conditions and limitations apply.

29. The operator must have a motion picture and television operations manual (MPTOM) as documented in this grant of exemption.

30. At least 3 days before aerial filming, the operator of the UAS affected by this exemption must submit a written Plan of Activities to the local Flight Standards District Office (FSDO) with jurisdiction over the area of proposed filming. The 3-day notification may be waived with the concurrence of the FSDO. The plan of activities must include at least the following:
    a. Dates and times for all flights;
    b. Name and phone number of the operator for the UAS aerial filming conducted under this grant of exemption;
    c. Name and phone number of the person responsible for the on-scene operation of the UAS;
    d. Make, model, and serial or N−Number of UAS to be used;
    e. Name and certificate number of UAS PICs involved in the aerial filming;
    f. A statement that the operator has obtained permission from property owners and/or local officials to conduct the filming production event; the list of those who gave permission must be made available to the inspector upon request;
    g. Signature of exemption holder or representative; and
    h. A description of the flight activity, including maps or diagrams of any area, city, town, county, and/or state over which filming will be conducted and the altitudes essential to accomplish the operation.

31. Flight operations may be conducted closer than 500 feet from participating persons consenting to be involved and necessary for the filming production, as specified in the exemption holder's MPTOM.

Unless otherwise specified in this grant of exemption, the UAS, the UAS PIC, and the UAS operations must comply with all applicable parts of 14 CFR including, but not limited to, parts 45, 47, 61, and 91.

This exemption terminates on July 31, 2017, unless sooner superseded or rescinded.

Sincerely,

/s/
John S. Duncan
Director, Flight Standards Service

Enclosures

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Kellyneubecker@uasolutionsgroup.com

March 17, 2015

U. S. Department of Transportation

Docket Operations
1200 New Jersey Ave., SE
Washington, DC 20590

Re: Petition for an Exemption to Conduct Small Unmanned Aircraft Systems (sSUAS) Operations Allowed by Section 333 of the Federal Aviation Administration Modernization and Reform Act of 2012, 49 U.S.C. § 44701(f), and 14 C.F.R. Part 11

A. Summary

On behalf of our clients, Farm Crisp Holdings, Inc. and pursuant to Section 333 of the Federal Aviation Administration (FAA) Modernization and Reform Act of 2012 ("FMRA"), Subsection (f) of 49 U.S.C. § 44701, and 14 C.F.R. Part 11, Farm Crisp Holdings, Inc. ("Farm Crisp") (hereafter known as the "Petitioner"), an operator of Small Unmanned Aircraft Systems ("sUAS") equipped to conduct aerial imaging, seeks exemption from the following listed Code of Federal Regulations ("CFR") to allow commercial operation of the DJI Spreading Wings S900 ("S900") within the National Airspace System (NAS) for controlled, low-risk, precision agriculture operations, conducted within and under the conditions outlined herein, or as may be established by the FAA, as required by Section 333 requirements.

As described more fully below, the requested exemption would permit the operation of the S900 sUAS by Petitioner under controlled conditions in predetermined airspace that is 1) Limited in scope 2) Controlled as to access by mission essential personnel only and 3) Provides improved safety controls and efficiency to the agricultural industry presently using conventional aircraft. Approval of this exemption would thereby enhance safety and fulfill the

Secretary of Transportation's (the FAA Administrator's) responsibilities to "…establish requirements for the safe operation of such aircraft systems in the national airspace system" as stated within Section 333(c) of the FMRA. In making this determination, the Secretary is required to determine which types of sUAS do not create a hazard to users of the NAS or the public or pose a threat to national security in light of the aircraft's size, weight, speed and operational capability; Operation of the sUAS in close proximity to airports and population centers; Operation of a sUAS within visual line of sight of the operator.

Grant of the requested exemption is in the public interest based upon the concise direction expressed within section 333 of the reform act; the added authority granted by the Act, as amended; an equivalent level of safety regarding flight operations as expressed herein, and significant cost savings achieved by transitioning from traditional manned aerial resources to sUASs. The petitioner respectfully requests that the FAA grant the requested exemption without delay. Petitioner will operate the S900 sUAS while keeping the documents required by the regulations at the ground control station and immediately accessible to the Pilot in Command (PIC) and by modification of the required markings (registration number) of the sUAS to be displayed on the fuselage of the unmanned aircraft.

The name and address of the Petitioner is:

Farm Crisp Holdings, Inc.

The primary contacts for this petition, with a copy to me at the address above are:

Sean Kish, CEO Ph: 703-304-1771 Email: sean@farmcrisp.com	Tom Lang, CTO / COO Ph: 719-942-3657 Email: tom@farmcrisp.com

Address: 900 Parish St., 4th Floor, Pittsburgh, PA 15220

B. Regulations – Exemptions Requested

a. 14 C.F.R. 45.27(a),
b. 14 C.F.R. 61.113(a) and (b),
c. 14 C.F.R. 91.7(a),
d. 14 C.F.R. 91.105,
e. 14 C.F.R. 91.119(c)
f. 14 C.F.R. 91.121,
g. 14 C.F.R. 91.151(b),
h. 14 C.F.R. 91.405(a),
i. 14 C.F.R. 91.407(a)(1),

j. 14 C.F.R. 91.409(a)(1) and (2), and
k. 14 C.F.R. 91.417(a) and (b).

C. Corporate Background

Farm Crisp is an imaging service company, with the operational infrastructure to provide imagery for various agricultural markets in different geographies in a safe, convenient, and legal manner.

Farm Crisp's sUAS for specific summer farming commitments is the S900, weighing approximately 3.3kg (7.3lbs) with a maximum takeoff weight of about 8.2kg (18.1lbs), including payload, and under normal conditions at a maximum speed of no more than 16 m/s (31knots). Farm Crisp will operate only in visual line of sight (VLOS) and will operate only within the sterile geographic areas as defined by the subsequent FAA approved Certificate of Waiver or Authorization (COA). Such operations will insure that the sUAS will "not create a hazard to users of the national airspace system or the "public" as stated in Section 333 of the FMRA.

D. Airworthiness

A critical element of consideration for grant of the petition is evidence of an equivalent level of safety for airworthiness of the sUAS. The FAA has been authorized to exempt aircraft from the requirement for an actual airworthiness certificate in accordance with the statutory criteria provided in Section 333 of PL 112-95 in reference to 49 USC 44704, in consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation. However, Petitioner believes it has achieved compliance with various requirements, including specifics contained within FAA Order 8130.34 series that ensures the safety of operations.

In support of these characteristics, along with the published S900 User's Manual, A2 Flight Control System User Manual, and Ground Station Wireless Data-link User manual, Farm Crisp submits the following additional documents and manuals as attachments to this exemption request, to provide the details for review by the FAA. The following are a set of Confidential Documents under 14 CFR 11.35(b) as each document and manual contains proprietary information that the applicant has not and will not share with others. The documents and manuals contain specifications, operating conditions and procedures, maintenance procedures and a safety management program that are not available to the public and are protected from release under the Freedom of Information Act 5 USC 552 et.seq.

- Farm Crisp Flight Operations and Procedures Manual (FOPM)
- Farm Crisp Safety Management Systems Manual (SMS)

- Farm Crisp Maintenance Manual (MM)
- Farm Crisp Aircrew Training Program (ATP)

E. DJI S900 Summary

Petitioner seeks an exemption to operate the S900 for limited approved commercial purposes within the NAS[1]. The S900 is a multi-rotor sUAS aircraft built with a carbon airframe and a transportable ground station. Farm Crisp will utilize the DJI PC Ground Control Station software operating within the 900MHz-2.4GHz unlicensed frequency bandwidth. The S900 has an empty weight of 3.3 kg (7.3lb) with a maximum payload weight of 4.9 kg (10.8 lb), making the maximum takeoff weight 8.2 kg (18.1 lb). The S900 carries 6- Cell Lithium Polymer batteries, ranging between 10,000-20,000 mAh, which facilitates up to 15-18 minutes of flight time. The S900 will be equipped with the DJI A2 multi-rotor autopilot which provides a maximum cruise speed of 16 m/s (31kts). The DJI autopilots feature auto-takeoff and landing, auto go home and landing, GPS waypoint navigation, direction lock, and GIS mapping. Specifications for the S900 platform include:

- Diameter: 900 mm (2.95ft)
- Maximum Weight:8.2 kg (18.1 lb)
- Number of Motors: 6
- Power of Motors: 500 W
- Maximum Cruise Speed: 16 m/s (31 kts)
- Maximum Climb Rate: 6 m/s (-1200 fpm)
- Maximum Wind Speed: 8 m/s (15.6 kts)

F. Regulatory Basis for Petition

Petitioner, pursuant to 14 C.F.R. §§ 11.61(b), 11.81, [2] and the FAA Modernization and Reform Act of 2012 ("FMRA"), Section 333, *Special Rules for Certain Unmanned Aircraft Systems* ("Section 333"), hereby respectfully petitions the Administrator for an exemption from the requirements of 14 C.F.R. §§, 45.27(a), 61.113(a) and (b), 91.7(a), 91.105, 91.119(c), 91.121, 91.151 (b), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), 91.417(a) and (b).

[1] Farm Crisp will submit Aircraft Registration Applications as required, upon the grant of the exemptions sought by this petition.

[2] 14 C.F.R. § 11.61(b) ("Using a petition for exemption, you may ask FAA to grant you relief from current regulations in 14 C.F.R."), 14 C.F.R. § 11.81 ("What information must I include in my petition for an exemption")?

1. Section 333

Congress identifies Section 333 of the FMRA, as a pathway for "expedited operational authorization" of certain sUAS in the NAS. Section 333 (b)(1) ("expedited operational authorization.").[3] Under Section 333 Congress mandates that the FAA "shall determine if certain unmanned aircraft systems may operate safely in the national airspace system before completion of the plan and rulemaking required by Section 332 of this Act or the guidance required by section 334 of this Act" (Section 333(a)) upon consideration of its "size, weight, speed, operational capability, proximity to airports and populated areas, and operation within visual line of sight." Section 333(b)(1). If the FAA makes such a determination, the FAA "shall [also] establish requirements for the safe operation." Section 333(c). The FAA further may find that the sUAS does not require "airworthiness certification under section 44704 of title 49, United States Code." Section 333(b)(2).

2. 49 U.S.C. § 44701

The FAA is further authorized to grant exemptions from its safety regulations and minimum standards under 49 U.S.C. § 44701 ("Section 44701") "if the Administrator finds the exemption is in the public interest." Section 44701(f)[4] (authorizing the grant of exemptions from safety regulations and minimum standards under Section 44701(a) and (b) and Sections 44702-44716).[5]

For the reasons addressed herein, this Petition qualifies for expedited approval of Petitioner's request for exemption under both Section 333 of the FMRA and 49 U.S.C § 44701.

G. S900 Statutory Criteria for Exemption under Section 333

Given its small size, light weight, slow speed, limited load capacity, superior operational capabilities, and that the operations will be conducted only during the day, under visual meteorological conditions ("VMC"), within Visual Line of Sight ("VLOS") of the PIC, with

[3] *See also* www.faa.gov/sUAS/legislative_programs/section_333/ (noting that Section 333 grants the FAA "the statutory flexibility to expedite requirements for the safe operation of certain aircraft systems in the NAS.").

[4] Under 49 U.S.C. § 44701(f), the "Administrator may grant an exemption from a requirement of a regulation prescribed under subsection (a) or (b) of this section or any of sections 44702-44716 of [Title 49] if the Administrator finds the exemption is in the public interest."

[5] *See e.g.* 49 USC §44711(a)(1) prohibiting operations without airworthiness certificate; (2) prohibiting serving as airman without airman's certificate; (5) prohibiting commercial operations in violation of regulations); 49 USC §44704 (issuance of airworthiness certificate); 14 C.F.R. §91.203 (a)(1) (carry airworthiness certificate)).

the assistance of a visual safety observer ("VO"), and confined within the boundaries of a consenting landowner's property and not in the proximity of airports or populated areas, the S900 is the very category of sUAS that qualifies for expedited approval under Section 333.

1. Operational Capability

The S900 was specially designed for low altitude surveillance, photography, and sensor management. Supported by electric batteries that are rechargeable, the S900 can fly from 15-18 minutes (*depending upon atmospheric conditions) and carry a variety of cameras or sensors. Other Operational metrics of the S900 are as follows:

Frame	
Diagonal Wheelbase	900mm
Frame Arm Length	358mm
Frame Arm Weight (with Motor, ESC, Propeller)	316g
Center Frame Diameter	272mm
Center Frame Weight (with Landing Gear Mounting Base, Servos)	1185g
Landing Gear Size	460mm(Length)×450mm(Width)×360mm(Height)
Motor	
Stator Size	41×14mm
kV	400rpm/V
Max Power	500W
Weight (with Cooling Fan)	158g
ESC	
Working Current	40A
Working Voltage	6S LiPo
Signal Frequency	30Hz ~ 450Hz
Drive PWM Frequency	8KHz
Weight (with Radiators)	35g
Foldable Propeller (1552/1552R)	
Material	High strength performance engineered plastics
Size	15×5.2 inch
Weight	13g
Flight Parameters	
Takeoff Weight	4.7Kg ~ 8.2Kg
Total Weight	3.3Kg

Power Battery	LiPo (6S, 10000mAh ~ 15000mAh, 15C(Min))
Max Power Consumption	3000W
Hovering Power Consumption	1000W (@6.8Kg Takeoff Weight)
Hovering Time	18min (@12000mAh & 6.8Kg Takeoff Weight)
Working Environment Temperature	-10°C ~ 40°C

2. Proximity to Airports/Population Centers or Areas

Flight operations pursuant to this Petition will be tightly controlled and restricted to low risk rural areas within Class G airspace at an altitude of no more than 400 feet above ground level ("AGL"). All altitudes reported to ATC will be in AGL when required. Any operations conducted within 5 nautical miles (NM) of the geographic center of a non-towered airport will obtain a Letter of Agreement with the appropriate airport management and made available to FAA upon request. In addition, access to any property will be limited to persons associated with and necessary to flight operations.

3. Visual Line-of-Sight

The minimum crew for each operation will consist of a PIC and VO. The VO will be used as an additional mitigation to satisfy the VLOS requirement, but the PIC will always maintain VLOS with the sSUAS. The S900 will at all times be flown by Petitioner only in the daytime (not at night) under VMC, within VLOS of the PIC, with the further assistance of the VO with whom the PIC will have the ability for direct and continuous two-way verbal communications[6] so as to ensure that the flight operations remain within the PIC's VLOS and prescribed flight boundaries and de-conflict with objects in the air and on the ground. Thus, pursuant to the FAA Order 8900.1 Volume 16, Chapter 1, Section 3, the proposed operations will provide an approved method of control and collision avoidance to satisfy the "see and avoid" requirement of 14 C.F.R. § 91.113:

Only qualified and current PIC's and VOs, as provided in the FOPM will be used.

4. Other Factors

[6] [PIC and VO are within speaking distance and all communications between PIC and VO will be without communications equipment]

a. S900 Safety Systems

Petitioner proposes that requirements should take into account the characteristics of this particular sUAS. The S900 is characterized by a high degree of pre-programmed control, various built-in technical capabilities that limit the potential for operation outside of the operating conditions as set forth below, and many built-in functional, safety and redundancy features to ensure a safe and reliable operation. At a minimum: geo-fencing at a maximum ceiling of 400' AGL, flight programming capabilities, a flight termination link available to the operator to prevent a "fly away," and safe abort procedures. If the S900 loses communications or its GPS signal, it will return to a pre-determined location and land or be recovered in accordance with the FOPM. The S900 will have markings identifying the serial number and identification (N-number) markings as large as practicable. Further, Farm Crisp operations will comply with all manufacturer Safety Bulletins. As previously stated, Farm Crisp will incorporate the associated DJI A2 Flight Control System into the S900.

The A2 is capable of controlling various multi-rotor platforms and offers high accuracy performance through a unique damping design and calibration algorithm. The high performance of the A2 guarantees stable flight in the presence of high vibration and winds. The A2 Flight Control System includes the controller unit with a built-in receiver, a power management unit, an inertial measurement unit, a Bluetooth unit, and a GPS & Compass. Detailed descriptions of each subsystem can be seen below.

Controller Unit:

- Output signals for up to eight electronic speed controllers (ESCs)
- Built-in receiver based on DJI DESST technology, which is compatible with Futaba FASST and DJI DESST transmitters
    - Two available ports for connecting Spektrum or JR DSM2 satellite receivers.
- Two CAN-Bus ports
    - Sensors
    - Power Management
- Four independent and configurable output channels

Power Management Unit:

- Provides dual Battery Eliminator Circuits (BECs)
  - PW port provides power to the whole flight control system with current no more than 2A
  - PX port provides 3A at 5V and V-SEV signal
- Two CAN-Bus ports for connecting peripheral devices

Inertial Measurement Unit:

- High quality components, with build in damper, precisely calibrated with temperature compensation in all gyros and sensors
- Built-in pressure sensor for altitude determination

Blue Tooth Unit:

- Connects to ground station for real-time parameter configuration, flight monitoring, and waypoint navigation

GPS & Compass

- Determines aircraft inertial position
- Measures geomagnetic field for correcting heading estimations

b. Safety Management System

A Safety Management System (SMS) will regulate Petitioner's operation of the S900 and will significantly contribute to maintaining the level of safety contemplated by the airworthiness certificate requirements from which Petitioner now seeks relief.

Pursuant to the SMS and 14 C.F.R. § 43.13, entitled *Performance Rules (general)*, each person performing maintenance, alteration, or preventive maintenance on the S900, motor, propeller, or appliance shall use the methods, techniques, and practices prescribed in the current manufacturer's User's Manual or Instructions for Continued Airworthiness prepared by its manufacturer, or other methods, techniques, and practices acceptable to the Administrator. Each person shall use the tools and equipment necessary to assure completion of the work in accordance with accepted industry practices.

c. Flight Operation Limitations and Safety

To ensure consistent safety operations, Petitioner has developed a detailed Flight Operations and Procedures Manual (FOPM) based upon procedures, notices and guidance the FAA has provided to obtain exemption under Section 333, (submitted on a proprietary and confidential basis to the FAA).

In seeking this exemption, Petitioner proposes to operate the S900 pursuant to the following specific operating limitations:

1. Flight operations are permitted in Class G Airspace.
2. The S900 shall only be operated at or below 400 ft AGL.
3. The S900 shall be operated within VLOS of the PIC and safety VO.
4. The S900 shall be operated pursuant to Day Visual Flight Rules (VFR) in visual meteorological conditions (VMC). The S900 shall be operated only during daylight hours (*i.e.* between the end of morning civil twilight and the beginning of evening civil twilight, as published in the American Air Almanac, converted to local time).
5. The S900 shall operate from on-site takeoff/landing locations directly next to the PIC and co-located VO. The PIC and the VO shall be able to verbally communicate during all operations.
6. Operations shall be conducted by certificated airmen who possess a minimum of a Private Pilot's Certificate and a valid third class medical certificate, as well as completed training, checking, currency, and recency of experience.
7. The PIC requirements will include the following:

    a. FAA licensed airman must possess a minimum of a Private Pilot's Certificate and a valid third class medical certificate.

    b. The PIC shall have accumulated and logged (in a manner consistent with 14 C.F.R. § 61.51(b)) a minimum of 50 flight cycles and 12 hours of total time as a sUAS rotorcraft pilot and at least ten hours as a sUAS pilot with a similar sUAS type (single or multi-rotor), such log of which shall be made available to the administrator upon request.

    c. The PIC shall have accumulated and logged (in a manner consistent with 14 C.F.R. § 61.51(b)) a minimum of five flight hours as a sUAS pilot operating the make and model of sUAS to be used for operations under the exemption (e.g. S900) and three take-offs and three landings in the preceding 90 days, such log of which shall be made available to the Administrator upon request.

    d. Have successfully completed the qualification process as specified in the FOPM to include a knowledge and skill test in accordance with the Aircrew Training Manual.

    e. Meet flight review requirements as specified in 14 CFR §61.56 in an aircraft in which the PIC is rated on their pilot certificate.
8. The PIC and VO will have been trained in the operation of sUAS generally and received up-to-date information on S900 operations.
9. The VO will hold at least a third class medical and will have training to

communicate to the PIC any instructions necessary for safe operations.

10. If a pilot certificate holder other than the PIC, who possesses the necessary PIC qualifications, is also present during flight operations, that person can also be designated as PIC and will follow the procedures as defined within the FOPM to assume control.
11. A briefing will be conducted in regard to the planned operations prior to each flight as detailed within the FOPM. It will be mandatory that all personnel who are performing duties within the boundaries of the flight operations safety perimeter be present for the briefing.
12. The S900 will only operate within a confined geographic area as defined in the subsequent FAA approved COA.
13. At least three (3) days before scheduled operations, operator shall submit a written Plan of Activities to the local Flight Standards District Office (FSDO) with jurisdiction over the area of proposed operations, such submission of which may be waived with the concurrence of the FSDO. If required by the FSDO to be submitted, the Plan of Activities shall include: dates and times for all flights; operator's and on-scene flight operator's name and phone number; sUAS make, model and serial or N-number; PIC's name and certificate number; statement that the operator has obtained permission from property owners and/or local officials to conduct the operations (such list of those who gave permission to be made available upon request); description of the planned flight activity, including, as applicable, maps or diagrams of the area, city, town, county and/or state over which the operation will be conducted, and the altitudes essential to accomplish the operation; signature of the exemption holder or representative.
14. Petitioner will obtain an Air Traffic Organization (ATO) issued COA prior to conducting any actual flight operations.
15. Petitioner will file a NOTAM for each flight no more than 72 hours but no less than 48 hours prior to each flight with the appropriate FSDO.
16. Any operations that will be conducted within 5 nautical miles (NM) of the geographic center of a non-towered airport will obtain a Letter of Agreement with the appropriate airport management and made available to FAA upon request.

17. Prior to flight operations, Petitioner shall coordinate 1 hour ahead of the proposed flight a communication with the nearest local Air Traffic Control facility indicating location, altitude and duration of the proposed flight.
18. All required permissions and permits will be obtained from territorial, state, county or city jurisdictions, including local law enforcement, fire, or other appropriate governmental agencies at least 12 hours in advance of any flight operation.
19. The S900 shall be marked with an identification (N-Number) in accordance with 14 C.F.R. § 45.23, such markings to be as large as practicable pursuant to 14 C.F.R. § 45.29(f), and identified by a serial number registered in accordance with 14 C.F.R. Part 47.
20. All flights will remain clear and yield the right of way to all other manned operations and activities at all times, including, but not limited to: ultralight vehicles, parachute activities, parasailing activities, hang gliders, etc.
21. Flights will 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.
22. For the proposed flight operation, only one S900 shall be airborne at any given time.
23. The S900 shall only be operated at or below an airspeed of 16 Meters Per Second (31kts).
24. Prior to performing any flight operations, the PIC and VO shall have successfully completed a qualifying process, as provided in the FOPM.
25. Any time the S900 is operating, all documents required under 14 C.F.R. § 91.9 and § 91.203 shall be available to the PIC at the GCS. Such documents shall be made available to the Administrator or any law enforcement official upon request.
26. The S900 shall not be operated directly over any person, except authorized and consenting personnel required for flight/imaging operations,
27. Prior to performing any flight operations, a pre-flight checklist will be used by a qualified PIC as provided in the FOPM. Documentation of such pre-flight check shall be made in the aircraft records and such records shall be made

available to the Administrator upon request.

28. The radio frequency spectrum used for operation and control of the S900 shall comply with the requirements of S900 manuals and the FOPM. The S900 shall at all times be operated to ensure a safe distance away from all participating and non-participating personnel, at least 500 feet away from persons not involved in the flight operations (non-participating persons). This distance may be reduced to no less than 200 feet if it would not adversely affect safety and such person provides his/her prior consent.

29. Other than for takeoff and landing, the S900 shall be operated at least 100 feet away from persons involved in the flight operations (participating persons), such participating persons shall at all times be essential to the flight operations and have provided prior written consent to their participation in such operations.

30. The flight will be terminated at 20% battery power reserve or 3 minutes, whichever occurs first.

31. Prior to each flight, the PIC shall inspect the S900, including any inoperable components, items or equipment, to ensure it is in an airworthy condition for safe flight. If the inspection reveals a condition that affects flight readiness or safe operations, the S900 shall not be operated until the necessary maintenance has been performed and it is found to be in a condition for safe flight. Any discrepancies and all maintenance or alterations shall be documented in the aircraft records, such records to be made available to the Administrator upon request.

32. Except as may be designated otherwise for Fail-Safe operations, the S900 shall take off and land at a location within the boundaries of the subject property next to the PIC.

33. Upon loss of communication or GPS signal, the S900 shall return to a predetermined location within the boundaries of the landowner's property and land or be recovered in accordance with the Operator's Manuals.

34. In the event of an emergency or unanticipated obstacle to planned operations, the operation shall be aborted and the S900, if airborne, shall return to a predetermined location.

35. The S900 shall be maintained in accordance with the manufacturer's

recommended practices and in accordance with the Farm Crisp Maintenance Manual, including any amendments or updates thereto. All amendments or updates shall be tracked and a record of such amendments or updates shall be maintained and made available to the Administrator upon request.

36. All maintenance to be performed on the S900 shall be performed by a qualified technician.

37. Farm Crisp will follow the manufacturer's aircraft/component, maintenance, overhaul, replacement, inspection and life limit requirements.

38. Any incident, accident or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA shall be reported to the FAA's UAS Integration Office within 24 hours. Accidents shall also be reported to the National Transportation Safety Board (NTSB). Further flight operations shall not be conducted until the incident, accident or transgression is reviewed by the UAS Integration Office and authorization to resume operations is provided.

d. Privacy

Petitioner will comply with all federal, state, and/or local privacy regulations that may apply in the areas in which Petitioner will operate the S900 pursuant to this Petition. Further, Petitioner's policy is to avoid operations that might invade personal privacy in accordance with Petitioner's privacy policy available to the administrator upon request.

e. Physical Security

In order to ensure its safe and proper use, Petitioner will be the only operator of the S900 and the S900 will at all times remain in Petitioner's custody.

5. Lack of Threat to the NAS, Public, or National Security

For the reasons previously addressed, including meeting Section 333(b)(1) criteria, Petitioner's established record of safety and the small size of the sUAS involved and the controlled sterile area within which they will operate, Petitioner falls squarely within that zone of safety (an equivalent level of safety) in which Congress envisioned that the FAA must, by exemption, allow commercial operations of sUASs to commence immediately. Petitioner will operate the S900 in accordance with the aforementioned flight limitations without creating a hazard to other aircraft or persons or property on the ground. The fact that each PIC will be required to be screened by the Department of Homeland Security, approval of the petition presents no

threat to national security. Further, given its small size and limit load capacity, the S900 sUAS is incapable of carrying any substantial external load, including explosive materials or flammable liquids.

For all of these reasons, Petitioner's proposed operations using the S900 qualify for expedited approval of the sought exemption pursuant to Section 333 for the specified uses and under the proposed operating requirements and restrictions.

H. Public Interest Benefits

Granting Petitioner's request for exemption would benefit the public and have no adverse effect on safety for the following reasons.

1. Public Interest Generally

The grant of the requested exemption is in the public interest based on the clear direction in Section 333 and 49 U.S.C. § 44701(f), the equivalent and enhanced level of safety of the proposed operations, the significant public benefit, and cost savings to be realized as a result of the use of sUAS for precision agricultural aerial imaging and survey services. Moreover, the FAA has granted similar exemptions for sUAS used to conduct high resolution aerial imaging and surveying operations.[7] The S900 is a battery powered sUAS that serves as a safer, more efficient, and economical alternative to larger and heavier manned aircraft carrying flammable liquid fuels, traditionally use for precision agricultural aerial surveying. This will provide for an added superior level of safety to persons and property in the air and on the ground than that provided by manned aircraft performing the same operations. No pilot or crew need be airborne and granting the exemption would also decrease the number of manned aircraft in the NAS and, as a result, reduce congestion as well as the environmental impact of such operations. Using the S900 also provides the benefit of greater operational flexibility and reduced cost when compared to manned aircraft.

a. Increased Aircrew Safety and Reduced Risk to Persons/Property On Ground

Because the S900 is unmanned, the proposed operations eliminate the risk to pilot and crew associated with flying such aerial-surveying missions in confined airspace at low altitude. Further, given its small size and weight and low airspeed, using the S900 also reduces the risk of damage or

[7] *See* Exemption Nos. 11109, 11110, 11114, 11136, 11166, 11167, 11170, 11172, 11177, 11185 11192, 11193,11195. Farm Crisp Holdings, Inc. requests that the FAA not request public comment on its application because it would not set a precedent and because the relief requested is identical to exemptions granted previously. 14 C.F.R. § 11.87.

injury to persons or property on the ground, and in the air, were there to be an unforeseen mishap.

b. Reduced Environmental Impact

Using the S900 sUAS instead of manned aircraft also benefits the public by eliminating or greatly reducing air and noise pollution associated with traditional aerial imaging operations. Because it is battery powered and uses electric motors, the S900 sUAS consumes no fuel, generates no air pollution, and creates very little noise. As a result, the public is benefited as a result of reduced environmental impact, reduced operator and other human exposure, and greater fuel conservation, which serves additionally to support our Government's specific efforts to reduce the U.S.'s carbon footprint.[8]

c. Fewer Manned Aircraft in the NAS and Reduced Need for ATC Handling

The Farm Crisp S900 also does not require a runway or helipad to takeoff or land and will not be operated within the close proximity of any airports without prior FAA approval. As such, fewer aircraft will need to be handled by air traffic control during ground, takeoff, departure, arrival, and landing phases. Operations pursuant to this Petition will further reduce the number of manned aircraft flying or transiting at or above 500' AGL to and from the areas of imaging operations as well as congestion around airports due to aircraft arrival and departure.

d. Superior Aerial Imagery and Increased Benefit to U.S. Economy

Better aerial footage can also be obtained using the small and nimble S900 than can be obtained using manned aircraft or other ground-based methods. Due to its small size and superior flight performance characteristics, the S900 allows for images to be taken from certain locations and angles and with better precision than using manned aircraft. As a result, less time is needed in the air to obtain the desired footage, which in addition to providing the benefit of fewer aircraft in the NAS and associated reduced risk to objects and persons and property in the air and on the ground, reduced noise, etc., allows for the production of surveys, which benefits consumers. This additionally ensures that companies such as Farm Crisp and its customers remain competitive and profitable, thereby providing their employees greater job stability, which ultimately contributes further to the U.S. economy through increased consumer spending.

e. Increased Operational Flexibility and Reduced Cost

Using the S900 also provides the benefit of greater operational flexibility and reduced cost when compared to manned aircraft. Instead of each time having to hire a manned aircraft at

[8] Reducing the U.S.'s carbon footprint is a high priority and consistent with the U.S. Environmental Protection Agency's regulatory efforts to phase out the use of fossil fuels.

thousands of dollars/hour, subject to the pilot's schedule and availability, Petitioner can operate the S900, which it has purchased and outfitted at lower combined cost, innumerable times and at the convenience of Petitioner's and its customer's schedules.

2. No Adverse Safety Effects

Granting this Petition will also not adversely affect aviation safety or pose any undue risks to the public. The operations pursuant to this Petition will be in accordance with Petitioner's internal safety Manuals, including approved processes and checklists and in compliance with all applicable FAA safety policies and guidance. Accordingly, and as detailed herein, granting the requested exemption would not adversely affect safety. Indeed, as detailed below, operations pursuant to the limitations and guidelines addressed herein and the safety procedures, Petitioner will provide an equivalent level of safety to those regulations from which Petitioner seeks exemption. The FAA has also recently set precedence by granting exemptions with similar aerial imaging parameters in all material respects, to those presented herein. For these reasons Farm Crisp's operations pursuant to this Petition also qualify for an exemption.

I. Exemptions Sought By Petitioner and Reasons for the Requested Relief

Pursuant to Section 333, Petitioner seeks an exemption from the requirements of 14 C.F.R. §§ 45.27(a), 61.113(a) and (b), 91.7(a), 91.105, 91.119(c), 91.121, 91.151(b), 91.405(a), 91.407(a)(1) and (2), 91.409(a)(1) and (2), 91.417(a) and (b).

1. Section 45.27(a). Location of marks; non fixed-wing aircraft.

Section 45.27, entitled *Location of marks; nonfixed-wing aircraft*, subsection (a) states (emphasis added):

> (a) Rotorcraft. Each operator of a rotorcraft must display on that rotorcraft horizontally *on both surfaces of the cabin, fuselage, boom, or tail* the marks required by § 45.23.

To the extent subsection 45.27(a) may be deemed to apply to the S900 sUAS, Petitioner seeks an exemption from the subsection (*i.e.*, that the marks be displayed on both surfaces of the cabin, fuselage, boom, or tail) because the S900 sUAS is of insufficient size to accommodate any such marking. Thus marking the S900 sUAS as required by this subsection would not be possible.

An equivalent level of safety can be provided instead by marking the S900 sUAS, as may be applicable, with lettering as large as practicable (14 C.F.R. § 45.29(f)) on its largest

available surface so as to permit such marking to be displayed to pilot, crew, and others both when the S900 sUAS is on the ground and airborne.

2. Section 61.113(a) and (b). Private pilot privileges and limitations: Pilot in command.

Petitioner seeks an exemption from 14 C.F.R. 61.113(a) and (b). Section 61.113, entitled *Private pilot privileges and limitations: Pilot in command*, subsections (a) and (b) state (emphasis added):

> (a) Except as provided in paragraphs (b) through (h) of this section, *no person who holds a private pilot certificate may act as pilot in command of an aircraft that is carrying passengers or property for compensation or hire; nor may that person, for compensation or hire, act as pilot in command of an aircraft*.
>
> (b) A private pilot may, for compensation or hire, act as pilot in command of an aircraft in connection with any business or employment if:
>
> (1) The flight is only incidental to that business or employment; and
>
> (2) The aircraft does not carry passengers or property for compensation or hire.

In general, subsections 61.113 (a) and (b) prohibit a private pilot from conducting commercial operations**.** Petitioner seeks exemption from the subsections because the S900 will not carry a pilot, passengers or property (other than a camera). As addressed, the S900 is a very light, remotely controlled sUAS with no persons or property on board. The area of operations is generally remote or sparsely populated. Each flight is planned and fully coordinated in advance in accordance with those procedures provided in the Safety Manual and FOPM. Thus the risk associated with the proposed operations is so diminished from that associated with commercial operations contemplated by Part 61, that allowing a PIC having a private pilot certificate, rather than a commercial certificate, met the minimum flight hour and qualification criteria, and operating according to the limitations and guidelines provided herein, provides a level of safety that exceeds that provided by a pilot having a commercial certificate operating a conventional aircraft as required under the regulations.

The FAA has already set precedence by previously granted exemptions in circumstances similar, in all material respects, to those presented herein.

3. Section 91.7(a). Civil Aircraft Airworthiness.

Either finding that Petitioner meets the Section 333 criteria or exemption from the airworthiness certification requirement under 14 C.F.R. Part 21 renders subsection 91.7(a) inapplicable.

Section 91.7, entitled *Civil aircraft airworthiness*, subsection (a) states (emphasis added): "No person may operate a civil aircraft unless it is in an *airworthy condition*." There is no FAA standard by which such a determination of airworthiness can be made. Nonetheless, given the limitations and procedures, as contained herein, the Safety Procedures contained within the SMS, the FOPM, and the Maintenance Manual, for maintaining the aircraft and checking it before each flight to ensure that it is in peak operational condition, an equivalent level of safety will be provided.

4. Section 91.105. Flight crewmembers at stations.

Petitioner seeks an exemption from 14 C.F.R. 91.105. Section 91.105, entitled *Flight crewmembers at stations*, states (emphasis added):

> (a) During takeoff and landing, and while en route, each required flight crewmember shall—
>
> > (1) *Be at the crewmember station* unless the absence is necessary to perform duties in connection with the operation of the aircraft or in connection with physiological needs; and
> >
> > (2) *Keep the safety belt fastened* while at the crewmember station.
>
> (b) Each required flight crewmember of a U.S.-registered civil aircraft shall, during takeoff and landing, *keep his or her shoulder harness fastened while at his or her assigned duty station*. This paragraph does not apply if—
>
> > (1) The seat at the crewmember's station is not equipped with a shoulder harness; or,
> >
> > (2) The crewmember would be unable to perform required duties with the shoulder harness fastened.

In general, Section 91.105 requires pilot and crew to be at their duty stations and harnessed during flight**.** Petitioner seeks exemption from the Section 91.105 because the S900 sUAS is by definition an unmanned aircraft, having neither pilot nor crew so as to be stationed or harnessed as required by the regulation. An equivalent or even higher level of safety can be provided instead by using an unmanned aircraft controlled by a PIC who at all times is located at

and controls the S900 from the GCS.

5. Section 91.119(c). Minimum safe altitudes.

Petitioner seeks an exemption from 14 C.F.R. 91.119(c). Section 91.119, entitled *Minimum safe altitudes: General*, subsection (d) states (emphasis added):

> Except when necessary for takeoff or landing, no person may operate an aircraft below the following altitudes:
>
> (c) *Over other than congested areas.* An altitude of *500 feet above the surface*, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure.

Section 91.119(c) establishes safe altitudes for operation of civil aircraft over other than congested areas. Petitioner seeks exemption from subsection 91.119(c) because, pursuant to this Petition, the S900 sUAS will at times be operated at or below 400 feet AGL.

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 a VO 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, 100 feet and 500 feet, respectively, away from who the UA would generally be restricted. Further the S900 sUAS flight operations will be monitored at all times by both the PIC and VO and will be in compliance with local public safety requirements, so as to prevent access to the restricted areas of operation.

The FAA has set precedence by previously granted exemptions in circumstances similar, in all material respects, to those presented herein.

6. Section 91.121. Altimeter settings.

Petitioner seeks an exemption from 14 C.F.R. 91.121. Section 91.121, entitled *Altimeter settings*, requires each person operating an aircraft to maintain cruising altitude by reference to an altimeter that is set "…to the elevation of the departure airport or an appropriate altimeter setting available before departure." Petitioner seeks exemption from Section 91.121 because the S900 sUAS does not use or have on board a typical barometric altimeter as contemplated by the regulation.

Note: An equivalent level of safety will be provided instead, by operating the sUAS at

or below 400 feet AGL, within the VLOS of the PIC (with the assistance of a VO), with altitude information downlinked from the S900 to the PIC to maintain altitude and ensure safety. Prior to each flight, a zero altitude/AGL will be established at the launch site, as confirmed for accuracy by the PIC.

6. Section 91.151(b). Fuel requirements for flight in VFR conditions.

Petitioner seeks an exemption from 14 C.F.R. 91.151(b). Section 91.151(b), entitled *Fuel requirements for flight in VFR conditions*, states (emphasis added):

> (b) No person may begin a flight in a rotorcraft under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing and, assuming normal cruising speed, to fly *after that for at least 20 minutes*.

The S900 is an unmanned aircraft, and thus would not begin a flight with a person in it as the regulation contemplates. To the extent the regulation applies to the S900, the S900 has a maximum flight duration of 15-18 minutes, depending upon atmospheric conditions and type of camera or sensor.

An equivalent level of safety can be achieved by terminating the flight at 20% battery power reserve or 3 minutes whichever occurs first, as provided in the FOPM. Given that the S900 will be operated within the VLOS of the PIC, within the confines of the particular landowner's property with prior written consent of the landowner and participating and non-participating personnel, this restriction would provide more than enough battery reserve to accommodate a safe return to the landing zone from anywhere in the operating area with no adverse effect on the safety of persons and property in the air or on the ground.

The FAA has set precedence by previously granted exemptions in circumstances similar, in all material respects, to those presented herein.

7. Sections 91.405(a), 91.407(a)(1), 91.409(a)(2), 91.417(a) and (b). Maintenance inspections and recording.

Section 91.405(a), entitled *Maintenance required*, states:

> Each owner or operator of an aircraft—
>
> (a) Shall have that aircraft inspected as prescribed in subpart E of this part and shall between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in part 43 of this chapter;

Section 91.407(a)(1), entitled *Operation after maintenance, preventive maintenance, rebuilding, or alteration*, states:

> (a) No person may operate any aircraft that has undergone maintenance, preventive maintenance, rebuilding, or alteration unless—
>
> > (1) It has been approved for return to service by a person authorized under § 43.7 of this chapter;

Section 91.409 (a)(2), entitled *Inspections*, states:

> (a) Except as provided in paragraph (c) of this section, no person may operate an aircraft unless, within the preceding 12 calendar months, it has had—
>
> > (1) An annual inspection in accordance with part 43 of this chapter and has been approved for return to service by a person authorized by § 43.7 of this chapter; or
> >
> > (2) An inspection for the issuance of an airworthiness certificate in accordance with part 21 of this chapter.
>
> No inspection performed under paragraph (b) of this section may be substituted for any inspection required by this paragraph unless it is performed by a person authorized to perform annual inspections and is entered as an "annual" inspection in the required maintenance records.

Section 91.417(a) and (b), entitled *Maintenance records*, state:

> (a) Except for work performed in accordance with §§ 91.411 and 91.413, each registered owner or operator shall keep the following records for the periods specified in paragraph (b) of this section:
>
> (1) Records of the maintenance, preventive maintenance, and alteration and records of the 100-hour, annual, progressive, and other required or approved inspections, as appropriate, for each aircraft (including the airframe) and each engine, propeller, rotor, and appliance of an aircraft. The records must include—
>
> > (i) A description (or reference to data acceptable to the Administrator) of the work performed; and
> >
> > (ii) The date of completion of the work performed; and
> >
> > (iii) The signature, and certificate number of the person approving the aircraft for return to service.

(2) Records containing the following information:

(i) The total time in service of the airframe, each engine, each propeller, and each rotor.

(ii) The current status of life-limited parts of each airframe, engine, propeller, rotor, and appliance.

(iii) The time since last overhaul of all items installed on the aircraft which are required to be overhauled on a specified time basis.

(iv) The current inspection status of the aircraft, including the time since the last inspection required by the inspection program under which the aircraft and its appliances are maintained.

(v) The current status of applicable airworthiness directives (AD) and safety directives including, for each, the method of compliance, the AD or safety directive number and revision date. If the AD or safety directive involves recurring action, the time and date when the next action is required.

(vi) Copies of the forms prescribed by § 43.9(d) of this chapter for each major alteration to the airframe and currently installed engines, rotors, propellers, and appliances.

(b) The owner or operator shall retain the following records for the periods prescribed:

(1) The records specified in paragraph (a)(1) of this section shall be retained until the work is repeated or superseded by other work or for 1 year after the work is performed.

(2) The records specified in paragraph (a)(2) of this section shall be retained and transferred with the aircraft at the time the aircraft is sold.

(3) A list of defects furnished to a registered owner or operator under § 43.11 of this chapter shall be retained until the defects are repaired and the aircraft is approved for return to service.

In general, these regulations require that an airworthy certificated aircraft be inspected as prescribed in 14 C.F.R. Part 91, Subpart E (Maintenance, Preventive Maintenance, and Alterations), any discrepancies be repaired and the aircraft be approved for return to service as

prescribed in Part 43 (Maintenance, Preventive Maintenance, Rebuilding, and Alterations) and that any work on the aircraft be recorded and such records maintained.

Petitioner seeks an exemption because, as addressed, the S900 sUAS will operate pursuant to this Petition without airworthiness certification. An equivalent level of safety can be provided instead by requiring, as provided herein, that inspections and maintenance be accomplished according to the inspection, maintenance, and preflight sections of the Maintenance Manual and FOPM. Among other things, the S900 will be inspected prior to each flight to confirm that it is in good working order. Any maintenance or repairs will be perform and logged, and, upon any work being performed on the S900, it will be checked and approved for flight by personnel before being returned to service.

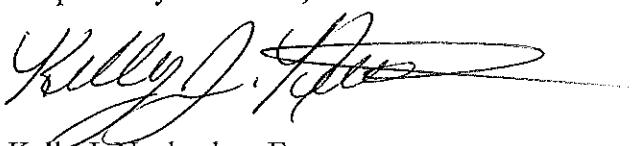
The FAA has set precedence by previously granted exemptions in circumstances similar, in all material respects, to those presented herein.

J. Conclusion

As set forth in the document above, the following summary is provided for publication in the Federal Register. Petitioner seeks an exemption pursuant to Section 333 of the FAA Modernization and Reform Act of 2012, 49 U.S.C. § 44701(f), and 14 C.F.R. Part 11 to permit safe operation of the S900 sUAS commercially, for the purposes of aerial imagery and photography relating to precision agriculture. By granting this Petition, the FAA Administrator will be fulfilling the Congressional mandate of Section 333 of the FAA Modernization and Reform Act of 2012 to expedite approval of operations of certain sUAS in the NAS, while also advancing the interests of the public.

WHEREFORE, in accordance with the Title 49 of the United States Code, the Code of Federal Regulations, and the FAA Modernization and Reform Act of 2012, Section 333, Petitioner respectfully requests that the Administrator grant this Petition for an exemption from the requirements of 14 C.F.R. §§ 45.27(a), 61.113(a) and (b), 91.7(a), 91.105, 91.119(c), 91.121, 91.151(b), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (b), and 91.417(a) and (b).

Respectfully submitted,



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