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

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

August 18, 2015

Exemption No. 12494
Regulatory Docket No. FAA–2015–1554

Mr. Derick E. Seaton
VP-Aviation Operations
Farmspace Systems, LLC.
Savannah, TN 38372

Dear Mr. Seaton:

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 May 1, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Farmspace Systems, LLC. (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial surveying.

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 3D Robotics 3DR Y-6, 3DR X-8, and the 3DR Solo.

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, Farmspace Systems, LLC. 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, Farmspace Systems, LLC. 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 3D Robotics 3DR Y-6, 3DR X-8, and the 3DR Solo 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 five 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 August 31, 2017, unless sooner superseded or rescinded.

Sincerely,

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

Enclosures

1 May 2015

U.S. Department of Transportation
Docket Management System
1200 New Jersey Ave., SE
Washington, DC 20590

Re: Exemption Request under Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations

Dear Sir or Madam:

FARMSPACE SYSTEMS, LLC ("FARMSPACE") requests an exemption from parts §§ 61.23 (a) and (c), 61.113(a) and (b), 91.7(a), 91.119 (c), 91.121, 91.151(a), 91.405(a), 91.407(a)(1), 91.409(a)(2), and 91.417(a) of Title 14, Code of Federal Regulations (14 CFR). The proposed exemption would allow Farmspace to operate UAS platforms manufactured by 3D Robotics (3DR) of California. Current systems include the "IRIS", "Y-6", "X-8", "Spektre", "Solo" and "Aero" aircraft, which all have a common autopilot, operating systems and Ground Control Stations (GCS). All aircraft weigh less than 20 lbs and consist of Vertical Take-Off and Landing (VTOL) and Fixed-Wing platforms. The granted exemption will allow Farmspace to conduct UAS flights for aerial surveying to support: Agriculture, Environmental, Emergency Management, Key National Security & Infrastructure, Real Estate, Economic Development, Training, plus UAS Research & Development initiatives.

FARMSPACE will provide the following proprietary documents, under separate cover, to support the petition:

1: Platform and Operating System Specifications
2: sUAS Users Manual
3: Standard Operating Procedures (SOPs) to include Flight, Ground and Safety procedures

FARMSPACE has organized its information into four sections: (1) the unmanned aircraft system (UAS), (2) the UAS Operator (3) the UAS operating parameters, and (4) the public interest.

The Unmanned Aircraft System (UAS)

FARMSPACE plans to operate 3DR Platforms carrying geo-referenced (1) video, (2) multi and hyper spectral, (3) LIDAR, (4) Infared, as well as other sensing payloads to support the above mentioned initiatives. The 3DR system consists of light weight battery powered aircraft, a personal computer or tablet based ground control station, and associated communications equipment. The 3DR VTOL platforms are multi-rotor systems with four (4), six (6) or eight (8) rotors, each platform weighing less than 10 pounds and with a diameter of less than 2 feet. The Fixed-Wing "Aero" aircraft is light weight (less than 15 pounds) with a wingspan of approximately 5 feet. The maximum speed for any of the aircraft is 50 knots.

The 3DR aircraft are capable of operating in either Autonomous or Manual mode. Also, the highly trained and experienced Pilot-In-Command (PIC)s can modify the flight plan at any time, using the flight management interface or by manual take-over via a regular RC remote controller, or controls integrated into a PC or tablet. In autonomous mode, the operator can instruct the vehicle to hold (loiter) at its current position, return to the Home waypoint, initiate the planned landing procedure or immediately land at the current location. The Pilot-In-Command (PIC) will always have the ability to manually control the aircraft with predetermined Lost Link Procedures (LLP), Divert Contingency Points (DCPs), and Flight Termination Points (FTPs).

14 CFR Part 21, *Certification Procedures for Products and Parts*

This provision prescribes, in pertinent part, the procedural requirements for issuing and changing design approvals, production approvals, airworthiness certificates, and airworthiness approvals. In accordance with the statutory criteria provided in Section 333 of P.L. 112-95 in reference to 49 USC § 44704, and in consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation,

FARMSPACE asserts that this aircraft meets the conditions of Section 333. Relief from 14 CFR part 21and any associated noise certification and testing requirements of part 36, is not necessary because 3DR platform will be at least as safe, if not safer, than a conventionally certificated aircraft performing the same mission. The platform (1) will not carry persons, property, or fuel, (2) will only fly under strict operational requirements, and (3) will weigh less than 20 pounds.

The PIC and crew will be remotely located from the aircraft. The limited weight and construction reduces the potential for harm to persons or damage to property in the event of an incident or accident. The risk to an onboard pilot and crew during an incident or accident is eliminated with the use of a UAS for the proposed operation.

Manned aircraft are at risk of fuel spillage and fire in the event of an incident or accident. The proposed platforms carry no fuel and therefore the risk of fire following an incident or accident due to fuel spillage is eliminated.

The 3DR platforms have the capability to operate safely after experiencing certain in-flight contingencies or failures and use an auto-pilot system to maintain UAS stability and control. The UAS is also able to respond to a loss of GPS or a lost-link event with pre-coordinated automated flight maneuvers. These safety features, in addition to the operator measures described above, ensure that these operations will not adversely impact safety compared to a manned aircraft performing a similar operation.

14 CFR 45.23 *Display of Marks*

FARMSPACE can comply with § 45.23(a). Regarding § 45.23(b), since FARMSPACE's UAS will not be certificated under § 21.191, a grant of exemption for § 45.23(b) is not necessary.

FARMSPACE's platform will 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. The markings will be as large as practicable per § 45.29(f). Therefore a grant of exemption for § 45.29 is not necessary.

14 CFR §§ 91.405(a) *Maintenance required,* 91.407(a)(1) *Operation after maintenance, preventive maintenance, rebuilding, or alteration*, 91.409(a)(1) and (2) *Inspections*, and 91.417(a) and (b) *Maintenance records.*

FARMSPACE requests an exemption from the specified maintenance, preventative maintenance, and alterations requirements in part 91, Subpart E. Farmspace will perform maintenance and inspection of the aircraft and be authorized to approve the aircraft for return to service. As provided in the supplemental, proprietary maintenance procedures submitted to the FAA under separate cover, the operator will ensure that the aircraft is in an airworthy condition prior to flight and conduct detailed inspections on an hourly programmed inspection schedule. Maintenance performed by the PIC is limited to performing "Field-Level" repairs, such as repairing simple hardware, replacing propellers, and updating software and firmware; all other maintenance will be performed by a certified and trained technician. Farmspace will document work performed in accordance with § 91.417. The size, construction, and simplicity of the aircraft will ensure that FARMSPACE will provide an equivalent level of safety.

In addition, prior to flight, FARMSPACE will ensure that all links between the control station and the small unmanned aircraft are operational. The PIC will verify control inputs from the control station to the servo actuators in the aircraft. If the PIC finds, during this preflight check, that a control link is not functioning properly, the PIC will not commence flight until the problem with the control link is resolved.

The UAS Operator

14 CFR 61.113, *Private pilot privileges and limitations*, and 14 CFR 61.133 *Commercial pilot privileges and limitations.*

The Pilot in Command will be referred to as the PIC. The PIC will be at least 17 years old, speak English proficiently, hold a minimum of a Sport Pilot certificate, and a third-class airman medical certificate or US Gov't issued drivers license. All FARMSPACE personnel have extensive experience in both manned and unmanned flight operations. FARMSPACE requires that all PIC's possess a minimum of a Sport Pilot's license in recognition of the fact that, currently, the FAA does not possess the authority to exempt FARMSPACE from the statutory requirement to hold an airman certificate as prescribed in 49 USC § 44711.

FARMSPACE is aware that unlike operations pursuant to a public Certificate of Waiver or Authorization (COA), the FAA is requiring a pilot certificate for UAS operations for two reasons, the first of which is to satisfy the statutory requirements as stated above. The second is because pilots holding a Pilot certificate are subject to the security screening by the Department of Homeland Security that certificated airmen undergo. As previously determined by the

Secretary, the requirement to have an airman certificate ameliorates security concerns over civil UAS operations conducted in accordance with Section 333.

Under current regulations, civil operations for compensation or hire require a PIC holding a commercial pilot certificate per 14 CFR part 61. Based on the pilot limitations in accordance with the pertinent parts of 14 CFR 61.113(a) and (b), a pilot holding a pilot certificate cannot act as a PIC of an aircraft for compensation or hire unless the flight is only incidental to a business or employment. However, in Grant of Exemption No. 11062 to Astraeus Aerial (Astraeus) (*see* Docket FAA-2014-0352), and in Grant of Exemption No. 11136 to Advanced Aviation Solutions, LLC (*see* Docket FAA-2014-0508) the FAA determined that a PIC with a pilot certificate operating the Astraeus UAS and the eBee Ag UAS would not adversely affect operations in the NAS or present a hazard to persons or property on the ground.

FARMSPACE's request does not differ significantly from the situation described in the exemptions issued to Astraeus and Advanced Aviation Solutions. The petitioner plans to operate over private property, or with a "Land-Use-Agreement", with controlled access in the NAS. Given: 1) the similar nature of the petitioner's proposed operating environment to that of Astraeus, 2) the parallel nature of pilot aeronautical knowledge requirements to those of commercial requirements, and 3) the airmanship skills necessary to operate the UAS, the additional manned airmanship experience of a commercially certificated pilot would not correlate to the airmanship skills necessary for the petitioner's operations. Therefore, an operator holding a pilot certificate and a third-class airman medical certificate, or Gov't issued Driver's License is appropriate for the proposed operations.

With regard to the airmanship skills necessary to operate the UAS, FARMSPACE will ensure, through PIC training, that P{ICs are knowledgeable about UAS regulations, airspace requirements, UAS flight restrictions, how to clear an obstacle during flight, the effects of weather and meteorology, how to calculate and account for weight and balance, how to handle emergency situations, aeronautical decision making and crew coordination, airport operations and radio communication, and the physiological effects of alcohol and drugs.

Once a UAS specific knowledge examination and operator certification is implemented by the FAA, all PICs will comply with FAA standards for UAS Operators and obtain such licensing. The conditions and limitations FARMSPACE is suggesting will prohibit an individual from operations unless that PIC has demonstrated that he or she is able to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption, including See & Avoid, plus emergency maneuvers and maintaining appropriate distances from persons, vessels, vehicles and structures.

To ensure that the PIC's vision (and that of a visual observer, if used) of the small unmanned aircraft is sufficient to see and avoid other aircraft in the NAS, the operator's and visual observer's vision of the small unmanned aircraft will be sufficient to allow him or her to: (1) know the small unmanned aircraft's location; (2) determine the small unmanned aircraft's attitude, altitude, and direction; (3) observe the airspace for other air traffic or hazards; and (4) determine that the small unmanned aircraft does not endanger the life or property of another.

If the aircraft must maneuver to avoid other users of the NAS, the PIC will always initiate an avoidance maneuver to avoid collision with any other user of the NAS. To the maximum extent possible, the PIC will give right-of-way to all manned aircraft in such a manner that the manned aircraft should not be presented with a see-and-avoid decision or the impression that it must maneuver to avoid the UAS.

The PIC will make available to the FAA, upon request, the platform for inspection or testing, and all associated documents and records. The Operator will report an accident to the FAA within 10 days of any operation that results in injury or property damage. The Operator will conduct a preflight inspection, to include specific aircraft and control station systems checks, to ensure the small UAS is safe for operation.

All PICs and visual observers will comply with the alcohol and drug use prohibitions that are currently in place in part 91 of the FAA's regulations.

No person will be involved in flight operations if he or she knows or has reason to know of any physical or mental condition that would interfere with the safe operation of a small UAS.

The PIC will provide a pre-flight briefing to all crewmembers involved in the flight operations.

In conclusion, FARMSPACE asserts that a PIC holding a sport pilot certificate (or higher) and a third-class airman medical certificate (or State Driver's License), and who has completed the FARMSPACE UAS training, can conduct the proposed UAS operations without adversely affecting the safety of the NAS and persons or property on the ground. FARMSPACE, therefore, requests relief from 14 CFR § 61.113(a) and (b). Relief from section 133 is not necessary.

Operating parameters of the UAS

14 CFR 91.7(a) *Civil aircraft airworthiness*

Although FARMSPACE's platform should not require an airworthiness certificate in accordance with 14 CFR part 21, Subpart H, FARMSPACE asks the FAA to consider its compliance with its operating documents to be a sufficient means for determining an airworthy condition and, therefore, to grant relief from § 91.7(a). FARMSPACE will ensure that its aircraft is in an airworthy condition – based on compliance with the operating documents prior to every flight, and as stated in the conditions and limitations herein.

14 CFR 91.7(b)

This provision requires the Operator of the UAS to determine whether the aircraft is in a condition for safe flight. As explained above, FARMSPACE can comply with this requirement, therefore relief from § 91.7(b) is not necessary.

14 CFR 91.9 *Civil aircraft flight manual, marking, and placard requirements* and 14 CFR 91.203(a) and (b) *Civil aircraft: Certifications required*

The FAA has previously determined that relief from these sections is not necessary. Nevertheless, should relief be necessary, such relief is justified as explained herein. The FAA has previously found that relevant materials may be kept in a location accessible to the PIC in compliance with the regulations.

14 CFR 91.109 *Flight instruction; Simulated instrument flight and certain flight tests*

FARMSPACE intends to accomplish training through the procedures referenced in the operating documents. Regarding the requirements for fully functioning dual flight controls aboard the aircraft, FARMSPACE points out that the ground control station is based on a small hand-held computer; while it does not offer a second set of "controls," two individuals can and when necessary operate the single set of controls simultaneously. Furthermore, training operations will only be conducted during dedicated training sessions. Safety will not be adversely impacted if FARMSPACE follows the training outlined in the operating documents. As such, FARMSPACE is not requesting relief from section 91.109.

14 CFR 91.119 *Minimum safe altitudes*

FARMSPACE is not requesting relief from Section 91.119(a), which requires operating at an altitude that allows a safe emergency landing if a power unit fails. FARMSPACE is also not requesting relief from § 91.119(b), operation over congested areas, because FARMSPACE will not conduct such operations.

FARMSPACE is requesting relief from § 91.119(c). The regulation provides that over sparsely populated areas the aircraft cannot be operated closer than 500 feet to any person, vessel, vehicle, or structure. Because the aircraft will be operating at a maximum of 400 feet AGL, it cannot comply with this requirement. FARMSPACE will provide an equivalent level of safety by only flying over private property with the permission of the landowner. The landowner will be briefed on the expected route of flight and the associated risks to persons and property on the ground. Due to the small size of the platform, the hazard to persons, vessels, vehicles, and structures is not comparable to manned aircraft and should be considered in granting the exemption. The aircraft will not be operated over individuals not involved with flight operations. Operations will be conducted only over private property with the permission of the landowner, the landowner will be briefed of the expected route of flight and the associated risks to persons and property on the ground. The UAS will be operated at an altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface.

As discussed in Exemption No. 11109 to Clayco, Inc. (*see* Docket No. FAA-2014-0507), operations conducted closer than 500 feet to the ground may require that the aircraft be operated closer than 500 feet to essential persons, or objects that would not be possible without additional relief. Therefore, the FAA has required, and FARMSPACE will ensure that, prior to conducting UAS operations, all persons not essential to flight operations (nonparticipating persons) will remain at appropriate distances. In open areas, FARMSPACE will require the aircraft to remain

an acceptable safe distance from all persons other than essential flight personnel (i.e. operator, observer, operator trainees or essential persons). Moreover, the platform will weigh less than 20 pounds. FARMSPACE will ensure that only persons engaged in flight operations will be closer than 500 feet. Barriers or structures will be present that can sufficiently protect both participating and nonparticipating persons from the UA or debris in the event of an accident. The operator will also 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 will cease immediately. When considering how to immediately cease operations, the primary concern is the safety of those nonparticipating persons. The only operations that will be conducted closer than 500 feet to vessels, vehicles and structures will be operations pursuant to a grant of permission from the land owner/controller after the operator makes a safety assessment of the risk of operating closer to those objects and determines that it does not present an undue hazard.

In order to address potential safety concerns surrounding a possible loss of positive control of the aircraft, FARMSPACE will implement a performance-based operator-responsibility standard built around the concept of a confined area of operation. FARMSPACE will confine each flight to a limited area of operations defined by the Area of Operations (AOR) to be surveyed. This will allow the operator to become familiar with the area of operation and to create contingency plans for using the environment in that area to mitigate the risk associated with possible loss of positive control. For example, the operator will mitigate loss-of-control risk to people on the ground by setting up a perimeter and excluding people not involved with the operation from the operational area. The operator will also mitigate risk to other aircraft by notifying the local air traffic control of the small UAS operation and the location of the confined area in which that operation will take place.

In addition to the operator-based standards above, FARMSPACE will use technological approaches to ensure safe operations in the event of a loss of positive control. All 3DR platforms will include automatic return-to-base instructions within their flight management software. In addition, to the extent possible, the platform will include geo-fencing software preventing the vehicle from travelling beyond pre-determined coordinates.

All operations will occur in class approved airspace at no more than 400 feet above ground level (AGL); operations will be conducted over private or approved Land Owner agreed upon property with the permission of the land owner; and all required permits will be obtained from state and local government before operation. The PIC will file a Notice to Airmen (NOTAM) providing radial/distance measuring equipment, radius, and a date/time group for each operation.

The aircraft will not be operated (1) over urban or populated areas; (2) at air shows or over an open-air assembly of people; (3) over heavily trafficked roads; (4) within 5 NM of an airport or heliport, without prior written consent, (5) over any persons not directly involved in the operation. Operations will be limited to day, visual meteorological conditions and the aircraft will remain within visual line of sight at no greater than 3/4 nautical mile of the PIC at all times.

In addition the flight parameters above, in order to ensure the safety of its flight operations, FARMPSACE will implement the following flight restrictions in accordance with the provisions of Proposed Part 107:

To the extent that a first-person view camera, binoculars, or other vision enhancing devices (other than corrective lenses) are used, these will not be used as a substitute for the "see-and-avoid" requirement. This requirement shall be met through the line of sight operation as described above.

The aircraft shall never be operated in excess of 100 mph (87 knots). Typical operations will involve airspeeds of approximately 15 knots.

The aircraft will never be flown without minimum weather visibility of 3 miles from the control station. In addition, the aircraft will maintain no less than: (1) 500 feet (150 meters) below clouds; and (2) 2,000 feet (600 meters) horizontal from clouds.

No person will act as a PIC or observer for more than one unmanned aircraft operation at one time.

Since the PIC and any visual observers will maintain or achieve visual line of sight with the aircraft at all times, FARMSPACE will not conduct a relay or "daisy-chain" formation of multiple visual observers.

No operations will be conducted from a moving vehicle or aircraft.

All operations will be conducted in a manner to avoid careless or reckless behavior.

14 CFR § 91.121 *Altimeter Settings*

FARMSPACE requests an exemption regarding the altimeter settings in § 91.121 because the platform will fly below 400 feet AGL and will not need to maintain hemispherical cruising altitudes to de-conflict with other aircraft. AGL should be an appropriate altimeter measurement presented to thePIC, and it should be based on the barometric pressure at the point of launch. To provide an equivalent level of safety, the platform's AGL altimeter will be set to zero on the ground before every flight. Because the aircraft will fly no more than 30 minutes, even rapid changes in barometric pressure will have limited effect on the safety of the flight.

14 CFR § 91.151(a)(1) *Fuel requirements for flight in VFR conditions,*

Regarding the fuel requirements in § 91.151, the 3DR vehicles are battery-operated and the maximum duration of flight from a single battery charge is currently approximately 30 minutes. The aircraft will never fly more than 3/4 nautical mile from the point of intended landing and a full battery charge at launch will ensure it meets the reserve energy requirements. FARMSPACE requests an exemption to the word "fuel" and asks for an equivalent interpretation with the words

"energy" or "power." The PIC will ensure that the UAS has enough power to operate for its intended operational time and an additional five minutes. The 5-minute buffer will ensure that the platform has sufficient power to return to the operator, or another location, and be able to make a controlled landing. Additionally, this buffer will ensure that the platform remains controllable throughout its intended operational time.

Prior relief has been granted for manned aircraft to operate at less than the prescribed minimums, including Exemption Nos. 2689, 5745, and 10650. In addition, similar UAS-specific relief has been granted in Exemption Nos. 8811, 10808, 10673, and 11136 for daytime, VFR conditions. The UAS provides battery power remaining in percent to the PIC. The UA batteries provide approximately 30 minutes of powered flight. Information provided in the operating documents discusses procedures regarding remaining battery power. Those documents contain a condition in which the PIC will initiate a landing procedure when 5 minutes of flight remain. Given the limitations on its proposed operations and the location of those proposed operations, a reduced minimum power reserve for flight in daytime VFR conditions is reasonable. These factors should provide the FAA with sufficient reason to grant the relief from 14 CFR 91.151(a) as requested in accordance with the conditions and limitations herein, that prohibit the operator from beginning a flight unless (considering wind and forecast weather conditions) there is enough power to fly to the first point of intended landing and, assuming normal cruising speed, land the UA when 5 minutes of power remain.

Public Interest

The FAA has acknowledged that technological advances in small UAS have led to a developing commercial market for their uses by providing a safe operating environment for them and for other aircraft in the NAS. The use of small unmanned aircraft will lead to more efficient methods of performing certain commercial tasks that are currently performed by other methods. Proposed Rule 107 lists FARMSPACE's sUAS initiatives as operations that can be safely conducted under a framework similar to that proposed by FARMSPACE.

The FAA has also acknowledged the experience that military pilots bring to the UAS field. All of the principals at FARMSPACE are military veterans. The CEO and the General Counsel are former military aviators. Two of the Vice-Presidents of the company have extensive experience flying and training operators in military unmanned systems. FARMSPACE will continue to focus on the hiring and training of military veterans.

The sUAS data gathered by FARMSPACE will allow organizations to become much more efficient, productive and by reducing risks to the NAS.

Summary of Conditions & Limitations

FARMSPACE currently supports flight operations for a "Public CoA" conducting sUAS Aeronautical Research with many years of safely flying in the NAS and complying with 14 CFR and FAA requirements.

Aerial data collection includes any remote sensing and measuring by an instrument(s) aboard the UAS. 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.

1. Operations authorized by this grant of exemption will be limited to the 3DR systems weighing less than 55 pounds including payload and utilizing a common operating software and Ground Control Station. Proposed operations of any other aircraft will require a new petition or a petition to amend this grant.

2. The UA will not be operated at a speed exceeding 87 knots (100 miles per hour). And never greater than the maximum UA operating airspeed recommended by the aircraft manufacturer.

4. The UA will not operated at an altitude more than 400 feet above ground level (AGL). Altitude will be reported in feet AGL.

5. The UA will operated within visual line of sight (VLOS) of the PIC at all times. The PIC will 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 will utilize a visual observer (VO). The UA will be operated within the visual line of sight (VLOS) of the PIC and VO at all times. The VO will be used to satisfy the VLOS requirement and augment the PIC, as long as the PIC always maintains VLOS capability. The VO and PIC will be able to communicate verbally at all times. Electronic messaging or texting will not permitted during flight operations. The PIC's will be designated before the flight and will not transfer his or her designation for the duration of the flight. The PIC will ensure that the VO can perform the duties required of the VO.

7. All operating documents and the exemption will be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in the exemption and the procedures outlined in the operating documents, the conditions and limitations in the exemption will take precedence and must be followed. Otherwise, the PIC will follow the procedures as outlined in the operating documents. The PIC will update or revise the operating documents. FARMSPACE will track revisions and present updated and revised documents to the Administrator or any law enforcement official upon request. Farmspace will also present updated and revised documents if it petitions for extension or amendment to this grant of exemption. If FARMSPACE determines that any update or revision would affect the basis upon which the FAA granted this exemption, then FARMSPACE will petition for an amendment to the grant of exemption. The FAA's UAS Integration Office (AFS-80) will 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 will undergo a functional test flight prior to conducting further operations. Functional test flights will only be conducted by a PIC with a VO and must remain at least 500 feet from other people. The functional test flight will be conducted in such a manner so as to not pose an undue hazard to persons and property.

9. The PIC 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 will conduct a pre-flight inspection and determine the UAS is in a condition for safe flight. The pre-flight inspection will 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 will be 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 PIC will follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components.

12. Each UAS operated under the exemption will comply with all manufacturer safety bulletins.

13. The PIC will hold either an airline transport, commercial, private, recreational, or sport pilot certificate. The PIC will also hold a current FAA airman medical certificate or a valid U.S. driver's license issued by a state, the District of Colombia, Puerto Rico, a territory, a possession, or the Federal government. The PIC will 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. FARMSPACE will 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 exemption requirements, including See & Avoid, emergency procedures and maintaining appropriate distances from persons, vessels, vehicles and structures. PIC qualification flight hours and currency will be logged in a manner consistent with 14 CFR § 61.51(b). Flights for the purposes of training the FARMSPACE'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 the requirements of this exemption and 14 CFR requirements. Training operations will only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights, all persons not essential for flight operations will be considered nonparticipants, and the PIC will operate the UA with appropriate distance from nonparticipants in accordance with 14 CFR § 91.119.

15. UAS operations will not be conducted at night, as defined in 14 CFR § 1.1. All operations will be conducted under visual meteorological conditions (VMC). Flights under special visual flight rules (SVFR) will not be conducted.

16. The UAS will 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 FARMSPACE. The letter of agreement with the airport management will be made available to the Administrator or any law enforcement official upon request.

17. The UAS 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.

18. If the UAS loses link or loses its GPS signal, the UA will return to a pre-determined LLP, DCP or Land immediately at a FTP within the private or controlled-access property.

19. The PIC will 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 five 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 will be conducted in accordance with an ATO-issued COA or administration accepted equivalent requirements. FARMSPACE will apply for a new or amended COA if it intends to conduct operations that cannot be conducted under the current terms.

22. All aircraft operated will 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 will be as large as practicable.

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

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

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

26. All Flight operations will 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 UAS and/or debris in the event of an accident. FARMSPACE will 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 UAS, flight operations will cease immediately to ensure 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 will 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 will be reported to the FAA's UAS Integration Office (AFS-80) within 24 hours. Accidents will be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: www.ntsb.gov.

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

Conclusion

The entire FARMSPACE team looks forward to your consideration of this request and is available to answer any remaining concerns. We are very excited by the prospect of demonstrating our ability to conduct safe operations while helping to support the growing global community, employ veterans, promote Science, Technology, Engineering & Math (STEM) education, improve the environment and protect National Security.

Sincerely,

Submitted on 1 may 2015

DERICK E. SEATON
Farmspace Systems, LLC.
VP-Aviation Operations
PO Box 57
Savannah, TN 38372
Tel: (731) 727-7021