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

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

July 29, 2015

Exemption No. 12213
Regulatory Docket No. FAA–2015–0611

Mr. David Faris
Faris Enterprises LLC DBA Eastern Drones
29C School Street
Hamden, CT 06518

Dear Mr. Faris:

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 posted March 11, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Faris Enterprises LLC DBA Eastern Drones (hereinafter petitioner or operator) for an exemption. The exemption would allow the petitioner to operate an unmanned aircraft system (UAS) to conduct aerial photography and 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 is a Yuneec Q500 Typhoon.

The petitioner requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*. 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 the requested 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, Faris Enterprises LLC DBA Eastern Drones 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.

[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.

Conditions and Limitations

In this grant of exemption, Faris Enterprises LLC DBA Eastern Drones is hereafter referred to as the operator.

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 Yuneec Q500 Typhoon 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

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, DC

Reg. Docket No. _____

In the Matter of Petition for Exemption of:
Faris Enterprises LLC (DBA Eastern Drones)
For an Exemption from the requirements of the
Code of Federal Regulations Sections
Concerning operation of an Unmanned Aircraft System
Pursuant to Section 333 of the
FAA Modernization and Reform Act of 2012

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Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the Reform Act), Faris Enterprises LLC DBA Eastern Drones (ED) (the operator), D. Faris (the applicant), planned operator of Small Unmanned Aircraft Systems (sUAS) equipped to conduct aerial photography and survey for various industries hereby applies for an exemption from Federal Aviation Regulations (FARs) to allow commercial operation of sUAS, so long as such operations are conducted within and under the conditions outlined herein or as may be established by the FAA as required by Section 333. As described more fully below, the requested exemption would permit the operation of sUAS by the applicant for commercial use that would provide the following benefits:

I. PUBLIC INTEREST

The applicant proposes to conduct sUAS flight operations for government and businesses in support of bridge, tower, roof and other structure inspections. Using video and photos from a sUAS is a safer and less expensive way to perform inspections of large complex structures without easy access such as elevated bridges spanning water or cliffs, towers in remote locations and steep building roofs that are hard to inspect. Traditional inspection methods include manned helicopter flights but they have had a number of accidents and or fatalities. One bridge inspection method includes using a mobile inspection platform to lower inspectors over the side of the bridge. This method requires inspectors to coordinate with the state to close a traffic lane for the length of the bridge. Placing a static vehicle in a lane next to moving traffic is particularly hazardous to motorists and the inspectors alike and has caused serious traffic incidents in the past.

Additionally, we propose to conduct aerial photography and videos of real property, specifically individual properties. Aerial photos and videos from several angles are far more effective than ground-based imagery for displaying the characteristics of large properties, particularly those with several buildings and large trees. The benefits of reduced cost and improved quality of presentation from the sUAS will be a valuable benefit to many buyers and sellers of property.

We also request that we be allowed to use our system to benefit first responders in our area who might require assistance, including fire fighters, police, sheriffs etc. while remaining subject to all limitations cited in this application.

Environmentally, sUASs are battery powered and create no emissions. If the sUAS crashes, there is no fuel to ignite and explode. Any impact damage of the lightweight sUAS is far less than a full size helicopter. The public's interest is furthered by minimizing ecological impact of an accident and by reducing human exposure to potentially harmful emissions associated with manned aircraft. Finally, aerial surveys are valuable tools for inspections and surveys. However, problems with safety, cost, statistical integrity, and logistics continue to impede aerial surveys and inspections using current methods. The use of sUAS addresses these problems and is a powerful tool for performing a wide-range of inspection and survey applications. The public as a whole will benefit from safer, more cost-effective aerial services that sUAS operations provide.

Operation of a sUAS would provide significant safety, environmental and economic benefits not possible by larger sized aircraft. Safety would improve by reducing the risk concerning infrastructure inspection by alleviating human exposure to dangers associated with traditional inspection methods. Government agencies as well as businesses will benefit from sUAS services currently unavailable. Those services will benefit the general public and serve the public interest.

II. PETITIONER'S DESCRIPTION

It is possible to operate sUAS without creating any hazards to users of the National Airspace System (NAS), the public or pose a threat to national security if done so safely and responsibly. The applicant currently holds a FAA Airline Transport Pilot Certificate (ATP) and has been employed by a major commercial airline (Express Jet Airlines) for 18 years. The applicant has already passed any and all TSA security and background checks as well as background check performed by the airline. The Airline Transport Pilot Certificate (ATP) and job experience demonstrates that the applicant has a high regard for safe operations, as well as a necessary understanding of the NAS and FARs. The ATP and work experience serves to add significantly to the level of safety in any operation performed by the applicant or the applicant's employees.

The name and address of the Petitioner's representative is:
Faris Enterprises LLC (DBA Eastern Drones)
Attn: David Faris
29C School Street
Hamden, CT 06518
Email: davidf01@att.net

III. THE UNMANNED AIRCRAFT (UA)

The sUAS is a Yuneec Q500 Typhoon (Q500) figure 1. A light weight (less than 5lbs with all on-board equipment) battery operated 4-motor rotorcraft in the form of a quadcopter that takes off and lands vertically, manufactured by Yuneec, model Q500. The Q500 has an on-board flight computer with GPS navigation and location ability that receives signals for flight controls from a ground-based transmitter/controller. It is a complete aerial photography and videography (APV) system. The Q500 system includes the aircraft, a 1080P HD camera, ST10 personal ground station and batteries. There are also a number of accessories including a sun shade for ground station LCD screen, car charger, USB adapter/charger and an extra set of 4 rotors.

The Q500 specifications are:
Height: 8.3 in
Length (without rotor blades): 16.5 in
Width (without rotor blades): 16.5 in
Diameter (without rotor blades): 22.2 in
Propeller/Rotor Blade Diameter: 13.0 in
Weight (without battery and payload): 40.0oz
Takeoff Weight with all on-board equipment 60.0oz
Battery: 5400mAh 3S 11.1V LiPo
Charger: DC 3S 11.1V LiPo balancing and AC adapter
Transmitter: ST10 10-channel 2.4GHz with 5.8GHz video link
Flight Time: 20-25 minutes

IV.THE GROUND STATION-BASED PART OF THE SYSTEM

The ST10 ground station allows the Pilot in Command (PIC) operational control of a flight operation from beginning to end and allows the PIC to control the sUAS while in the air. The ST10 personal ground station is a 10-channel 2.4GHz RC transmitter that supports a 5.8GHz video downlink that delivers streaming video to the built-in LCD screen on the ground station. During flight the ST10 ground station receives telemetry from the Q500s on-board flight computer and camera displaying live video and flight data including altitude AGL, horizontal and vertical speed, compass direction of flight and direction back to the ground station.

ST10 ground station specifications:
Number of Channels: 10
RC Band: 2.4GHz
RC Modulation: Yuneec
Video Downlink Band: 5.8GHz
Telemetry: Yes
SD Card Compatible: Yes
LCD Screen Size: 4.5”
Touchscreen: Yes

V. PROPOSED OPERATIONS AND QUALIFICATION FOR APPROVAL UNDER SECTION 333 OF THE REFORM ACT

The Q500 or any future Eastern Drones sUAS will weigh 55lbs or less including payload. They would operate, under normal conditions, at a speed of no more than 50 knots. Operations will be performed by a qualified sUAS PlC, to insure that the sUAS will "not create a hazard to users of the national airspace system or the public." Given the small size of the sUAS involved and the pre-defined area in which they will operate, the applicant believes that these operations will ensure a level of safety and prevent the possibility of a national security issue in which Congress envisioned that the FAA must, by exemption, allow commercial operations of sUAS to commence immediately. The operation of sUAS by knowledgeable professionals with experience in the NAS will serve to enhance safety, add to the public benefit and reduce environmental impacts related to current methods of aerial photography and survey.

The limitations and conditions to which the operator, or its' employees, acting as sUAS PIC agrees to when conducting commercial operations under an FAA issued exemption:
1. Safety will be the first and foremost consideration in any sUAS operation.
2. Flights will be operated within line of sight of the PIC and/or an observer.
3. The sUAS will weigh less than 55 lbs total.
4. Flights will be operated in Class G airspace whenever possible. If operation in other airspace is required, the relevant controlling agency will be notified at least 24 hours prior to the operation and, if required, any necessary permission obtained.
5. Flights will be operated under visibility and cloud clearance requirements equivalent to Visual Flight Rules (VFR).
6. The sUAS will at all times give way to any aircraft carrying persons.
7. Minimum crew for each operation will consist of the sUAS PlC. An observer will be utilized if the sUAS will be flown beyond line of sight of the PlC. The observer, if required, and PIC will at all times be able to communicate by voice and/or text.

8. Prior to a sUAS flight, an area of operation will be established. This area of operation will include a defined lateral and vertical area, where the sUAS will operate. Safety procedures will be established for persons, property and applicable airspace within the area of operation.
9. Flight planning prior to the flight will minimize hazards to persons and property in the air and on the ground. Flight planning will include flight completion with at least 15% battery power remaining as measured by the sUAS or appropriate timing.
10. If equipped, and appropriate for the operation, sUAS aircraft will utilize GPS navigation, and failsafe return-to-home (RTH) safety features.
11. A briefing will be conducted in regard to the planned sUAS operations prior to operation at each new location. All personnel who will be performing duties within the boundaries of the area of operation will be present for this briefing.
12. All required permissions and permits will be obtained from appropriate state, county or city jurisdictions, including local law enforcement, fire, or other appropriate governmental agencies if needed.
13. Written or oral permission, from the relevant property owners will be obtained prior to an operation.
14. The PIC must have accumulated and logged a minimum of 25 hours of total time as a UA rotorcraft pilot. This will include operation of the sUAS both in normal and emergency modes of operation, and will include familiarization with the operation manual if published by the sUAS manufacturer.

It is the applicant's belief that the size, speed, operating environment, limitations and level of applicant's experience in the NAS outlined provides an "equivalent level of safety" or better when operating a sUAS for the public interest as outlined in Section 333 in the FAA Modernization and Reform Act of 2012. lt is requested that the FAA issue an exemption to permit safe, legal, commercial sUAS operation by the applicant as soon as possible.

The applicant requests the FAA Administrator to grant this exemption. Given the foregoing, the applicant’s proposed usage does not pose a hazard to the NAS or to the public. Considering the clear statutory language in Section 333 of the Reform Act, the authority contained in the Federal Aviation Act, as amended, the equivalent level of safety to the public and to the men and women conducting infrastructure inspections, and the reduction in environmental effects, the grant of the requested exemptions is in the public interest. Accordingly, applicant respectfully requests that the FAA grant the requested exemption without delay.

VI. FEDERAL REGISTER SUMMARY

14 CFR Part21, Subpart H: Airworthiness Certificates
21 .191 Experimental certificates.
14 CFR 91.203(a) & (b) Civil aircraft: Certifications required.
14 CFR 45.23 Display of marks; general and 45.29 Size of marks.
14 CFR 91.9 Civil aircraft flight manual, marking, and placard requirements.
14 CFR 91.109 Flight instruction
14 CFR 91.119 Minimum safe altitudes: General.
14 CFR 9l.l21Altimeter settings.
14 CFR. 91.103: Preflight Action.
14 CFR Part 27: Airworthiness Standards: Normal Category Rotorcraft.
14 CFR Subpart E (91.401 -91.4171- Maintenance, Preventive Maintenance, and Alterations

Appendix A

REGULATIONS FROM WHICH EXEMPTION IS REQUESTED
Faris Enterprises LLC (DBA Eastern Drones), requests an exemption from the following regulations as well as any additional regulations that may technically apply to the operation of sUAS:

14 CFR Part21, Subpart H: Airworthiness Certificates
This part establishes the procedures for the issuance of an airworthiness certificate. While the FAA continues to work to develop airworthiness standards for sUAS, we request an experimental certificate be issued for the sUAS's operated by the applicant under either or both of the following provisions:

21 .191 Experimental certificates.
Experimental certificates are issued for the following purposes:
(a) Research and development. Testing new aircraft design concepts, new aircraft equipment, new aircraft installations, new aircraft operating techniques, or new uses for aircraft.
(b) Showing compliance with regulations. Conducting flight tests and other operations to show compliance with the airworthiness regulations including flights to show compliance for issuance of type and supplemental type certificates, flights to substantiate major design changes, and flights to show compliance with the function and reliability requirements of the regulations. Since the experimental certificate can be used for commercial purposes such as market surveys, sales demonstrations, and customer crew training, we would expect that an experimental certificate would permit our commercial purpose as well. The aircraft will not carry persons or property and will only fly under strict operational requirements. Combined with the fact that any aircraft operated would be light weight we propose that a sUAS will be at least as safe, if not safer, than a conventionally certificated aircraft performing the same function. If an experimental airworthiness certificate is not appropriate for this application, then we request an exemption of 14 CFR Part21, Subpart H, and the requirement for an airworthiness certificate in general, citing the equivalent level of safety outlined in the previous paragraph.

14 CFR 91.203(a) & (b) Civil aircraft: Certifications required.
The regulation provides that an airworthiness certificate, with the registration number assigned to the aircraft and a registration certificate must be aboard the aircraft. Additionally, subparagraph (b) provides that the airworthiness certificate be "displayed at the cabin or cockpit entrance so that it is legible to passengers or crew." A sUAS is too small to carry documentation, does not have an entrance, and is not capable of carrying passengers or crew. To obtain an equivalent level of safety and meet the intent of 91.203, we propose that documents deemed appropriate for this aircraft by the FAA will be co-located with the crew at the ground control station and available for inspection upon request.

14 CFR 45.23 Display of marks; general and 45.29 Size of marks.
These regulations provide that each aircraft must display "N" and the aircraft's registration number in letters at least 3 inches high. Additionally, the aircraft must display the word "EXPERIMENTAL" in letters at least 2 inches high near the entrance to the cabin, cockpit, or pilot station. A sUAS does not have an entrance in which the word "EXPERIMENTAL" can be placed, and may not have a registration number assigned to it by the FAA. If 14 CFR 45.23 Display of marks general and 45.29 Size of marks is not appropriate for this application, then we request an exemption of 14 CFR 45.23 and 14 CFR 45.29 and the requirement for Display of marks and size of marks. To obtain an equivalent level of safety and meet the intent of 45.23 and 45.29, we propose that markings deemed appropriate for this aircraft by the FAA will located with the crew at the ground control station and available for inspection upon request.

14 CFR 91.9 Civil aircraft flight manual, marking, and placard requirements.
This regulation provides that no person may operate an aircraft unless a current, approved flight manual is in the aircraft. The intent of this requirement is to ensure that flight manual information is available to the aircrew while operating the aircraft. We request an exemption to this requirement since the sUAS cannot carry such a manual, and if the sUAS did carry such manual, it would be unavailable to the crew for review. To obtain an equivalent level of safety and meet the intent of 91.9, we propose that a current, sUAS manufacturers operation manual or equivalent be available to the crew at the ground station anytime the aircraft is in, or preparing for flight.

14 CFR 91.109 Flight instruction; Simulated instrument flight and certain flight tests. The regulation provides that "No person may operate a civil aircraft that is being used for flight instruction unless that aircraft has fully functioning dual controls." The controls for a sUAS do not currently have a set of fully functioning dual controls. If a sUAS pilot is being trained, the pilot performing the training would be directly supervising and could take over the controls from the pilot in training if the need arose. This would be similar to the technique of a "throw-over type" control wheel in some fixed wing aircraft. We feel that this technique meets the intent 91 .109 and provides an equivalent level of safety.

14 CFR 91.119 Minimum safe altitudes: General.
The regulation provides that over sparsely populated areas the aircraft cannot be operated closer than 500 feet to any person, vessel, vehicle, or structure. Since the typical mission of this sUAS would be photography or survey of vessels, vehicles or structures it would be necessary to operate closer than 500 feet to the items listed. Operations will only be flown over property or persons where permission has been obtained, and careful pre-planning has been performed. Further, sUAS aircraft operate at a very slow airspeed, and a low mass, and do not need as much space to operate safely, as outlined in 91.119. We believe the slower speed, smaller mass and careful pre-planning would provide an equivalent level of safety.

14 CFR 9l.l21Altimeter settings.
The regulation provides that aircraft shall maintain cruising altitudes by reference to an altimeter setting available within 100 nautical miles of the aircraft. The sUAS will normally be flying close to the ground, and in line of sight of the PIC or an observer. This line of sight operation will provide separation from other aircraft, obstructions and terrain, and would override the use of an altimeter for such a purpose. We feel that this will provide an equivalent level of safety.

14 CFR 91.151 Fuel requirements for flight in VFR conditions.
The regulation provides that no person may begin a flight in an airplane under day-VFR conditions unless there is enough fuel to fly to the first point of intended landing and to fly after that for at least 30 minutes. We feel the intention of this paragraph it to provide a reasonable reserve of energy to plan for a safe landing should there be a delay in landing. The close proximity to the ground station, the ability for both rotorcraft and small fixed wing aircraft to land in a very small space and the built in energy level monitoring of the sUAS we feel provide an equivalent level of safety if the flight is planned to be completed with 15% battery energy remaining. We request an exemption to the word "fuel" and ask for an equivalent interpretation with the word "energy".

14 CFR Subpart E (91.401 -91.4171- Maintenance, Preventive Maintenance, and Alterations
The regulation provides that the operator is primarily responsible for maintaining the aircraft in an airworthy condition, including compliance with part 39 and 43. Paragraphs 91.407 and 91.409 require that the aircraft be "approved for return to service by a person authorized under 43.7" after maintenance

and inspection. It is our intention that the PIC perform maintenance and inspection of the aircraft and "be authorized to approve the aircraft for return to service." Prior to every flight, the PIC will inspect the aircraft to ensure that it is in an airworthy condition. Any general maintenance procedures or replacement of consumable items outlined by the sUAS manufacturer, if applicable, will be complied with by the PIC. In no circumstance will a sUAS be operated in a condition that is deemed, or suspected to be, unsafe. If such a determination is reached, and the problem cannot be remedied to the satisfaction of the PIC, the sUAS will not be operated until consulting with the manufacturer or authorized dealers to complete necessary repairs. We feel that due to the size, construction, and simplicity of the aircraft, the PIC can ensure an equivalent level of safety.

8900.227 Paragraph 16(c)(4) PIG Medical. and Paragraph 16(e)(1) Observer Medical.
This policy provides that both the PIC and observer must have a valid FAA second-class medical certificate issued under part 67 in order to perform as a pilot or observer. Requiring the crew to meet the same medical requirements as a commercial pilot carrying passengers in a large aircraft is an unnecessary burden. We propose that the minimum medical requirements be vision corrected to 20/2O and a valid, state-issued driver's license. The risk of both the PIC and observer becoming incapacitated at the same time and suddenly is very low. Further, since the sUAS is operating close to the ground, it could be brought in for landing in a very short time if incapacitation was suspected. Finally, most sUAS's are equipped with an automatic return to home feature which would provide a final level of safety. We feel this would provide an equivalent level of safety.

14 CFR Part 27: Airworthiness Standards: Normal Category Rotorcraft.
14 C.F.R. Part 27 sets forth the procedural requirements for airworthiness certification of normal category rotorcraft. To the extent the applicant 's sUASs would otherwise require certification under Part 27, as a rotorcraft, applicant requests an exemption from Part 27’s airworthiness standards for the same reasons identified in the exemption request from 14 C.F.R. Part 21, Subpart H.

14 CFR. 91.103: Preflight Action.
This petition seeks an exemption from 91.103, which requires a PIC to become familiar with specific information before each flight, including information contained in the FAA approved Flight Manual on board the aircraft.22 Inasmuch as an FAA approved flight manual will not be provided for the sUAS, an exemption is requested. An equivalent level of safety will be provided by following the manufactures operations manuals comprehensive preflight checklist. The PIC will take all actions, including reviewing weather, flight battery requirements, landing and takeoff distances, and aircraft performance data, before initiation of flight.

Appendix B

Figure 1 Yuneec Q500 Typhoon

Figure 2 ST10 ground station

Figure 3 ST10 LCD Display