Aetos Group Inc.

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

Re: Submission of Requests for Determination under Section 333 of the FAA Modernization and Reform Act and Exemptions Under 14 C.F.R. Section 11.81

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 ("FMRA"), Aetos Group Inc. (AGI) hereby requests a determination by the Secretary of Transportation authorizing AGI to conduct commercial operation of its sUAS for the purposes of aerial inspection of specific chemical plant infrastructure and environmental monitoring in the petrochemical industry. Operations will be conducted within and under the safeguards outlined herein and as may be established by the FAA under FMRA Section 333(c).

AGI also petitions for exemptions as necessary to effect the determination requested pursuant to FMRA Section 333. The attached documentation includes detailed exemption requests that demonstrate how these exemptions are in the public interest and will maintain at least an equal level of safety to existing regulations. Authorizing AGI to conduct inspections and environmental monitoring of chemical plants would bring immediate and significant improvement to environmental and operational risk management in the chemical industry. The AGI sUAS would conduct inspections and monitoring in a manner that is significantly safer than current practices.

The use of sUAS technology for chemical plant infrastructure inspections and environmental monitoring will benefit the public interest in the following ways:

- Reduces the risk associated with elevated human operations.

- Provides a higher quality and more efficient inspection and monitoring capability. This enhanced inspection process will reduce the probability of dangerous and costly unplanned events which impact plant personnel and the surrounding ecosystem and communities.

AGI proposes to fly the Aeryon Scout and Sky Ranger sUAS, proven aircraft now operating in the United States under certificates of authorization (COA) issued by the FAA, as well as overseas. The aircraft are battery-powered quad-copters weighing less than 7 pounds (the Scout weighs 3.4 pounds, the Sky Ranger 5.3 pounds) that will be flown over industrial areas at a maximum altitude of 400 feet AGL, during daylight, within the visual line of sight of the pilot, and subject to strict operating safeguards including geo-fencing. AGI's pilots have extensive experience operating UAS and all hold a commercial pilot's certificate and at least a second class medical certificate.

Operations will be subject to applicable Federal Aviation Regulations, AGI's operating and safety protocols, and additional safety and risk management standards and protocols dictated by each specific company for which AGI conducts inspection and monitoring operations. These safeguards include failsafe and lost-link mechanisms to prevent "fly-aways" and specific, validated procedures for system and equipment failures. The Scout and Sky Ranger will operate with the additional safeguard of geo-fencing. AGI will only fly only in predetermined and preapproved airspace; and will obtain airspace waivers and otherwise coordinate with the FAA as necessary to ensure safe operations. In addition to the safeguards specified in the attached documentation, AGI submits a confidential Operations Manual that has been developed by AGI during its years of working with the petrochemical industry and academia, including support to research using UAS operating under COA granted by the FAA. The Operations Manual contains confidential proprietary and commercial information that is not available to the public and protected from release under the Freedom of Information Act.

We trust that we have provided all of the necessary background and information needed to approve this request consistent with FMRA Section 333. Please contact me if you require any additional information or clarification. We look forward to being a constructive contributor to the safe integration of sUAS technology into the National Airspace System.

Best regards,

William Donberg
President
Aetos Group Inc.

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## Purpose

Aetos Group Inc. (AGI) is applying for an exemption from the listed Federal Aviation Regulations (“FARs”) to allow for commercial operation of its sUAS to conduct aerial inspection of specific chemical plant infrastructure and environmental monitoring in the petrochemical industry. The operations described in this document will provide safety enhancements, increase reliability of operations, and aid emergency response crews in petrochemical facilities. The sUAS will provide maintenance and reliability engineers with high-resolution imagery of infrastructure to include flare stacks, elevated pipelines, tanks, and columns. The technology significantly reduces risk by eliminating the need for inspection personnel on elevated structures currently using rope access, scaffolding, bucket trucks, and ladders. Improved efficiency allows the opportunity for higher quality, more frequent inspections, and improvement of overall safety of the facility.

## Aetos Group Inc. (AGI) Corporate Profile / Capabilities

AGI is a leading consultant to sUAS manufacturers, operators, and the petrochemical industry. We have provided insights that integrate emerging sUAS technology into solutions that define alternatives to current methods of infrastructure inspections, environmental monitoring, and disaster relief. The management and staff of AGI include a unique combination of significant experience in chemical plant operations, manned aircraft operations and training, sUAS technology, and piloting experience.

All of the principals of AGI hold commercial or ATP certificates with CFI ratings. We have a background in professional aviation and military UAS operations with combined manned flight experience of nearly 14,000 hours and over 1,000 UAS combat flight hours, with many more in R&D and test flights.

For the last three years, in anticipation of eventual sUAS regulations, AGI has assisted companies in the petrochemical industry in identifying high value applications of UAS technology including infrastructure inspections, emergency response, air sampling (fugitive emissions), environmental monitoring/compliance, and security.

AGI has aided in the design of proof of concept research projects with academia to design and validate integrated UAS solutions that safely meet the needs of the application.

AGI's principals have developed standard operating procedures for plant inspections including:

- Risk analysis to include risk mitigation, risk management and risk assessments.
- Development of operational protocols.
- Interpreting FAA regulations and the impact they will have on future uses of UAS technology in the petrochemical industry.

AGI has been actively involved with the ASTM F38 Committee assisting the FAA in development of sUAS standards related to aircraft certification, pilot requirements and operational protocols.

# Aeryon

### Aeryon Labs Corporate Description

Aeryon Labs is a Canadian developer and manufacturer of unmanned aerial vehicles. Founded in 2007, it is based in Waterloo, Ontario. The company is the world leader in sUAS VTOL systems having gained significant experience with its systems in military, commercial, and academic institutions around the world. Aeryon customers have accrued thousands of hours of flight experience and participated in the continuous improvement of the aircraft and its systems and payloads. The wide customer base includes military organizations in many countries, including Special Operations Forces in the US and Canada; and leading Universities in the US and Canada, including the University of Alaska, Northwestern Michigan College, and Kansas State University. Numerous law enforcement agencies in the US and Canada have accumulated significant experience with Aeryon aircraft, as have major global petrochemical, oil and gas, and power companies. Together with its customers, Aeryon has gained approvals to fly in multiple countries around the world, including Canada and the UK, as well as Middle and Far Eastern countries. Aeryon aircraft have been approved for research purposes in multiple COAs through the US, contributing to significant developments and refinements in the aircraft.

**Aeryon Aircraft Description**

The Scout and Sky Ranger are quad-copter type vertical takeoff and landing small UAS, with four rotors mounted on booms and four legs. Payloads are mounted underneath the fuselage on a gimbal mount. Communications use common frequencies and are digitally encrypted, which reduces the risk of hijacking and video interception.

The aircraft are controlled with a tablet based interface, reducing pilot fatigue and workload. The aircraft are piloted by the use of a stylus, pointing to an area on a moving map display. Altitude is controlled by using a slider bar on the touch screen interface to command the aircraft to climb or descend.

The system is fully stabilized and GPS guided. Custom or commercially available map data in several formats may be used for operator orientation. The aircraft can be flown real-time by the operator or pre-programmed to fly a series of GPS waypoints. While the aircraft is flying its pre-programed flight path, the operator always has full control of the vehicle and can change its flight path or altitude immediately. Flight information such as position, altitude, environmental conditions, signal link strength, GPS signal strength, battery voltage, and other flight data is displayed to the operator in real time. The aircraft itself is constantly monitoring environmental and system conditions and will alert the operator to any abnormalities. The aircraft have many built in failsafe mechanisms that will allow return to the point of origin and vertical landing if an emergency condition exists.

The aircraft and payloads are gyro stabilized, allowing for exceptional imaging and resolution quality at safe distances from infrastructure, which is essential for safe and effective inspections. The aircraft have a quick-change payload interface with common interfaces including USB and Ethernet, which allows custom payloads to be developed. The system is able to detect the type of payload connected, and configure it and operate it appropriately. The payload capacity of the system is 250 g (0.55 pounds). Offered payloads include gimbal-mounted digital still and video cameras, a near IR camera for remote sensing, a FLIR night-vision camera, and a stabilized 10x Optical Zoom camera.

**Aeryon Scout Technical Specifications**

| | |
|---|---|
| Deployment | Vertical Take-off and Landing |
| Operation Range | 1 Mile |
| Operational Duration | Up to 20 Minutes |
| Operational Velocity | Up to 30 mph |
| Wind Limits | Up to 30 mph (Gusts up to 50 mph) |
| Dimensions | 31.5 in. x 31.5 in x 7.9 in |
| Max Weight | 3.4 pounds |
| Power Source | 11.1V Intelligent LiPo Battery |

**Aeryon Sky Ranger Technical Specifications**

| | |
|---|---|
| Deployment | Vertical Take-off and Landing |
| Operation Range | 2 Miles |
| Operational Duration | Up to 50 Minutes |
| Operational Velocity | Up to 30 mph |
| Wind Limits | Up to 40 mph (Gusts up to 55 mph) |
| Dimensions | 40 in. x 40 in. x 9.3 in. |
| Max Weight | 5.3 pounds |
| Power Source | 14.8V Intelligent LiPo Battery |

**Command and Control Systems**

The Aeryon Ground Control Station allows the operator simultaneous control over aircraft and payloads. The touch screen control allows for quick navigation and data entry while the display screen provides all essential flight data to the operator. Telemetry data is transmitted to the command station at least once per second.

Displayed on GCS:

- Position
- Navigation Route
- Altitude
- Heading
- Battery voltage and time remaining
- GPS signal strength
- Radio link strength

- Aircraft status to include error messages or failures
- Date/time
- Sensor position and orientation relative to sUAS

**On-board Flight Instruments** – The sUAS is equipped with an Inertial Navigation System (3-axis gyroscope, magnetometer, GPS receiver, and static pressure sensor) and a sonar sensor for precision AGL altitude measurement.

**On–board computer systems** – The sUAS is equipped with on-board computer systems to monitor (sensors, battery, etc.), control (speeds, altitude, position, etc.), and communicate (control, telemetry, etc.).

**On-board guidance and navigation equipment** – The sUAS can operate autonomously; it does not require any input from ground-based equipment, or from the pilot to hover in place.

**Frequency Allocations** – 900 MHz and 2.4 GHz.

**Fly away protection** – To prevent a “fly away” or other potentially dangerous situations, the aircraft employs a system of fail-safes that will either return the aircraft to its home origin point or land the aircraft in its present position. See “Emergency Procedures and System Failures” in section 3 for additional detail.

**Takeoff and Landing** – The sUAS has vertical lift autonomous launch and recovery. A Landing Zone (“LZ”) is designated by the operators and identified in the GCS software. For launch procedures the aircraft will take off and hover 3 meters directly above the LZ and hold until further operator instruction is given. The aircraft will automatically adjust for wind during this period.

**Navigation System** – Specific maps, such as air sectional and geographic maps, can be downloaded to the display screen and overlaid with GPS positional data. Waypoints can be created before and during flight operation creating specific locations and sequences for the aircraft.

**Redundant Systems** – The sUAS combines the input from a multitude of sensors. Even though the data from all sensors is required for optimal system performance, a single sensor malfunction is likely to result in degraded performance rather than leading to a catastrophic failure.

# Emergency Procedures and System Failures

### Engineered Failsafe Mechanisms

### Lost Communications

The sUAS does not need constant signal from the tablet to continue flying. Communication outages are detected by the system and are reported to the pilot. During the communication outage the aircraft will hover in place, climb to a pre-set safe altitude, and then fly to its takeoff location. If communication is still not established the aircraft will descend slowly and make a landing at the point of takeoff. All of this is accomplished without input from the operator.

If the aircraft receives interference or another overpowering signal, the system will simply go into its lost communication procedure as stated above. It will climb to a safe altitude, fly home and land.

### Communications Data Security

All communication links are encrypted. The communication system and protocol is designed in such a way that control of the aircraft cannot be taken over by accident. The video feed is also encrypted. Any unauthorized person attempting to receive the video would see a scrambled picture.

### Battery Life

The battery voltage and flight time remaining are displayed to the operator throughout the flight. When 3 minutes of flight time is remaining, a warning is given to the operator. If the operator does not bring the aircraft home, the system will return home (takeoff point at a safe transit altitude) on its own. The sUAS is equipped with an intelligent battery monitoring system that will allow it to leave its present position and fly home with reserve battery power to make a safe landing under current environmental conditions.

**Ignition Source Resistant**

The aircraft are equipped with a sealed LiPo battery pack and is operated by 4 brushless electric motors. The brushless motors, by their design, do not spark or arc while being operated. The operating temperature of the motors and the battery is extremely low.

**Potential Component Failures**

The aircraft have highly engineered systems monitoring software. Examples include battery health and temperature, voltage going to the motors, GPS accuracy, magnetic anomalies, vibration sensing, and yaw detection. There is a warning prior to any major failure, giving time to safely manage the situation. If the failure is considered “non-fatal,” it will return home and land. If it is considered “fatal,” it will set down immediately at its present position. Automatic pre-flight checks prevent the UAS from taking off if problem conditions are present.

**Defined “No Fly Zones”**

The navigation software allows for preplanning No Fly Zones which can allow the operator to maintain clearance from any “prohibited areas.” The Scout and Sky Ranger will operate with geo-fencing. This technology allows the operator to effectively put a GPS based perimeter around the area of operations which will keep the aircraft in a designated “operational box” regardless of normal or emergency operations. The geo-fence is custom designed and can be adjusted based on each location of operation.

**Visual Line-of-Sight Loss**

All flight operations will be conducted with the sUAS within visual sight of the pilot. If for some reason the pilot’s view becomes obstructed and line-of-sight is lost, the aircraft will hover in position until line-of-sight is reestablished.

# EXHIBIT A - Exemption / Waiver Requests

The regulations from which the exemption is requested are as follows:
14 C.F.R. Part 21;
14 C.F.R. 45.23(b);
14 C.F.R. 47.3(b)(2);
14 C.F.R. 47.31(c);
14 C.F.R. 61.133(a)(1)(ii);
14 C.F.R. 91.7(a);
14 C.F.R. 91.9(b)(2);
14 C.F.R. 91.119;
14 C.F.R. 91.121;
14 C.F.R. 91.151(a);
14 C.F.R. 91.203(a) & (b);
14 C.F.R. 91.405(a);
14 C.F.R. 91.407(a)(1);
14 C.F.R. 91.409(a)(2);
14 C.F.R. 91.417(a) & (b).[1]

The following discusses each rule listed above and explains why exemptions pursuant to the proposal set forth in this letter are appropriate, provide an equivalent level of safety, and are in the public interest.

## EXEMPTION REQUEST AND EQUIVALENT LEVEL OF SAFETY SHOWINGS UNDER APPLICABLE RULES SUBJECT TO EXEMPTION

Aetos Group Inc. requests an exemption from the following regulations, as well as from any additional regulations that may be necessary to effect the Secretary's determination under FMRA Section 333.

### 14 C.F.R. Part 21, Subpart H: Airworthiness Certificates 14 C.F.R. §91.203 (a) (1)

Subpart H, entitled Airworthiness Certificates, establishes the procedural requirements for the issuance of airworthiness certificates as required by FAR §91.203 (a) (1). Given

[1] Exemptions from the requirements of sections 91.9(b), 91.203(a) and (b), 47.3(b)(2), and 47.31(c) of Title 14 C.F.R. are sought only in an abundance of caution, as they appear to be unnecessary given a recent FAA Interpretation. Memorandum from Mark Bury, FAA Assistant Chief Counsel for International Law, Legislation and Regulations, to John Duncan, Director, FAA Flight Standards Service (Aug. 8, 2014), *available at* http://www.faa.gov/about/office_org/headquarters_offices/agc/pol_adjudication/agc200/interpretations/data/interps/2014/duncan-afs-1-2%20-%20(2014)%20legal%20interpretation.pdf.

the size and limited operating area associated with the aircraft to be utilized by the AGI, an exemption from Part 21 Subpart H meets the requirements of an equivalent level of safety under Part 11 and FMRA Section 333. The Federal Aviation Act (49 U.S.C.§ 44701 (f)) and FMRA Section 333 authorize the FAA to exempt aircraft from the requirement for an airworthiness certificate, upon consideration of the size, weight, speed, operational capability, and proximity to airports and populated areas of the particular UAS. In all cases, an analysis of these criteria demonstrates that the sUAS operated without an airworthiness certificate, in the restricted environment and under the conditions proposed will be at least as safe, or safer, than a conventional aircraft (fixed wing or rotorcraft) operating with an airworthiness certificate without the proposed restrictions and conditions.

The sUAS to be operated hereunder is less than 7 pounds, fully loaded, carries neither a pilot nor passenger, carries no explosive materials or flammable liquid fuels, and operates exclusively within a secured area. Operations under this exemption will be tightly controlled and monitored by the operator under AGI's safeguards and in compliance with local public and facility safety requirements. AGI will coordinate with the FAA as necessary to obtain airspace waivers and to support the issuance of NOTAMs. Receipt of the prior permission of the land owner, the size of the aircraft, the lack of flammable fuel, and the fact that the aircraft is carried to the location and not flown there all establish the equivalent level of safety. This provides at least an equivalent level of safety to that of operations conducted with conventional aircraft that would be orders-of-magnitude larger and would be carrying passengers, cargo, and flammable fuel.

**14 C.F.R. § 45.23 (b): Marking of the Aircraft.**

The regulation provides:

> When marks include only the Roman capital letter "N" and the registration number is displayed on limited, restricted or light-sport category aircraft or experimental or provisionally certificated aircraft, the operator must also display on that aircraft near each entrance to the cabin, cockpit, or pilot station, in letters not less than 2 inches nor more than 6 inches high, the words "limited," "restricted," "light-sport," "experimental," or "provisional," as applicable.

Even though the UAS will have no airworthiness certificate, an exemption may be needed as the sUAS will have no entrance to the cabin, cockpit or pilot station on which

the word “Experimental” (or other marking as required by the FAA) can be placed. Given the size of the sUAV, two-inch lettering will be impossible. The word “Experimental” (if required) will be placed on the fuselage in compliance with §45.29 (f).

The equivalent level of safety will be provided by having the sUAV marked on its fuselage as required by §45.29 (f) in such a manner that the pilot, observer and others working with the sUAV will see the identification. The FAA has issued the following exemptions to this regulation as Exemptions Nos. 10700, 8738, 10167 and 10167A.

**14 C.F.R. §§ 47.3(b)(2) and 47.31(c): Carriage of Registration.**

These regulations require that an applicant for aircraft registration carry “in the aircraft” the second copy of the registration application as temporary authority to operate without registration.

Given the size and configuration of this sUAS, there is no room to carry the document aboard the aircraft. Maintaining this document at the pilot’s control station would meet the intent of the rule and establish an equivalent of safety.

**14 C.F.R. § 61.133 (a)(1)(ii): Commercial Pilot Privileges and Limitations.**

The regulation provides:

> A person who holds a commercial pilot certificate may act as pilot in command of an aircraft for compensation or hire, provided the person is qualified in accordance with this part and with the applicable parts of this chapter that apply to the operation.

The FAA requires a commercial pilot certificate for operations for compensation or hire and AGI supports this. However, the commercial certificate is category and class specific. Because the FAA has not formally assigned a category or class to UAS, we request an exemption to all category and class requirements of the commercial pilot certificate within the scope of this exemption. AGI will require all of its UAS operators to hold a commercial pilot certificate of any category or class.

**14 C.F.R. §91.7(a): Civil Aircraft Airworthiness.**

The regulation requires that no person may operate a civil aircraft unless it is in airworthy condition. As there will be no airworthiness certificate issued for the aircraft,

should this exemption be granted, no FAA regulatory standard will exist for determining airworthiness. All maintenance conducted on the aircraft will be accomplished according to the manufacturer's maintenance and operating procedures. Operators will strictly adhere to operating checklists and procedures for the aircraft in accordance with AGI's Operations Manual. All operators will be commercially rated and have proper training for the aircraft. Given the weight, speed, operational capability, and controlled flight environment of the sUAS, it will remain in a condition of airworthiness at an equivalent level of safety.

**14 C.F.R. § 91.9(b)(2): Civil Aircraft Flight Manual in the Aircraft.**

The regulation provides:

> No person may operate a U.S.-registered civil aircraft …
> (2) For which an Airplane or Rotorcraft Flight Manual is not required by §21.5 of this chapter, unless there is available in the aircraft a current approved airplane or Rotorcraft Flight Manual, approved manual material, markings, and placards, or any combination thereof.

Given the size and configuration of the sUAS, there is no room or capacity to carry a flight manual on the aircraft.

The equivalent level of safety will be achieved by keeping the flight manual at the ground control station where the pilot flying the sUAS will have immediate access to it. The FAA has issued to Trimble and others the following exemptions to this regulation: Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 9565B, 10167, 10167A, 10602, 32827, and 10700.

**14 C.F.R. §91.119: Minimum Safe Altitudes.**

Section 91.119 establishes safe altitudes for operation of civil aircraft. Section 91.119 (d) allows helicopters to be operated at less than the minimums prescribed, provided the person operating the helicopter complies with any route or altitudes prescribed for helicopters by the FAA. As this exemption is for sUAS that are multi-rotor VTOL that can be considered helicopters and the exemption requests authority to operate at altitudes up to 400 AGL, or not more than 100 above an object to be inspected, an exemption may be needed to allow such operations. As set forth herein, the sUAS will never operate at higher than 400 AGL. It will, however, be operated in a restricted area

where buildings and people will not be exposed to operations without their pre-obtained consent.

The equivalent level of safety will be achieved given the size, weight, and speed of the sUAS, as well as the location where it is operated. No flight will be conducted without the permission of the property owner. Advance notice to the property owner and a Safe Work Permit will be issued ensuring all affected individuals will be aware of planned flight operations. Compared to flight operations with aircraft or rotorcraft weighting far more than the maximum 7 pounds proposed herein and the lack of flammable fuel, any risk associated with these operations is far less than those presently presented with conventional aircraft operating at or below 500 AGL. In addition, the low-altitude operations of the sUAS will ensure separation between these sUAS operations and the operations of conventional aircraft that must comply with Section 91.119.

**14 C.F.R. §91.121: Altimeter Settings.**

This regulation requires each person operating an aircraft to maintain cruising altitude by reference to an altimeter that is set "…to the elevation of the departure airport or an appropriate altimeter setting available before departure." As the sUAS may not have a barometric altimeter, but instead GPS altitude control, an exemption may be needed. An equivalent level of safety will be achieved by the operator as the sUAS uses AGL height from its initialization (launch) point, cross-referenced with MSL altitude of the launch point.

**14 C.F.R. § 91.151(a): Fuel Requirements for Flight in VFR Conditions.**

Section 91.151 (a) prohibits an individual from beginning "a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing, and, assuming normal cruising speed – (1) During the day, to fly after that for at least 30 minutes; or (2) At night, to fly after that for at least 45 minutes."

The battery powering the sUAS provides approximately 20 minutes of powered flight, which is less than the required reserve for a VFR day flight. AGI believes that an exemption from 14 CFR §91.151(a) falls within the scope of prior exemptions. See Exemption 10673 (allowing Lockheed Martin Corporation to operate without compliance with FAR 91.151 (a)). Operating the sUAS, in a tightly controlled area where only people and property owners or official representatives who are made aware of the operation will be allowed, with less than 30 minutes of reserve fuel, does not engender

the type of risks that Section 91.151(a) was intended to alleviate given the size and speed of the small UAS. Additionally, without exemption from 91.151(a), the sUAS would not be able to launch for any flight.

AGI believes that an equivalent level of safety can be achieved by first implementing operational limitations on flight times. The battery capacity will be monitored in flight and the flight will be terminated when 25% of the battery capacity is remaining. This restriction will be more than adequate to return the aircraft to its planned landing zone from anywhere in its limited operating area. The second level of safety is achieved through the use of an aircraft battery monitoring system. The aircraft system will alert the operator of low battery voltage and return the aircraft to its take off location before battery capacity is depleted.

Similar exemptions have been granted to other operations, including Exemptions 2689F, 5745, 10673, and 10808.

**14 C.F.R. §91.203 (a) and (b): Carrying Civil Aircraft Certification and Registration.**

The regulation provides in pertinent part:

> (a) Except as provided in § 91.715, no person may operate a civil aircraft unless it has within it the following:
> (1) An appropriate and current airworthiness certificate. . . .
> (b) No person may operate a civil aircraft unless the airworthiness certificate required by paragraph (a) of this section or a special flight authorization issued under §91.715 is displayed at the cabin or cockpit entrance so that it is legible to passengers or crew.

The sUAS fully loaded weighs no more than 7 pounds and is operated without an onboard pilot. As such, there is no ability or place to carry certification and registration documents or to display them on the sUAS.

An equivalent level of safety will be achieved by keeping these documents at the ground control point where the pilot flying the sUAS will have immediate access to them, to the extent they are applicable to the sUAS. The FAA has issued numerous exemptions to this regulation. A representative sample of other exceptions includes Exemption Nos. 9565, 9665, 9789, 9789A, 9797, 9797A, 9816A, and 10700.

**14 C.F.R. §91.405 (a); 407 (a) (1); 409 (a) (2); 417(a) & (b): Maintenance Inspections.**

These regulations require that an aircraft operator or owner “shall have that aircraft inspected as prescribed in subpart E of this part and shall between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in part 43 of this chapter...,” and others shall inspect or maintain the aircraft in compliance with Part 43.

Because these regulations and Part 43 apply only to aircraft with an airworthiness certificate, they will not apply to the sUAS. Maintenance will be accomplished by properly certified and trained operators according to manufacturer’s published maintenance procedures, following the developed checklist and operating procedures for the aircraft. An equivalent level of safety will be achieved because these sUAS are very limited in size, carry a small payload, and operate only in restricted areas for limited periods of time at an altitude not to exceed 400 feet AGL. If mechanical issues arise, the sUAS can land immediately and safely. As provided in the checklist, the operator will ensure that the UAS is in working order prior to initiating flight, perform required maintenance, and keep a log of any maintenance performed. The operator is the person most familiar with the aircraft and best suited to maintain the aircraft in an airworthy condition to provide the equivalent level of safety. Moreover, neither sUAS will allow flight if anomalies are detected.

# EXHIBIT B - Proposed Limitations and Conditions

These limitations and conditions to which AGI agrees to be bound when conducting commercial operations under an FAA issued exemption include:

1. The sUAS will weigh less than 7 pounds.
2. The sUAS will go through a Failure Mode and Element Analysis (FMEA) to ensure the highest level of safety.
3. The Pilot will use a detailed checklist for every flight.
4. Flights will be operated within line of sight of the pilot during daylight hours.
5. Flights will be terminated no later than manufacturer designed return-home battery voltage or 25% remaining battery capacity.
6. Flights will be operated at an altitude 400 feet AGL or lower.
7. Minimum crew for each operation will consist of the sUAS Pilot and the Visual Observer.
8. The sUAS pilot will be an FAA licensed airman with at least a commercial pilot's certificate and second class medical.
9. The sUAS pilot (operator) will be Pilot in Command (PIC).
10. The sUAS will only operate within the lateral boundaries of customer property. Confined "Safe Zones" will be established for each flight. These zones will be free of unnecessary hazards or risks and non-participating personnel. The Scout and Sky Ranger will operate with geo-fencing that will confine the aircraft to a pre-defined "operational box."
11. A briefing will be conducted and a work permit will be issued by the customer prior to each sUAS operation. Work permits will be issued only if customer and PIC determines sUAS operation is safe in the vicinity. This also gives permission to operate over the private, controlled-access property.
12. AGI will coordinate with the appropriate ATC facility or Flight Standards District Office in order to obtain airspace waivers and effect issuance of NOTAMs, as necessary.
13. Pilots will have been appropriately trained by the sUAS manufacturer or other authorized instructor, and current on its operation prior to flight. Observers will have been trained in operation of sUAS generally.
14. The pilot and observer will have current specific safety training for the area in which sUAS operations will take place.
15. The pilot and observer will at all times be able to communicate by voice.
16. If the sUAS loses command/control communications (C2) or loses its GPS solution, the UAS will have capability to return to a pre-determined location within the Safe Zone and land.

17. The sUAS will have the capability to abort a flight in case of unpredicted obstacles, emergencies, or system anomalies.

# EXHIBIT C - Summary of Aetos Group Inc. Section 333 Exemption Request

Docket Number: FAA-2014-XXXX

Petitioner: AETOS GROUP INC.

Sections of 14 C.F.R. Part 21;
14 C.F.R. 45.23(b);
14 C.F.R. 47.3(b)(2);
14 C.F.R. 47.31(c);
14 C.F.R. 61.133(a)(1)(ii);
14 C.F.R. 91.7(a);
14 C.F.R. 91.9(b)(2);
14 C.F.R. 91.119;
14 C.F.R. 91.121;
14 C.F.R. 91.151(a);
14 C.F.R. 91.203(a) & (b);
14 C.F.R. 91.405(a);
14 C.F.R. 91.407(a)(1);
14 C.F.R. 91.409(a)(2); and
14 C.F.R. 91.417(a) & (b).

Description of relief sought: The petitioner seeks exemptions in order to commercially operate its small UAS for aerial inspection of plant infrastructure and environmental monitoring in the petrochemical industry.