

Richard Bowie
T: +1 207 866 2109
cencom@juno.com

DEPARTMENT OF
TRANSPORTATION
AIRCRAFT OPERATIONS
2014 NOV 19 P 3:02

Nov 15, 2014

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

Re: Exemption Request Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations from 14 C.F.R. 45.23(b); 14 CFR Part 21; 14 CFR 61.113 (a) & (b); 91.7 (a); 91.9(b) (2); 91.103 (b); 91.109; 91.119; 91.121; 91.151 (a); 91.203(a) & (b); 91.407(a) (1); 91.409 (a) (2); 91.417 (a) & (b)

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the Reform Act) and 14 C.F.R. Part 11, Down East Emergency Medicine Institute (DEEMI), developer and operator of small Unmanned Aircraft Systems ("sUAS") equipped to conduct aerial Search and Rescue Operations in the US get higher success rates on (SAR) on operations and to help prevent contamination of lands if there was a manned aircraft accident, hereby applies for an exemption from the listed Federal Aviation Regulations ("FARs") to allow commercial operation fits sUASs, 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 small Unmanned and relatively inexpensive sUAS under controlled conditions in airspace that is 1) limited 2) predetermined 3) controlled as to access and 4) would provide safety enhancements to the already safe operations in the SAR presently using conventional aircraft. Approval of this exemption would thereby enhance safety and fulfill the Secretary of Transportation's (the FAA Administrator's) responsibilities to "...establish requirements for the safe operation of such aircraft systems in the national airspace system."

The name and address of the applicant is:

Down East Emergency Medicine Institute (DEEMI)
Attn: Richard Bowie
Ph: 207-866-2109
Email: cencom@juno.com
Address: PO Box 268
Orono, Maine 04473

The conditions proposed by the applicant are drawn from order 8900.1 CHG 0

Regulations from which the exemption is required

14 CFR Part 21
14 C.F.R. 45.23(b)
14 CFR 61.113 (a) & (b)
14 C.F.R. 91.7 (a)
14 CFR 91.9 (b) (2)
14 C.F.R. 91.103
14 C.F.R. 91.109
14 C.F.R. 91.119
14 C.F.R. 91.121
14 CFR 91.151 (a)
14 CFR 91.203 (a) & (b)
14 CFR 91.405 (a)
14 CFR 407 (a) (1)
14 CFR 409 (a) (2)
14 CFR 417 (a) & (b)

This exemption application is expressly submitted to fulfill Congress' goal in passing Section 333(a) through (c) of the Reform Act. This law directs the Secretary of Transportation to consider whether certain unmanned aircraft systems may operate safely in the national airspace system (NAS) before completion of the rulemaking required under Section 332 of the Reform Act. In making this determination, the Secretary is required to determine which types of UASs do not create a hazard to users of the NAS or the public or pose a threat to national security in light of the following:

- The UAS's size, weight, speed, and operational capability
- Operation of the UAS in close proximity to airports and populated areas; and
- Operation of the UAS within visual line of sight of the operator.

Reform Act Section 333 (a). Lastly, if the Secretary determines that such vehicles "may operate safely in the national airspace system, the Secretary shall establish requirements for the safe operation of such aircraft in the national airspace system." ID Section 333(c) (emphasis added)

The Federal Aviation Act expressly grants the FAA the authority to issue exemptions. This statutory authority by its terms includes exempting civil aircraft, as the term is defined under section 40101 of the Act, that includes sUASs, from the requirement that civil aircraft must have a current airworthiness certificate.

Applicant interprets this provision to place the duty on the Administrator not only process applicants for exemptions under section 333, but for the administrator to craft conditions for the safe operation of the UAS, if it should be determined that the conditions set forth herein do not fulfill the statutory requirements for approval.

The Administrator may grant an exemption from a requirement of a regulation prescribed under subsection (a) or (b) of this section or any sections 44702-44716 of this title if the Administrator find the exemption in the public interest. 49 U.S.C. Section 44701(f) *see also* 49 USC Section 44711(a); 49 USC Section 44704; 14 CFR Section 91.203 (a) (1).

Down East Emergency Medicine Institute (DEEMI), sUASs fixed wing and rotorcraft, weighing 55 or fewer lbs. including payload. They operate, under normal conditions at a speed of no more than 70 knots and in the case of our multirotors have a capability to hover, and move in the vertical and horizontal plane simultaneously. They will operate in a line of sight and will operate only within the sterile area made up of farm land, power utility grid and towers.

Given the small size of the sUASs involved and restricted sterile environment within which they will operate, the applicant falls squarely within that zone of safety (an equivalent level of safety) in which Congress envisioned that the FAA must, by exemption, allow commercial operations of UASs to commence immediately. Also due to the size of the UASs and the restricted areas in which the relevant sUASs will operate, approval of the application presents no national security issue. Given the clear direction in Section 333 of the Reform Act, the authority contained in the Federal Aviation Act, as amended; the strong equivalent level of safety surrounding the proposed operations, and the significant public benefit, including enhanced safety, reduction in environmental impacts, including reduced emissions and chemical spills, exemptions associated with allowing UASs for agricultural operations, the grant of the requested exemptions is in the public interest. Accordingly, the applicant respectfully requests that the FAA grant the requested exemption without delay.

AIRCRAFT AND EQUIVELANT LEVEL OF SAFETY

The applicant proposes that the exemption requested herein apply to aircraft that have the characteristics and that operate within the limitations listed herein. These limitations provide for at least an equivalent or even higher level of safety to operations under the current regulatory structure because the proposed operations represent a safety enhancement to the already safe agricultural services and crops dusted currently being used with conventional aircraft.

1. The sUASs will weigh less than 55 lbs.
2. Flights will be operated within line of sight of a pilot and/or observing.
3. Maximum total flight time for each operational flight will be 120 minutes for multirotor application and 90 minutes for fixed wing operation. Flights will be terminated at 25% battery power reserve should that occur prior to the 30 minute limit for fixed wing operations.
4. Flights will be operated at an altitude of no more than 1,000 feet AGL.
5. Minimum crew for each operation will consist of the sUAS Pilot, and Visual Observer.
6. sUAS Pilot will be an certified by the aircraft manufacture for operations and have at least a private pilot written exam, No Medical required. Most pilots will have military UAS training the observer will hold at least manufactures ground school certificate. No medical required.
7. sUAS Pilot will be pilot in command (PIC). If a pilot certificate holder other than the sUAS Pilot, who possess the necessary PIC qualifications, is also present on set (i.e. the aerial coordinator), that person can also be designated as PIC
8. The UAS will only operate within a confined "sterile area" and have a "Security Perimeter" for the flight operations area.
9. A briefing will be conducted in regard to the planned sUAS operations prior to each day's production activities. It will be mandatory that all personal who will be performing duties within boundaries of the safety perimeter be present for this briefing.
10. The operator will file a FAA Form 7711-1, or its equivalent, as modified in light of the requested exemption, with the appropriate Flight Standards District Office.
11. The operator will obtain the consent of all persons involved in the flying area and ensure that only consenting persons be allowed within 100 feet of the flight operation, and this radius may be reduced to 30 feet based upon an equivalent level of safety and determination. With the advanced permission of the FSDO, operations at closer range can be approved.
12. The operator will notify a Plan of Activities to the FSDO 30 minutes before the proposed flights.
13. Pilot and observer will have been trained in the operation of UAS generally and received up-to-date information on the particular UAS. Observer and Pilot will at all times be able to communicate by voice or text.
14. SAR operations will be launched from and/or oral permission from the relevant property holders will be obtained.
15. If the sUAS losses communications or it losses its GPS signal, the UAS will have capability to return to a pre-determined location within the Security Perimeter and land.
16. The sUAS will have capability to abort flight in case of unpredictable obstacles or emergencies.

14 C.F.R. Part 21, Subpart H: Air worthiness certificates 14 C.F.R. Section 91.203 (a) (1)

Subpart H, entitled Airworthiness Certificates, establishes the procedural requirements for the issuance of airworthiness certificates as required by FAR Section 91.203 (a) (1). Given the size and limited operating area associated with aircraft to be utilized by the Applicant, an exemption from Part 21 Subpart H meets the requirements of an equivalent level of safety under Part 11 and Section 333 of the Reform Act both authorize the FAA to exempt aircraft from the requirement for an airworthiness certificate, upon consideration of the size, weight, speed, operational capability, proximity to airports and populated areas of the particular UAS. In all cases, an analysis of these criteria demonstrates that the UAS operated without an airworthiness certificate, in a restricted environment and under the conditions proposed will be at least as safe, or safer, than conventional aircraft (fixed wing or rotorcraft) operating with an airworthiness certificate without the retractions and conditions proposed.

The sUAS to be operated here under is less than 55 lbs. fully loaded, carries neither a pilot nor passenger, carries no explosive materials or flammable materials liquid fuels, and operates exclusively within a secured area as set out in manual. Unlike other civil aircraft, operations under this exemption will be tightly controlled and monitored by both the operator and, pursuant to the requirements, and in compliance to local public safety requirements, to provide security of the area of operation as is now done with conventional flag man. The FAA will have advance notice of all operations. These safety enhancements, which already apply to civil aircraft operated in connection to agricultural aerial applicators, provide a greater degree of safety to public and property owners than conventional operations conducted with airworthiness certificates issued under 14 C.F.R. Part 21, Subpart H. Lastly, application of these same criteria demonstrates that there is no credible threat to national security posed by the UAS, due to its size, speed of operation, location of operation, lack of explosive materials or flammable liquid fuels, and inability to carry a substantial external load.

14 C.F.R. Section 45.23 (b). Marking of the aircraft

The regulation requires:

When marks include only the Roman capital letter "N" and the registration of the number is displayed on limited, restricted or in a light-sport category aircraft or experimental or provisionally certified aircraft, the operator must also display on the 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 spot," "experimental," or "provisional," as applicable.

Even though the UAS will have no airworthiness certificate, and exemption may be needed as the UAS will have no entrance to the cabin, cockpit or pilot station on which the word "experimental" can be placed. Given the size of the sUAV, the two inch lettering will be impossible. The word "experimental" 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 it fuselage as required by §45.29 (f) where the pilot, observer and others working with the sUAV will see the identification of the sUAV as "Experimental." The FAA has issued the following exemptions to this regulation to exemptions to this regulation to Exemptions Nos. 10700, 8738, 10167A.

14 C.F.R. § 61.113 (a) & (b): Private pilots Privileges and Limitations: Pilot in Command.

Sections 61.113 (a) & (b) limit pilots to non-commercial operations. Because the UAS will not carry a pilot or passengers, the proposed operations can achieve the equivalent level of safety of current operations by requiring the PIC operating the aircraft to have a sport pilot's Certificate rather than have than a commercial pilots Certificate to operate this small UAS. Unlike a conventional aircraft that carries a pilot and passengers, the sUAS is remotely controlled with no living thing onboard. The area of operation is controlled and restricted, and all flights are planned and coordinated in advance as set forth by in the S.O.P. The level of safety provided by the requirements included in the S.O.P exceeds that provided by a single individual holding a commercial pilot's certificate operating a conventional aircraft. The risks associated with the operation of the sUAS are so diminished from the level of risk associated with the operation of a commercial operations contemplated with Part 61 when drafted, that allowing operations of the sUAS as requested with a recreational pilot as the PIC exceeds the present level of safety achieved by 14 C.F.R. §61,113 (a) & (b).

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 airworthiness condition. As there will be no airworthiness certificate issued for the aircraft, should this should this exemption be granted, no FAA regulatory standard will exist for determining airworthiness. Given the size of the aircraft and the requirements contained in the SOP for maintenance and use of safety check lists prior to each flight, and equivalent level of safety will be provided.

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

Section 91.9 (b) (2) 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 placard, or any combination thereof.

The sUAS, given its size and configuration has no ability or place to carry such a flight manual on the aircraft, not only because there is no pilot onboard, but because there is no room or capacity to carry such an item on the aircraft.

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

14 C.F.R. § 91.103: Preflight action

This regulation requires each pilot in command to take certain actions before flight to insure the safety of the flight. As the FAA approved rotor craft flight manuals will not be provided as set forth in sections the SOP. The PIC will take all actions including reviewing weather, flight battery requirements, landing and takeoff distances and aircraft performance data before initiation of flight.

14 C.F.R. §91.109: Flight instruction

Section 91.103 provides that no person may operate a civil aircraft (except a manned free balloon) that is being used for flight instruction unless that aircraft has fully functioning dual controls.

sUASs and remotely controlled aircraft, by there design do not have fully functioning dual controls. Flight control is accomplished though the use of a control box that communicates with the aircraft via radio communications. The FAA has approved exemptions for flight training without fully functioning dual controls for a number of aircraft and for flight instruction in experimental aircraft. See exemption Nos.5778K & 9862A. The equivalent level of safety provided by that neither a pilot nor passengers will be carried in the aircraft and by the size and speed of the aircraft.

14 C.F.R. §91.119: Minimum safe altitudes

Section 91.119 establishes safe altitudes for operations 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 exemption is for the sUAS that is a helicopter and the exemption requests authority to operate at altitudes of up to 400 AGL rotorcraft and 1000 AGL for fixed-wing, or not more than 200 above an elevated platform such as radio towers, an exemption may be needed to allow such operations. As set forth by herein, except for the limited conditions stated in the SOP, the UAS will never operate higher than 400 AGL rotorcraft and 1000 AGL for fixed-wing. It will however be operated in a restricted area with a security perimeter, 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, speed of the UAS as well as the location where it is operated. No flight will be taken without the permission of the property owner or local officials. Because of the advance notice to the property owner and participants in the activity, all affected individuals will be aware of the planned flight operations as set forth in the SOP. Compared to flight operations with aircraft or rotorcraft weighing more far more than the maximum 55lbs. proposed herein and the lack of flammable fuel, any risk of 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 small UAS 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 a GPS altitude read out, an exemption may be needed. An equivalent level of safety will be achieved by the operator, pursuant to the Manual and Safety Check list, confirming the altitude of the launch site shown on the GPS altitude indicator before flight.

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 40 minutes of powered flight. To meet the 30 minute reserve requirement in 14 CFR §91.151, sUAS flights would be limited to approximately 10 minutes in length. Given the limitations on the UAS’s proposed flight area and the location of its proposed operations within a predetermined area, a longer time frame for flight in daylight or night VFR conditions is reasonable.

Applicant believes that an exemption from 14 CFR (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 small UAS, in a tightly controlled area where only people and property owners or official representatives who have signed waivers will be allowed, with less than 30 minutes of reserve fuel, does not engender the type of risk that Section 91.151(a) was intended to alleviate given the size and speed of the small UAS. Additionally, limiting sUAS flights to 10 minutes would greatly reduce the utility for which the exemption will be granted.

Applicant believes that an equivalent level of safety can be achieved by limiting flights to 30 minutes or 25% of battery power whichever happens first. This restriction would be more than adequate to return the sUAS to its planned landing zone from anywhere in its limited operating area.

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 cockpit entrance so that it is legible to passengers or crew.

The UAS fully loaded weighs no more than 55lbs and is operated without an onboard pilot. As such, there is no ability or place to carry certification and registration documents or 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 exemptions includes Exemption Nos. 9565, 9665, 9789, 9789A, 9797, 9816A, 10700.

14 C.F.R. §91.405 (a); 407 (a) (2); 417 (a) & (b)

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.

Given that these section and Part 43 apply only to aircraft with an airworthiness certificate, these sections will not apply to the application. Maintenance will be accomplished by the operator pursuant to the flight manual and operating handbook as referenced in the Manual. An equivalent level of safety will be achieved because these small UASs are very limited in size and will carry a small payload and operate only in restricted areas for limited periods of time. If mechanical issues arise the UAS can land immediately and will be operating from no higher than 400 feet AGL rotorcraft and 1000 AGL for fixed-wing. As provided in the SOP, 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. Moreover, 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.

Pursuant to 14 C.F.R Part 11, the following summary is provided for publication in the Federal Register, should it be determined that publication is needed:

Applicant seeks an exemption from the following rules:

14 C.F.R. §21, subpart H; 14 C.F.R 45.23 (b); 14 C.F.R. §§ 61.113 (a) & (b); 91.7 (a); 91.9 (b) (2);91.103 (b); 91.109; 91.119;91.121;91.151 (a); 91.203 (a) and (b); 91.405 (a); 91.407 (a) (1); 91.409 (a) (2) and 91.417 (a) & (b) to operate commercially a small unmanned vehicle (55lbs or less) in the Agricultural 3d Mapping Service Operations.

Approval of exemptions allowing commercial operations of sUASs in the Agricultural 3d mapping/scanning and tower inspection industry will enhance safety by reducing risk. Conventional operations using jet or piston aircraft, operate at extremely low altitudes just feet from the equipment and livestock and structures; and present the risks associated with vehicles that weigh in the neighborhood of 3,000-5,000 lbs., carrying large amounts of jet A or other fuel in most cases helicopters operating with 140 gallon fuel tanks. The sUAS will carry no passengers or crew and, therefore, will not expose them to the risks associated with manned aircraft flights.

The operations of small UASs, weighing less than 55 lbs., conducted in the strict conditions outlined above, will provide an equivalent level of safety supporting the grant of the Part 21 and allowing commercial operations. These lightweight UAVs operate at slow speeds, close to the ground and in sterile environment and, as a result, are far safer than conventional operations conducted with a piston and or turbine aircraft operating close to the ground.

Public Acknowledgement/Privacy

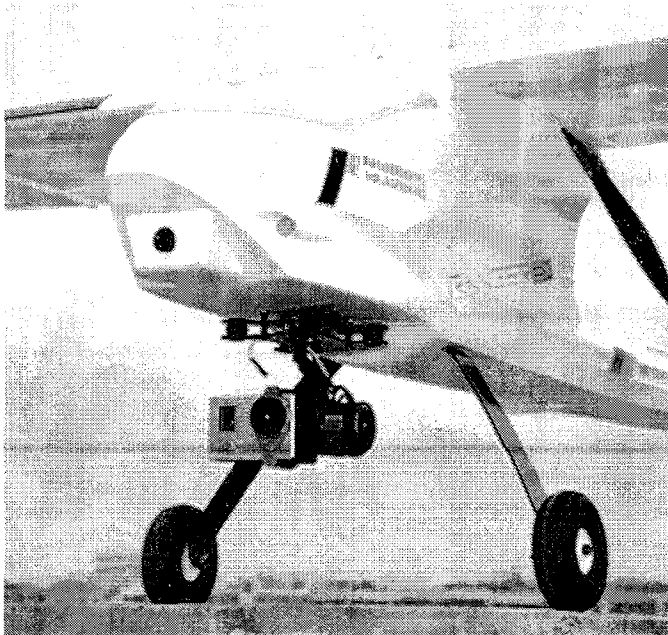
Aircraft that are going to be covered are seen in Appendix A

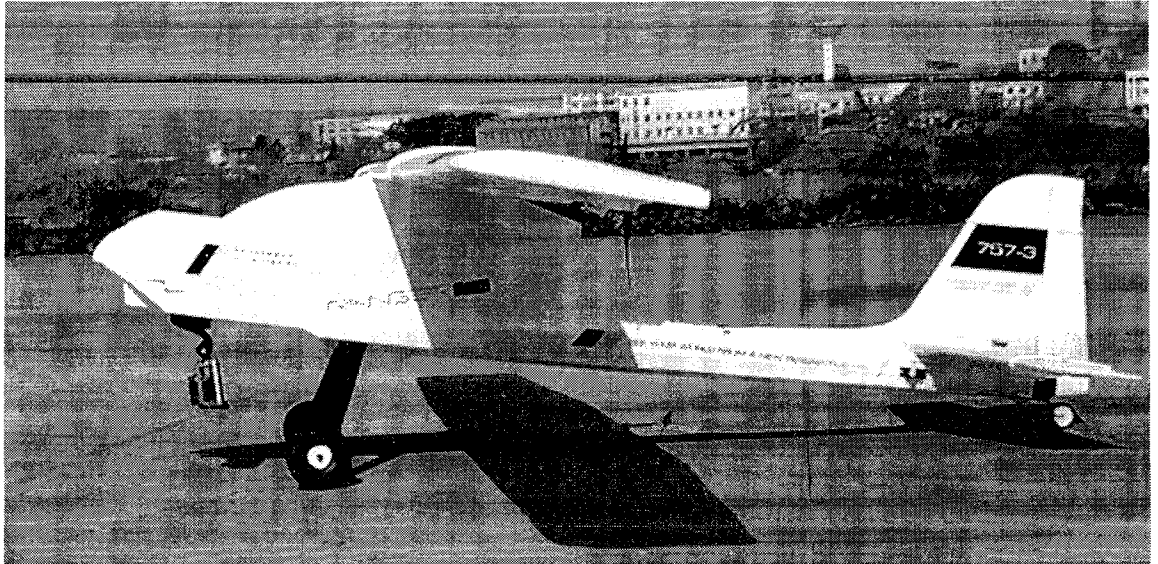
Appendix A.

VK- FF-X4 Multicopter

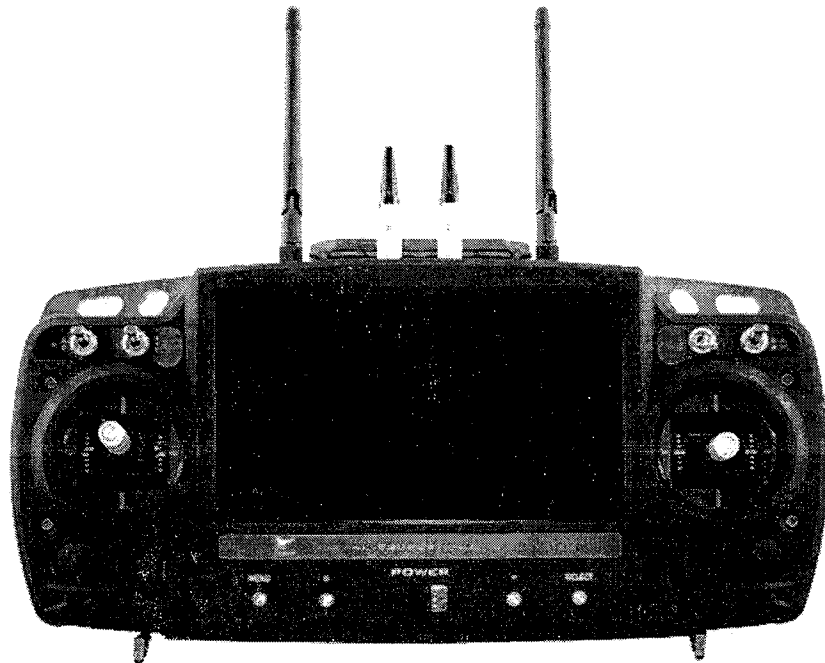


VK- Ranger EX- SAR Fixed Wing

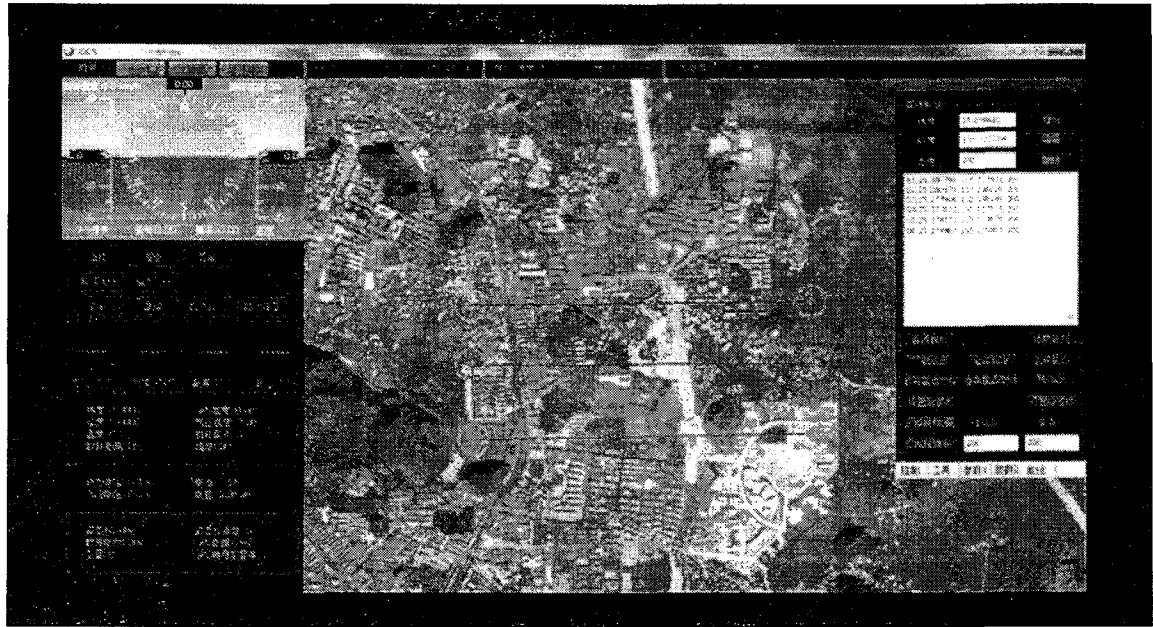




VK- Skylark Radio Control Flight System



SAR Autonomous Ground Station and AC Tracking System



Satisfaction of the criteria provided in Section 333 of the Reform Act of 2012—size, weight, speed, operating capabilities, proximity to populated areas and or close proximity to airports and operations within visual line of sight provides more than adequate justification for the grant of the requested exemptions allowing commercial operation of applicant's UAS in the agricultural scanning services industry.

Sincerely,

A handwritten signature in black ink, appearing to read "Richard Bowie". The signature is fluid and cursive, written over a white background.

Richard Bowie
Down East Emergency Medicine Institute (DEEMI)

CC: Board Members DEEMI