

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

Regulatory Docket No. _____

**IN THE MATTER OF THE PETITION FOR EXEMPTION OF:
ALTAVIAN, INC.
FOR AN EXEMPTION SEEKING RELIEF FROM THE REQUIREMENTS OF
TITLE 14 OF THE CODE OF FEDERAL REGULATIONS
SECTIONS 14 C.F.R 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) & (a)(2), AND
91.417(a) & (b) CONCERNING OPERATION OF THE
NOVA F6500 UNMANNED AIRCRAFT SYSTEM PURSUANT TO SECTION 333 OF
THE FAA MODERNIZATION AND REFORM ACT OF 2012 (PUBLIC LAW 112-95)**

Submitted on November 18, 2014

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GLOSSARY OF ABBREVIATIONS

AGL	Above Ground Level
ATC	Air Traffic Control
AV	Aerial Vehicle
COA	Certificate of Authorization
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FDEP	Florida Department of Environmental Protection
GCS	Ground Control Station
NAS	National Airspace System
PIC	Pilot In Command
Section 333	FAA Modernization and Reform Act of 2012 (FMRA) Section 333
UA	Unmanned Aircraft
UAS	Unmanned Aircraft System
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions

SUMMARY

Altavian, Inc. seeks exemption from the requirements of 14 C.F.R §§ 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) & (a)(2), and 91.417(a) & (b), to operate an Unmanned Aircraft System pursuant to Section 333 of the FAA Modernization and Reform Act of 2012. This exemption will permit Altavian, Inc. to operate an Unmanned Aircraft System (UAS) for the purpose of conducting aerial acquisitions and research over the New River Regional Land Fill located in Union County, Florida.

INTRODUCTION AND INTERESTS OF THE PETITIONER

Altavian, Inc. (hereinafter referred to as “Altavian”) is an unmanned aircraft solutions provider that integrates engineering and manufacturing with services that enable the technology for federal, state, local, and commercial clients. Altavian is focused on providing solutions for utilizing unmanned aircraft to safely and efficiently collect data that is precise, accurate, and timely.

Altavian’s mission is to use unmanned aircraft to simplify and increase the effectiveness of data collection in: Natural Resources and Conservation, Construction and Infrastructure, Precision Agriculture, as well as Inspection and Monitoring.

As set forth in this Petition, Altavian seeks to operate its Nova F6500 UAS over the New River Regional Landfill located near Raiford¹ in Union County, Florida. Specifically, the Nova F6500 UAS will be used to collect topographic data that is critical to conducting capacity calculations, estimating the remaining life of the landfill, and ensuring compliance with the regulations set forth by the Florida Department of Environmental Protection (FDEP).

¹ Raiford is a town in Union County, Florida, United States. The population was 187 at the 2000 census. As of 2004, the population recorded by the U.S. Census Bureau is 193.

BACKGROUND

Unmanned Aircraft System: Altavian Nova F6500 UAS

Altavian seeks an exemption to operate the Altavian Nova F6500 UAS (also known as the Nova Block III UAS), Serial No. 3016, registration number N6682B², for compensation or hire within the national airspace system (“NAS”). The Nova F6500 UAS is comprised of an amphibious unmanned aircraft (UA) and a transportable ground control station. The Nova F6500 UA has a maximum gross weight of approximately fifteen (15) pounds, while having a wingspan of 108 inches and a length of 65 inches. The Nova F6500 UA is equipped with a single propeller driven by a Lithium Polymer battery powered electric motor.



Figure 1: The Nova F6500 UA.

² A copy of the FAA Registry information for Altavian’s Nova F6500 UAS, registration number N6682B, is attached hereto as Exhibit A, which is submitted with exhibits containing proprietary information, to be held in a separate file pursuant to 14 C.F.R. § 11.35(b).

Proven Operational History of the Nova F6500 UAS in the NAS

The Nova F6500 UAS (also known as the Nova Block III) is currently operating safely within the NAS pursuant to approximately fifteen (15) Certificates of Authorization (“COA”) granted by the Federal Aviation Administration (“FAA”) to the Middle Tennessee State University; Sinclair Community College in Dayton, Ohio; the U.S. Army Corps of Engineers (Jacksonville District and Mobile District); Mississippi State University for the Pearl River Basin; and the University of Florida. The U.S. Army Corps of Engineers will be operating the Nova F6500 UAS pursuant to additional COAs in the foreseeable future, pending approval by the FAA.

BASIS FOR PETITION

Petitioner, Altavian, Inc., by and through undersigned counsel, pursuant to the provisions of the Federal Aviation Regulations (14 C.F.R. § 11.61) and the FAA Modernization and Reform Act of 2012, Section 333, *Special Rules for Certain Unmanned Aircraft Systems*, hereby petitions the Administrator to operate the Nova F6500 UAS in the national airspace system, and for an exemption from the requirements of 14 C.F.R §§ 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) & (a)(2), and 91.417(a) & (b).

In consideration of the size, weight, speed, and limited operating area associated with the unmanned aircraft and its operation, Altavian’s operation of the Nova F6500 UAS meets the conditions of Section 333 and will not require an airworthiness certificate in accordance with 14 C.F.R. Part 21, Subpart H.

Therefore, Altavian requests relief from Sections 91.405(a), 91.407(a)(1), 91.409(a)(1) & (a)(2), 91.417(a) & (b), as these sections set forth requirements for maintenance that only apply to aircraft with an airworthiness certificate.

Altavian submits that the requested relief is proper since an equivalent level of safety will be ensured. Altavian, as the manufacturer of the Nova F6500 UAS, will use its technicians to perform maintenance, alterations, or preventive maintenance on the unmanned aircraft system using the methods, techniques, and practices prescribed in the manufacturer's maintenance manual. Furthermore, Altavian will document and maintain all maintenance records for the Nova F6500 UAS.

Altavian also seeks an exemption from the requirements of Section 91.151(a)(1), *Fuel requirements for flight in VFR conditions*. Altavian submits that safety will not be affected by terminating flights of the battery powered Nova F6500 UA after 90 minutes of continuous operation or with 20% remaining battery power (whichever occurs first).

In accordance with 14 C.F.R. § 11.81, Altavian provides the following information in support of its petition for exemption:

A. Name And Address Of The Petitioner.

The name and address of the Petitioner is:

Altavian, Inc.
1724 NE 2nd Street
Gainesville, Florida 32609

The point of contact for this Petition and specific contact information is as follows:

Gregory S. Winton, Esq.
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B. The Specific Sections Of 14 C.F.R. From Which Altavian Seeks Exemption.

1. Altavian Seeks Exemption From The Requirements Of Section 91.151(a)(1).

Section 91.151, entitled *Fuel requirements for flight in VFR conditions*, subsection (a)(1), states the following:

(a) No person may begin 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[.]

2. Altavian Seeks Exemption From The Requirement Of Section 91.405(a).

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

Each owner or operator of an aircraft—

(a) Shall have that aircraft inspected as prescribed in subpart E of this part and shall between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in part 43 of this chapter[.]

3. Altavian Seeks Exemption From The Requirements Of Section 91.407(a)(1).

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

(a) No person may operate any aircraft that has undergone maintenance, preventive maintenance, rebuilding, or alteration unless--

(1) It has been approved for return to service by a person authorized under § 43.7 of this chapter[.]

4. Altavian Seeks Exemption From The Requirements Of Sections 91.409(a)(1) and 91.409(a)(2).

Section 91.409, entitled *Inspections*, subsection (a), states the following:

(a) Except as provided in paragraph (c) of this section, no person may operate an aircraft unless, within the preceding 12 calendar months, it has had --

(1) An annual inspection in accordance with part 43 of this chapter and has been approved for return to service by a person authorized by § 43.7 of this chapter; or

(2) An inspection for the issuance of an airworthiness certificate in accordance with part 21 of this chapter.

5. Altavian Seeks Exemption From The Requirements Of Sections 91.417(a) and 91.417(b).

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

(a) Except for work performed in accordance with §§ 91.411 and 91.413, each registered owner or operator shall keep the following records for the periods specified in paragraph (b) of this section:

(1) Records of the maintenance, preventive maintenance, and alteration and records of the 100-hour, annual, progressive, and other required or approved inspections, as appropriate, for each aircraft (including the airframe) and each engine, propeller, rotor, and appliance of an aircraft. The records must include--

(i) A description (or reference to data acceptable to the Administrator) of the work performed; and

(ii) The date of completion of the work performed; and

(iii) The signature, and certificate number of the person approving the aircraft for return to service.

(2) Records containing the following information:

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

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

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

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

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

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

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

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

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

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

C. The Extent Of Relief Altavian Seeks And The Reason Altavian Seeks The Relief.

1. Extent of Relief Altavian Seeks And The Reason Altavian Seeks Relief From Section 91.151(a)(1).

Relief from Section 91.151(a)(1) is requested to the extent required to allow flights of the battery powered Nova F6500 UA during daylight hours in visual flight rules (VFR) conditions to continue for a total duration of 90 minutes, or until 20% battery power is remaining (whichever occurs first). Altavian seeks the requested relief because without an exemption from Section 91.151(a)(1), the flight time duration of the battery powered Nova F6500 UA will be reduced by one third, which would severely constrain the practicality of any aerial acquisition and research operations that Altavian proposes to conduct pursuant to this Petition.

Significantly, as set forth below, the technical specifications of the Nova F6500 UAS, the Nova Operations Manual, and Altavian's proposed operating limitations, ensure that Altavian will safely operate the battery powered Nova F6500 UA during daylight hours in VFR conditions for a total duration of 90 minutes, or until 20% battery power is remaining (whichever occurs first).

2. Extent of Relief Altavian Seeks And The Reason Altavian Seeks Relief From Sections 91.405(a), 91.407(a)(1), 91.409(a)(1) & (a)(2), and 91.417(a) & (b).

Since Sections 91.405(a), 91.407(a)(1), 91.409(a)(1) & (a)(2), and 91.417(a) & (b) only apply to aircraft with an airworthiness certificate, Altavian requests relief from these Sections because the Nova F6500 UAS does not require an airworthiness certificate. As set forth more fully below, the Nova F6500 UAS meets the conditions of Section 333 for operation without an airworthiness certificate. Accordingly, Altavian, which manufactures the Nova F6500 UAS, will use Altavian technicians to perform maintenance, alterations, or preventive maintenance on the unmanned aircraft system using the methods, techniques, and practices prescribed in the manufacturer's maintenance manual. Furthermore, Altavian will document and maintain all maintenance records for the Nova F6500 UAS.

D. The Reasons Why Granting Altavian's Request Would Be In The Public Interest; That Is, How It Would Benefit The Public As a Whole.

Granting the present Petition will further the public interest by allowing Altavian to safely, efficiently, and economically perform aerial acquisitions and research over the New River Regional Land Fill located near Raiford in Union County, Florida. As set forth below, the Nova F6500 UAS will be used to collect critical data about the bioreactor landfill, which is the first of its kind in Florida. Additionally, use of the Nova F6500 UAS will decrease congestion of the NAS, reduce pollution, and provide significant benefits to the economy. Notably, the benefits of the proposed operation of the Nova F6500 UAS will be realized without implicating any privacy issues.

1. The Public Will Benefit From The Aerial Acquisition And Research Performed.

Altavian submits this Petition to perform aerial acquisitions and research in support of the New River Regional bioreactor landfill, which accelerates waste decomposition. The New River

Regional Landfill is the first of its kind in the state of Florida. Pursuant to this Petition, the Nova F6500 UAS will be used to collect topographic data about the landfill that will be critical in conducting capacity calculations, estimating the remaining life of the landfill, and ensuring compliance with the regulations set forth by the Florida Department of Environmental Protection (FDEP).

The New River Regional Landfill not only serves the citizens of Baker, Bradford, and Union Counties in Florida; it is the first bioreactor landfill in the state of Florida, and will provide valuable research data that will benefit the entire field of waste management. By introducing air and water into solid waste, the New River Regional Landfill is a bioreactor landfill that accelerates the waste decomposition process, which extends the life of the landfill and also generates methane gas that may be captured as an alternative energy source. Data collected from the New River Regional Landfill will provide landfill operators and engineers a valuable tool in the design of landfills.

By operating the Nova F6500 UAS, Altavian will be able to perform safe, efficient, and economical aerial acquisitions that will directly benefit the public. Specifically, the Nova F6500 UAS will be used to collect topographic data about the landfill that will be critical in conducting capacity calculations, estimating the remaining life of the landfill, and ensuring compliance with the regulations set forth by the Florida Department of Environmental Protection (FDEP). For example, FDEP Rule 62-701.500(13)(c), F.A.C, requires all landfills to submit an annual estimate of the remaining life and capacity of the permitted landfill area. Currently, aerial surveying by manned aircraft is often the method utilized to collect the topographic data used to perform the capacity calculations. Furthermore, the topographic data collected annually by aerial

surveying is utilized in estimating the remaining life of the landfill, which is used in calculating financial assurance as required by FDEP Rule 62-701.630, F.A.C.

2. The Public Will Benefit From Decreased Congestion Of The NAS.

The Nova F6500 UA is battery powered and serves as a safe, efficient, and economical alternative to the manned aircraft traditionally utilized to obtain aerial imagery. By reducing the amount of manned aircraft needed to perform aerial acquisitions, an exemption allowing the use of a Nova F6500 UAS would reduce the amount of manned aircraft in the NAS, reduce noise and air pollution, as well as increase the safety of life and property in the air and on the ground.

Furthermore, by reducing the number of manned aircraft operating in the NAS, congestion around airports caused by arriving and departing aircraft will be reduced. The Nova F6500 UA does not require an airport to takeoff or land. Likewise, a reduction of manned aircraft conducting aerial survey missions would result in fewer aircraft that must be handled by air traffic control during the ground, takeoff, departure, arrival, and landing phases of flight operations.

3. The Public Will Benefit From The Safety And Efficiency Of The Nova F6500 UAS.

Conducting aerial acquisitions with the Nova F6500 UAS, instead of manned aircraft, will greatly benefit the public by drastically reducing the levels of air and noise pollution generated during traditional aerial survey flight operations. By using battery power and an electric motor, the Nova F6500 UAS produces no air pollution, and is the most viable environmentally conscious alternative to the cabin class, six cylinder internal combustion twin engine aircraft that are typically utilized for aerial acquisitions, while burning approximately 20-30 gallons per hour of leaded aviation fuel. The Nova F6500 UA, while reducing the carbon footprint of aerial acquisitions, also eliminates noise pollution, as its battery powered electric motor is barely audible

during the take-off phase, and cannot be heard when operating more than 100 feet above ground level.

By using the Nova F6500 UAS to perform aerial acquisitions, the substantial risk to life and property in the air and on the ground, which is usually associated with traditional manned aircraft flight operations, will be substantially reduced or completely eliminated. Aside from the lack of aircrew members located onboard the aircraft, the Nova F6500 UA (weighing approximately fifteen (15) pounds at its maximum gross weight with a wingspan of 108 inches and a length of 65 inches, with no fuel on board), has less physical potential for collateral damage to life and property on the ground, and in the air, compared to the manned aircraft that typically conduct aerial acquisitions (weighing approximately 6,500 pounds with a wingspan of approximately 40 feet, a length of 34 feet, and a fuel capacity of 180 gallons).

4. Performing Aerial Acquisition Operations With The Nova F6500 UAS Will Benefit The Economy.

In addition to being safe and efficient, the Nova F6500 UAS is also an economical alternative to using manned aircraft to conduct aerial acquisitions. As such, operation of the Nova F6500 UAS will allow United States based companies, like Altavian, to remain competitive and contribute to growth of the U.S. economy. Specifically, with the rising cost of aviation fuel and the Environmental Protection Agency (“EPA”) regulatory actions phasing out leaded fuels, U.S. owned and operated companies must adopt new and alternative technology in order to remain competitive. Operating the battery powered Nova F6500 UAS is one such technology that not only allows companies greater operational flexibility compared to manned aircraft, but provides such flexibility without the high operational cost of a traditional manned aircraft.

By operating the Nova F6500 UAS, companies such as Altavian can remain competitive and profitable, and therefore provide greater job stability to employees and contractors, which will ultimately contribute to growth of the U.S. economy. Improved financial performance of U.S. companies, through commercial use of the Nova F6500 UAS, provides a stable workforce that increases consumer spending; improves local, state, and federal tax revenues; and allows companies to invest in research and development in order to remain competitive both in the United States and abroad.

5. There Are No Privacy Issues.

Like the manned aerial acquisition flight operations that have been conducted for decades, the proposed operation of the Nova F6500 UAS will not implicate any privacy issues. Specifically, the Nova F6500 UAS will be operated only in rural areas, and in accordance with all Federal Aviation Regulations, including the minimum altitude requirements of 14 C.F.R. § 91.119. Most significantly, the Nova F6500 UAS will not be operated closer than 500 feet to any person, vessel, vehicle, or structure, except when necessary for takeoff or landing.

E. The Reasons Why Granting The Exemption Would Not Adversely Affect Safety, Or How The Exemption Would Provide A Level Of Safety At Least Equal To That Provided By The Rule From Which Altavian Seeks Exemption.

1. Reasons Why The Nova F6500 UAS Meets The Conditions Of The FAA Modernization and Reform Act of 2012 (FMRA) Section 333.

In consideration of the size, weight, speed, and limited operating area associated with the unmanned aircraft and its operation, Altavian's operation of the Nova F6500 UAS meets the conditions of FMRA Section 333, and will not require an airworthiness certificate in accordance with 14 C.F.R. Part 21, Subpart H.

Section 333 provides authority for UAS to operate without airworthiness certification and sets forth requirements for considering whether a UAS will create a hazard to users of the NAS

or the public, or otherwise pose a threat to national security. Specifically, FMRA Section 333 states the following, in part:

(a) In General.--Notwithstanding any other requirement of this subtitle, and not later than 180 days after the date of enactment of this Act, the Secretary of Transportation shall determine if certain unmanned aircraft systems may operate safely in the national airspace system before completion of the plan and rulemaking required by section 332 of this Act or the guidance required by section 334 of this Act.

(b) Assessment of Unmanned Aircraft Systems.--In making the determination under subsection (a), the Secretary shall determine, at a minimum--

(1) which types of unmanned aircraft systems, if any, as a result of their size, weight, speed, operational capability, proximity to airports and populated areas, and operation within visual line of sight do not create a hazard to users of the national airspace system or the public or pose a threat to national security; and

(2) whether a certificate of waiver, certificate of authorization, or airworthiness certification under section 44704 of title 49, United States Code, is required for the operation of unmanned aircraft systems identified under paragraph (1).

(c) Requirements for Safe Operation.--If the Secretary determines under this section that certain unmanned aircraft systems may operate safely in the national airspace system, the Secretary shall establish requirements for the safe operation of such aircraft systems in the national airspace system.

In seeking this exemption, Altavian submits that the Nova F6500 UAS can operate safely in the NAS pursuant to FMRA Section 333, as demonstrated by: (a) the safe operational history and current use of the Nova F6500 UAS in the NAS; (b) the characteristics of the Nova F6500 UAS; (c) the limited area of Altavian's intended operation; (d) the private pilot certification requirement; and (e) the specific operating limitations.

a. The Nova F6500 UAS Has A Proven History Of Operation In The NAS Pursuant To A Certificate Of Authorization ("COA").

The Nova F6500 UAS (also known as the Nova Block III) is currently operating safely in the NAS pursuant to approximately fifteen (15) Certificates of Authorization ("COA") granted by the FAA to the Middle Tennessee State University; Sinclair Community College in Ohio; the

U.S. Army Corps of Engineers (Jacksonville District and Mobile District); Mississippi State University for the Pearl River Basin; and the University of Florida. The U.S. Army Corps of Engineers will be operating the Nova F6500 UAS pursuant to additional COAs in the foreseeable future, pending approval by the FAA.

b. The Specifications Of The Nova F6500 UAS Demonstrate Its Safe Characteristics.

The Nova F6500 UAS does not create a hazard to users of the NAS or the public, or otherwise pose a threat to national security considering its size, weight, speed, or operational capability.

i. Technical Specifications Of The Nova F6500 UAS.

Unmanned Aircraft System	The Nova F6500 is an Unmanned Aircraft System that is comprised of an amphibious unmanned aircraft and a transportable ground station.
Serial No.	3016
Unmanned Aircraft Dimensions	Wingspan: 108 in. Length: 65 in.
Engine (Propulsive Unit)	<p><u>Engine (Propulsive Unit)</u></p> <p>(1) Altavian Inc. P/N : 30027 (Electric) FAA Engine Type Cert: None Propulsive Unit Type: 25V, 11 Amp Hour capacity, Lithium ion battery powered, direct drive electric motor</p> <p><u>Motor, Electric Sub-Assembly:</u> Manufacturer: NeuMotor Model: 1509 2.0 HP Peak Power Direct Drive 10 oz. Wt.</p>

	<p><u>Motor, Controller Sub-Assembly:</u> Manufacturer: Castle Creation Model: Phoenix Ice 100 Type: Speed Controller 100 Amps Maximum 4.6 oz. Wt.</p> <p><u>Motor, Battery:</u> Manufacturer: MaxAmps, Inc. Type: Lithium Ion 11 Amp hour 22.2V (nominal)</p>
Fuel	<p>Not Applicable. NOTE: The Nova F6500 UAS is powered by a Lithium Polymer rechargeable battery, Altavian P/N 30142.</p>
Engine (Propulsive Unit) Limits	<p>Maximum Power Output: 2.0 HP Maximum RPM: 60,000 RPM (reduced to a propeller RPM of 7,200) Maximum Motor Temperature: 170 °F (77 °C) NOTE: The motor temperature is not displayed to the operator. Maximum motor, controller sub-assembly temperature: 194 °F (90 °C) Minimum voltage, motor battery during pre-flight engine run up after 3 sec. at max throttle: 22.6V</p>
Propeller and Propeller Limits	<p>(1) Altavian Inc. P/N 30360 FAA Propeller Type Certificate: None Propeller Type: 2-blade, hinged (folding), carbon fiber reinforced plastic, fixed pitch, tractor</p> <p><u>Propeller Sub-Assembly:</u> Manufacturer: Aeronaut Model: CAM 15x13 Diameter (Nominal): 15 in.</p>
Battery Command & Control	<p>Nova Air Vehicle Battery P/N 30142 powers the motor, and battery command and control.</p>

Airspeed Limits	Vne (Never Exceed Speed) 58 knot (30 m/s) Vno (Maximum Structural Cruising Speed) 48 knots (25 m/s) Va (Maneuvering Speed) 48 knots (25 m/s) Landing Speed: 27 knots (14 m/s)
Empty Weight C.G. Range	20.2 – 21.7 inches aft of datum
Datum	Front of Motor Case
Mean Aerodynamic Chord (MAC)	13 in. long with leading edge 21.2 in. from nose
Leveling Means	Not Applicable.
Maximum Weights	Ramp 15 lbs. Takeoff 15 lbs. Landing 15 lbs.
Empty Weight	8.35 lbs. NOTE: Empty Weight Excludes weight of battery and payload modules.
Frequencies	902-928 MHz (ISM Band) 2.4 GHz (ISM Band) NOTE: FCC license is not required to utilize the above frequencies; uplink and downlink are on the 900Mhz band. If video is utilized, uplink, downlink, and video are all on 2.4 Ghz.
Computer Software	Avionics embedded processor, P/N 30138

Minimum Crew	(1) The Nova F6500 UAS can be operated by a single operator.										
Number of Seats	(0) Not Applicable.										
Fuel Capacity	Not Applicable.										
Oil Capacity	Not Applicable.										
Max. Operating Altitude	1,000 ft. AGL (304 M)										
Control Surface Movements	<table> <tr> <td>Wing Flaps</td> <td>N/A</td> </tr> <tr> <td>Aileron</td> <td>Up 30° Down 30°</td> </tr> <tr> <td>“V” tail elevator action</td> <td>Up 60° Down 60°</td> </tr> <tr> <td>“V” tail rudder action</td> <td>Up 60° Down 60°</td> </tr> <tr> <td>“V” tail max. combination Rudder elevator action</td> <td>Up 60° Down 60°</td> </tr> </table>	Wing Flaps	N/A	Aileron	Up 30° Down 30°	“V” tail elevator action	Up 60° Down 60°	“V” tail rudder action	Up 60° Down 60°	“V” tail max. combination Rudder elevator action	Up 60° Down 60°
Wing Flaps	N/A										
Aileron	Up 30° Down 30°										
“V” tail elevator action	Up 60° Down 60°										
“V” tail rudder action	Up 60° Down 60°										
“V” tail max. combination Rudder elevator action	Up 60° Down 60°										
Nominal Endurance	90 minutes above 32 °F (0 °C) 45 minutes below 32 °F (0 °C)										
Ambient Outside Air Temperature (OAT)	Maximum OAT: 120 °F (49 °C) Minimum OAT At Altitude: -20 °F (-29 °C)										
Wind Limitation	19 knots										
Maintenance	This Nova F6500 UAS must be maintained in accordance with the manufacturer’s maintenance manual, or later FAA accepted revision.										

ii. The Nova F6500 UAS Autonomous Flight And Navigation Modes Enable The UAS To Remain Within A Defined Operational Area.

A complete description of the autonomous modes and methods of navigation for the Nova F6500 UAS is provided in the Nova F6500 UAS Operator Manual at pages 7-2 through 7-4. A copy of the Nova F6500 UAS Operator Manual, which contains proprietary information, is attached hereto as Exhibit B, and is to be held in a separate file pursuant to 14 C.F.R. § 11.35(b)³.

iii. The Nova F6500 UAS Is Designed For Complete Autonomy From Launch To Landing Even In The Unlikely Event Of Loss Of The Control Link Or Navigation.

Although a degradation or loss of the control link, and/or degradation or loss of the source of navigation, is unlikely, it is a situation that is well planned for and therefore, is a benign event. The Nova F6500 UA is designed for complete autonomy from launch to landing with a line of sight operator in the loop monitoring the airframe.

The Nova F6500 unmanned aircraft (UA) uses a two-stage failsafe approach for all avionics failure conditions, including the event of a loss of communications (“Lost Link”). Upon loss of the communication signal, the Nova F6500 UA will attempt to reacquire the link. If after 10 seconds the link has not been reacquired, the Nova F6500 UA will continue to attempt to reacquire the link while maintaining the current altitude and navigating to the home waypoint, which is the same as the location of the ground control station. Once at the home waypoint, the Nova F6500 UA will loiter while continuing its attempt to reacquire the link for 300 seconds (to allow for rebooting of the ground control station, if needed). The Nova F6500 UA will then continue to attempt to re-acquire the link while it navigates through the landing procedure.

³ Exhibits to this Petition contain proprietary information, and in accordance with 14 C.F.R. § 11.35(b), are not to be included in the Federal Docket Management System (FDMS).

The landing procedure for Lost Link is identical to a normal landing procedure. The Nova F6500 UA will descend from “minimum safe altitude” to a breakout altitude (site specific) while continuing to loiter around the rally point. Once at the breakout altitude, the Nova F6500 UA will depart the loiter along a tangential path toward the touchdown spot. The Nova F6500 UA will descend on glide slope from the tangent point to the touchdown spot, slowing down to flair speed (12m/s) in the final moments before touchdown and automatically flare 3 meters above the ground.

Loss of GPS signal will result in a two tiered recovery approach. Upon loss of a GPS signal, the Nova F6500 UA will immediately enter a loiter orbit in an attempt to reacquire a signal. If after 15 seconds, GPS is not reacquired, the UA will enter tier two. At any time in tier one or two, the operator can take over with augmented control and utilize its onboard magnetometer to navigate back to the home waypoint through dead-reckoning. During this failure mode, the observer will call out UA position and movement back to the operator. Once the UA is close enough to resolve orientation, or if operating with a live video payload, the operator can engage manual control and perform a manual landing at the pre-decided landing site.

If a cascade of failures has occurred and Lost-Link has also occurred during tier two, the Nova F6500 UA will enter into a loiter-land procedure; descending in a loiter while reducing speed until contact with the ground at flair speed. During this decent, the Nova F6500 UA is still in controlled flight and at touchdown the forward speed should not exceeded 11 m/s with the propeller off, minimizing damage to anything that the Nova F6500 UA may contact.

The Nova F6500 UAS Operator Manual at Chapter 9 “Emergency Procedures” fully describes the features of the Nova F6500 UA and sets forth the unmanned aircraft’s operation in

the event of a power loss, loss of communications, loss GPS, loss of video link, or software crash. A copy of Nova F6500 UAS Operator Manual, which contains proprietary information, is attached hereto as Exhibit B, and is to be held in a separate file pursuant to 14 C.F.R. § 11.35(b).

iv. The Nova F6500 Ground Control Station And Its Operation.

A complete description of the operation and specifications of the ground control station (GCS) and flight control software for the Nova F6500 UAS is provided in the Nova F6500 UAS Operator Manual at Chapter 2. A complete overview of the features and operation of the GCS software is provided at Chapter 7. A copy of the Nova F6500 UAS Operator Manual, which contains proprietary information, is attached hereto as Exhibit B, and is to be held in a separate file pursuant to 14 C.F.R. § 11.35(b).

c. Flight Operations Pursuant To The Exemption Sought Would Be Limited To Areas Over The New River Regional Landfill That Are Not In The Proximity Of Airports Or Over Populated Areas.

Pursuant to this Petition, Altavian proposes to only conduct aerial acquisition flight operations over the New River Regional Land Fill, which is not located near any populated areas, airports, helipads, or major roadways. Specifically, Altavian's proposed area of flight operations, the New River Regional Land Fill, is located near Raiford⁴, Union County, Florida, which is a rural area that is:

1. Not a populated area as depicted on VFR Sectional Aeronautical Charts;
2. Not within five (5) miles of any airport or helipad;
3. Not within one hundred (100) meters of state roads having more than two lanes; and
4. Not within fifty (50) meters of state roads having two lanes or less.

⁴ Raiford is a town in Union County, Florida, United States. The population was 187 at the 2000 census. As of 2004, the population recorded by the U.S. Census Bureau is 193.

Furthermore, all flight operations will be conducted in accordance with 14 C.F.R. § 91.119, *Minimum safe altitudes: General.*

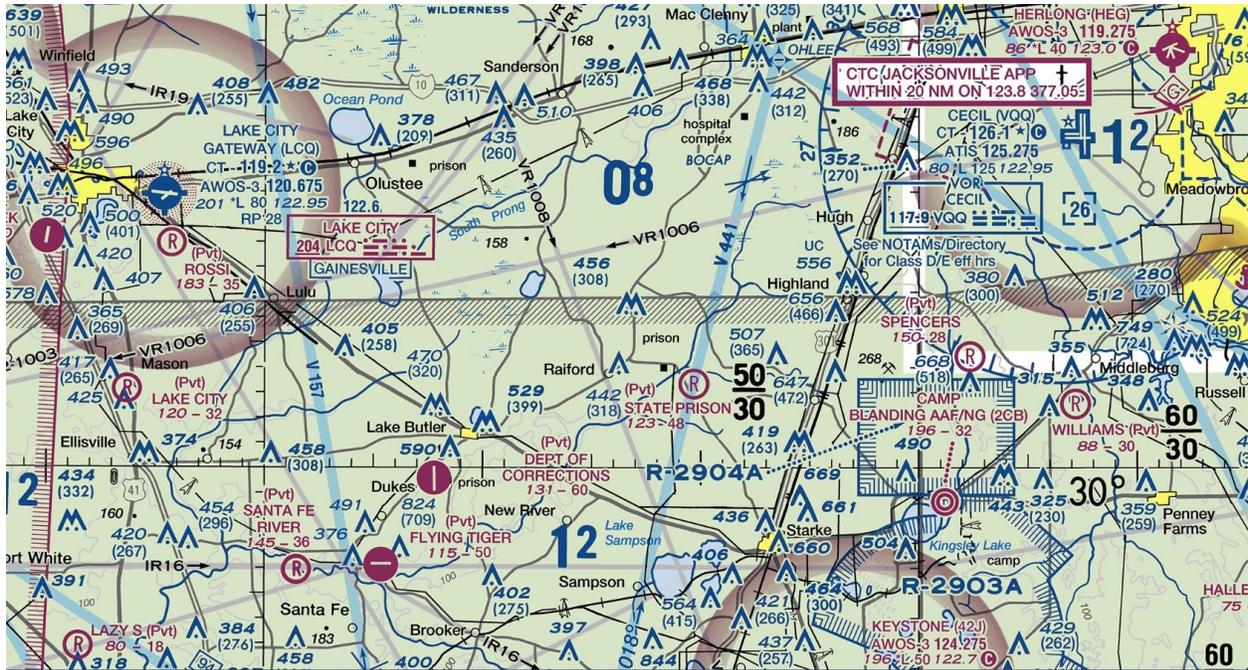


Figure 2: Jacksonville (SJAC) VFR Sectional Chart view of Raiford, Florida.

d. Flight Operations Of The Nova F6500 UAS Are Limited To The Line Of Sight Of A Certificated Private Pilot in Command With A Safety Observer.

Altavian will only utilize certificated Private Pilots who possess a valid Second Class Airman Medical Certificate to act as a pilot in command of the Nova F6500 UAS. Additionally, a safety observer, who will also possess a valid Second Class Airman Medical Certificate, and who have completed a private pilot ground school, and passed the FAA private pilot knowledge test, will assist all pilots. Additionally, both the pilot in command and safety observer must complete the Altavian Nova Operators Course and meet the experience requirements as set forth in the Nova Family of Systems Operations Manual. A copy of the Nova Family of Systems Operations Manual, which contains proprietary information, is attached hereto as Exhibit C, and is to be held in a separate file pursuant to 14 C.F.R. § 11.35(b).

e. Flights Will Be Conducted Pursuant To Specific Operating Limitations.

In seeking this exemption, Altavian proposes to commercially operate the Nova F6500 UAS for the special purpose of conducting aerial acquisitions over the New River Regional Landfill, pursuant to the following specific operating limitations:

1. Flight operations are permitted only in the defined areas over the New River Regional Landfill.
2. The Nova F6500 UA will be operated at or below 500 ft. above ground level (AGL), except as necessary to comply with the requirements of 14 C.F.R. § 91.119.
3. The Nova F6500 UA will be operated within one mile, and within line of sight, of the pilot in command and safety observer.
4. The Nova F6500 UA will be operated pursuant to Day Visual Flight Rules (VFR) in visual meteorological conditions (VMC). The Nova F6500 UAS will be operated only during daylight hours (*i.e.* between the end of morning civil twilight and the beginning of evening civil twilight, as published in the American Air Almanac, converted to local time).
5. Flights of the Nova F6500 UA will continue for a total duration of 90 minutes, or until 20% battery power is remaining (whichever occurs first).
6. The Nova F6500 UA will operate from on-site takeoff/landing location(s) directly next to the pilot in command and co-located safety observer. If the operation is from a watercraft, the pilot in command and safety observer will remain co-located on the same watercraft.

7. Private pilot certificated airmen, who have completed training, checking, currency, will conduct operations and recency of experience requirements as approved by the FAA Administrator.
8. Operation of the Nova F6500 UAS with any inoperative instruments or equipment shall be prohibited.
9. The Nova F6500 UAS will be maintained in accordance with the Manufacturer's Maintenance Manual.
10. The Nova F6500 UAS will be operated pursuant to 14 C.F.R. Part 91, operating requirements.
11. For the proposed flight operation, only one Nova F6500 UA shall be airborne at any given time.
12. Prior to flight operations, Altavian will coordinate and establish two-way communications with the nearest Air Traffic Control facility.
13. For any flight operations over U.S. Government or state managed lands, Altavian will coordinate with the appropriate authority and ensure that the property owners have at least twelve (12) hours of advance notice prior to the proposed flight operations. Coordination shall include anticipated periods of operation, purpose of the flights, and contact information for the operator should questions or issues arise.

2. Reasons Why An Exemption From The Requirements Of Section 91.151(a)(1) Would Not Adversely Affect Safety.

A grant of this exemption would ensure the level of safety established by 14C.F.R. Section 91.151(a)(1) because the technical specifications of the Nova F6500 UAS, the Nova Operations Manual, and Altavian's proposed operating limitations ensure that Altavian may safely operate the battery powered Nova F6500 UA during daylight hours in VFR conditions for

a total duration of 90 minutes, or until 20% battery power is remaining (whichever occurs first). Furthermore, previous exemptions granted by the FAA concerning Section 91.151(a)(1) establish that safety is not adversely affected when the technical characteristics and operating limitations of a UAS are considered.

The Nova F6500 UA is powered by a Lithium Ion 11 Amp hour, 22.2V battery, and is protected by two low battery failsafes, while the ground control station (GCS) provides a battery indicator on the heads-up display, which indicates the Nova F6500 UA's current remaining battery power measured in volts, providing the PIC with constant awareness of the real-time battery voltage during a flight.

The two low battery failsafes that protect the Nova F6500 UA are a "Low AV⁵ battery" failsafe and a "Critically low AV battery" failsafe. The "Low AV battery" failsafe flies the UA to the location of the ground control station (GCS), or identified Rally point, when the UA battery reaches a certain threshold of time as configured by the operator (or 20.4V). The "Critically low AV battery" shuts the propulsion motor off and lands the UA at its current location. This failsafe is triggered if the battery drops below the critical battery voltage as configured by the operator, or 19.4V.

Furthermore, an exemption from the requirements of Section 91.151(a)(1) would not adversely affect safety because Altavian will only conduct flights during daylight hours in VMC, with the duration of each flight not to exceed 90 minutes, as set forth by the Nova Family of Systems Operations Manual. A copy of the Nova Family of Systems Operations Manual, which contains proprietary information, is attached hereto as Exhibit C, and is to be held in a separate file pursuant to 14 C.F.R. § 11.35(b).

⁵ The Nova F6500 UAS Operator Manual defines "AV" as "Aerial Vehicle."

Likewise, as set forth above, Altavian has proposed specific operating limitations in this Petition that will maintain the level of safety established by Section 91.151(a)(1), including the following: (1) the Nova F6500 UA will only be operated during daylight hours (i.e. between the end of morning civil twilight and the beginning of evening civil twilight, as published in the American Air Almanac, converted to local time); (2) Nova F6500 UA will only be operated pursuant to visual flight rules (VFR) in visual meteorological conditions (VMC); and (3) the duration of each flight shall not exceed 90 minutes.

Significantly, previous exemptions granted by the FAA concerning Section 91.151(a)(1) establish that safety is not adversely affected when the technical characteristics and operating limitations of the UAS are considered. Relief has been granted for manned aircraft to operate at less than the minimums prescribed in Section 91.151(a), including Exemption Nos. 2689, 5745, and 10650. Moreover, the FAA has previously granted relief from Section 91.151(a)(1), specific to UAS, in circumstances similar, in all material respects, to those presented herein (e.g. Exemption Nos. 8811, 10808, 10673, 11042, 11062, 11063, 11064, 11065, 11066, 11067, 11080).

3. Reasons Why An Exemption From The Requirements Of Sections 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) & (a)(2), And 91.417(a) & (b) Would Not Adversely Affect Safety.

In seeking this exemption, Altavian submits that the level of safety with regard to the regulatory maintenance and alteration requirements established by Sections 91.405(a), 91.407(a)(1), 91.409(a)(1) & (a)(2), 91.417(a) & (b) will be met because Altavian, the manufacturer of the Nova F6500 UAS, will use its trained technicians to perform maintenance, alterations, or preventive maintenance on the unmanned aircraft system using the methods,

techniques, and practices prescribed in the manufacturer's maintenance manual. Furthermore, Altavian will document and maintain all maintenance records for the Nova F6500 UAS.

Since the Nova F6500 UAS will be inspected as prescribed by the manufacturer's maintenance manual, Altavian will maintain the level of safety established by Sections 91.405(a), 91.409(a)(1), and 91.409(a)(2). The Nova F6500 Maintenance Manual sets forth Scheduled Maintenance Inspection Procedures for each system and component. Inspection intervals for the Nova F6500 UAS include preflight and post flight inspections, as well as scheduled inspections every 25 hours, 50 hours, 75 hours, and 100 hours.

Likewise, the exemption sought will not adversely affect safety because Altavian will perform maintenance, alterations or preventive maintenance on the unmanned aircraft system using the methods, techniques, and practices prescribed by the manufacturer's maintenance manual. The Nova F6500 Maintenance Manual details procedures for each component of the unmanned aircraft, including the components of the propulsion system, avionics system, payload system, fuselage system, wing, and tail.

A copy of the Nova F6500 Maintenance Manual, which contains proprietary information, is attached hereto as Exhibit D, and is to be held in a separate file pursuant to 14 C.F.R. § 11.35(b).

Furthermore, the exemption sought would maintain the level of safety established by Sections 91.407, 91.417(a) and 91.417(b) because all maintenance of the Nova F6500 UAS will be performed by Altavian trained technicians, who will document and maintain maintenance records for the Nova F6500 UAS. Altavian trained technicians are qualified to conduct any and all maintenance to ensure the safe operation of the Nova family of UAS, conduct all service inspections, and authorize the use of each vehicle in the Nova family of UAS based upon

completion of appropriate inspections. *See* Nova Family of Systems Operations Manual, Exhibit C, at page 3-4. Pursuant to the Nova Family of Systems Operations Manual and the Nova F6500 Maintenance Manual, a Maintenance Action Form must be completed and saved in the maintenance logs for all maintenance that is performed on the UAS. The procedures for maintaining the maintenance logs for the UAS are fully set forth in the Nova Family of Systems Operations Manual, Exhibit C, at Chapter 5, and the Nova F6500 Maintenance Manual, Exhibit D, at Chapter 5.

Significantly, previous exemptions granted by the FAA concerning Sections 91.405(a), 91.407(a)(1), 91.409(a)(1) & (a)(2), 91.417(a) & (b) establish that safety is not adversely affected when the technical characteristics and operating limitations of a UAS are considered. The FAA has previously granted relief specific to UAS in circumstances similar, in all material respects, to those presented herein (e.g. Exemption Nos. 11062, 11063, 11064, 11065, 11066, 11067, 11080).

4. The FAA May Prescribe Any Other Conditions For Safe Operation.

In accordance with Section 333 of the FAA Modernization and Reform Act of 2012 (FMRA) and 14 C.F.R. § 21.16 entitled *Special Conditions*, Altavian requests that the FAA prescribe special conditions for the intended operation of the Nova F6500 UAS, which contain such safety standards that the Administrator finds necessary to establish a level of safety equivalent to that established by 14 C.F.R. Part 21, Subpart H, and 14 C.F.R §§ 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) & (a)(2), and 91.417(a) & (b). Such special conditions will permit safe operation of the unmanned aircraft for the limited purpose of conducting aerial acquisitions over the New River Regional Landfill. FMRA Section 333 sets forth the requirements for considering whether a UAS will create a hazard to users of the NAS or the public, or otherwise pose a threat to national security; and further, provides the authority for such

UAS to operate without airworthiness certification in accordance with any requirements that must be established for the safe operation of the aircraft systems in the NAS.

Likewise, the Administrator may prescribe special conditions pursuant to 14 C.F.R. § 21.16, for operation of the Nova F6500 UAS, since the airworthiness regulations of 14 C.F.R. Part 21 do not contain adequate or appropriate safety standards, due to the novel or unusual design features of the aircraft. Section 21.16, entitled *Special Conditions*, states the following:

If the FAA finds that the airworthiness regulations of this subchapter do not contain adequate or appropriate safety standards for an aircraft, aircraft engine, or propeller because of a novel or unusual design feature of the aircraft, aircraft engine or propeller, he prescribes special conditions and amendments thereto for the product. The special conditions are issued in accordance with Part 11 of this chapter and contain such safety standards for the aircraft, aircraft engine or propeller as the FAA finds necessary to establish a level of safety equivalent to that established in the regulations.

See 14 C.F.R. § 21.16.

Therefore, in accordance with FMRA Section 333 and 14 C.F.R. § 21.16, the FAA may prescribe special conditions for Altavian's intended operation of the Nova F6500 UAS, which contain such safety standards that the Administrator finds necessary to establish a level of safety equivalent to that established by 14 C.F.R. Part 21, Subpart H, and 14 C.F.R. Sections 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) & (a)(2), and 91.417(a) & (b).

F. A Summary That Can Be Published In The *Federal Register*, stating:

The Rules From Which Altavian Seeks Exemption:

Altavian, Inc. seeks exemption from the requirements of 14 C.F.R. Sections 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) & (a)(2), and 91.417(a) & (b).

A Brief Description Of The Nature Of The Exemption Altavian Seeks:

This exemption will permit Altavian, Inc. to operate an Unmanned Aircraft System (UAS) for the purpose of conducting aerial acquisitions and research over the New River Regional Land Fill in Union County, Florida.

G. Any Additional Information, Views, Or Arguments Available To Support Altavian's Request.

This Petition is made pursuant to the FAA Modernization and Reform Act of 2012 (FMRA) Section 333, which directs the Secretary of Transportation to determine if certain UAS may operate safely in the NAS. As such, Altavian's request for exemption may be granted pursuant to the authority of FMRA Section 333 and 14 C.F.R. Part 11, as set forth above.

FMRA Section 333 sets forth the requirements for considering whether a UAS will create a hazard to users of the NAS or the public, or otherwise pose a threat to national security; and further, provides the authority for such UAS to operate without airworthiness certification.

As discussed in detail above, the Nova F6500 UAS has in the past, and will continue in the future, to operate safely in the NAS without creating a hazard to users of the NAS, or the public, or otherwise pose a threat to national security.

CONCLUSION

As set forth herein, Altavian seeks an exemption pursuant to 14 C.F.R. § 11.61 and Section 333 of the FAA Modernization and Reform Act of 2012 (FMRA), which will permit safe operation of the Nova F6500 UAS commercially, without an airworthiness certificate, for the limited purpose of conducting aerial acquisitions over the New River Regional Landfill. By granting this Petition, the FAA Administrator will be fulfilling the Congressional mandate of the FAA Modernization and Reform Act of 2012, while also advancing the interests of the public, by allowing Altavian to safely, efficiently, and economically operate the Nova F6500 UAS commercially within the NAS.

WHEREFORE, in accordance with the Federal Aviation Regulations and the FAA Modernization and Reform Act of 2012, Section 333, Altavian respectfully requests that the Administrator grant this Petition for an exemption from the requirements of 14 C.F.R Sections

91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) & (a)(2), and 91.417(a) & (b), and permit Altavian to operate the Nova F6500 UAS for the purpose of conducting aerial acquisitions and research over the New River Regional Land Fill in Union County, Florida.

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Respectfully submitted,

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