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

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

May 22, 2015

Exemption No. 11658
Regulatory Docket No. FAA–2015–0546

Ms. Gladys M. Miller
Senior Project Engineer
Navigator CS, LLC
1523 Kinnaird Terrace NE
Leesburg, VA 20176

Dear Ms. Miller:

This letter is to inform you that we have granted your request for exemption. It transmits our decision, explains its basis, and gives you the conditions and limitations of the exemption, including the date it ends.

By letter dated March 2, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Navigator CS, LLC (hereinafter petitioner or operator) for an exemption. The exemption would allow the petitioner to operate an unmanned aircraft system (UAS) to conduct aerial imaging in support of engineering surveys of construction sites, existing buildings and facilities, and other sites, for the purpose of monitoring and ensuring site safety, proper material usage, quality of workmanship, and/or to inspect the integrity of buildings and/or structures, including bridges and dams.

See Appendix A for the petition submitted to the FAA describing the proposed operations and the regulations that the petitioner seeks an exemption.

The FAA has determined that good cause exists for not publishing a summary of the petition in the Federal Register because the requested exemption would not set a precedent, and any delay in acting on this petition would be detrimental to the petitioner.

Airworthiness Certification

The UAS proposed by the petitioner is a DJI Inspire 1.

The petitioner requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*. In accordance with the statutory criteria provided in Section 333 of Public Law 112−95 in reference to 49 U.S.C. § 44704, and in consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation, the Secretary of Transportation has determined that this aircraft meets the conditions of Section 333. Therefore, the FAA finds that the requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*, and any associated noise certification and testing requirements of part 36, is not necessary.

The Basis for Our Decision

You have requested to use a UAS for aerial data collection. The FAA has issued grants of exemption in circumstances similar in all material respects to those presented in your petition. In Grants of Exemption Nos. 11062 to Astraeus Aerial (*see* Docket No. FAA−2014−0352), 11109 to Clayco, Inc. (*see* Docket No. FAA−2014−0507), 11112 to VDOS Global, LLC (*see* Docket No. FAA−2014−0382), and 11213 to Aeryon Labs, Inc. (*see* Docket No. FAA−2014−0642), the FAA found that the enhanced safety achieved using an unmanned aircraft (UA) with the specifications described by the petitioner and carrying no passengers or crew, rather than a manned aircraft of significantly greater proportions, carrying crew in addition to flammable fuel, gives the FAA good cause to find that the UAS operation enabled by this exemption is in the public interest.

Having reviewed your reasons for requesting an exemption, I find that—

- They are similar in all material respects to relief previously requested in Grant of Exemption Nos. 11062, 11109, 11112, and 11213;
- The reasons stated by the FAA for granting Exemption Nos. 11062, 11109, 11112, and 11213 also apply to the situation you present; and
- A grant of exemption is in the public interest.

Our Decision

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. 106(f), 40113, and 44701, delegated to me by the Administrator, Navigator CS, LLC is granted an exemption from 14 CFR §§ 61.23(a) and (c), 61.101(e)(4) and (5), 61.113(a), 61.315(a), 91.7(a), 91.119(c), 91.121, 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b), to the extent necessary to allow the petitioner to operate a UAS to perform aerial data collection. This exemption is subject to the conditions and limitations listed below.

Conditions and Limitations

In this grant of exemption, Navigator CS, LLC is hereafter referred to as the operator.

Failure to comply with any of the conditions and limitations of this grant of exemption will be grounds for the immediate suspension or rescission of this exemption.

1. Operations authorized by this grant of exemption are limited to the DJI Inspire 1 when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.

2. Operations for the purpose of closed-set motion picture and television filming are not permitted.

3. The UA may not be operated at a speed exceeding 87 knots (100 miles per hour). The exemption holder may use either groundspeed or calibrated airspeed to determine compliance with the 87 knot speed restriction. In no case will the UA be operated at airspeeds greater than the maximum UA operating airspeed recommended by the aircraft manufacturer.

4. The UA must be operated at an altitude of no more than 400 feet above ground level (AGL). Altitude must be reported in feet AGL.

5. The UA must be operated within visual line of sight (VLOS) of the PIC at all times. This requires the PIC to be able to use human vision unaided by any device other than corrective lenses, as specified on the PIC's FAA-issued airman medical certificate or U.S. driver's license.

6. All operations must utilize a visual observer (VO). The UA must be operated within the visual line of sight (VLOS) of the PIC and VO at all times. The VO may be used to satisfy the VLOS requirement as long as the PIC always maintains VLOS capability. The VO and PIC must be able to communicate verbally at all times; electronic messaging or texting is not permitted during flight operations. The PIC must be designated before the flight and cannot transfer his or her designation for the duration of the flight. The PIC must ensure that the VO can perform the duties required of the VO.

7. This exemption and all documents needed to operate the UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption, are hereinafter referred to as the operating documents. The operating documents must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in this exemption and the procedures outlined in the operating documents, the conditions and limitations herein take precedence and must be followed. Otherwise, the operator must follow the procedures as outlined in its operating documents. The operator may update or revise its operating documents. It is the operator's responsibility to track such revisions and present updated and revised

documents to the Administrator or any law enforcement official upon request. The operator must also present updated and revised documents if it petitions for extension or amendment to this grant of exemption. If the operator determines that any update or revision would affect the basis upon which the FAA granted this exemption, then the operator must petition for an amendment to its grant of exemption. The FAA's UAS Integration Office (AFS−80) may be contacted if questions arise regarding updates or revisions to the operating documents.

8. Any UAS that has undergone maintenance or alterations that affect the UAS operation or flight characteristics, e.g., replacement of a flight critical component, must undergo a functional test flight prior to conducting further operations under this exemption. Functional test flights may only be conducted by a PIC with a VO and must remain at least 500 feet from other people. The functional test flight must be conducted in such a manner so as to not pose an undue hazard to persons and property.

9. The operator is responsible for maintaining and inspecting the UAS to ensure that it is in a condition for safe operation.

10. Prior to each flight, the PIC must conduct a pre-flight inspection and determine the UAS is in a condition for safe flight. The pre-flight inspection must account for all potential discrepancies, e.g., inoperable components, items, or equipment. If the inspection reveals a condition that affects the safe operation of the UAS, the aircraft is prohibited from operating until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight.

11. The operator must follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components.

12. Each UAS operated under this exemption must comply with all manufacturer safety bulletins.

13. Under this grant of exemption, a PIC must hold either an airline transport, commercial, private, recreational, or sport pilot certificate. The PIC must also hold a current FAA airman medical certificate or a valid U.S. driver's license issued by a state, the District of Columbia, Puerto Rico, a territory, a possession, or the Federal Government. The PIC must also meet the flight review requirements specified in 14 CFR § 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.

14. The operator may not permit any PIC to operate unless the PIC demonstrates the ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption, including evasive and emergency maneuvers and maintaining appropriate distances from persons, vessels, vehicles and structures. PIC qualification flight hours and currency must be logged in a manner consistent with

14 CFR § 61.51(b). Flights for the purposes of training the operator's PICs and VOs (training, proficiency, and experience-building) and determining the PIC's ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption are permitted under the terms of this exemption. However, training operations may only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights, all persons not essential for flight operations are considered nonparticipants, and the PIC must operate the UA with appropriate distance from nonparticipants in accordance with 14 CFR § 91.119.

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

16. The UA may not operate within 5 nautical miles of an airport reference point (ARP) as denoted in the current FAA Airport/Facility Directory (AFD) or for airports not denoted with an ARP, the center of the airport symbol as denoted on the current FAA-published aeronautical chart, unless a letter of agreement with that airport's management is obtained or otherwise permitted by a COA issued to the exemption holder. The letter of agreement with the airport management must be made available to the Administrator or any law enforcement official upon request.

17. The UA may not be operated less than 500 feet below or less than 2,000 feet horizontally from a cloud or when visibility is less than 3 statute miles from the PIC.

18. If the UAS loses communications or loses its GPS signal, the UA must return to a pre-determined location within the private or controlled-access property.

19. The PIC must abort the flight in the event of unpredicted obstacles or emergencies.

20. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough available power for the UA to conduct the intended operation and to operate after that for at least 5 minutes or with the reserve power recommended by the manufacturer if greater.

21. Air Traffic Organization (ATO) Certificate of Waiver or Authorization (COA). All operations shall be conducted in accordance with an ATO-issued COA. The exemption holder may apply for a new or amended COA if it intends to conduct operations that cannot be conducted under the terms of the attached COA.

22. All aircraft operated in accordance with this exemption must be identified by serial number, registered in accordance with 14 CFR part 47, and have identification (N−Number) markings in accordance with 14 CFR part 45, Subpart C. Markings must be as large as practicable.

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

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

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

26. All Flight operations must be conducted at least 500 feet from all nonparticipating persons, vessels, vehicles, and structures unless:
    a. Barriers or structures are present that sufficiently protect nonparticipating persons from the UA and/or debris in the event of an accident. The operator must ensure that nonparticipating persons remain under such protection. If a situation arises where nonparticipating persons leave such protection and are within 500 feet of the UA, flight operations must cease immediately in a manner ensuring the safety of nonparticipating persons; and
    b. The owner/controller of any vessels, vehicles or structures has granted permission for operating closer to those objects and the PIC has made a safety assessment of the risk of operating closer to those objects and determined that it does not present an undue hazard.

    The PIC, VO, operator trainees or essential persons are not considered nonparticipating persons under this exemption.

27. All operations shall be conducted over private or controlled-access property with permission from the property owner/controller or authorized representative. Permission from property owner/controller or authorized representative will be obtained for each flight to be conducted.

28. Any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA must be reported to the FAA's UAS Integration Office (AFS−80) within 24 hours. Accidents must be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: www.ntsb.gov.

If this exemption permits operations for the purpose of closed-set motion picture and television filming and production, the following additional conditions and limitations apply.

29. The operator must have a motion picture and television operations manual (MPTOM) as documented in this grant of exemption.

30. At least 3 days before aerial filming, the operator of the UAS affected by this exemption must submit a written Plan of Activities to the local Flight Standards District Office (FSDO) with jurisdiction over the area of proposed filming. The 3-day notification may be waived with the concurrence of the FSDO. The plan of activities must include at least the following:
    a. Dates and times for all flights;
    b. Name and phone number of the operator for the UAS aerial filming conducted under this grant of exemption;
    c. Name and phone number of the person responsible for the on-scene operation of the UAS;
    d. Make, model, and serial or N−Number of UAS to be used;
    e. Name and certificate number of UAS PICs involved in the aerial filming;
    f. A statement that the operator has obtained permission from property owners and/or local officials to conduct the filming production event; the list of those who gave permission must be made available to the inspector upon request;
    g. Signature of exemption holder or representative; and
    h. A description of the flight activity, including maps or diagrams of any area, city, town, county, and/or state over which filming will be conducted and the altitudes essential to accomplish the operation.

31. Flight operations may be conducted closer than 500 feet from participating persons consenting to be involved and necessary for the filming production, as specified in the exemption holder's MPTOM.

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

This exemption terminates on May 31, 2017, unless sooner superseded or rescinded.

Sincerely,

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

Enclosures

NAVIGATOR CS, LLC

Chart a Course to Project Success

March 2, 2015

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

Re: Exemption Request in accordance with 14 CFR Part 11 and Section 333 of Public Law 112-95 (the 2012 Reform Act) from 14 CFR Part 21, Subpart H; 14 CFR 61.113 (a) and (b); 14 CFR 91.7(a); 14 CFR 91.103(b); 14 CFR 91.119(c); 14 CFR 91.121; 14 CFR 91.151(a)(1); 14 CFR 91.405(a); 14 CFR 91.407(a)(1); 14 CFR 91.409 (a)(1) and (2);14 CFR 91.417 (a) and (b).

Dear Sir or Madam:

Attached please find Navigator CS, LLC's ("Navigator") request for an exemption from the listed Federal Aviation Regulations to allow commercial operation of its Small Unmanned Aircraft System ("sUAS") ***Inspire 1***, manufactured by DJI Innovations. Navigator intends to use the ***Inspire 1*** to obtain aerial imaging in support of engineering surveys of construction sites, existing buildings and facilities, and other sites, for the purpose of monitoring and ensuring site safety, proper material usage, quality of workmanship, and/or to inspect the integrity of buildings and/or structures, including but not limited to bridges, dams and others.

Also attached to this letter is the Operating Manual for the ***Inspire 1***, outlining its operating requirements, limitations, and technical specifications; as well as *"Navigator CS, LLC's Pre-Flight Checklist for Small Unmanned Aircraft Systems (sUAS) Used in Commercial Operations."* Navigator submits this Checklist as proprietary information pursuant to 14 CFR 11.35 (b). The Checklist contains operating conditions and procedures that are not available to the public and are protected from release under the Freedom of Information Act 5 USC 552 et. seq.

We at Navigator CS, LLC thank you in advance for your time and consideration. We trust that the attached documents are self-explanatory; however, should you have any questions or comments, or need further clarification, please do not hesitate to contact me by phone at (703)568-7780 or by e-mail at gmiller@navigatorcs.com.

Very truly yours,

Gladys M. Miller

Gladys M. Miller, M.S., M.B.A.
Senior Project Engineer

Attachment A: "Navigator CS, LLC's Pre-Flight Checklist for Small Unmanned Aircraft Systems (sUAS) Used in Commercial Operations"
Attachment B: "***Inspire 1*** Operating Manual"

Petition for Exemption

in Accordance with
14 CFR Part 11 and Section 333 of Public Law 112-95

From

14 CFR
Part 21, Subpart H;
61.113(a) and (b)
91.7(a); 91.103(b); 91.119(c);
91.121; 91.151(a)(1); 91.405(a)
91.407(a)(1); 91.409(a)(1) and (2)
91.417 (a) and (b)

Submitted To

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

by

NAVIGATOR CS, LLC
Chart your Course to a Successful Project

1523 Kinnaird Ter NE
Leesburg, VA 20176

March 2, 2015

Table of Contents

A. INTRODUCTION

Pursuant to 14 Code of Federal Regulations (14 CFR) part 11 and Section 333 of the Federal Aviation Administration (FAA) Modernization and Reform Act of 2012 (Public Law 112-95), Navigator CS, LLC ("Navigator") hereby applies for an exemption from the Federal Aviation Regulations ("FARs") listed in table 1, to allow commercial operation of its small Unmanned Aircraft System (sUAS) ***Inspire 1***, manufactured by DJI Innovations, 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 of Public Law 112-95 or as later modified by Navigator under the approval of the FAA subsequent to future amendments.

This petition uses as guides prior petitions for exemptions and their corresponding FAA rulings, as well as the FAA's Notice of Proposed Rule Making (NPRM) Docket No.: FAA-2015-0150, Notice No. 15-01, published on February 15, 2015. On this NPRM, the FAA proposes to add a new part 107 to Title 14 Code of Federal Regulations (14 CFR) to allow for routine civil operation of small UAS in the national air space (NAS) and to provide safety rules for those operations. Because the proposed part 107 regulation is not final, and mindful that the final regulation might need to be redacted to address public comments, Navigator is proposing actions that will allow its sUAS operations to achieve an equivalent level of safety or that will meet the intent of (1) the airworthiness provisions of 14 CFR part 21; (2) airman certification provisions of 14 CFR part 61; and operating limitations of 14 CFR part 91, all of which will be replaced by 14 CFR part 107.

The most onerous requirement imposed to date by the FAA as a condition for exemption from current manned aircraft regulations, involves the requirement that the sUAS be operated by a Pilot-In-Command (PIC) holding a private pilot certificate and a third-class airman medical certification. The knowledge currently necessary to obtain a private pilot certificate does not equip the certificate holder with the tools necessary to safely operate a sUAS. Therefore, the PIC must demonstrate that s/he is able to safely operate the sUAS in a manner consistent with how the sUAS will be operated under the given exemption, including evasive and emergency maneuvers, and maintaining appropriate distances from people, vessels, vehicles, and structures.

The proposed part 107 replaces the PIC certification requirement with the requirement that the sUAS be operated by an operator holding an *"Unmanned Aircraft Operator Certificate With a Small UAS Rating"* (see proposed 14 CFR 107.13 (a)). To obtain this certificate, the individual must be at least 17 years of age; demonstrate English language proficiency (read, write, speak and understand English); and pass an initial aeronautical knowledge test in addition to demonstrating competency operating the sUAS. Navigator will comply with the operator requirements in place at the time the FAA grants this petition.

In the following sections, Navigator discusses the actions that it proposes to take to ensure that its sUAS operations do not create a hazard to the users of the NAS or the public, or pose a threat to national security. Navigator also discusses how its proposed sUAS operations will be of benefit to the public.

A.1 Petitioner

The name and address of the petitioner is:

Navigator CS, LLC
1523 Kinnaird Ter NE
Leesburg, VA 20176

Point of Contact: Gladys M. Miller, M.S., M.B.A.
Sr. Project Engineer
Phone No.: 703-568-7780
Email: gmiller@navigatorcs.com

Navigator is a properly verified service disabled veteran-owned small business performing engineering and management consulting services in support of the construction, real estate, property management, and information security industries. Navigator is the operator of the ***Inspire 1***, a sUAS equipped to conduct aerial filming and photography.

A.2 Intended Operations

This exemption will allow Navigator to use its sUAS ***Inspire 1*** to safely, efficiently, and economically obtain aerial imaging in support of engineering surveys of construction sites, existing buildings and facilities, and other sites, for the purpose of monitoring and ensuring site safety, proper material usage, quality of workmanship and/ or to inspect the integrity of buildings and/or structures, including but not limited to bridges, dams and others.

A.3 Small Unmanned Aircraft System (sUAS)

The ***Inspire 1*** sUAS manufactured by DJI Innovations consists of a lightweight (6.5 lbs.) battery operated quadcopter measuring 17.2 x 17.8 x 11.9 in., a tablet-based ground control station and/or RC Controller, and associated communications equipment. The rotorcraft is a multirotor helicopter that is lifted and propelled by four rotors. It carries an onboard geo-referenced gimbaled camera that allows it to obtain photography and videography.

Under normal conditions, the ***Inspire 1*** operates at a speed of no more than 22 meters per second (50 mph; 43 knots) and has the capability to hover and move in the vertical and horizontal plane simultaneously. The battery is a lithium polymer LiPo 6S high voltage battery. The maximum flight time is 18 minutes. The complete specifications for the ***Inspire 1*** are contained in the "*Inspire 1* Operating Handbook" contained in Attachment B.

A.4 Relief Sought

Table 1 lists the regulations from which Navigator is seeking relief. Each of these is discussed in detail in Section D, "Regulations for Which Exemptions is Sought," along with Navigator's proposed actions to provide an equivalent level of safety or to meet the intent of the regulation.

Table 1: Regulations from Which Navigator is Seeking Relief

14 CFR PART	REGULATION DESCRIPTION
PART 21 AIRWORTHINESS CERTIFICATION	
21, SUBPART H	CERTIFICATION PROCEDURES FOR PRODUCTS AND PARTS, AIRWORTHINESS CERTIFICATES
PART 61 CERTIFICATION: PILOTS, LIGHT INSTRUCTORS, AND GROUND INSTRUCTORS	
61.113(a) and (b)	PRIVATE PILOT PRIVILEGES AND LIMITATIONS; PILOT IN COMMAND
PART 91 GENERAL OPERATING AND FLIGHT RULES	
91.7(a)	CIVIL AIRCRAFT AIRWORTHINESS
91.103(b)	PRE-FLIGHT ACTION
91.119(c)	MINIMUM SAFE ALTITUDES
91.121	ALTIMETER SETTINGS
91.151(a)(1)	FUEL REQUIREMENTS FOR FLIGHTS IN VFR CONDITIONS
91.405(a)	MAINTENANCE REQUIRED
91.407(a)(1)	OPERATION AFTER MAINTENANCE
91.409(a)(1) and (2)	INSPECTIONS
91.417(a) and (b)	MAINTENANCE RECORDS REQUIRED

Table 2 lists regulations for which numerous petitioners have sought relief, but from which Navigator is not seeking relief either because (1) they are not applicable to Navigator's planned operations, or (2) because the FAA has determined that relief is not necessary. To ensure that the FAA does not consider this an oversight on the part of Navigator, Section E of this petition discusses each of the regulations in Table 2, the reason why Navigator is not seeking relief, and actions that Navigator proposes to take to ensure that the intent of the regulation is met, or that the sUAS operations provide an equivalent level of safety.

Table 2: Regulations from Which Navigator is NOT Seeking Relief

14 CFR PART	SUMMARY OF REGULATION
PART 91 GENERAL OPERATING AND FLIGHT RULES	
91.203(a) and (b)	CARRYING CIVIL AIRCRAFT CERTIFICATION AND REGISTRATION
91.9(b)(2)	CIVIL AIRCRAFT FLIGHT MANUAL IN THE AIRCRAFT
91.9(c) / 45.23(b)	MARKING OF THE AIRCRAFT
91.109(a)	FLIGHT INSTRUCTION

B. STATUTORY AUTHORITY FOR EXEMPTIONS

The Federal Aviation Act expressly grants the FAA authority to issue exemptions. This statutory authority includes exempting civil aircraft, as the term is defined under §40101 of the Act, including sUAS, from the requirement that all civil aircraft must have a current airworthiness certificate. 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 finds the exemption to be in the public interest. 49 USC 44701(f). See also 49 USC §4471 l(a); 49 USC 44704; 14 CFR 91.203(a)(l).

In order to determine whether certain sUAS may operate safely in the NAS pursuant to section 333 of Public Law 112-95, the Secretary must find that the operation of the UAS would not: (1) create a hazard to users of the NAS or the public; or (2) pose a threat to national security. The Secretary must also determine whether small UAS operations pose a safety risk sufficient to require airworthiness certification.

Section 333(c) of Public Law 112-95 further states that if the Secretary determines that a sUAS "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."

B.1 Hazard to Users of the NAS or the Public

Section 333 of Public Law 112-95 requires the Secretary to determine whether the operation of the sUAS would create a hazard to users of the NAS or the public. The two primary safety concerns associated with sUAS operations are: (1) the ability to "see and avoid" other aircraft with no pilot on board; and (2) the operator losing positive control of the sUA aircraft. Navigator will mitigate these concerns by adhering to the provisions listed in Table 3, which are in line with proposed regulation 14 CFR part 107.

The light weight of the ***Inspire 1***, coupled with the provisions listed in Table 3, significantly reduce the risk posed by Navigator's proposed sUAS operations when compared with other categories of aircraft that weigh more, fly higher, and are faster. Therefore, Navigator's sUAS operations would not create a hazard to users of the NAS or to the public.

B.2 Threat to National Security

Section 333 of Public Law 112-95 also requires the Secretary to determine whether the operation of the sUAS would pose a threat to national security. Under proposed 14 CFR part 107, these operations would be subject to specific requirements, such as being able to operate only during daylight and only within visual line of sight of the operator and, if applicable, a visual observer. The sUA would also have to be registered with the FAA and to display its FAA-issued registration marking prominently on the aircraft.

In addition, the operator of the sUA will be required to obtain a FAA-issued *"Unmanned Aircraft Operator Certificate With a Small UAS Rating."* The process for obtaining this certificate will include the same TSA-review procedures that are currently used under 49 USC 46111 to screen out airman-certificate applicants posing a security risk. These provisions, coupled with those contained in Table 3, which Navigator will follow for all sUAS commercial operations, will ensure that Navigator's sUAS operations will not pose a threat to national security.

B.3 Airworthiness Certification

Section 333(b)(2) of Public Law 112-95 requires the Secretary to determine whether small UAS operations pose a safety risk sufficient to require airworthiness certification. In previous exemptions, as well as in the preamble of the FAA's Notice of Proposed Rule Making (NPRM) [Docket No.: FAA-2015-0150; Notice No. 15-01] published on February 15, 2015, the Secretary has determined that airworthiness certification should not be required for sUAS due to their low-risk operational characteristics. In addition, the provisions listed in Table 3 and the pre-flight checks that will be performed (see Attachment A, *"Navigator CS, LLC's Pre-Flight Checklist for Small Unmanned Aircraft System (sUAS) Used in Commercial Operations"*) significantly reduce the risk associated with sUAS operations.

In the above referenced NPRM, the FAA emphasizes that the operator of the sUAS will not need to determine design conformity or reliability probabilities when evaluating the airworthiness of the sUAS. Instead, the operator will need to make a determination of whether the sUAS is in a safe condition during flight operations and ground operations conducted for the purpose of flight. During pre-flight and post-flight inspections, the sUAS operator should conduct a simple visual inspection to look for simple items such as dents, corrosion, misalignment, loose wires, binding controls, loose fasteners, and excessive wear. This simple but not all-inclusive list will identify most problems that could impact the airworthiness and reliability of the aircraft.

Another inspection method unique to sUAS that would be governed by proposed rule 107 will be a check of the control link. This check can be accomplished by using the control station to verify proper flight control deflection prior to flight. The check can also be used to ensure the flight controls deflect freely, without binding. Like the aforementioned inspection items, this too is a simple visual inspection that should not require specialized training, and is included in *"Navigator CS, LLC's Pre-Flight Checklist for Small Unmanned Aircraft Systems (sUAS) Used in Commercial Operations"* in Attachment A.

Because (1) the proposed airworthiness provisions discussed above would sufficiently ensure that the sUAS is in a condition for safe operation; and (2) the provisions listed in Table 3 and the *"Navigator CS, LLC's Pre-Flight Checklist for Small Unmanned Aircraft Systems (sUAS) Used in Commercial Operations"* contained in Attachment A of this petition would ensure that the risk posed by small unmanned aircraft is significantly smaller than the public risk posed by other groups of aircraft, pursuant to section 333(b)(2) of Public Law 112-95, airworthiness certification would be unnecessary for the sUAS.

Table 3: Navigator's Provisions to Mitigate Safety and Security Risks

Navigator's Provisions to Mitigate Safety and Security Risks	Applicable 14 CFR Regulations[1]	
	For Manned Aircraft	Proposed for sUAS
General Provisions:		14 CFR 107:
• The maximum gross weight of the sUA will be 6.5 lbs. This is below the 55-lb limit in the definition of small unmanned aircraft contained in Public Law 112-95, sec. 331(6).		
• The airspeed of the SUA will not exceed 43 knots (50 mph). This is half the FAA proposed maximum airspeed of 87 knots.		51(a)
• The sUAS will not be operated unless it is in condition for safe operation, as determined by Navigator's preflight checks and regular maintenance procedures.		15(a)
• The flight of the sUA will be discontinued if conditions develop such that continuing the flight would pose a hazard to other aircraft, people, or property.	91.7 (b)	15(b)
• The sUA will have enough power to operate for its intended operational time and an additional four minutes. See Section D.7 of this petition for Navigator's reasoning on this matter.		49 (a)(4)
sUA Registration and Markings Provisions:		14 CFR 107:
• The sUA will be registered with the FAA.		13(b)
• The registration number will be displayed on the aircraft in as large a manner as practicable. The location of the display will be as prescribed for the type of aircraft.	45.29(f)	13(c)
sUAS Maintenance Provisions:		14 CFR 107:
• The operator will maintain the sUAS in a condition for safe operation by performing the manufacturer's recommended maintenance at manufacturer-recommended regular intervals.		21(a)
Operator and Visual Observer (VO) Provisions:		14 CFR 107:
• The sUAS will be operated by a pilot-in-command (PIC) holding a pilot private certificate.		
• As soon as the process to obtain the *"Unmanned Aircraft Operator Certificate with a Small UAS Rating"* is established and operational, Navigator will use a holder of this certificate for the operation of its sUAS.		13(a)
• Navigator will use a VO for its sUAS operations. The VO will not be allowed to operate the sUA. The operator will ensure that the VO is able to see the sUA as specified in part 107.31 and 37		33
• The operator and VO will only participate in the operation of one sUAS at a time.		35
• When operating the sUAS, the operator will refrain from careless or reckless behavior that could endanger the life or property of other. This includes not dropping objects as to create a hazard to persons or property.	91.13 & 15	23
• The operator and VO will comply with the FAA alcohol and drug use prohibitions.	91.17	27

[1] While Navigator has made an attempt to reference relevant existing and proposed regulations pertaining to hazards to users of the NAS and the Public and threats to national security that apply to sUAS operations, the references identified on this Table are not all inclusive.

Navigator's Provisions to Mitigate Safety and Security Risks	Applicable 14 CFR Regulations[1]	
	For Manned Aircraft	Proposed for sUAS
• An individual with a physical or mental condition that could interfere with the safe operation of the sUAS will not be allowed to function as operator or VO. In the event that the operator or the VO have reason to believe that the physical or mental condition of self or other might interfere with the safe operation of the sUAS, s/he will immediately notify the Project Manager for appropriate action. • The operator and VO will scan the airspace where the sUA is operating for potential collision hazards and will maintain awareness of the position of the sUA through direct visual observation. • The operator and VO will maintain effective communication with each other at all times. • The operator and VO will maintain Visual Line of Sight (VLOS) of the sUA through the duration of the flight, with human vision that is unaided by any device other than corrective lenses. • The operator or VO's vision of the sUA will be sufficient to allow them to know the sUA's location; determine the sUA's attitude, altitude, and direction; observe the sUA for other traffic or hazards; and determine that the sUA does not endanger the life or property of another.	61.53(b)	17 33 (d) 33 (a) 31 & 37(a)(1) 33(a) 31 31

Pre-flight Inspections, Assessments, and Checks:
• The operator will inspect the sUAS to ensure that it is in a condition for safe operation. This includes performing the manufacturer-recommended preflight inspection and/or performing an on-the-ground test of the sUAS to determine whether safety-critical systems and components are working properly.
• The operator will ensure that all links between the control station and the sUA are working properly. In the event that a control link is not functioning properly, flight will not commence until the problem is resolved.
• The operator will become familiar with the confined area of operation by assessing the operating environment and risks to persons and property in the immediate vicinity both on the surface and in the air. As part of this pre-flight assessment, the operator will consider conditions that could pose a hazard to the operation of the sUAS, as well as conditions in which the operation of the sUAS could pose a hazard to other aircraft or persons or property on the ground. Special consideration will be given to:
  • (1) local weather conditions;
  • (2) local airspace and any flight restrictions;
  • (3) the location of persons and property on the ground;
  • (4) overhead wires and power transmission cables, and
  • (5) any other ground or air hazards.
• The operator will compare the GPS altitude read-out with the launch site altitude to ensure proper readings.
• The operator will ensure that the sUAS will pose no undue hazard to other aircraft, people or property in the event of loss of control of the aircraft for any reason.
		14 CFR 107:
		21(b)
		49(a)(3)
		49(a)(1)
		19(b)

Navigator's Provisions to Mitigate Safety and Security Risks	Applicable 14 CFR Regulations[1]	
	For Manned Aircraft	Proposed for sUAS
• If the operation takes place in a residential area, the operator will ask everyone in the area of operation to remain inside their homes while the operation is conducted. • If the operation takes place in an area where other air traffic could pose a hazard, the operator will advise local air traffic control as to the location of his or her area of operation and add extra visual observers to the operation so that they can notify the operator if other aircraft are approaching the area of operation. Please refer to Attachment A, *"Navigator CS LLC's Pre-Flight Checklist for Small Unmanned Aircraft Systems (sUAS) Used in Commercial Operations"* for additional details.		
Provisions to Confine Area of Operations (to mitigate risks associated with loss-of-positive-control): • The operator will always be able to see the sUA unaided, except for corrective lenses, as appropriate. • The sUA will not be operated from a moving aircraft or land-borne vehicle. • The sUA will operate at an altitude not to exceed 500 ft above ground level (AGL). • The sUA operations will take place in Class G airspace. Operations in Class A airspace will not be allowed. Operations in Class B, C, D, and E airspace, as well as in prohibited or restricted areas, require permission from the ATC having jurisdiction over the airspace and/or from the using or controlling agency. • Navigator shall fully cooperate with the sUAS manufacturer to upgrade sUAS operating software, as appropriate, to incorporate exclusion or no-fly zones.		14 CFR 107: 33 (c) 25 51 (b) 41, 45, and 47
"See-and-Avoid" and Visibility Provisions: • VLOS will be maintained throughout the flight. • Operations will be conducted during daylight, between the hours of official sunrise and sunset. • Minimum flight visibility from the control station will be three statute miles (5 km). • The sUA will be no less than 500 ft below clouds and 2000 ft horizontally from clouds.	91.113(b)	14 CFR 107: 31 29 51 (c) 51 (d)
Mid-Air Collision Avoidance Provisions: • The UAS operator will always initiate avoidance maneuvers to avoid collision with any other user of the NAS. • The sUAS will not operate so close to any other aircraft as to create a collision hazard.	91.111 (a)	14 CFR 107: 37 (a)(2) 37 (b)
Other Provisions to Mitigate the Risk Posed by Loss-of-Positive-Control: • Prior to flight, the operator will ensure that all links between the control station and the aircraft are working properly and that the battery is fully charged. • The sUA will not be operated over people not directly involved in the operation • Prior to the flight, the operator will ensure that all persons directly involved in the operation receive a briefing that includes: (1) operating conditions; (2) emergency procedures; (3) contingency procedures; (4) roles and responsibilities; and (5) potential hazards. • The operator will ensure that the sUAS will not pose undue hazard to other aircraft, people, or property in the event of		4 CFR 107: 49(a)(3) 39 49(a)(2) 19 (b)

Navigator's Provisions to Mitigate Safety and Security Risks	Applicable 14 CFR Regulations[1]	
	For Manned Aircraft	Proposed for sUAS
loss of control of the aircraft. • The ***Inspire 1's*** operating software includes a "Failsafe Return to Home" feature which will automatically fly the aircraft back to the point of origination of the flight if the remote controller signal is lost for more than three seconds.		
Demonstration of Compliance Provisions: • Upon FAA's request, Navigator will make available to the FAA any document, record, or report required to be kept regarding the operation and maintenance of the sUAS. This includes the operator's *"Unmanned Aircraft Operator Certificate with a sUAS Rating"* certificate, and the Certificate of Registration for the sUAS being operated. • Navigator, its operator and/or VO, will allow the FAA to make any test or inspection of the sUAS, the operator and/or the VO, to determine compliance with applicable regulations. • Within 10 days of occurrence, Navigator will report to the FAA any sUAS operation that results in injury to a person or damage to property other than the sUA.		14 CFR 107: 7(a) 7(b) 9

C. PUBLIC INTEREST

This application for exemption is expressly submitted to fulfill Congress' goal in passing Section 333(a) through (c) of Public Law 112-95. This law directs the Secretary to consider whether certain unmanned aircraft systems may operate safely in the NAS before completion of the rulemaking required under Section 333 of the Law. By granting this exemption, the FAA will fulfill Congress's intent of allowing sUAS to operate with significant safety precautions in low risk environments.

The use of sUAS to obtain aerial imaging in support of engineering surveys of construction sites, existing buildings and facilities, and other sites, for the purpose of monitoring and ensuring site safety, proper material usage, quality of workmanship and/ or to inspect the integrity of buildings and/or structures, including but not limited to bridges, dams and others, can significantly reduce the risk to workers arising from falls while inspecting, surveying, or monitoring site progress. Small UAS can take video and photos, and collect data on high and hard-to-get-to areas, such as building exteriors, towers, and roofs that otherwise would require worker inspection. Falls are the leading source of workplace fatality and injury on construction sites[2] and reducing the possibility of falls by using sUAS for site imaging could significantly reduce the safety risk for workers performing many such inspections, ultimately save workers' lives.

Additionally, sUAS could replace the use of helicopters and small aircraft to monitor sites and take site/project progress photographs. Navigator's selected sUAS weighs 6.5 lbs and carries no explosive materials or flammable liquid fuels on board, as opposed to much larger, conventionally powered small aircraft. The use of sUAS over helicopters presents a substantial increase in safety for workers and the public.

When used for aerial imaging and data collection over construction and other sites, the ***Inspire 1's*** rechargeable Lithium Polymer battery (LiPo 6S) has a reduced environmental impact over fossil fuel burned to operate much heavier small aircrafts.

D. REGULATIONS FROM WHICH EXEMPTION IS SOUGHT

The regulations from which Navigator is seeking relief are listed in Table 1 of this petition. This Section discusses each of these regulations, the reasons why Navigator is seeking relief, and Navigator's provisions to assure an equivalent level of safety, as applicable.

D.1 14 CFR Part 21, Subpart H: Airworthiness Certificates

Subpart H, *Airworthiness Certificates*, establishes the procedural requirements for the issuance of airworthiness certificates as required by FAR 91.203 (a)(1). Given the size and limited operating area associated with the aircraft to be utilized by Navigator, an exemption from Part 21 Subpart H meets the

[2] "Commonly Used Statistics", Occupational Safety and Health Administration. Available at: https://www.osha.gov/oshstats/ commonstats.html

requirements of an equivalent level of safety under Part 11 and Section 333 of Public Law 112-95.

The Federal Aviation Act (49 U.S.C.44701 (f)) and Section 333 of Public Law 112-95 authorize the FAA to exempt aircraft from the requirement for an airworthiness certificate, upon consideration of the sUAS' size, weight, speed, operational capability, and proximity to airports and populated areas.

As discussed in Section B.3 of this petition, the FAA has determined in previous exemptions that airworthiness certification should not be required for sUAS due to their low-risk operational characteristics. The provisions listed in Table 3 and on *"Navigator CS, LLC's Pre-Flight Checklist for Small Unmanned Aircraft Systems (sUAS) Used in Commercial Operations, "* contained in Attachment A of this petition significantly reduce the risk associated with Navigator's sUAS operations. During preflight and post flight inspections, Navigator will seek to identify problems that could impact the airworthiness and reliability of the sUAS. In addition, before each flight, the control link will be checked to ensure proper flight control. These combined efforts will ensure that Navigator's sUAS is in a condition for safe operation.

An analysis of these provisions demonstrates that Navigator's sUAS operated without an airworthiness certificate, in the restricted environment, and under the provisions in Table 3 and *"Navigator CS, LLC's Pre-Flight Checklist for Small Unmanned Aircraft Systems (sUAS) Used in Commercial Operations"* contained in Attachment A, will be as safe as, or safer than, conventional aircraft operating with an airworthiness certificate without the restrictions and conditions proposed.

Navigator's ***Inspire 1*** weighs less than 10 lbs., carries neither a pilot nor passenger, carries no explosive materials or flammable liquid fuels, and operates exclusively within a secured area as set out in Table 3 of this petition. Like other civil aircraft, operations under this exemption will be tightly controlled and monitored by the operator, and will be in compliance with local public safety requirements, to provide security for the area of operation as is currently done on active construction sites. These safety enhancements, which already apply to civil aircraft operated in connection with construction sites, provide a greater degree of safety to the public and property owners than conventional operations conducted with airworthiness certificates issued under 14 CFR Part 21, Subpart H.

The FAA has previously granted exemptions from this regulation, some examples of which may be found in Exemption Nos. 11062, 11067, 11080, 11112, 11114, and 11138.

D.2 14 CFR 61.113(a) and (b): Private Pilot Privileges and Limitations: Pilot in Command

Section 61.113(a) and (b) prescribe that

> (*a) No person who holds a private pilot certificate may act as a pilot in command (PIC) of an aircraft that is carrying passengers or property for compensation or hire; nor may that person, for compensation or hire, act as PIC of an aircraft.*
>
> *(b) A private pilot may, for compensation or hire, act as PIC of an aircraft in connection with any business or employment if*

(1) The flight is only incidental to that business or employment; and
(2) The aircraft does not carry passengers or property for compensation or hire.

Unlike a conventional aircraft, which is operated by an onboard pilot, Navigator's sUA will not carry a pilot, passengers, or any other life form on board. The sUA will be remotely controlled and, as shown on the provisions contained in Table 3 and on *"Navigator CS, LLC's Pre-Flight Checklist for Small Unmanned Aircraft Systems (sUAS) Used in Commercial Operations"* contained in Attachment A, the area of operation will be controlled and restricted, and all flights will be planned and coordinated in advance. These provisions are consistent with the requirements proposed by the FAA in NPRM Docket No. FAA-2015-0150, Notice No. 15-01, dated February 15, 2015, and significantly reduce the risk of Navigator's sUA operations compared with the level of risk posed by the commercial operations governed by Part 61.

To date, the FAA has granted petitions for exemption similar to this one, and has authorized sUAS to be operated by a PIC with a private pilot certificate and third-class airman medical certification. The PIC has been required to demonstrate his/her ability to operate the sUAS. In the above referenced NPRM, the FAA proposed that sUA be operated by an operator holding an "*Unmanned Aircraft Operator Certificate with a sUAS Rating*." Navigator will comply with the requirements current at the time this petition is granted, which will provide an **equivalent level of safety** as that achieved by 14 CFR 61.113(a) and (b).

The FAA has issued the following exemptions to this regulation as shown in Exemption Nos. 11062, 11065, 11067, 11110, 11109, 11136 and 11138.

D.3 14 CFR 91.7(a): Civil Aircraft Airworthiness

Section 91.7(a) prescribes that no person may operate a civil aircraft unless it is in an airworthy condition. As there will be no airworthiness certificate issued for the aircraft, should this exemption be granted, there will be no FAA regulatory standard for determining airworthiness. The size and operational characteristics of the aircraft, the provisions outlined in Table 3 of this petition related to preflight inspections, checks, assessments, and maintenance, and on *"Navigator CS, LLC's Pre-Flight Checklist for Small Unmanned Aircraft Systems (sUAS) Used in Commercial Operations"* contained in Attachment A of this petition, which incorporate the FAA's proposed requirements for sUAS, will ensure that the ***Inspire 1*** is in a condition for flight. Therefore, an **equivalent level of safety** will be provided.

The FAA has granted exemptions from this regulation in several instances, including Exemption Nos. 11080, 11109, 11136, 11138, 11150, 11153, 11157, and 11159.

D.4 14 CFR 91.103(b): Preflight Action

Section 91.103 prescribes that the aircraft's pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight. This information must include:

(b) For any flight, runway lengths at airports of intended use, and the following takeoff and landing distance

information:

(1) For civil aircraft for which an approved Airplane or Rotorcraft Flight Manual containing takeoff and landing distance data is required, the takeoff and landing distance data contained therein; and

(2) For civil aircraft other than those specified in paragraph (b)(1) of this section, other reliable information appropriate to the aircraft, relating to aircraft performance under expected values of airport elevation and runway slope, aircraft gross weight, and wind and temperature.

Navigator seeks relief from this regulation because the type of information and actions required to ensure the safe operation of a sUA are different from those called for in 14 CFR 91.103 (b). The Provisions contained in Table 3, particularly those pertaining to preflight inspections, assessments, and checks, and completion of *"Navigator CS, LLC's Pre-Flight Checklist for Small Unmanned Aircraft Systems (sUAS) Used in Commercial Operations"* shown in Appendix A of this petition, will ensure an **equivalent level of safety** as that provided for conventional aircraft governed by 14 CFR 91.103(b).

D.5 14 CFR 91.119(c): Minimum Safe Altitudes

Section 91.119 prescribes that, except when necessary for takeoff or landing, no person may operate an aircraft below the following altitudes:

(a) Anywhere. An altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface.

(b) Over congested areas. Over any congested area of a city, town, or settlement, or over any open-air assembly of persons, an altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft.

(c) Over other than congested areas. An altitude of 500 feet above the surface, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure.

(d) Helicopters, powered parachutes, and weight-shift-control aircraft. If the operation is conducted without hazard to persons or property on the surface

(1) A helicopter may be operated at less than the minimums prescribed in paragraph (b) or paragraph (c) of this section, provided each person operating the helicopter complies with any routes or altitudes specifically prescribed for helicopters by the FAA; and

(2) A powered parachute or weight-shift-control aircraft may be operated at less than the minimums prescribed in paragraph (c) of this section.

Section 91.119(d) allows helicopters to be operated at less than the minimum prescribed altitudes, provided the person operating the helicopter complies with any route or altitudes prescribed for helicopters by the FAA. This petition of exemption is for a quadcopter that flies similarly to a helicopter, with vertical take-off and vertical landing, which will typically operate at altitudes of 200 feet above ground level (AGL) or less. Therefore, an exemption will be needed to allow such operations.

As stated in Table 3, Navigator intends to conduct its sUAS operations in secure, confined areas that are not congested. To this effect, the only portion of this regulation from which Navigator seeks relief is 119(c), which sets the minimum flying altitude to 500 feet AGL. This is the maximum allowable flying

altitude proposed by the FAA in NPRM Docket No. FAA-2015-0150, Notice No. 15-01, published on February 15, 2015.

Navigator's sUA will not operate over any person that is not directly involved in the operation of the sUAS unless these persons are protected by a structure. Further, prior to its sUAS commercial operations, Navigator will ensure that:

(1) All persons directly involved in the sUAS operation receive a briefing that includes operating conditions, emergency procedures, contingency procedures, roles and responsibilities, and potential hazards;

(2) All persons not essential to flight operations (nonparticipating persons) remain at least 500 ft. away from the area of operations unless they are protected by barriers or structures that can sufficiently protect non-participating persons from debris in the event of an accident. The operator will ensure that nonparticipating persons remain under or within such protection. If a situation arises where nonparticipating persons leave such protection and are within 500 feet of the sUA, flight operations will cease immediately or the operator will move the aircraft to a safe distance, whichever is safer.

(3) In the event that operations need to be conducted closer than 500 ft. from vessels, vehicles and/or structures, Navigator will first obtain permission from the owner/controller, and the operator will make a safety assessment of the risk of operating closer to those objects.

The size, weight, and speed of the ***Inspire 1***, combined with the provisions listed above and in Table 3 and Attachment A of this petition will ensure the safety of Navigator's sUAS operations and will provide an **equivalent level of safety** as that intended for conventional aircraft governed by 14 CFR 91.119, which are heavier and carry flammable fuel.

Some of the exemptions where the FAA has granted relief from this regulation include Exemption Nos. 4063, 11062, 11063, 11066, 11067, 11080, 11109, 11110, 11112, 11136, and 11138.

D.6 14 CFR 91.121: Altimeter Settings

Section 91.121 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.*"

Navigator requests relief from this regulation because its sUAS does not have a barometric altimeter but a Global Positioning System (GPS) altitude read-out whose altitude information is generated by GPS equipment installed onboard the aircraft. Prior to each flight, the GPS read-out will be verified by the operator by comparing it to the launch site altitude, thus setting the zero altitude initiation point. To actively monitor the flight path, the sUAS operator will have access to altitude information via a radio communications telemetry data link which downlinks from the sUA to the operator. These provisions, coupled with Navigator's intent to operate its sUA within VLOS below 500

feet AGL, will ensure the safety of Navigator's sUAS operations, and will provide an **equivalent level of safety** as that intended by the provisions of 14 CFR 91.121 for conventional aircraft.

The FAA has granted relief from this regulation, as shown in Exemption Nos. 11136, 11138, 11150, 11153 and 11159.

D.7 14 CFR 91.151(a)(1): Fuel Requirements for Flight in VFR Conditions

Section 91.151(a) prescribes that no person may begin a flight in an airplane under visual flight rules (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.

As indicated in Table 3, Navigator will conduct its sUAS operations in daylight; for this reason, the fuel requirement for night operations covered under 151(a)(2) is not applicable, and Navigator is only seeking relief from 151(a)(1). This relief is required because the battery that powers the ***Inspire 1*** provides approximately 18 minutes of powered flight, thus making it unfeasible to meet this 30-minute fuel reserve requirement.

An **equivalent level of safety** will be provided by commanding the aircraft to return to the ground control station when the battery has 20% of power remaining. It should be noted that in its proposed regulations for sUAS, the FAA is requiring that the sUAS have enough power for its intended operational flight plus 5 minutes. Given the short (18 minute) flight duration allowed for the ***Inspire 1*** by its battery power, Navigator's 20% battery power provision will allow 14 minutes of flight time and leave 4 minutes of battery reserve. While this does not meet the 5 minutes in the proposed regulation we feel it provides a significant safety margin, complies with the current requirement and provides a reasonable flight time without adversely affecting the safety of the operations. Navigator's proposed provision has been found acceptable by the FAA on previous exemptions, including Exemption No. 11109.

Navigator's provision to return the aircraft to the ground control station when the battery reaches 20% of power can be easily carried out because when in flight, the remaining battery power of the ***Inspire 1*** is shown live on the operator's display, letting the operator know the remaining flight time. Built-in algorithms calculate the distance of the aircraft and the estimated time to return to the ground control station, which allows the operator to know when it's time to fly back. These features, combined with the above flight-duration provision, the confined nature of the operating area, and the size, weight, speed, and construction material of the ***Inspire 1*** will ensure the safety of Navigator's sUAS operations.

To date, the FAA has granted relief from this regulation to sUAS for daytime, VFR conditions. Examples of these exemptions include Exemption Nos. 2689F, 5745, 8811, 10159, 10650, 10673, 10808, 11112, 11136 and 11138.

D.8 14 CFR 91.405(a); 407(a)(1); 409(a)(1) and (2); 417(a) and (b): Maintenance Requirements

Section 91.405(a) prescribes that 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 [Maintenance, Preventive Maintenance, Rebuilding, and Alteration] *of this chapter.*

Section 91.407(a)(1) prescribes that

(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;

Section 91.409(a)(1) and (2) prescribe that:

(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.

Section 91.417(a) and (b) prescribe that

(a) 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 that 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) 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 shall be retained until the defects are repaired and the aircraft is approved for return to service.

Given that these section and Part 43 apply only to aircraft with an airworthiness certificate, these sections will not apply to Navigator's sUAS. However, Navigator's sUAS operator will ensure that the ***Inspire 1*** is in proper working condition prior to initiating flight operations (see Provisions in Table 3 and *"Navigator CS, LLC's Pre-Flight Checklist for Small Unmanned Aircraft Systems (sUAS) Used in Commercial Operations"* contained in Attachment A of this petition). Regular preventive maintenance will be accomplished in accordance with the manufacturer's operating manual. The date and type of preventive and corrective maintenance will be documented on the sUA log, which will be made available to FAA personnel upon request.

The above provisions, combined with the ***Inspire 1's*** size and weight and the confined area where it will be operated for short periods of time, will achieve an **equivalent or level of safety** as that intended by these regulations for conventional aircraft.

The FAA has granted similar exemptions from these regulations, as shown in Exemption Nos. 11080, 11109, 11136, 11138, 11150, 11153, 11157 and, 11159.

E. REGULATIONS FROM WHICH RELIEF IS NOT SOUGHT

As mentioned earlier, previous petitioners have sought relief from other regulations which the FAA has determined are not necessary or applicable. To ensure that the FAA does not consider this an oversight on the part of Navigator, those regulations are discussed next, along with the reason why Navigator is not seeking relief, and the actions that Navigator proposes to take to ensure that the intent of the regulation is met, or that its sUAS operations provide an equivalent level of safety.

E.1 14 CFR 45.23(b): Marking of the Aircraft

This regulation prescribes that:

(b) 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.

As stated by the FAA on previous rulings (see Exemption No. 11109), this regulation applies only to aircraft with an experimental certificate under 14 CFR Part 21.191, which is not the case here. For this reason, Navigator is not seeking relief from this regulation. Navigator's sUAS will be identified by serial

number, it will be registered with the FAA in accordance with 14 CFR part 47, and will have identification (N- Number) markings in accordance with 14 CFR part 45, Subpart C. Markings will be as large as practicable.

E.2 14 CFR 91.9 (b)(2): Civil Aircraft Flight Manual, Marking, and Placard Requirements

Section 91.9(b)(2) prescribes, in pertinent part, that no person may operate a US-registered civil aircraft 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.

Due to its small size and configuration, the sUA has no ability or place to carry a flight manual on the aircraft; therefore, an exemption is required. On previous exemptions, however, the FAA has stated that based on the FAA's memorandum titled "Interpretation regarding whether certain required documents may be kept at an UA's control station" dated August 8, 2014, relief is not necessary. Navigator will achieve an **equivalent level of safety** by keeping the flight manual at the ground control point where the PIC/operator flying the sUAS will have immediate access to it.

E.3 14 CFR 91.109: Flight Instruction

Section 91.109 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. By design, sUAS and remotely piloted aircraft do not have fully functional dual controls. Flight control is accomplished through the use of a control box that communicates with the aircraft via radio communications. The FAA has previously approved exemptions for aircraft without fully functional dual controls. See Exemption Nos.5778K and 9862A.

In Exemption No. 11109, the FAA ruled that this regulation does not apply if the operator does not intend to conduct training that requires dual controls. Because Navigator does not intend to conduct training that requires dual controls, this regulation does not apply and Navigator is, therefore, not seeking relief from it.

E.4 14 CFR 91.203(a) and (b): Carrying Civil Aircraft Certification and Registration

The regulation provides in 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 10 lbs. and is operated without an onboard pilot.

Therefore, 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 flight control point where the PIC/operator will have immediate access to these documents.

The FAA has already addressed this matter on the memorandum titled "Interpretation regarding whether certain required documents may be kept at an UA's control station" dated August 8, 2014. For this reason, Navigator is not seeking relief from this regulation. Prior to the above referenced memorandum, the FAA had issued numerous exemptions to this regulation (see Exemption Nos. 9565, 9665, 9789, 9789A, 9797, 9797A, 9816A, and 10700).

F. PRIVACY

All of Navigator's sUA flights will occur over private or controlled access property with the prior consent and knowledge of the property owner or the authority having jurisdiction. Images taken will be of individuals who have consented to being filmed or otherwise have agreed to be in the area where aerial imagery will take place.

G. SUMMARY FOR PUBLICATION IN THE FEDERAL REGISTER

Pursuant to 14 CFR 11, Navigator provides the following summary for publication in the Federal Register, should the FAA determine that publication is needed.

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In accordance with 14 CFR Part 11 and Section 333 of Public Law 112-95 (the 2012 Reform Act) Navigator CS, LLC seeks relief from the following rules:

14 CFR Part 21, Subpart H; 14 CFR 61.113 (a) and (b); 14 CFR 91.7(a); 14 CFR 91.103(b); 14 CFR 91.119(c); 14 CFR 91.121; 14 CFR 91.151(a)(1); 14 CFR 91.405(a); 14 CFR 91.407(a)(1); 14 CFR 91.409 (a)(1) and (2); 14 CFR 91.417 (a) and (b);

Approval of this petition will allow petitioner to safely, efficiently, and economically operate commercially a small unmanned aircraft (sUA) weighing less than 10 lbs, to obtain aerial imaging in support of engineering surveys of construction sites, existing buildings and facilities, and other sites, for the purpose of monitoring and ensuring site safety, proper material usage, quality of workmanship and/ or to inspect the integrity of buildings and/or structures, including but not limited to bridges, dams and others.

Conventional operations in this industry using rotorcraft or fixed-wing aircraft present the risks associated with vehicles that weigh several thousand pounds and carry large amounts of fuel. Such aircraft must fly to and from the survey or inspection site and operate at low altitudes. In contrast, the sUA weighs less than 10 lbs., is powered by batteries, is transported (not flown) to the designated site, and carries no passengers or crew. These features eliminate virtually all risks posed by manned aircraft flights for this purpose.

The operation of a sUA weighing less than 10 pounds provides an equivalent level of safety and thus supports the grant of the exemptions requested herein, including exempting the applicant from the requirements of part 21 and allowing commercial operations. These light sUAS operate a slow speed, close to the ground, and in a sterile environment. As a result, they are safer than conventional aerial survey and inspection operations conducted with fixed-wing aircraft or helicopters.

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H. CONCLUSION

As detailed in this document and attachments, the requested exemption will permit the commercial operation of sUAS under controlled conditions in airspace that is limited, predetermined and accessed-controlled, and would provide safety enhancements to the already best practices and safety protocols followed by Navigator in the conduct of surveys and inspections at construction and other sites. 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 small size and light weight of the ***Inspire 1,*** its operating capabilities, the restricted and sterile environment within which Navigator will operate it, the provisions in Table 3 that Navigator is committed to maintain, and *"Navigator CS, LLC's Pre-Flight Checklist for Small Unmanned Aircraft Systems (sUAS) Used in Commercial Operations"* contained in Attachment A, which will be used by Navigator for all commercial operations, Navigator's proposed sUAS operations fall within the zone of safety (an equivalent level of safety) in which Congress envisioned that the FAA must, by exemption, allow commercial operations of sUAS to commence immediately. In addition, as discussed in Section B.2 of this petition, approval of this petition presents no threat to national security.

Given the clear direction in Section 333 of Public Law 112-95, the authority contained in the Federal Aviation Act, as amended, the strong equivalent level of safetysurrounding the proposed operations, and the significant public benefit, including enhanced safety, FAA's granting of the requested exemptions is in the public interest. Accordingly, Navigator respectfully requests that the FAA grant the requested exemptions without delay.