UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
DOCKET MANAGEMENT SYSTEM
1200 NEW JERSEY AVE., SE
WASHINGTON, DC 20590

IN THE MATTER OF THE PETITION FOR EXEMPTION OF:

North Star Aerial

**FOR AN EXEMPTION SEEKING RELIEF FROM
THE REQUIREMENTS OF THE FAA REFORM ACT AND
PART 11 OF THE FEDERAL AVIATION REGULATIONS FROM
TITLE 14 OF THE CODE OF FEDERAL REGULATIONS**

SECTIONS C.F.R. §§ 61.113 (a) & (b); 91.7(a); 91.119 (c); 91.121; 91.151(a); 91.405 (a); 91.407(a) (1); 91.409 (a) (2); 91.417 (a) & (b).

**CONCERNING COMMERCIAL OPERATION OF UNMANNED AIRCRAFT SYSTEMS
PURSUANT TO SECTION 333 OF
THE FAA MODERNIZATION
AND REFORM ACT OF 2012 (PUBLIC LAW 112-95)**

Submitted on October 13, 2015

North Star Aerial
5605 Highwood Dr.
Edina, MN 55436
adam@northstaraerial.com

NSA's Consultant
Gowdy Brothers Aerospace, LLC
8170 Old Carriage Court N. Suite #200
Shakopee, MN 55379
www.GowdyBrothersAerospace.com
Info@GowdyBrothers.com

Table of Contents

GLOSSARY OF ABBREVIATIONS

AGL	Above Ground Level
AOI	Area of Interest
ATC	Air Traffic Control
ATO	Air Traffic Organization
AV	Aerial Vehicle
CFR	Code of Federal Regulations
COA	Certificate of Authorization
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
GCS	Ground Control Station
GPS	Global Positioning System
LOL	Loss of Link
NAS	National Airspace System
NOTAM	Notice To Airman
PIC	Pilot In Command
Section 333	FAA Modernization and Reform Act of 2012 (FMRA) Section 333
SO	Safety Observer
SOP	Standard Operating Procedures
sUAS	Small Unmanned Aircraft System

sUAV	Small Unmanned Aircraft Vehicle
UA	Unmanned Aircraft
UAS	Unmanned Aircraft System
UAV	Unmanned Aircraft Vehicle
VFR	Visual Flight Rules
VLOS	Visual Line of Site
VMC	Visual Meteorological Conditions
VTOL	Vertical Take-Off and Landing

INTRODUCTION AND INTERESTS OF THE PETITIONER

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the "Reform Act") and 14 C.F.R. Part 11, North Star Aerial, ("NSA") Operator of Small Unmanned Aircraft Systems ("sUASs") equipped to offer on-demand commercial UAS operations for a host of industries and applications and to perform the purposes listed below, hereby applies for an exemption from the listed Federal Aviation Regulations ("FARs") to allow commercial operation of its sUAV's/UAS, so long as such operations are conducted within and under the conditions outlined herein or as may be established by the FAA in an exemption granted under either Section 333 or Section 49 U.S.C. §44701(f)

As described more fully below, the requested exemption would permit the operation of a UAS under controlled conditions in airspace that is 1) limited; 2) predetermined; and 3) would provide safety enhancements in the fields in which it will operate, which now depend upon conventional aircraft or humans climbing high on dangerous structures, walking in insect laden swamps, and working adjacent to treacherous infrastructure. 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." Section 333(c) of the Reform Act.[1]

Executive Summary

Expeditious Summary Grant Approval Request

The petitioner requests the agency issue a summary grant process for this application. Petitioner has provided in a confidential document attachment labeled as petitioner proprietary information, specific exemption numbers whereby the FAA has already granted a previous exemption similar or identical to each and every request, herein.

For the FAA's benefit, Petitioner's Consultant, Gowdy Brothers Aerospace, LLC, has researched, categorized and arranged all 631 exemptions granted as of June 23,

[1] North Star Aerial relies upon the following exemptions where specific reference to an exemption is not provided: Exemptions 11062 thru 11067, 11080, 11109 through 11112, 11114, 11213, 11062 and as recent as 11857.

2015 into a usable searchable database, based upon the following criteria: date submitted, date grant issued, time to petition grant, petitioner, petitioner's state, exemption number, sUAV equipment type, grant purpose (mission/operation), along with other supporting data.

Petitioner has identified four previous approved exemptions for each of the Petitioners FAA submission requests:

- Commercial (mission/operation) purposes;
- Type of sUAV's (UAS);
- Title 14 Exemptions (exemption pattern referenced in appendix A)[2]

Description of Type, Make and Models of sUAV/UAS Requested:

The petitioner is seeking an exemption to commercially operate sUAV's makes and modes as follows:

DJI - Phantom 2, DJI - Phantom 3, DJI - Inspire 1, DJI – Spreading Wings S800, DJI – Spreading Wings S900, DJI – Spreading Wings S1000, DJI – Matrics 100, Cinestar 8 Octo, Altavian Nova F6500, FreeFly Alta, Blade 350 QX3, AgEagle, 3DRobotics X8, 3DRobotics Iris, 3DRobotics Solo, SenseFly eBee, Yuneec Q500 Typhon, DraganFlyer X4-ES, Trimble UX5, Microdrones MD4

Each separately weighs 55 lbs. or less, with imaging payload and applicable equipment.

Equipment operation manuals for each sUAV are included for your reference and are considered confidential information for each respective company's UAS and are affixed separately in these documents labeled Appendix.

Commercial (Mission, Operation) Purpose:

This exemption request, once granted would allow the petitioner to operate a small unmanned aerial vehicle (sUAV), unmanned aircraft system (UAS) to conduct bridge Inspections, flare stack inspection, utility-power generation system inspections and patrolling, aerial inspection, photography and videography of residential and commercial real estate, weddings, aerial inspection, photography and videography

[2] Petitioner submits the Appendix and Manuals marked "CONFIDENTIAL," as they contain proprietary confidential business information that is not released to the public and is protected under the Freedom of Information Act 5 USC §552 et. seq. 5 Reform Act Section 333 (b).

of utility infrastructure including but not limited to electrical power lines, wind turbines and cell towers, pipeline inspection and patrolling, filmmaking, cinematography, and videography, precision agriculture with on board sensors, wildlife and forestry monitoring and mosquito and insect control, aerial surveying, construction site inspection and monitoring, public entity support operations, Aerial imaging for safety, monitoring and comparing work efforts and completion percentages, and security of controlled environment of various sites, aerial video and live video feed to assist with search and rescue operations under the authority and support of local authority officials, aerial video and photography for public and private use including television, public events, and cinematography live feed and live news-gathering, training to persons individually or belonging to both private and public organizations to increase awareness and improve safety for current and future UAS operations within the NAS, special events: including high schools, colleges, professional sports, open air events and fairs, research, risk management and assessment, motion picture production[3], surface mining, closed set filming[4], disaster and catastrophe events.

Regulations from which the Exemption Relief is requested:

14 C.F.R. § 61.113 (a) & (b)
14 C.F.R. § 61.133(a)
14 C.F.R. § 91.7(a)
14 C.F. R.§ 91.119
14 C.F.R. § 91.121
14 C.F.R. § 91.151 (a)
14 C.F.R. § 91.405 (a)
14 C.F.R. § 407 (a) (1)
14 C.F.R. § 409 (a) (2)
14 C.F.R. § 417 (a) & (b)

See Appendix E

[3] Motion Picture and Television Flight Operations Manual is herein attached as Appendix G.
[4] Motion Picture and Television Flight Operations Manual for closed set filming is herein attached as Appendix G.

The name and address of the Petitioner:

North Star Aerial
Attn: Adam Geiss
5605 Highwood Dr.
Edina, MN 55436

Please direct any question or comment regarding this petition to Petitioners Consultant: Gowdy Brothers Aerospace, LLC.
8170 Old Carriage Court N., Suite #200
Shakopee, MN 55379
www.GowdyBrothersAerospace.com
Info@GowdyBrothers.com

Background

The Petitioner, NSA is under Adam Geiss' direction. Adam Geiss is a highly accomplished, capable, experienced and trusted professional.

Adam has spent more than 20 years in the world of commercial photography and video production. Shooting for ad agencies like Campbell Mithun and Fallon and studios like Paramount Pictures, Geiss has always enjoyed creative visual problem solving. Adam as logged over 1000 flights. He is FlySafe trained and certified RC pilot, and he founded North Star Aerial. Adam is on the board of the local chapter of the American Society of Media Photographers, and is a passionate advocate for professionals working in the Radio Controlled Aerial Photography (RCAP) industry. "Safety is Paramount and Weather is King" says Geiss, "training and proper education is key in this new evolving industry."

Commitment to Safety

As part of its commitment to safety and innovation, NSA is asking for this exemption, in part, to further advocate safe UAV operations, to promote professionalism within the industry, and to reduce the risk of injury to its employees and contractors, who participate in the proposed activities the petitioner requests. These activities include, but are not limited to, damage to agriculture, natural habitat, buildings, and other structures within the United States of America.

Expertise & Experience

NSA and Adam Geiss, due to his professional experience as a trusted sUAV pilot, is not only extremely well-qualified, but also is considered an up and coming subject matter expert in the Minneapolis area for UAS of all types, models, and makes. Adam has logged over 1,000 UAV flights. He has world-wide drone experience, flying in many types of environments. "Safety is Paramount and Weather is King says Geiss. From saving lives in search and rescue operations, to telling a story from remote places in the world, this newer technology will become, and is now, a game changer in countless industries.

Geiss has been involved in many projects over the years, and three are of critical importance: He was the first to provide aerials for the US Capital Christmas Tree cutting project, he has been involved with Mission Trips to the Dominion Republic to tell the story of education thru the building of schools that have been utilized to literally change lives, and locally he has produced a training video for the Minneapolis Police Department, which has been employed to aid in the safe training of cadets involved in pursuit training.

The Exemption Request

NSA proposes the use of the sUAV's will be for capture of high resolution imagery and video of residential or commercial applications and purposes to a level of quality that allows the Petitioner to use the imagery to identify, record, memorialize events and objects according to the purposes noted.

The imagery and video will be used to identify the condition of landscapes, agriculture, events, disasters and infrastructure to conduct bridge inspections, flare stack inspection, utility-power generation system inspections and patrolling, aerial inspection, photography and videography of residential and commercial real estate, weddings, aerial inspection, photography and videography of utility infrastructure including but not limited to electrical power lines, wind turbines and cell towers, pipeline inspection and patrolling, filmmaking, cinematography, and videography, precision agriculture with on board sensors, wildlife and forestry monitoring and mosquito and insect control, aerial surveying, construction site inspection and monitoring, public entity support operations, aerial imaging for safety, monitoring and comparing work efforts and completion percentages, and security of controlled environment of various sites, aerial video and live video feed to assist with search and rescue operations under the authority and support of local authority officials, aerial video and photography for public and private use including television, public events, and cinematography live feed and live news-gathering, training to persons individually or belonging to both private and public organizations to increase awareness and improve safety for current and future UAS operations within the NAS, special events: including high schools, colleges, professional sports, open air events and fairs research, risk management and assessment, motion picture production, surface mining, closed set filming, disaster and catastrophe events.

The UAS will be operated by a NSA and or contracting operators on occasion to capture high-resolution imagery/video of large structures (wide and tall) such as warehouses, high rise buildings, bridges, and construction sites, as well as "bird's eye" views of fire and explosion sites. Given the small size of the sUAV's involved, no more than 55 lbs., majority of the speed of operation be between 5-15 mph and the restricted environment within which they will operate, the Petitioner falls squarely within that zone of safety (an equivalent level of safety) in which Congress envisioned that the FAA must, by exemption, allow commercial operations of UASs to commence immediately.

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

users of the NAS or the public or pose a threat to national security in light of the following:

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

Reform Act § 333 (a). Lastly, if the Secretary determines that such vehicles "may operate safely in the national airspace system, the Secretary shall establish requirements for the safe operation of such aircraft in the national airspace system." Id. §333(c) (emphasis added).[5]

The Federal Aviation Act expressly grants the FAA the authority to issue exemptions. This statutory authority, by its terms, includes exempting civil aircraft, as the term is defined under §40101 of the Act: The Administrator may grant an exemption from a requirement of a regulation prescribed under subsection (a) or (b) of this section or any of sections 44702-44716 of this title if the Administrator finds the exemption is in the public interest. 49 U.S.C. §44701(f). See also 49 USC §44711(a); 49 USC §44704; 14 CFR §91.203(a)(1) This authority to grant exemptions reaches such issues as authorization of commercial operation of aircraft without an FAA issued pilot's license.

NSA in filing this application is requesting that the FAA combine the grant of the Section 333 exemption with a standard Certificate of Operation (COA) that will allow commercial operations of its NSA's sUAV without the necessity of filing for a COA for each flight, unless such flight is to be conducted in an area not approved in the exemption. Compliance with the conditions agreed to herein and that may be imposed by the FAA, as set forth in prior Section 333 exemptions, provide the separation needed from other aircraft.

In addition, given that all operations will be conducted below 400 AGL feet and no closer than 5 nautical miles of the geographic center of an airport as denoted on a current FAA published aeronautical chart, unless a letter of agreement with that airport's management is obtained, NSA requests that operations over congested or densely populated areas be allowed. The new sUAV's do have GPS geo-fencing, it will operate at a very low altitude, within confined areas, at low speed and weighs no more than 55 lbs. Such operations will only be under-taken with the approval of the land or home owner, as set forth herein, and will comply with the requirements that operations be no closer than 500 feet to the adjacent building unless the land owner

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

has provided permission, and the Operator has made a safety assessment of the risk from such operations.

Operator Requirements

Given the sUAV proposed by NSA, Operators should not be required to hold a private pilot license. NSA believes that 1) the operator, instead of understanding how to operate a passenger carrying aircraft, should have knowledge and experience that enables the safe operation of a small, remotely piloted sUAV should understand airspace restrictions and know how to ensure separation from other aircraft as well as non-participants and property; 2) the sUAV has built-in technical capabilities that limit the potential for unsafe operation and 3) there are other security screening mechanisms already in existence that NSA will utilize to ensure the operators are acting consistently with national security interests.

Given the sUAV safety features outlined below, NSA proposes that its operations under this Exemption request should not be required to hold a commercial or private pilot certification. Instead, Operators should be required to: have successfully completed, at a minimum, FAA private pilot ground instruction and passed the FAA Private Pilot written examination or FAA-recognized equivalents; have completed NSA' training program for operation of the UAS.

NSA notes that 1) the FAA has found that safety factors permitted operation of sUAV's by Operators with these qualifications in the case of operations pursuant to public COAs when the mandatory operating conditions specified above were present; and 2) that the Notice of Proposed Rule making entitled Operation and Certification of Small Unmanned Aircraft Systems, 80 F.R. 9544 (February 23, 2015) ("NPRM"), does not require the operator to hold a private pilot license or a third class medical.

Advanced sUAVs have a navigation and control system and auto-pilot that allows it to execute very accurate pre-programed flights. Flights are pre-programmed with GPS waypoint to establish perimeters beyond which the aircraft will not operate. Flights under auto-pilot are not directed by positive manual input, but through pre-programmed flight parameters that are executed by the auto-pilot. In the case of unplanned events, the Operator inputs preprogrammed evasive maneuvers from the control unit, and the autopilot executes those maneuvers. Pre-programmed Operator interventions include: initiation of holding at present position; suspension of mission; fly back to launch point; abort mission and land immediately; and emergency power cut off and land (flight termination system). Additional automated safety functions and safety enhancing features of the advanced sUAV's may include the following:

1) Auto-pilot detection of lost GPS or of insufficient satellites initiates an immediate landing,
2) Low power on the aircraft triggers escalating alarms at GCS at 35% and 10% levels. Low power below 10% triggers an immediate landing,
3) If the auto-pilot detects a lost-link to the ground controller, the UAS will hold position at its current location for 5 seconds and if the signal is not restored, execute a return to home and land,
4) Redundant "kill switches" that enable completely shutting the aircraft down in flight in the event of a loss of control or un-commanded deviation from the flight path,
5) The aircraft, weighs less than 55 lbs., fully loaded,
6) The motors are driven by pulse width modulated signals, not analog signals,
7) The aircraft will operate for the Purposes at no more than 30 mph (while imaging) nor above 200 feet above the structure (imaging altitude) or a maximum of 400 feet AGL.

See Federal Aviation Administration, Notice N-8900.227, Unmanned Aircraft Systems (UAS) Operational Approval, at 20-21 (July 30, 2013); As the FAA has determined in Exemptions 11062 thru 11067,11080 and 11110 (the "Exemptions"), in comparing the requirements for private pilot knowledge and the knowledge required for a commercial pilot, that knowledge associated with a private pilot license, and therefore private pilot ground school, was sufficient to allow private pilots to operate sUAV's under those exemptions.

Based upon that analysis, NSA believes successful completion of FAA private pilot ground school is a suitable predicate to operating the sUAV under this exemption. NSA proposes that the Operator accumulate required sUAV flight training hours through the operation of sUAV's rather than flight hours in conventional aircraft. Those hours are more relevant to the operations proposed herein than hours gained in obtaining a private pilot's certificate in conventional or rotor aircraft. Those aircraft are orders of magnitude heavier than the sUAS and carry not only the pilot himself, but also passengers and fuel, none of which is carried in the sUAS. These conventional aircraft fly over all sorts of airspace without the permission or knowledge of the landowner.

A handheld radio controller controls the sUAV and the vehicle is operated within the line of sight. The requirements of Part 61.127 (commercial flight proficiency) and §61.107 (private flight proficiency), to the extent they are relevant to UAS operations, can be taught in the training proposed herein. As a review of the requirements of part 61.127 and 107 demonstrate, the issues presented as they relate to a 55 pound aircraft, operating at less than 30 mph during filming operations are those taught in ground school and in flight training with the particular UAS and not gained from accumulating flight hours in a fixed wing or rotorcraft gas or jet A powered aircraft completing cross country flights and take offs and landings at controlled and uncontrolled airports.

As to national security review of pilots, each of NSA's pilots/operators will obtain internally provided certified training (Ground and Practical) from NSA to operate the sUAV. This review and certification could reasonably vet the Operators against any known terrorist or no fly listings that are relevant and publicly available.

NSA additionally asks that the exemption be issued without the requirement for a visual observer. As set forth herein, an equivalent level of safety is provided by the size, speed and control capabilities of the aircraft, as well as the operational procedures that will be applicable to all flight hereunder. These obviate the need for the visual observer.

The Operator will be operating the aircraft, always within line of sight. He or she will walk and follow the aircraft around the inspection area so that while it is flying its pre-programed and at times, manual flight path, the UAS will always be directly in his or her line of sight. The Operator will not be distracted by viewing the pictures taken during the flight. Rather, once the sUAV is launched, the Operator's only duty will be to watch the flight of the UAS over the structure and intervene to address flight path deviations or other issues that arise during the flight. The functions that an observer performs where the aircraft is flown at long distances from the launch area will not be necessary as the Operator will always have the aircraft in his or her direct sight. The observer also will not be necessary because the Operator will conduct a pre-flight inspection of the area, will and if needed, cordon off the area and will perform frequent visual scans of the area while the vehicle is operating.

NSA again notes that the NPRM does not require the use of a visual observer. Given the clear direction in Section 333 of the Reform Act; the authority contained in the Federal Aviation Act, as amended; the strong equivalent level of safety surrounding the proposed operations, and the significant public benefit, including enhanced safety, reduction in environmental impacts, including reduced emissions associated with allowing battery powered sUAV's for these functions instead of turbine or gas power aircraft/rotorcraft and operations with pilots having at least a private pilot license, the grant of the requested exemptions is in the public interest. [6]

[6] Should the FAA determine that it cannot grant such an exemption for operations without a FAA licensed private pilot, despite the showing made herein, under the statutory authority the FAA already has, North Star Aerial will operate its aircraft with pilots holding at least a private pilot certificate issued by the FAA. In that event, North Star Aerial requests that the exemption be granted with conditions similar to those contained in numbered paragraphs 14-15 in Exemption 11136

Aircraft and Equivalent Level of Safety

The Petitioner proposes that the exemption requested herein apply to civil aircraft that have the characteristics and that operate with the limitations listed herein. These limitations provide for at least an equivalent or even higher level of safety to operations under the current regulatory structure because the proposed operations represent a safety enhancement to the operations conducted with conventional aircraft or with humans climbing up and around structures. These conditions are drawn from Exemptions 11136, 11138, 11172, 11174 and 11177, 11062, 11109, 11112, and 11213 and as recent as 11857.

These limitations and conditions to which NSA (referred to as "Operator") agrees to be bound when conducting commercial operations under an FAA issued exemption include:

1) Operations authorized by this grant of exemption are limited to the aircraft described in the Operator's manual, which is a multi-rotor weighing up to 55 pounds: Proposed operations of any other aircraft will require a new petition or a petition to amend this grant.

2) The UA may not be flown at an indicated airspeed exceeding 30 mph (10 mph during inspections).

3) The UA must be operated at an altitude of no more than 400 feet above ground level (AGL), as indicated by the procedures specified in the Operator's manual. All altitudes reported to ATC must be in feet AGL.

4) The UA must be operated within visual line of sight (VLOS) of the Aircraft Operator at all times. This requires the Aircraft Operator to be able to use human vision unaided by any device other than corrective lenses..

5) The Exemption Holder's Manuals must be amended to include all conditions and limitations required by the FAA. The Manuals must be maintained and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in the exemption and the procedures outlined in the Exemption Holder's Operator's manual, the conditions and limitations in the exemption take precedence and must be followed. Otherwise, the Aircraft Operator must follow the procedures as outlined in its Aircraft's manual. The Exemption Holder may update or revise its Manuals. It is the Exemption Holder's responsibility to track such revisions and present updated and revised documents to the Administrator upon

request. The Exemption Holder must also present updated and revised documents if it petitions for an extension or amendment of this exemption. If the Exemption Holder determines that any update or revision would affect the basis upon which the FAA granted this exemption, then the Exemption Holder must petition for amendment to its exemption.

6) Prior to each flight, the Aircraft Operator must inspect the UAS to ensure it is in a condition for safe flight. 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. The Ground Control Station must be included in the preflight inspection. All maintenance and alterations must be properly documented in the aircraft records.

7) 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 in accordance with the Exemption holder's Manuals. The Aircraft Operator who conducts the functional test flight must make an entry in the UAS aircraft records of the flight. The requirements and procedures for a functional test flight and aircraft record entry must be added to the Exemption Holder's Operator's manual.

8) The Exemption Holder must follow the manufacturer's UAS aircraft/component, maintenance, overhaul, replacement, inspection, and life limit requirements, with particular attention to flight critical components that may not be addressed in the manufacturer's manuals.

9) The Exemption Holder must carry out its maintenance, inspections, and record keeping requirements in accordance with the Operator's Manuals. Maintenance, inspection, and alterations must be noted in the aircraft logbook, including total flight hours, description of work accomplished, and the signature of the authorized technician returning the UAS to service.

10) The authorized technicians must receive and document training referenced in the Exemption Holder's Manuals.

11) Each UAS operated under this exemption must comply with all manufacturer System and Safety Bulletins.

12) The Exemption Holder's maintenance personnel must make a record entry in the UAS logbook or equivalent document of the

corrective action taken against discrepancies discovered between inspections.

13) Prior to commencing operations, the Aircraft Operator shall have logged at least 25 hours of total time as a UA rotorcraft pilot and at least ten hours logged as a UA pilot with a similar UA type and 5 hours in the make and model.

14) 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 and land or be recovered in accordance with the Exemption Holder's Manuals.

15) The Aircraft Operator must abort the flight in the event of unpredicted obstacles or emergencies, including unauthorized people entering the flight area, in accordance with the Exemption Holder's Manuals.

16) The Aircraft Operator is prohibited from beginning a UAS flight unless (considering wind and forecast weather conditions) there is enough power to fly to the first point of intended landing and, assuming normal cruising speed, to fly after that for at least 10 minutes.

17) All aircraft operated in accordance with the 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.

18) Before conducting operations, the radio frequency spectrum used for operation and control of the UA must comply with the Federal Communications Commission (FCC) or other appropriate government oversight agency requirements.

19) The documents required under 14 CFR 91.9 and 91.203 must be available to the Operator 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.

20) The UA must remain clear and yield the right of way to all other manned operations and activities at all times (including, but not limited to, ultra-light vehicles, parachute activities, parasailing activities, hang gliders, etc.).

21) The UA may not be operated by the Aircraft Operator from any moving device or vehicle.

22) UAS operations may not be conducted during night, as defined in 14 CFR 1.1.

23) All operations must be conducted under visual meteorological conditions (VMC). 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 Operator.

24) During operations the UA may not operate within 5 nautical miles of the geographic center of an airport as denoted on a current FAA-published aeronautical chart unless a letter of agreement with that airport's management is obtained, and the operation is conducted in accordance with a NOTAM, if as required by the Operator's COA. The letter of agreement with the airport management must be made available to the Administrator upon request.

25) The UA may not be operated over congested or densely populated areas unless the conditions set for in #26 are satisfied. These populated areas include but are not limited to the yellow areas depicted on World Aeronautical Charts (WAC), Sectional Aeronautical Charts (Sectionals), or Terminal Area Charts (TAC). However, aeronautical charts may not reflect pertinent local information. Ultimately, it is the Operator's responsibility to maintain the minimum safe altitudes required by § 91.119 (d) (1).

26) 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 debris in the event of an accident. The Aircraft Operator must ensure that nonparticipating persons remain under such protection. If a situation arises where nonparticipating persons leave such protection and are within 30 feet of the UA, flight operations must cease immediately and/or;

    b. The aircraft is operated near vessels, vehicles or structures where the land owner/controller has granted permission and/or the Aircraft Operator has made a safety assessment of the risk of operating closer to those objects and;

c. Operations near the Aircraft Operator do not present an undue hazard to the Operator per § 91.119(a).

27) All operations shall be conducted over private or controlled-access property with permission from the land owner/controller or authorized representative. Permission from land 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.

Specific Uses Public Benefits

NSA proposes use of its sUAV provided equivalent or augmented levels of safety for each of the uses proposed herein:

The present systems of photography and videography and mapping of inspecting the roofs, agriculture land, buildings and large structures site surveys, wild life monitoring, mosquito and insect control are now conducted by either humans wading through swamps, climbing on the roofs and structures that are steep, tall, slippery, weakened or otherwise hazardous or by the use of conventional aircraft.

The current procedures can result in significant injuries to the people who must climb on the roofs or require the use of aircraft that are orders of magnitude greater in size than the sUAV. Either method, manual inspection or large conventional aircraft, results in increased risk of injury due to personnel falling off roofs or ladders, carrying heavy ladders and dealing with confined and dangerous spaces, or increased risk from low altitude flyovers with helicopters or fixed wing aircraft inspecting buildings after damage from storms or other disasters, such as earthquakes or fires. Such flights are, of course, significantly more expensive than those undertaken with a sUAV.

The present system exposes those not only in the immediate area of inspection, but those who are along the path of flight associated with the arrival and departure of the conventional aircraft at the inspection site because the aircraft must be flown to and from the site. By contrast, the sUAV is carried to the site and transits no other property. Conventional aircraft carry flammable fuels that are not carried by the UAS and emit pollutants associated with internal combustion engines. The sUAV's proposed herein are battery powered and have no emissions.

Equivalent Level of Safety

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

Section 61.113(a) & (b) limit private pilots to non-commercial operations. Unlike a conventional aircraft that carries a pilot, passengers, and cargo, the NSA's sUAV is remotely controlled with no passengers or property of others on board. Section 61.133(a) requires an individual with a commercial pilot's license to be pilot in command of an aircraft for compensation or hire.

NSA respectfully proposes that Operator requirements should take into account the characteristics of the particular UAS. NSA's sUAV has a high degree of pre-programmed control and various built-in technical capabilities that strictly limit the potential for operation outside of the operating conditions set forth in the exemption application. The NSA's sUAV has navigation and control system comprised of a Ground Control Station (GCS) and auto-pilot system that can be pre-programmed to set operational boundaries. All flights are pre-programmed with precision GPS guidance. In the case of unplanned events, the Operator may input pre-programmed evasive maneuvers from the control unit, and the onboard autopilot executes those maneuvers. Pre-programmed Operator interventions include initiation of holding at present position; suspension of mission; fly back to launch point; abort mission and land immediately; and emergency power cut off and land (Flight Termination System).

Additional automated safety functions and safety enhancing features of the NSA's sUAV's may include the following:

1.1. Auto-pilot detection of lost GPS or of insufficient satellites initiates an immediate landing.
1.2. Low power on the aircraft triggers escalating alarms at GCS at 35% and 10% levels. Low power below 10% triggers an immediate landing.
1.3. If the auto-pilot detects a lost-link to the ground controller, the UAS will hold position at its current location for 5 seconds and if the signal is not restored, execute a return to home and land.
1.4. Redundant "kill switches" that enable completely shutting the aircraft down in flight in the event of a loss of control or un-commanded deviation from the flight path.
1.5. The aircraft, weighs less than 55 lbs., fully loaded.
1.6. The motors are driven by pulse width modulated signals, not analog signals.
1.7. The aircraft will operate for the Purposes at no more than 30 mph (while imaging) nor above 200 feet above the structure (imaging altitude) or a maximum of 400 AGL.

Given these safety features, NSA proposes that Operators of the NSA's sUAV should not be required to hold a commercial or private pilot certification.

Instead, Operators should be required to: have successfully completed, at a minimum, FAA private pilot ground instruction and passed the FAA Private Pilot written examination or FAA-recognized equivalents; have completed the manufacturer's or NSA's training program for operation of the UAS.

NSA notes that the FAA has found that safety factors permitted operation of UASs by Operators with these qualifications in the case of operations pursuant to public COAs where the mandatory operating conditions specified above were present. See, Federal Aviation Administration, Notice N-8900.227, Unmanned Aircraft Systems (UAS) Operational Approval, at 20-21 (July 30, 2013). Likewise, NSA notes that the NPRM does not require that the Operator hold a private pilot license issued by the FAA.

Given these conditions and restrictions, an equivalent level of safety will be provided by allowing operation of the NSA's sUAV without a private pilot's certificate or a commercial pilot's certificate, under the conditions set forth herein.

The risks associated with the operation of the NSA's sUAV (given its size, speed, operational capabilities, and lack of combustible fuel) are so diminished from the level of risk associated with private pilot operations or commercial operations contemplated by Part 61 with conventional aircraft (fixed wing or rotorcraft), that allowing operations of the UAS as set forth above meets or exceeds the present level of safety provided under 14 C.F.R. § 61.113(a) & (b) and does not rise to the level of requiring a commercial pilot to operate the aircraft under § 61.133(a).

14 C.F.R. § 91.7(a): Civil aircraft airworthiness.

This regulation requires that no person may operate a civil aircraft unless it is in airworthy condition. Should the exemption be granted allowing commercial operation of the UAS without an airworthiness certificate, no standard will exist for airworthiness of the UA. Given the size of the aircraft and the requirements that the Operator has agreed to as it relates to airworthiness, as contained in the manual, an equivalent level of safety will be achieved by insuring compliance with the manuals prior to each flight. The FAA has granted exemptions to conduct similar operations in Exemptions 11062 through 11067, 11080 and 11110.

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

Section 91.119 establishes safe altitudes for operation of civil aircraft. Section 91.119 (d) allows helicopters to be operated at less than the minimums prescribed, provided the person operating the helicopter complies with any route or altitudes prescribed for helicopters by the FAA. As this exemption is for a sUAS that is a helicopter and the exemption requests authority to operate at altitudes up to 400 AGL, an exemption may be needed to allow such operations.

The equivalent level of safety will be achieved given the size, weight, and speed of the UAS as well as the location where it is operated. No flight will be taken without the permission of the property owner, facility owner, and/or local officials. Because of the advance notice to the property owner and participants, all affected individuals will be aware of the planned flight operations as set forth in the Manuals. Compared to flight operations with aircraft or rotorcraft weighing far more than the maximum 55 lbs. and the lack of flammable fuel, any risk associated with these operations is far less than those presently presented by conventional aircraft operating at or below 500 AGL in the aerial photography industry. In addition, the low-altitude operations of the sUAS will ensure separation between these small-UAS operations and the operations of conventional aircraft that must comply with Section 91.119. The FAA has granted exemptions to conduct similar operations in Exemptions 11062 through 11067, 11080 and 11110.

14 C.F.R. §91.121 Altimeter Settings

This regulation requires each person operating an aircraft to maintain cruising altitude by reference to an altimeter that is set "…to the elevation of the departure airport or an appropriate altimeter setting available before departure." As the NSA' sUAV, in manual or emergency mode, will not have a barometric altimeter display, but instead a GPS altitude display, an exemption will be needed. The Operator, pursuant to the procedures set forth in the Manuals as indicated before flight, will achieve an equivalent level of safety. The FAA has granted exemptions to conduct similar operations in Exemptions 11062 through 11067, 11080 and 11110.

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

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

The battery powering the sUAS provides approximately 40 minutes of powered flight. To meet the 30-minute reserve requirement in 14 CFR §91.151, sUAS flights would be limited to approximately 10 minutes in length. Given the limitations on the

UAS' proposed flight area and the location of its proposed operations within a predetermined area, a longer time frame for flight is reasonable.

Petitioner believes that an exemption from 14 CFR §91.151(a) falls within the scope of prior exemptions. See Exemption 10673 (allowing Lockheed Martin Corporation to operate without compliance with FAR 91.151 (a)). Operating the small UAS, in a tightly controlled area where only people and property owners or official representatives who have signed waivers will be allowed, with less than 30 minutes of reserve fuel, does not engender the type of risks that Section 91.151(a) was intended to alleviate given the size and speed of the small UAS.

Petitioner believes that an equivalent level of safety can be achieved by limiting flights to 30 minutes or 25% of remaining battery power whichever happens first. This restriction would be more than adequate to return the sUAS to its planned landing zone from anywhere in its limited operating area. Similar exemptions have been granted to other operations, including Exemptions 2689F, 5745, 10673, 10808 and Exemptions 11062, through11067, 11080 and 11110.

14 C.F.R. §91.405 (a); 91.407 (a) (1); 91.409(a) (2); 91.417(a) & (b): Maintenance Inspections

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

Given that these sections and Part 43 apply only to aircraft with an airworthiness certificate, these sections will not apply to the Petitioner. Maintenance will be accomplished by the Operator or manufacturer pursuant to the flight manual and operating handbook as referenced in the Manuals attached as confidential Exhibits an equivalent level of safety will be achieved because these small UASs are very limited in size and will carry a small payload and operate only in defined areas for limited periods of time. If mechanical issues arise, the UAS can land immediately and will be operating from no higher than 400 feet AGL. As provided in the Aircraft Flight Operations Manual the Operator will ensure that the UAS is in working order prior to initiating flight, perform required maintenance, and keep a log of any maintenance performed. Moreover, the Operator and manufacturer are most familiar with the aircraft and best suited to maintain the aircraft in an airworthy condition to provide the equivalent level of safety. The FAA has granted exemptions for similar operations in Exemptions 11062 through 11067, 11080 and 11110.

****

Federal Register Publication

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

Petitioner seeks an exemption from the following rules:

14 C.F.R. §§ 61.113(a) & (b); 91.7(a); 91.119; 91.121; 91.151(a); 91.405(a); 91.407(a)(1); 91.409(a)(2) and 91.417 (a) & (b) to operate commercially a small unmanned vehicle (55 lbs. or less) for the following purposes: to conduct bridge inspections, flare stack inspection, utility-power generation system inspections and patrolling, aerial inspection and photography of residential and commercial utility infrastructure including but not limited to electrical power lines, wind turbines and cell towers, pipeline inspection and patrolling, filmmaking, cinematography, and videography, precision agriculture with on board sensors, wildlife and forestry monitoring and mosquito and insect control, aerial surveying, construction site inspection and monitoring, public entity support operations, aerial video and live video feed to assist with search and rescue operations under the authority and support of local authority officials, aerial video and photography for public and private use including television, public events, and cinematography live feed and live news-gathering, training to persons individually or belonging to both private and public organizations to increase awareness and improve safety for current and future UAS operations within the NAS, special events: including high schools, colleges, professional sports, open air events and fairs, research, risk management and assessment, motion picture production, surface mining, closed set filming, disaster and catastrophe events.

Privacy and National Security

All flights will occur over private or controlled access property with the property owner's prior consent and knowledge. Inspection will be of inanimate objects in areas where the owners will have consented to the inspections or otherwise have agreed to allow the UAS and the Operator to be in the area where operations will take place.

The size of the UAS, its speed and restricted area of operation do not raise national security issues.

Summary

Approval of exemptions allowing commercial operations of sUAV's for petitioner to operate an unmanned aircraft system (UAS) to conduct bridge Inspections, flare

stack inspection, utility-power generation system inspections and patrolling, aerial inspection and photography of residential and commercial utility infrastructure including but not limited to electrical power lines, wind turbines and cell towers, pipeline inspection and patrolling, filmmaking, cinematography, and videography, precision agriculture with on board sensors, wildlife and forestry monitoring and mosquito and insect control, aerial surveying, construction site inspection and monitoring, public entity support operations, aerial video and live video feed to assist with search and rescue operations under the authority and support of local authority officials, aerial video and photography for public and private use including television, public events, and cinematography live feed and live news-gathering, training to persons individually or belonging to both private and public organizations to increase awareness and improve safety for current and future UAS operations within the NAS, special events: including high schools. colleges, professional sports, open air events and fairs, research, risk management and assessment, motion picture production, surface mining, closed set filming, disaster and catastrophe events, will enhance safety by reducing risk.

Conventional operations, using jet or piston powered aircraft, ladders or placing people in swamps, on roofs or tall, hazardous or weakened structures, exposes them to higher risks than those created by use of a sUAV'S. Conventional aircraft that operate at extremely low altitudes just feet from the subject being inspected and in extreme proximity to people and structures present the risks associated with vehicles that weigh in excess of 6,000 lbs., carrying large amounts of jet A or other fuel (140 gallons for jet helicopters). Such aircraft must fly to and from the project location. In contrast, a sUAV weighing fewer than 55 lbs. and powered by batteries eliminates virtually all of that risk given the reduced mass and lack of combustible fuel carried on board. The sUAV is carried to the target area and not flown. The sUAV will carry no passengers or crew and, therefore, will not expose them to the risks associated with manned aircraft flights.

The operation of small UASs, weighing less than 55 lbs., conducted under the strict conditions outlined above, will provide an equivalent level of safety supporting the grant of the exemptions requested herein. These lightweight aircraft operate at slow speeds, close to the ground, and in areas that are under the control of the customer for the operations and, as a result, are far safer than conventional operations conducted with turbine helicopters operating in close proximity to the ground and people or the use of individuals to climb the structures to conduct the operations.

Satisfaction of the criteria provided in Section 333 of the Reform Act of 2012 –size, weight, speed, operating capabilities, proximity to airports and populated areas and operation within visual line of sight and national security – provide more than adequate justification for the grant of the requested exemptions allowing commercial operation of Petitioner's UAS for the Purposes outlined herein and are consistent with exemptions already granted, including Exemptions number 11171 through 11174, 11176, 11177, 11062, 11109, 11112, and 11213 and as recent as 11857.

Sincerely,
Adam Geiss
North Star Aerial
5605 Highwood Dr.
Edina, MN 55436

and

Stephen Gowdy
Chief Pilot,
Gowdy Brothers Aerospace, LLC
Consulting Agent for North Star Aerial

APPENDIX A - EXEMPTION PATTERN

Petitioner submits the Appendix and Manuals marked "CONFIDENTIAL," as they contain proprietary confidential business information that is not released to the public and is protected under the Freedom of Information Act 5 USC §552 et. seq. 5 Reform Act Section 333 (b).

Submitted under separate cover.

APPENDIX B - TECHNICAL MANUALS AND SPECIFICATIONS

Petitioner submits the Appendix and Manuals marked "CONFIDENTIAL," as they contain proprietary confidential business information that is not released to the public and is protected under the Freedom of Information Act 5 USC §552 et. seq. 5 Reform Act Section 333 (b).

Submitted under separate cover.

APPENDIX C - COMMERCIAL (MISSION/OPERATION) PURPOSE - FAA PREVIOUS APPROVED EXEMPTION NUMBERS

Petitioner submits the Appendix and Manuals marked "CONFIDENTIAL," as they contain proprietary confidential business information that is not released to the public and is protected under the Freedom of Information Act 5 USC §552 et. seq. 5 Reform Act Section 333 (b).

Submitted under separate cover.

APPENDIX D - EQUIPMENT - FAA PREVIOUS APPROVED EXEMPTION NUMBERS

Petitioner submits the Appendix and Manuals marked "CONFIDENTIAL," as they contain proprietary confidential business information that is not released to the public and is protected under the Freedom of Information Act 5 USC §552 et. seq. 5 Reform Act Section 333 (b).

Submitted under separate cover.

APPENDIX E - EXEMPTION 14 C.F.R - FAA PREVIOUS APPROVED EXEMPTION NUMBERS

Petitioner submits the Appendix and Manuals marked "CONFIDENTIAL," as they contain proprietary confidential business information that is not released to the public and is protected under the Freedom of Information Act 5 USC §552 et. seq. 5 Reform Act Section 333 (b).

Submitted under separate cover.

APPENDIX F - MONTHLY MAINTENANCE AND REPAIR LOG

Petitioner submits the Appendix and Manuals marked "CONFIDENTIAL," as they contain proprietary confidential business information that is not released to the public and is protected under the Freedom of Information Act 5 USC §552 et. seq. 5 Reform Act Section 333 (b).

Submitted under separate cover.

APPENDIX G – MOTION PICTURE AND TELEVISION FLIGHT OPERATIONS MANUAL VERSION 1.0

Petitioner submits the Appendix and Manuals marked "CONFIDENTIAL," as they contain proprietary confidential business information that is not released to the public and is protected under the Freedom of Information Act 5 USC §552 et. seq. 5 Reform Act Section 333 (b).

Submitted under separate cover.