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

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

August 6, 2015

Exemption No. 12368
Regulatory Docket No. FAA–2015–1976

Mr. Christopher C. Knight
President
Dark Technologies, LLC
10319 Mount Oxford Avenue
Las Vegas, NV 89166

Dear Mr. Knight:

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 May 13, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Dark Technologies, LLC (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct precision aerial mapping, inspections, photography and video.

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 3D Robotics Iris +.

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[1]. 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, Dark Technologies, 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

[1] Aerial data collection includes any remote sensing and measuring by an instrument(s) aboard the UA. Examples include imagery (photography, video, infrared, etc.), electronic measurement (precision surveying, RF analysis, etc.), chemical measurement (particulate measurement, etc.), or any other gathering of data by instruments aboard the UA.

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, Dark Technologies, 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 3D Robotics Iris + 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 five 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 August 31, 2017, unless sooner superseded or rescinded.

Sincerely,

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

Enclosures

Dark Technologies, LLC – Las Vegas, NV

May 13, 2015

U.S. Department of Transportation

Docket Management System

1200 New Jersey Avenue, SE

Room W12-140, West Building Ground Floor

Washington, D.C. 20590-0001

Re: Exemption Request Section 333 of the FAA Reform Act of the Federal Aviation Regulations from 14 C.F.R. 45.23(b); 14 C.F.R. Part 21; 14 C.F.R. 61.113(a)&(b); 91.7(a); 91.9(b) (2); 91.103(b); 91.109; 119.121; 91.151(a); 91.203(a)&(b); 91.405(a); 91.407(a) (1); 91.409(a) (2); 91.417(a)&(b)

Dear Sir or Madam,

Dark Technologies, LLC hereby petitions the Secretary of Transportation and Federal Aviation Administration for a Grant of Exemption to the above referenced and below more fully described Federal Aviation Regulations (FARs) that currently may or may not apply to the recreational and business operations of sUAS (Small Unmanned Aircraft Systems) for the use in precision aerial mapping, inspections, photography and video.

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 and the procedures contained within 14 C.F.R. 11, petition that Dark Technologies, LLC, owner and operator of sUAS's commercially in airspace regulated by the FAA with the following sUAS quad rotor systems:

- 3DR Iris 2 plus w/Gimbal and GoPro Camera or small point and shoot camera

Dark Technologies, LLC Background and Purpose for Exemption:

With safety being our primary goal we have obtained the aforementioned quad rotor systems that are commercially available and flown regularly by advanced hobbyist clientele. Our company is primarily all degreed aerospace engineers with over 85 years of collective professional aviation experience. Our pilot cadre is all former military pilots with over 10,000 hours of collective flying experience in both Military and Civil aviation as well as over 3,000 UAV Pilot in Command (PIC) hours.

Our intent is to conduct aerial photography/Inspection/ included but not limited to the following; Business Operations: over land, waterways, and oceans; Operation over/in non-restricted National Parks, National Forests, flight in non-navigable airspace, using nonintrusive recording devices, operation in otherwise unrestricted U.S. States/Territories for aerial videography for commercial operation and to enhance academic community awareness for those individuals and companies unfamiliar with the geographical layout of their areas of operation.

As described more fully below, the requested exemption would permit the operation of UAS under controlled conditions in airspace that is 1) limited; 2) Pre-determined in areas away from general public, airports, heliports and vehicular traffic for community videos, and within property boundaries for individual homeowner real estate listing videos/photos; And 3) controlled as to access.

Contact Information:

Christopher C. Knight

President - Dark Technologies, LLC

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Las Vegas, NV 89166

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List of Specific Exemptions of 14 CFR:

14 CFR 21, Subpart H – Airworthiness Certificates

14 CFR 45.23 (b) – Aircraft Marking Certification and Registration

14 CFR 61.113 (a) & (b) – Certification: Pilots, Flight Instructors, and Ground Instructors

14 CFR 91.7 (a) – Civil Aircraft Airworthiness

14 CFR 91.103 (b) (2) - Preflight action

14 CFR 91.105 - Flight crewmembers at stations

14 CFR 91.109 - Flight instruction

14 CFR 91.119 (c) - Minimum safe altitudes

14 CFR 91.121 - Altimeter settings

14 CFR 91.151 - Fuel requirements for flights in VFR conditions

14 CFR 91.405 (a) - Maintenance required

14 CFR 91.407 (a) (1) - Operation after maintenance

14 CFR 91.409 (a) (2) - Inspections

14 CFR 91.417 (a) and (b) - Maintenance records

In accordance with the outline given in the FAA's "Public Guidance for Petitions Files under Section 333", the following information is provided for each numbered section in that guidance:

1. Aircraft Description

Design and Operational Characteristics:

Dark Technologies plans to operate the 3DR Iris Plus quad rotor aircraft, which is a readily available and widely utilized and tested quad rotor sUAS aircraft.

3DR Iris Plus –

- 3.7 pound weight with battery and camera payload
- 16-22 min estimated flight times
- 21.6 inches from rotor to rotor
- Maximum capability to set forward speed of 30 mph
- GPS Autopilot (Next Gen 32-bit 3DR Pixhawk) with 3 available flight mode settings (Return to Home/Launch, Stabilize or Manual mode, and position hold)
- Controller – 2.4 GHz Preconfigured FlySky FS-TH9x RC with built in backup telemetry module (915 mHz)
- Ground-Station Telemetry Connection – 915 mHz (FCC Compliant)

The 3DR Iris Plus is equipped with a built-in flight control system, which includes a failsafe function that will activate if the remote control is powered off or signal is lost to the sUAS. When this mode is activated the Iris Plus will automatically fly the Iris Plus back to the home point (the point at which the copter was armed and took off from) and land itself. If the GPS is lost the Iris Plus will descend and land in place after a short period.

The ground-station application runs on an associated laptop that is dedicated for this purpose and communicates to the Iris Plus via a telemetry link that serves as a near real time view for the associated spotter to view aircraft essential data and general health and status of the system.

Through the ground-station software the Iris Plus will have a pre-programmed flight area limitation set prior to every flight activity that it will return to the launch area should it depart from that pre-set flight area. This area is set for a designated area or radius as well at altitude. This negates the ability for the sUAS to fly into restricted areas or airspace.

Detailed manufacturer's information and manuals (current to date) have been included as follows in the appendices attached along with this document:

- Appendix A – 3DR Iris + Operations Manual
- Appendix B – 3DR Iris + Pre-Flight Checklist

For reference, the 3DR Iris Plus is included in a current FAA Section 333 Exemption No. 11204 granted on March 11, 2015 to Build Imagery, LLC.

2. Procedures for Ensuring the sUAS is in a Condition Safe for Flight

Preflight Checks will be accomplished before any operation of the Iris Plus sUAS aircraft and will consist of the following as well as the reference material presented in Appendix B.

- Operation is conducted in daylight hours under visual conditions
- Survey or operational area is defined and set into the aircraft autopilot via the ground-station interface.
- All areas of the flight path are at least 500 ft. from all non-participating persons, vehicles and structures unless protection is in place and permission to overfly these areas is granted or such operations present no hazard to the PIC, VO or other essential persons involved.
- The Visual Observer (VO) assisting the PIC during all flight activities as well as the PIC will verify all planned flight points; the schedule will be reviewed and a flight briefing conducted with procedures covered for any emergency situation.
- Flight battery, remote control battery and all back-up batteries will be checked for full charge and proper installation.
- All four propellers are checked for proper installation and examined to be free from any damage.

- Damping absorbers are in good working condition.
- SD card installed in camera.
- Power on aircraft and connect to ground-station
- Ensure proper GPS has been attained
- Check upload of proper working area coincides with pre set flight distance and altitude limits for current operating area.
- Ensure altitude limits are NEVER to exceed 300 ft. AGL (leaving a 100 ft. buffer for safety purposes).
- Place aircraft onto launch point and press the arm button to establish the "home" location.
- Ensure that the Green indication for proper GPS lock is attained.
- Visual Observer is in place and audibly verifies that the area is clear to proceed with the flight mission.
- No inoperable components for flight
- PIC and VO record the preflight check complete and sign, and file into equipment inspection and maintenance record book.
- Proceed with flight activities.

3. Qualifications for the Pilot in Command (PIC)

Certifications: a Pilot in Command (PIC) possessing at a minimum a private pilot certificate and at minimum a current third-class medical certificate will conduct Operations.

Hour Requirement: Prior to operations the PIC will have accumulated a minimum of 25 hours of total sUAS operation time. Training and experience building flights (not less than 10 flight activities) in dedicated training sessions will be accomplished prior to operating this system to ensure a full understanding of capabilities, normal operations and system limitations for all standard Dark Technologies, LLC flight profiles/mission activities.

Currency: Prior to operational flight activities the PIC will have accumulated at least 5 hours of 3DR Iris Plus operations as the PIC. Training activities will be included in this total. The PIC for any given mission will have accomplished at least 3 flight activities in the past 90 days to remain in a "current" status. To re-accomplish currency a minimum of 3 takeoffs and 3 landings will be accomplished with demonstrations of system capabilities for specific mission purposes.

Emergency Procedures: The PIC will be proficient in evasive maneuvers and mitigate risk by accomplishing the proper standoff distances from all properties, people, structures and vehicles outside of the designated operating area.

4. Medical Standards and Certification for the PIC

As previously described in “3. Qualifications for the Pilot in Command (PIC)”, the PIC will possess at least a current third-class medical certificate.

5. Description of intended UAS Operations

No operations of the sUAS will occur within 5 miles of an airport (towered or non-towered). I fa need arises to be within this parameter a letter of agreement will be obtained with the airport directive authority and the operation is conducted in accordance with a Notice to Airman (NOTAM) as required by the Certificate of Waiver of Operation (COA).

The 3DR Iris plus sUAS quad rotor aircraft will be utilized to survey construction sites, structures and open mines for the purposes of three dimensional modeling, these generated models will give an increased level of safety to the general public and provide a more immediate and thorough information than is readily available by other current means. In some cases the utilization of manned aircraft are obtained to do these types of analysis. The associated risk and cost of this type of operation will be greatly diminished by the use of such a small sUAS and with no pilot or souls on board the risk of public safety are immediately reduced. In other applications workers erect scaffolding or climb structures to allow for inspection and measure, this risk of a fall hazard and risk of life and limb is not present with the use of the sUAS proposed.

As proposed in section 2 above proper detailed pre-flight checks will take place before every operation, altitude and distance limits will be set and entered into the on board flight control system. These parameters will be double checked by the VO as well to mitigate any issues or conflict. All of this coupled with the aircrafts failsafe measures assure that this aircraft will stay within the area deemed safe and operable for system operations.

All survey and photo facilities have strict safety procedures and guidelines, Dark Technologies, LLC and its operators take great measure to ensure that there is a strict compliance with these procedures and all applicable laws and regulations.

6. Proposed Speed, Altitude, Visibility and Distances

Speed: The 3DR Iris Plus is capable of travelling at speeds up to 44 knots. A limit in the Flight Control Software has been set to only allow the aircraft to top out at 15 m/s or 29 knots. Typically the craft will be taking photos that need to be very clear to allow the 3D model to be rendered correctly, thus the speed of normal operation is around 2-3 m/s or 4-6 knots. In the case the aircraft performs a failsafe function to return to the home location it will increase to the maximum set speed of 29 knots. Additionally, when traversing sections of the operating area that are not of interest, a higher speed (not to exceed 29 knots) may be utilized.

Altitude: All operations will be completed below 200 ft. AGL, which will provide more than enough room for all facilities and structures in the range of our operations. The flight control system again will be set to never achieve an AGL altitude of over 200 ft.

Clearance Distances (Operating Area): The flight control system will be set to limit the maximum radial distance from the home location such that the Iris Plus cannot leave those boundaries of the property lines or pre-established operating area. The PIC and VO will operate the equipment to assure those limits are not reached and plan the missions accordingly to allow for ample buffer space.

All operations will be aborted immediately if the PIC or VO encounters any abnormalities or system behavior outside of the specified ranges. A safe landing procedure will be followed in accordance with operating documentation.

7. Descriptions of the area of intended operations

Operations will be restricted to the prescribed Dark Technologies, LLC client property and not taken into any public spaces. All client and operators will be aware of operations prior to any flight activity.

8. Proximity of Airports

Operations will be restricted to the Class G airspace. No operations will occur within 5 miles of a non-towered airport reference point as denoted on current FAA published aeronautical charts.

9. Operation within Visual Line of Sight (VLOS)

In addition to the PIC the VO will be present for all flight activities. The VO will stay in constant available contact with the PIC at all times by utilizing voice or two way radio means.

10. Procedures for Preflight Safety Assessment

Prior to each flight activity the PIC will inspect the Iris Plus and the ground-station for proper operation per the provided pre-flight checklists (see section 2. Above & Appendix B). If any section of the pre-flight checklist indicates any unsafe condition the flight will not commence until the proper maintenance is performed and the pre-flight check can be accomplished successfully. All maintenance and alterations performed will be documented and filed in the Maintenance Record Book for the Iris Plus – Appendix C.

11. Notifications

In accordance with the COA, a NOTAM will be requested not more than 72 hours in advance and not less than 48 hours prior to any operation outside the currently authorized “blanket” COA as of

March 23, 2015 for Section 333 exempt flights for aircraft under 55 pounds, during daytime VFR conditions and below 200 ft. AGL within VLOS of the PIC and VO.

12. Certificate of Waiver or Authorization (COA)

Prior to conducting any operations, an Air Traffic Organization (ATO) issued Certificate of Waiver or Operation (COA) will be obtained for each aircraft. Services will start with one aircraft, with additional units added as needs for operations increase over time. Each Phantom 2 Vision+ aircraft will be identified with its 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 will be as large as practicable.

Specific Regulations for which Exemption is sought:

1. 14 CFR 21, Subpart H – Airworthiness Certificates

Part 21 covers certification procedures for products and parts. Subpart H specifies for Airworthiness Certificates for various types of aircraft. Small Unmanned Aircraft are not specifically called out and addressed in these rules.

Existing law (49 USC 44701 (f)), Part 11 and Section 333 allow the FAA to exempt aircraft from the requirements of an airworthiness certificate upon consideration of the size, weight, speed, operational capability and proximity to airports and populated areas of the identified sUAS aircraft. Unlike the manned counterparts, the Iris Plus is lightweight, carries no flammable fuel or lubricants, operates at very slow speeds and stays well below the prescribed limitations set forth by the FAA for the use of sUAS aircraft under Section 333.

Due to this consideration of the size, weight, speed and limited operating area associated with the proposed utilization of the Dark Technologies, LLC Iris Plus, we believe it will not create a hazard to users of the National Airspace System (NAS) or the general public. Therefore, a request is made for exemption from 14 CFR part 21, and any associated noise certification and testing requirements of part 36.

2. 14 CFR 45.23 (b) – Aircraft Marking Certification and Registration

Per CFR 45.23; when marks include only the Roman capital letter “N” and the registrations number is displayed on limited, restricted or light-sport category aircraft of experimental or provisionally certified 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.

We request an exemption in this section due to the lack of a cabin, cockpit or pilot station where any reference to the term “Experimental” could be affixed. Our proposed equivalency will be to place the term “Experimental” on the fuselage. This precedent has been established previously on exemption 10167 & 11408.

3. 14 CFR 61.113 (a) & (b) – Certification: Pilots, Flight Instructors, and Ground Instructors

14 CFR 61.113 (a) and (b) prohibit private pilots from fulfilling the role of PIC if the aircraft is carrying property for compensation, unless the flight is only incidental to that business or employment.

Dark Technologies believes that due to the size, weight, speed and limited operating area associated with our proposed operations, a PIC possessing a private pilot certificate and a current third-class medical certificate, and also having the aforementioned training and hours on the specifically utilized system (Iris Plus) would ensure safety inherently and prevent creating any hazard to users of the National Airspace System (NAS) or the general public. Therefore, we are requesting exemption from these parts of 14 CFR.

4. 14 CFR 91.7 (a) – Civil Aircraft Airworthiness

Under the assumption that the above exemption for 14 CFR 21, Subpart H is granted, no airworthiness certificate will be required. In lieu of the airworthiness certification by 14 CFR 21, Dark Technologies, LLC and the operating crew (PIC & VO) will ensure that the 3DR Iris Plus system is in full compliance with its own operating documentation as described in this document. This will include all pre-flight inspections and maintenance as described in the included manufacturer’s documentation.

5. 14 CFR 91.103 (b) (2) - Preflight action

14 CFR 91.103 (b) (2) specifies that the PIC be familiar with the aircraft performance under expected values of airport elevation and runway slope, aircraft gross weight and wind and temperature.

The Iris Plus will not be operating out of an airport and therefore this rule would not be applicable. On that basis that the operating documentation covers the requirements for safety during all operations an exemption from this rule is requested.

6. 14 CFR 91.105 - Flight crewmembers at stations

This part requires certain actions by onboard crewmembers. Since the Iris Plus is unmanned, an exemption from this rule is requested.

7. 14 CFR 91.109 - Flight instruction

14 CFR 91.109 states requirements for flight instruction and requires that the aircraft used for flight instruction have fully functioning dual controls.

These details pertain to manned aircraft and are not applicable to small unmanned aircraft systems. The equivalent level of safety will be attained and accomplished via the flight training program and the on boards fail safe methods explained in this documentation. The combined required hours on the system and inherent training program will show the robust nature of this system coupled with the experience obtained with a private pilot's license and current third-class medical certificate will assure that the required competency for safe operations of the Iris Plus will be maintained. On this basis as exemption from this rule is requested.

8. 14 CFR 91.119 (c) - Minimum safe altitudes

14 CFR 91.119 (c) requires that no operation is permitted below 500 ft. AGL, except over open water and sparsely populated areas. The proposed use of the Iris Plus is specifically for altitudes well beneath the 500 ft. AGL limitation. On the basis of the previously mentioned safety procedures, we believe that there will be no increased hazard to users of the National Airspace System (NAS) or the general public created by the operation of the Iris Plus as detailed in this document.

9. 14 CFR 91.121 - Altimeter settings

14 CFR 91.121 provides specific rules for altimeter settings for cruising altitude and flight level of aircraft and speaks of altimeter stations along the route and the elevation of the departure airport. In lieu of these specific requirements, most suitable for manned aircraft, the Iris Plus will incorporate the GPS altitude received from the onboard Radio Frequency telemetry system to derive specific altitude. An equivalent level of safety will be achieved through the use of operational procedures and the flight control system as a backup reading. A preflight check for the proper launch location altitude will be performed for every flight. All altitudes reported will be in feet Above Ground Level (AGL). On this basis, an exemption from this rule is requested.

10. 14 CFR 91.151 - Fuel requirements for flights in VFR conditions

14 CFR 91.151(a) requires that no person may begin a flight under Visual Flight Rule (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 3DR Iris Plus has the built in capability to monitor battery levels in real time as well as provide audible warnings upon low limit levels of battery capacity. Given that the normal flight time for the Iris Plus in this configuration is 22 min, Dark Technologies, LLC will limit use of the battery to 50% of battery level. If the aircraft reaches a critical battery level, the Iris Plus will simply descend and land safely at that point. Prior to that action the PIC will get audible notification that the system battery levels are reaching their minimum and the PIC must take action to bring the aircraft to a safe home location or land.

The batteries that are being utilized for this aircraft are 5100mAh 3 cell Lithium Polymer batteries. Each battery will be verified charged before flight actions take place and will be monitored in the aircraft maintenance documentation the number of cycles on the battery. The batteries will be properly disposed of after 50 cycles of charge and discharge and replaced with new.

On the basis of these specific safety features and processes of battery power level monitoring and operating procedures, an exemption from this rule is required.

11. 14 CFR 91.405 (a) - Maintenance required

Please see exemption request explanation in item 14 below (14 CFR 91.417).

12. 14 CFR 91.407 (a) (1) - Operation after maintenance

Please see exemption request explanation in item 14 below (14 CFR 91.417).

13. 14 CFR 91.409 (a) (2) - Inspections

Please see exemption request explanation in item 14 below (14 CFR 91.417).

14. 14 CFR 91.417 (a) and (b) - Maintenance records

Parts 91.405 (a), 91.407 (a) (1), 91.409 (a) (2), and 91.417 (a) and (b), contain requirements for maintenance of larger aircraft. In lieu of adapting these rules for the 3DR Iris Plus, Dark Technologies, LLC is requesting an exemption on the basis that it will inspect the Iris Plus and ensure it is in a safe flight ready condition prior to beginning any flight operation. We propose that adherence to the operating documentation describing the requirements for maintenance, inspection and recordkeeping are sufficient to ensure safety is not adversely affected. Additionally, maintenance will be documented on a monthly basis (see Appendix C) and kept along with the aircraft documentation for reference at any time.

Public Benefit

Granting this Section 333 Exemption would benefit the public in the following ways:

- Public Safety: The current common practices for surveying any construction facility or open mining project are intrusive and inherently dangerous by the utilization of manned aircraft systems. The utilization of a sUAS such as Dark Technologies, LLC is proposing will reduce risk to life, limb and property in orders of magnitude over current conventional means.
- Public Knowledge: Given the current state of public acceptance of the UAS industry as a whole an appropriate representation of a capable, safety oriented operation for others to view and

learn the true benefit of these types of technology will certainly benefit the overall public purview of the UAS as a whole. Additionally, the educational community stands to gain knowledge and understanding from a proper sUAS operation with all aspects of maintenance, safety and governance covered by legal and ethical means.

- Industrial Safety: Accomplishing these types of inspections and modeling of buildings requires large scaffoldings for which they bring their own level of safety equipment and fall protection devices mandated by OSHA rules. This technology implementation with the Iris Plus would not involve personnel in such activities and would complete the work with an unmanned aircraft which poses little to zero risk for life safety.
- Energy Savings: By utilizing a sUAS to accomplish these tasks would reduce the frequency of manned aircraft being required and utilized for aerial photography purposes. This would also reduce the amount of fuel being burned and saving energy and reducing emissions of combustible gasses.

The reasons why granting the exemption would not adversely affect safety:

The key features of the proposed 3DR Iris Plus unmanned aircraft system that assure that safety to the public and safety of the National Airspace System (NAS) is not adversely affected are the following:

- PIC training and credentials, along with detailed operating procedures assure the level of competency required for safe and successful flight operations are achieved.
- VLOS operations are provided solely by the PIC and VO, and the provided ability to communicate verbally at all times mitigates risk and assures operational control of the sUAS at all times.
- The built in flight control system with associated built in fail safe functionality assures proper flight control data feedback to the PIC, and provides immediate return to home/launch point and safe landing capability under failure scenarios further mitigates mishaps and assures full operational control to prevent injury and damage.
- Detailed procedures for operations and maintenance, and an included pre-flight checklist further assure the mechanical integrity and full functionality of the system prior to any flight operation.

Summary for publication in the Federal Register

Petition for exemption

Docket No.: FAA-2015-xxxx

Petitioner: Dark Technologies, LLC

Seeking exemption from the following regulations: Section 14 CFR 21, Subpart H, 14 CFR 45.23 (b), 14 CFR 61.113 (a) & (b), 14 CFR 91.7 (a), 14 CFR 91.103 (b) (2), 14 CFR 91.105, 14 CFR 91.109, 14 CFR 91.119 (c), 14 CFR 91.121, 14 CFR 91.151, 14 CFR 91.405 (a), 14 CFR 91.407 (a) (1), 14 CFR 91.409 (a) (2), 14 CFR 91.417 (a) and (b)

Description of sought relief: The petitioner is seeking exemption to utilize a small unmanned aircraft system (sUAS) to accomplish precision aerial survey, building and construction inspections, utilizing aerial video and photography.

Respectfully Submitted,

//Signed//

Christopher C. Knight

President, Dark Technologies, LLC

Tel: 702-238-5122

Appendix – A – Iris Plus Operation Manual

- *See Attached Documentation*

Appendix – B – Iris Plus Flight Checklist

- *See Attached Documentation*

Appendix – C – Monthly Maintenance Log

Dark Technologies, LLC – Iris +

Month:_____Year:_____

sUAS #	Date Discovered	Date Completed	Issue Description / Maintenance Conducted	Performed by Print & Sign
Software Update				
Airframe				
Engines				
Propellers				
Camera Mount/Gimbal				
Landing Gear				
Dampners				
Other:				