U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

CERTIFICATE OF WAIVER

Issued To: Volusia Sheriff's Office
Responsible Person: Matthew Andracke
Waiver Number: 107W-2020-01040

Address:
1330 Indian Lake Rd.
Daytona Beach, FL 32124

This certificate is issued for the operations specifically described hereinafter. No person shall conduct any operation pursuant to the authority of this certificate except in accordance with the standard and special provisions contained in this certificate, and such other requirements of the Federal Aviation Regulations not specifically waived by this certificate.

OPERATIONS AUTHORIZED

Night small unmanned aircraft system (sUAS) operations.

LIST OF WAIVED REGULATIONS BY SECTION AND TITLE

14 CFR § 107.29—Daylight operation

STANDARD PROVISIONS

1. A copy of the application made for this certificate shall be attached to and become a part hereof.
2. This certificate shall be presented for inspection upon the request of any authorized representative of the Administrator of the Federal Aviation Administration, or of any State or municipal official charged with the duty of enforcing local laws or regulations.
3. The holder of this certificate shall be responsible for the strict observance of the terms and provisions contained herein.
4. This certificate is nontransferable.

NOTE—This certificate constitutes a waiver of those Federal rules or regulations specifically referred to above. It does not constitute a waiver of any State law or local ordinance.

SPECIAL PROVISIONS

Special Provisions Nos. 1 to 13, inclusive, are set forth on the attached pages.

This Certificate of Waiver is effective from March 11, 2020, to March 31, 2024, and is subject to cancellation at any time upon notice by the Administrator or an authorized representative.

BY DIRECTION OF THE ADMINISTRATOR

General Aviation and Commercial Division, AFS–800

SPECIAL PROVISIONS ISSUED TO
Volusia Sheriff's Office

General

The FAA's Flight Standards Service has reviewed your application to ensure compliance with the requirements of 14 CFR § 107.200. The Administrator finds that the proposed sUAS operation can be conducted safely under the provisions of this Certificate of Waiver (Waiver) as listed below because you have established adequate mitigations for risks involved with operating your sUAS in the manner you described. Adherence to the provisions of this Waiver establishes the required level of safety within the national airspace system.

This Waiver may be canceled at any time by the Administrator, the person authorized to grant the Waiver, or the representative designated to monitor a specific operation. As a general rule, this Waiver may be canceled when it is no longer required, there is an abuse of its provisions, or when unforeseen safety factors develop. Failure to comply with any provision listed below is a violation of the terms of this Waiver and may serve as justification for cancellation.

List of Regulations Waived by Section and Title. The following regulations are waived:

14 CFR § 107.29, Daylight operation, is waived to allow sUAS operations during night.

No part of this waiver will function as an airspace authorization under 14 CFR § 107.41. The FAA's Air Traffic Organization responds directly to such requests.

Common Special Provisions. The Responsible Person is directly responsible for safety of operations conducted under this Waiver and will ensure the remote PIC, manipulator of the controls, and Visual Observer(s) (VO)[1] comply with all provisions of this Waiver.

1. The Responsible Person listed on the Waiver is responsible to the FAA for the safe conduct of the operations. Prior to conducting operations that are the subject of this Waiver, the responsible person:
   a. Must ensure the remote PIC, manipulators of the controls, and VO are informed of the terms and provisions of this Waiver and strictly observe the terms and provisions herein;
   b. Must ensure the remote PIC, manipulators of the controls, and VO are informed and familiar with part 107 regulations; and
   c. Evidence of the above (a and b) must be documented and must be presented for inspection upon request from the Administrator or an authorized representative;

2. This Waiver may not be combined with any other waiver(s), authorizations(s), or exemption(s) without specific authorization from the FAA;

3. The FAA has the authority to cancel or delay any or all flight operations if the safety of persons or property on the ground or in the air are in jeopardy or there is a violation of the terms of this Waiver;

4. A copy of this Waiver must be accessible and available to the Remote Pilot in Command (remote PIC) at the ground control station during sUAS operations that are the subject of this Waiver;

[1] Title 14 CFR § 107.3 defines the term "visual observer." Any VO participating in operations conducted under this Waiver must meet the requirements listed in § 107.33 throughout the duration of flight operations.

5. The Responsible Person listed on this Waiver must maintain a current list of pilots by name and remote pilot certificate number used in operations under this Waiver. This list must be presented for inspection upon request from the Administrator or an authorized representative;

6. The Responsible Person listed on this Waiver must maintain a current list of small unmanned aircraft (sUA) by registration number(s) used in the Waiver holder's operations. This list must be presented for inspection upon request from the Administrator or an authorized representative;

7. For the purposes of this Waiver, Direct Participants are the remote pilots in command (PICs), persons manipulating the controls, visual observers (VOs), and any persons whose involvement is necessary for safety of the sUAS operation. All other persons are considered non-participants;

Operations as defined in 14 CFR § 1.1, Specific Special Provisions. sUAS operations may be conducted under this waiver provided:

8. All operations under this Waiver must use one or more VO;

9. Prior to conducting operations that are the subject of this Waiver, the remote PIC and VO must be trained, as described in the Waiver application, to recognize and overcome visual illusions caused by darkness, and understand physiological conditions which may degrade night vision. This training must be documented and must be presented for inspection upon request from the Administrator or an authorized representative;

10. The area of operation must be sufficiently illuminated to allow both the remote PIC and VO to identify people or obstacles on the ground, or a daytime site assessment must be performed prior to conducting operations that are the subject of this Waiver, noting any hazards or obstructions;;

11. The sUA must be equipped with lighted anti-collision lighting visible from a distance of no less than 3 statute miles. The intensity of the anti-collision lighting may be reduced if, because of operating conditions, it would be in the interest of safety to do so;

12. ADS-B out (1090/978 MHz) may not be transmitted from the sUAS when operating pursuant to this Waiver; and

13. All emitters used in sUAS must be in compliance with all applicable FCC regulations and all provisions of the FCC authorization granted for the emitter. A FCC experimental authorization may not be used for sUAS operations under this Waiver.

Daylight operation (§107.29)
Operations are to be conducted for public safety uses by the Volusia Sheriff's Office UAS unit. These uses include the following missions; search and rescue for missing persons, water rescue, fleeing suspect search, evidence search, crime scene/accident scene photo documentation, fire department preplan surveys, search warrant surveillance, and other missions directly related to public safety functions

These operations will be conducted using both visual (EO) and thermal (FLIR) cameras in support of agency activities of a law enforcement, firefighting, or emergency management nature. All flight operations will be in coordination with incident command as appropriate for the incident.

The sUAS will be flown within visual line-of-sight by the pilot-in-command (PIC) for the entire duration of the flight. The PIC will utilize a combination of the PIC, visual observers (VO/s), sUAS video downlink and sUAS telemetry downlink to maintain situational awareness of where the aircraft is located, altitude, and attitude at any time. At no time, will the PIC continue flight operations If they lose line-of-sight of the aircraft and are unable to determine its position, orientation, attitude, altitude, or the environment around the sUAS. It is required that the PIC maintains situational awareness to acquire line-of-sight, even if utilizing video downlink and visual observers for a portion of the flight.

During any flight operations that take place during night, the flight crew will consist of a PIC and a visual observer (VO) at a minimum. If the flight crew is operating outside of their primary jurisdiction they are familiar with and a daylight site survey has not been completed, a daylight site survey to determine structures or hazards will be conducted prior to flight operations taking place. For flights within the county of jurisdiction, all members of the flight crew will be familiar with the minimum safe altitudes and existing hazards for the operational area. Any identified hazards, and their locations, will be discussed during the crew briefing prior to flight operations. Safe alternate landing areas will also be identified during the daylight site survey in the event that the sUAS cannot be recovered to the takeoff point.
The visual observer will be responsible for scanning the airspace around the sUAS from takeoff until recovery and shutdown. The PIC and VO will

maintain communication by direct contact, 800mHz radio, or cellular telephone, at all times. The VO will not be responsible for any other tasks beyond visually scanning the airspace and maintaining sight of the sUAS. If for any reason communication fails, the PIC will immediately transition to line-of-sight flight and recover the sUAS to a safe landing zone. Also, if the VO/s are unable to observe the sUAS at any time, they will communicate the loss of visual of the sUAS and the PIC will immediately begin to recover the aircraft, until visual observation is reestablished and confirmed by the VO/s.

During all flight operations occurring during night, the PIC will maintain visual line of sight of the sUAS at all times with their natural vision, and within the operational area. They will also maintain situational awareness of where the sUAS is located over the ground at all times utilizing the moving map telemetry as provided by the GPS system. The PIC will also be equipped with an aviation frequency transceiver that will be tuned to any local airport, or air traffic control, frequencies to monitor for aircraft traffic in the operational area. A visual observer, or multiple observers if required by the mission, will also be assigned to the sole duty of observing the position of the sUAS and the airspace in the vicinity of the SUAS and the operational area to include other sUAS, manned aircraft, buildings, other structures, or any other potential hazards. The PIC and all VO's will maintain communication by either direct contact or issued 800mHz radios at all time. All personnel in the operational area also have the ability to communicate the presence of other aircraft or hazards utilizing the same direct contact or 800mHz radio system, even if they are not assigned as a visual observer.
If another aircraft, sUAS or manned, is encountered during flight operations occurring at night, the sUAS will immediately be maneuvered by the PIC to a position that does not cause undue hazard to the other aircraft, persons or vehicles on the ground, or any structure. The PIC will safely recover the sUAS, or land the sUAS in a safe alternate landing area, and flight operations will be suspended until any other aircraft is well clear of the operational area.

During any flight operations that occur during night, the operational area will have an effective ground perimeter established prior to the beginning of flight operations. This is common in public safety type incidents and highly

effective at monitoring the movement of all persons and vehicles on the ground inside the operational area perimeter. These perimeter units will have the responsibility to communicate any persons or vehicles that enter the operational area, their position, and their direction of travel or destination to the PIC. Any identified groups or crowds will be communicated to the PIC and that area will be avoided during flight operations.

Any persons who encroach on the operational area will be identified and contacted by ground based perimeter units who are not being utilized in the capacity of being a visual observer. The encroaching party will be advised of the sUAS flight operations and escorted by a ground perimeter unit who has situational awareness of the sUAS position to a safe area when able. In the event that the encroaching party cannot, or will not, leave the operational area, their geographic location, direction of travel, and destination will be clearly communicated to the PIC. The area they will be present in will be avoided by the PIC monitoring the geographic moving map telemetry provided by the primary flight display until the encroaching party is under a covered structure sufficient to protect them from a falling sUAS. The position of the encroaching party will be constantly monitored by ground based perimeter units any time they are in the operational area and clearly communicated to the PIC.

The PIC will utilize a visual camera when operating in an illuminated area, or when operating with an installed spotlight system that illuminates the ground, or FLIR camera when so equipped.

The aircraft is equipped with navigation light system with red LED lights observable from the front of the aircraft to allow the PIC to maintain orientation while in flight. A flashing status light is also visible from the rear of the aircraft providing information on the aircraft positioning status and battery level status. These strobes have been shown to be visible at 3 statute miles and provide effective orientation lighting.

All members of the flight crew will be briefed on, and familiar with, night vision physiology and common night vision illusions.
These include:

Darkness Adaptation: 30-45 minutes to adapt, loss of adaptation with exposure to momentary bright light.
Central Blind Spot: Understanding of the importance of off-centered viewing of objects at night
Visual Scanning Techniques: Deliberate pausing at each direction and importance of peripheral vision to detect motion.
Empty-field Myopia: Loss of detail acuity due to lack of objects to focus on beyond 20 feet.
Autokinesis: Apparent movement of an object when the object is stared at for a length of time.
Flicker Vertigo: Disorientation due to flashing light stimulus in fog or haze conditions.

Any persons utilized as a required flight crew member for night operations will be required to take a 10 question, multiple choice test regarding these night illusions prior to being authorized to act as a PIC, or VO, for night operations.

The knowledge related to night operations, low light vision physiology, and common visual illusions will be obtained by having any PIC or VO authorized for night operations under this waiver to review chapter 8 of the Aeronautical Information Manual regarding night operations, Chapter 10 of the Airplane Flying Handbook regarding night operations, and Chapter 17 of the Pilots Handbook of Aeronautical knowledge regarding aeromedical factors. The written 10 question, multiple choice test, will be provided, developed from the content in the information contained in those chapters. The responsible person for this waiver will verify that each PIC or VO has read the required material, proctor the 10 question test, and pass with an 80% or better . The original signed copy of the test, and documented results, will be retained with the sUAS logbook that will be available with the sUAS at all times.

The landing pad will include lighting that allows the pilot to locate the landing area using the sUAS camera and orient for a safe descent to landing. This includes 1 steady white light indicating takeoff direction orientation and three flashing red lights for landing pad identification. The takeoff/landing area will be dimly lit so as to not degrade flight crew night vision. When practicable, all flight crew members will wear high visibility

vests in the vicinity of the takeoff/landing area for easy identification during the flight operation. All flight crew will be briefed on common phraseology so they are aware of current flight operation status.

When practicable, the primary takeoff/landing area will have a perimeter marked with four (4) illuminated orange cones in a perimeter of 30 feet surrounding the illuminated landing pad. No persons are to be inside of the perimeter without authorization of the PIC. No takeoff, approach, or landing will be conducted if any person enters the 30 foot perimeter around the takeoff/landing pad. This area will be constantly monitored by the PIC or other ground support personnel.

The aircraft is equipped with a white strobe light that is visible 360 degrees for a minimum of 3 statute miles at night. This light is mounted directly to the top of the aircraft and is powered by an independent battery system.

In the event of a lost control link, the sUAS is equipped with a GPS enabled return-to-home (RTH) system that will record the initial takeoff location for automated return, and landing, if required. The position of the sUAS will be monitored by the PIC and VO during the return-to-home flight.

Authorization to fly within the entire class G airspace within the geographical boundaries of Volusia and Flagler County at the highest available altitudes as published by the faa.maps.arcgis.com grid maps. Flights will not be conducted in any areas listed as '0' altitude no-fly zones without coordination and approval of ATC. Flight operations will be filed as a NOTAM advising of the operation when practicable.

The sUAS will follow established altitude restrictions specific to the location where the operation is taking place. These altitudes will correspond with published facility grid maps found at www.faa.maps.arcgis.com.

The responsible person for this authorization, Matthew Andracke, holds an FAA remote pilot certificate, 3988902. They will conduct or verify all training with the flight crew regarding flight operations in controlled airspace, communication procedures, weather considerations, and any other requirements pertinent to the flight operation.

Any questions or comments can be directed to mandracke@vcso.us, or by phone at [redacted]