

UNMANNED AERIAL VEHICLES POLICY

SUMMARY

This policy details the operations for unmanned aerial vehicles (UAVs) by City employees.



FAR Part 107 Compliant
UAS Operations Manual

SECTIONS

Section One -- Non- Emergency Operations
Section Two--Public Safety Operations

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This policy is hereby approved on the _____ day of _____, 2018.

Denis Peterson, City Manager

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Section One -- Non- Emergency Operations

1. Preface

- 1.1.1. This Johnson City UAS Operations Manual (“Manual”) describes Johnson City's small Unmanned Aerial Systems (“UAS”) operations and related safety considerations. These procedures are intended to promote safe and efficient operation of UAS in accordance with Title 14 of the Code of Federal Regulations (14 CFR) part 107 and current state law. Safety, above all else, is the primary concern when conducting UAS operations.
- 1.1.2. This Manual has been prepared for the use and guidance of flight, ground operations, and management personnel. It has been designed for the use of both Johnson City employees working with and around UAS and vendors providing UAS support to Johnson City projects. This Manual is intended to be a convenient source of government policy, and includes instructions and information necessary to allow personnel to perform their duties safely.
- 1.1.3. This Manual should not be used as an occasional operating reference. Johnson City employees and vendors providing UAS related support services should study the entire Manual to familiarize themselves with the limitations, procedures, and operational handling characteristics of the UAS before participating in any flight operations under this Manual.
- 1.1.4. This Manual does not address every possible contingency that may arise or every rule of safety and good practice. All Johnson City personnel shall be in compliance with all applicable Federal Aviation Regulations (“FARs”), State and local laws, and the rules set forth in this Manual.
- 1.1.5. In the event of a discrepancy between any provision of this Manual and the provisions contained in 14 CFR, Part 107, the requirements of the Code of Federal Regulations shall take precedence and must be followed.
- 1.1.6. This manual is not intended to address the use of UAS in emergency, evidence gathering, or law enforcement situations by police or first responders.
- 1.1.7. This manual is not intended to address the use of UAS under Section 333 of the 2012 FAA Modernization and Reform Act or under a Public Aircraft Certificate of Authorization or Waiver.
- 1.1.8. This manual contains appendices providing specific operational requirements for particular UAS missions as well as missions conducted pursuant to Certificates of Waiver (“CoW”).

2. Revision Control

2.1. General

- 2.1.1. Johnson City will prepare and track revisions for this Manual. Each revision will contain a version number and date. Revisions will be consecutively numbered.
- 2.1.2. All revisions will be in the form of complete page changes or additions. Upon receipt of a page change or addition, the holder of the Manual shall follow the page control chart to insert or remove pages as instructed.
- 2.1.3. The Operations Manager or his/her designee shall be responsible revising and disseminating changes to this Manual.
- 2.1.4. Once a new version is issued, all prior versions may not be used, and any such copies must either be updated to the current version or destroyed. It is the responsibility of all holders of this Manual to ensure its currency prior to conducting UAS operations.

3. Distribution

3.1. General

- 3.1.1. A master copy of the current version of this Manual will be maintained by the UAS Program Manager. Copies of this Manual will be furnished, in either hard-copy or digital format, to the following Johnson City personnel:
 - 3.1.1.1. Pilot in Command (“PIC”);
 - 3.1.1.2. Payload Operators;
 - 3.1.1.3. Observers;
 - 3.1.1.4. Maintenance Personnel;
 - 3.1.1.5. Any other person necessary for the safe conduct of flight operations or flight planning.
- 3.1.2. It is the responsibility of all persons receiving copies of this Manual to ensure that they are current and have all revisions.

4. Unmanned Aerial System

4.1. General

- 4.1.1. Johnson City will operate the UAS specified by Johnson City’s UAS program manager and listed in Appendix A. No other make or model UAS may be operated by Johnson City personnel.
- 4.1.2. All Johnson City UAS will be registered with the FAA and marked with a registration number. Registration may be accomplished at <https://registermyuas.faa.gov/>.
- 4.1.3. Guidance regarding UAS registration and marking may be found at http://www.faa.gov/licenses_certificates/aircraft_certification/aircraft_registry/.
- 4.1.4. All UAS operated by Johnson City must be maintained and flown in accordance with the UAS Manufacturer's Manual.

- 4.1.5. The term “Manufacturer's Manual” includes all manuals and publications provided by the relevant UAS manufacturer, including, but not limited to:
 - 4.1.5.1. User Manuals;
 - 4.1.5.2. Instruction Manuals;
 - 4.1.5.3. Training Manuals;
 - 4.1.5.4. Flight Manuals;
 - 4.1.5.5. Operations Manuals;
 - 4.1.5.6. Pilot Operating Handbooks;
 - 4.1.5.7. Component Maintenance Manuals;
 - 4.1.5.8. Service/Safety Bulletins;
 - 4.1.5.9. Service Information Letters.

5. Applicability

5.1. General

- 5.1.1. This operations manual applies only to commercial operations conducted pursuant to FAR Part 107.

5.2. Non-applicable operations

- 5.2.1. Conducted under the previously issued Part 333 exemption.
- 5.2.2. Model aircraft operations, meeting the following criteria:
 - 5.2.2.1. Flown strictly for hobby or recreation.
 - 5.2.2.2. Operated in accordance with community guidelines.
 - 5.2.2.3. Total aircraft weight below 55 pounds.
 - 5.2.2.4. Aircraft operated in a manner that does not interfere with and gives way to any manned aircraft.
 - 5.2.2.5. When flown within 5 miles of an airport, operator gives prior notice to airport operator and ATC prior to flight.
- 5.2.3. Outside of the United States.
- 5.2.4. Indoors.
- 5.2.5. Amateur rocket, moored balloon or kite.
- 5.2.6. Public aircraft.
- 5.2.7. Air carrier.

6. Definitions

6.1. Air Traffic Organization (“ATO”).

- 6.1.1. The Air Traffic Organization (ATO) is the operational arm of the FAA.

6.2. Control Station (“CS”).

- 6.2.1. An interface used by the remote pilot or the person manipulating the controls to control the flight path of the small UA.

6.3. Corrective Lenses.

- 6.3.1. Spectacles or contact lenses.

6.4. Model Aircraft.

- 6.4.1. A UA that is

- 6.4.1.1. Capable of sustained flight in the atmosphere;
- 6.4.1.2. Flown within Visual Line-of-Sight (“VLOS”) of the person operating the aircraft; and
- 6.4.1.3. Flown for hobby or recreational purposes.

6.5. Person Manipulating the Controls.

- 6.5.1. A person other than the remote pilot in command (“PIC”) who is controlling the flight of a UAS under the supervision of the remote PIC.

6.6. Remote Pilot in Command (“Remote PIC” or “Remote Pilot”).

- 6.6.1. A person who holds a remote pilot certificate with a UAS rating and has the final authority and responsibility for the pilot certificate with a UAS rating and has the final authority and responsibility for the operation and safety of a UAS operation conducted under part 107.

6.7. Small Unmanned Aircraft (“sUA”).

- 6.7.1. A UA weighing less than 55 pounds, including everything that is onboard or otherwise attached to the aircraft, and can be flown without the possibility of direct human intervention from within or on the aircraft.

6.8. Small Unmanned Aircraft System (“sUAS”).

- 6.8.1. A small UA and its associated elements (including communication links and the components that control the small UA) that are required for the safe and efficient operation of the small UA in the NAS.

6.9. Unmanned Aircraft (“UA”).

- 6.9.1. An aircraft operated without the possibility of direct human intervention from within or on the aircraft.

6.10. Visual Observer (“VO”).

- 6.10.1. A person acting as a flight crew member who assists the small UA remote PIC and the person manipulating the controls to see and avoid other air traffic or objects aloft or on the ground.

7. Obtaining a Remote Pilot Certification

7.1. General

- 7.1.1. All Remote Pilots must meet Johnson City training requirements in addition to the FAA requirements contained in this section.

7.2. First-Time Pilots

7.2.1. Qualifications

- 7.2.1.1. Be at least 16 years old.

- 7.2.1.2. Be able to read, speak, write, and understand English (exceptions may be made if the person is unable to meet one of these requirements for a medical reason, such as hearing impairment).
- 7.2.1.3. Be in a physical and mental condition to safely operate a small UAS.
- 7.2.1.4. Pass the initial aeronautical knowledge exam at an FAA-approved knowledge testing center.
- 7.2.2. Pilot Certificate Requirements
 - 7.2.2.1. Must be easily accessible by the remote pilot during all UAS operations
 - 7.2.2.2. Valid for 2 years – certificate holders must pass a recurrent knowledge test every two years
- 7.2.3. Application Process
 - 7.2.3.1. Schedule an appointment with a Knowledge Testing Center (KTC), which administer initial and recurrent FAA knowledge examinations.
 - 7.2.3.2. View the list of Knowledge Testing Centers (PDF) to find one near you. This list can be found at https://www.faa.gov/training_testing/testing/media/test_centers.pdf.
 - 7.2.3.3. Applicants must bring government-issued photo ID to their test.
 - 7.2.3.4. Pass the initial aeronautical knowledge test – initial knowledge test areas include:
 - 7.2.3.4.1. Applicable regulations relating to small unmanned aircraft system rating privileges, limitations, and flight operation
 - 7.2.3.4.2. Airspace classification and operating requirements, and flight restrictions affecting small unmanned aircraft operation
 - 7.2.3.4.3. Aviation weather sources and effects of weather on small unmanned aircraft performance
 - 7.2.3.4.4. Small unmanned aircraft loading and performance
 - 7.2.3.4.5. Emergency procedures
 - 7.2.3.4.6. Crew resource management
 - 7.2.3.4.7. Radio communication procedures
 - 7.2.3.4.8. Determining the performance of small unmanned aircraft
 - 7.2.3.4.9. Physiological effects of drugs and alcohol
 - 7.2.3.4.10. Aeronautical decision-making and judgment
 - 7.2.3.4.11. Airport operations
 - 7.2.3.4.12. Maintenance and preflight inspection procedures

- 7.2.3.5. Complete FAA Form 8710-13 for a remote pilot certificate (FAA Airman Certificate and/or Rating Application) using the electronic FAA Integrated Airman Certificate and/or Rating Application system (IACRA)*
 - 7.2.3.5.1. Register using the FAA IACRA system.
 - 7.2.3.5.2. Login with username and password.
 - 7.2.3.5.3. Click on “Start New Application” and 1) Application Type “Pilot”, 2) Certifications “Remote Pilot”, 3) Other Path Information, 4) Start Application
 - 7.2.3.5.4. Follow application prompts
 - 7.2.3.5.5. When prompted, enter the 17-digit Knowledge Test Exam ID (NOTE: it may take up to 48 hours from the test date for the knowledge test to appear in IACRA)
 - 7.2.3.5.6. Sign the application electronically and submit to the Registry for processing.
- 7.2.3.6. A confirmation email will be sent when an applicant has completed the TSA security background check. This email will provide instructions for printing a copy of the temporary remote pilot certificate from IACRA.
- 7.2.3.7. A permanent remote pilot certificate will be sent via mail once all other FAA-internal processing is complete.

7.3. Existing Pilots

7.3.1. Eligibility

- 7.3.1.1. Must hold a pilot certificate issued under 14 CFR part 61
- 7.3.1.2. Must have completed a flight review within the previous 24 months

7.3.2. Remote Pilot Certificate Requirements

- 7.3.2.1. Must be easily accessible by the remote pilot during all UAS operations
- 7.3.2.2. Valid for 2 years – certificate holders must pass either a recurrent online training course OR recurrent knowledge test every two years

7.3.3. Application Process:

- 7.3.3.1. Complete the online training course “Part 107 small Unmanned Aircraft Systems (“UAS”) ALC-451” available on the FAA FAASafety website at <https://www.faasafety.gov/>. – initial training course areas include:
 - 7.3.3.1.1. Applicable regulations relating to small unmanned aircraft system rating privileges, limitations, and flight operation

- 7.3.3.1.2. Effects of weather on small unmanned aircraft performance
- 7.3.3.1.3. Small unmanned aircraft loading and performance
- 7.3.3.1.4. Emergency procedures
- 7.3.3.1.5. Crew resource management
- 7.3.3.1.6. Determining the performance of small unmanned aircraft
- 7.3.3.1.7. Maintenance and preflight inspection procedures
- 7.3.3.2. Complete FAA Form 8710-13 (FAA Airman Certificate and/or Rating Application for a remote pilot certificate) Online or by paper (see instructions in previous section)
- 7.3.3.3. Validate applicant identity
 - 7.3.3.3.1. Contact a FSDO, an FAA-designated pilot examiner (DPE), an airman certification representative (ACR), or an FAA-certificated flight instructor (CFI) to make an appointment.
 - 7.3.3.3.2. Present the completed FAA Form 8710-13 along with the online course completion certificate or knowledge test report (as applicable) and proof of a current flight review.
 - 7.3.3.3.3. The completed FAA Form 8710-13 application will be signed by the applicant after the FSDO, DPE, ACR, or CFI examines the applicant's photo identification and verifies the applicant's identity.
 - 7.3.3.3.4. The FAA representative will then sign the application.
- 7.3.3.4. An appropriate FSDO representative, a DPE, or an ACR will issue the applicant a temporary airman certificate (a CFI is not authorized to issue a temporary certificate; they can process applications for applicants who do not want a temporary certificate).
- 7.3.3.5. A permanent remote pilot certificate will be sent via mail once all other FAA-internal processing is complete.

8. Mission Planning

8.1. General

- 8.1.1. The mission planning process is an important part of risk assessment and risk mitigation. The preparation of a flight operation is a multi-step process, and must be completed before any mission may be flown.

8.2. Operation Near Airports

8.2.1. Controlled Airspace

- 8.2.1.1. Operations in Class A airspace are prohibited.

- 8.2.1.2. Operations in Class B, Class C, or Class D airspace, or within the lateral boundaries of the surface area of Class E airspace designated for an airport.
 - 8.2.1.2.1. Must obtain prior authorization from air traffic control (“ATC”).
 - 8.2.1.2.2. The link to the current authorization process can be found at https://www.faa.gov/uas/request_waiver/.
 - 8.2.1.2.3. Contact the FAA as early as possible.
- 8.2.2. Uncontrolled airspace.
 - 8.2.2.1. No notification or authorization is necessary to operate at or near an airport in uncontrolled airspace.
 - 8.2.2.2. Be aware of all traffic patterns and approach corridors to runways and landing areas.
 - 8.2.2.3. Do not operate in the traffic pattern or published approach corridors used by manned aircraft.
 - 8.2.2.4. Avoid operating anywhere that the presence of the UAS may interfere with operations at the airport, such as approach corridors, taxiways, runways, or helipads.
 - 8.2.2.5. Yield right-of-way to all other aircraft, including aircraft operating on the surface of the airport.
- 8.2.3. Recurring or Long-Term Operations.
 - 8.2.3.1. There is an area around Tri-Cities Regional Airport (KTRI), located north of Johnson City, that is Class D airspace to the surface. The CTAF and Tower frequency is 119.5. The airport manager phone is 423-325-6001. Flight is prohibited within the Class D airspace without ATC authorization or waiver.
 - 8.2.3.2. Johnson City Airport (0A4) operates in uncontrolled airspace. The CTAF frequency is 122.9. The airport manager phone is 423-928-4500. The PIC shall notify the airport manager prior to operations within a 5 mile radius of this airport and shall monitor CTAF during operations.
 - 8.2.3.3. A private helipad, Bell Helicopter Heliport (89TN) is located north of Johnson City. The Unicom frequency is 123.075. The heliport manager phone is 423-538-5111. The heliport is in uncontrolled airspace. The PIC shall notify the heliport manager prior to operations within a 5 mile radius of this airport and shall monitor UNICOM during operations.
 - 8.2.3.4. Elizabethtown Municipal Airport (0A9) is located east of Johnson City. The CTAF frequency is 123.0. The airport manager phone is 423-543-2801. The PIC shall notify the airport manager prior to operations within a 5 mile radius of this airport and shall monitor CTAF during operations.

- 8.2.3.5. Johnson City Medical Center (JCMC) operates an air ambulance from a helipad located next to the hospital emergency room. The PIC shall notify JCMC prior to conducting operations.
- 8.2.3.6. The Johnson City UAS Program manager is encouraged to obtain a letter of agreement (“LOA”) with the Air Traffic Organization (“ATO”) for recurring or long-term operations in the Class D airspace associated with KTRI.

8.3. Temporary Flight Restrictions.

- 8.3.1. Certain temporary flight restrictions (<http://tfr.faa.gov/tfr2/list.html>) may be imposed by way of a Notice to Airmen (“NOTAM”) (<https://pilotweb.nas.faa.gov/PilotWeb/>).
- 8.3.2. The Remote PIC must check for NOTAMs before each flight to determine if there are any applicable airspace restrictions.

8.4. Type of Airspace.

- 8.4.1. The Remote PIC must also be aware of the type of airspace in which they will be operating their small UA. Referring to the B4UFLY app or a current aeronautical chart (<http://faacharts.faa.gov/>) of the intended operating area will aid the UAS remote PIC’s decision making.
- 8.4.2. If the PIC is uncertain of the requirements for operation within given airspace, the operation must not be conducted until this uncertainty is resolved and all requirements are met.

9. Flight Personnel

9.1. General

- 9.1.1. Johnson City shall insure that all Flight Personnel are fully qualified to perform their duties safely and effectively in the conduct of UAS operations under this Manual. Johnson City will evaluate the qualifications of individual Flight Personnel based on their experience with the UAS being operated, which will be verified through written, oral, and/or practical examination. Johnson City will maintain training records for all Flight Personnel.
- 9.1.2. Johnson City will retain documentation of prior training and experience used to qualify Flight Personnel in accordance with the record keeping requirements of this Manual.
- 9.1.3. Johnson City employees shall notify their supervisor, or other responsible leadership, if they observe any work practices (by pilots, other employees, or contractors) that are considered unsafe or in violation of safety rules and regulations.
- 9.1.4. All Flight Personnel shall intend initial and recurrent compliance training.

9.2. Medical Conditions.

- 9.2.1. Being able to safely operate the UAS relies on, among other things, the physical and mental capabilities of the remote PIC, person manipulating the controls, VO, and any other direct participant in the UAS operation.
- 9.2.2. Though the person manipulating the controls of a UAS and VO are not required to obtain an airman medical certificate, they may not participate in the operation of a UAS if they know or have reason to know that they have a physical or mental condition that could interfere with the safe operation of the UAS.
- 9.2.3. Personnel shall not participate in UAS operational duties when experiencing any of the following:
 - 9.2.3.1. The temporary or permanent loss of the dexterity necessary to operate the CS to safely control the small UA.
 - 9.2.3.2. The inability to maintain the required “see and avoid” vigilance due to blurred vision.
 - 9.2.3.3. The inability to maintain proper situational awareness of the small UA operations due to illness and/or medication(s), such as after taking medications with cautions not to drive or operate heavy machinery.
 - 9.2.3.4. A debilitating physical condition, such as a migraine headache or moderate or severe body ache(s) or pain(s) that would render the remote PIC, person manipulating the controls, or VO unable to perform UAS operational duties.
 - 9.2.3.5. A hearing or speaking impairment that would inhibit the remote PIC, person manipulating the controls, and VO from effectively communicating with each other. In a situation such as this, the remote PIC must ensure that an alternative means of effective communication is implemented. For example, a person who is hearing impaired may be able to effectively use sign language to communicate.

9.3. Remote Pilot in Command (PIC)

- 9.3.1. The Pilot of the UAS shall be the Pilot-in-Command (“PIC”) who has all the responsibility and authority of the PIC as described by 14 C.F.R. 91.3, *Responsibility and Authority of the Pilot in Command*.
- 9.3.2. The PIC has ultimate responsibility for the safe operation of the UAS. The PIC has the final decision on whether to initiate or terminate any flight.
- 9.3.3. The PIC shall maintain operational control throughout the flight through at least one of the following methods.
 - 9.3.3.1. The PIC is the sole person on the controls.
 - 9.3.3.2. Two or more PICs holding Remote Pilot Certifications are transferring operational control and:
 - 9.3.3.2.1. Both are capable on maintaining Visual Line of Sight
 - 9.3.3.2.2. Is able to positively communicate transfer of control.

- 9.3.3.3. The PIC is directly supervising a person who does not hold a current, valid remote pilot certificate or the PIC has the ability to take immediate control through one of the following methods:
 - 9.3.3.3.1. The operation uses two control stations (CS): one for the person manipulating the flight controls and one for the remote PIC that allows the remote PIC to override the other CS.
 - 9.3.3.3.2. The remote PIC stands close enough to physically take over the CS from the other person.
 - 9.3.3.3.3. An automation system could be engaged by PIC to put the small UA in a pre-programmed “safe” mode (such as in a hover, in a holding pattern, or “return home”).
- 9.3.4. Duties and Responsibilities
 - 9.3.4.1. PICs will evaluate all missions. It is the pilot’s responsibility to recognize and refuse to perform a mission that, in their judgment, is not safe. The pilot’s word is final as to whether the flight is feasible and can be conducted in a safe and efficient manner.
 - 9.3.4.2. If at any time, the Operations Manager (as defined in Part 9.6, below) feels that a flight or operation is unsafe and request that it be terminated for safety reasons, it is the PIC’s responsibility to comply with such requests in a professional manner.
 - 9.3.4.3. Before departure, the PIC must understand the mission request and have all applicable and updated maps and charts and manuals at the ground control station. Additionally, the pilot is required to be aware of weather forecasts, winds, hazards, temporary flight restrictions, NOTAMs and all pertinent information necessary to perform the mission.
 - 9.3.4.4. The PIC must conduct a check of the UAS and verify that it is in safe operating condition prior to each flight.
- 9.3.5. Qualifications
 - 9.3.5.1. The PIC must have a Remote Pilot Certificate with a small UAS (UAS) rating.
 - 9.3.5.2. The PIC must complete an aeronautical knowledge test every 24 months.
 - 9.3.5.3. The PIC shall maintain an understanding of the normal, abnormal and emergency procedures of the UAS.
 - 9.3.5.4. The PIC shall maintain an appropriate level of understanding of the Federal Aviation Regulations applicable to the airspace where UAS operations will occur.
 - 9.3.5.5. No one may act as PIC unless they have read and familiarized themselves with the contents of this Manual, as well as the Manufacturer's Manual for the UAS to be flown.

- 9.3.5.6. The PIC shall comply with the ongoing training and certification standards established by Johnson City.

9.4. Visual Observer.

- 9.4.1. The use of a VO is required.
- 9.4.2. The remote PIC must use a VO to supplement situational awareness and VLOS.
- 9.4.3. Although the remote PIC and person manipulating the controls must maintain the capability to see the UA, using one or more VOs allows the remote PIC and person manipulating the controls to conduct other mission-critical duties (such as checking displays) while still ensuring situational awareness of the UA.
- 9.4.4. The VO must be able to effectively communicate:
 - 9.4.4.1. The small UA location, attitude, altitude, and direction of flight;
 - 9.4.4.2. The position of other aircraft or hazards in the airspace; and
 - 9.4.4.3. The determination that the UA does not endanger the life or property of another.
- 9.4.5. VO Responsibility
 - 9.4.5.1. Scan the airspace where the small UA is operating for any potential collision hazard,
 - 9.4.5.2. Maintain awareness of the position of the small UA through direct visual observation.
- 9.4.6. Method of communication between VO and PIC.
 - 9.4.6.1. The communication method must be determined prior to operation. This effective communication requirement would permit the use of communication-assisting devices, such as a hand-held radio, to facilitate communication from a distance.
- 9.4.7. Qualifications
 - 9.4.7.1. The VO shall have sufficient knowledge of the airspace in which the work detailed in this Manual will be performed to permit them to adequately assess the risks posed by other aircraft or objects.
 - 9.4.7.2. The VO must have 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.
 - 9.4.7.3. The VO shall have knowledge of basic Visual Flight Rules weather minimums.
 - 9.4.7.4. The VO shall maintain a thorough understanding of all normal, abnormal, and emergency operational aspects of the UAS.

9.5. Payload Operator

- 9.5.1. It is the duty of the Payload Operator (if any) to control and direct the operation of any remote sensing equipment or mission payloads carried by the UAS.

9.5.2. The Payload Operator does not have the authority to require the PIC to maneuver the aircraft in any unsafe manner, or in any manner that violates the FARs.

9.5.3. No one may act as a Payload Operator unless they have read and familiarized themselves with the contents of this Manual, as well as any additional manuals for the sensor to be operated.

9.6. Operations Manager

9.6.1. The Operations Manager is the on-site Johnson City representative responsible for oversight of the UAS flight operation. The Operations Manager shall ensure that all mission planning and preflight operations have been completed for any given flight.

9.6.2. The Operations Manager may also be the PIC.

9.7. UAS Program Manager

9.7.1. The Johnson City UAS Program Manager will be responsible for the overall development and maintenance of the Johnson City UAS program.

10. Operational Area and Airspace Control

10.1. General Safety Policies and Procedures

10.1.1. Compliance with the policies and procedures of this Manual ensure compliance with Johnson City's safety policies and procedures.

10.1.2. The Operations Manager has ultimate responsibility to ensure field operations are conducted within the tolerances of this Manual, the FARs, State and Local laws, and in accordance with applicable Manufacturer's Manuals.

10.2. Prohibited Operation Over Persons

10.2.1. The PIC shall not fly the UA directly over a person who is not under a safe cover, such as a protective structure or a stationary vehicle.

10.2.2. The UA may be flown over a person who is directly participating in the operation of the UAS, such as the remote PIC, other person manipulating the controls, a VO, or crewmembers necessary for the safety of the UAS operation, as assigned and briefed by the remote PIC.

10.3. Area Security

10.3.1. To the maximum extent possible, the PIC will select an operational area (site) that is clearly unpopulated/uninhabited.

10.3.2. If selecting a site that is populated/inhabited, the PIC shall have a plan of action which ensures persons remain clear of the operating area, remain indoors, or remain under safe cover until such time that the small UA flight has ended.

10.3.3. Safe cover is a structure or stationary vehicle that would protect a person from harm if the small UA were to crash into that structure or vehicle;

10.3.4. The remote PIC will take reasonable precautions to keep free of persons not directly participating in the operation of the UAS;

10.3.5. The remote PIC will post prominent signs announcing the operation and, where applicable, use personnel on the ground to announce the unexpected presence of non-participants to avoid overflight.

10.4. Take-off and Landing Zones

10.4.1. All operations require a Johnson City employee to designate a take-off zone, landing zone, and lost link/emergency termination zone; however, the pilot retains the right to change or modify that selection if potentially unsafe conditions exist.

10.4.2. Take-off and landing zones shall be designated with the use of high-visibility markers in the form of traffic cones, caution tape or other appropriate signage.

10.4.3. These zones may be the same location or different locations depending on the needs of the mission.

10.4.4. Prior to operation, these zones shall be cleared of all persons not involved in the operation.

10.4.5. All non-essential personnel and nonparticipating persons must remain outside of the landing zone while the UAS is taking off or landing.

10.4.6. Markings and other appropriate measures will be taken to ensure that persons do not enter these areas while the operation is in progress.

10.4.7. Site Selection

10.4.7.1. The landing zones shall provide sufficient space to safely land and launch the aircraft in accordance with procedures in the Manufacturer's Manual.

10.4.7.2. The landing zone should be as safe and secure as possible. The zones should be free of any obstacles or hazards to the safe conduct of the flight, including but not limited to:

10.4.7.2.1. Nonparticipating persons

10.4.7.2.2. Trees or tall brush

10.4.7.2.3. Fences

10.4.7.2.4. Large rocks

10.4.7.2.5. Towers

10.4.7.2.6. Poles

10.4.7.2.7. Overhead wires

10.4.7.2.8. Dust and small pieces of debris

10.4.7.2.9. Vehicles

10.4.7.2.10. Fresh snow (snow can be tamped down)

10.4.7.3. When possible, locate landing areas so that takeoffs and landings may be made into the prevailing winds.

11. Pre-Flight Assessment

11.1. Briefings

11.1.1. Briefing is an essential part of conducting UAS operations in a safe and efficient manner. On the day of the flight prior to the start of UAS operations, the PIC shall brief all Flight Personnel on the goals, objectives and key safety considerations of the planned UAS operation. The intent is to cover all operation aspects of the mission and to promote full understanding among all flight personnel. The guidelines for conducting Flight Personnel briefings are listing below. The briefing shall include, but is not limited to:

11.1.1.1. Abnormal and emergency procedures as defined in Section 14 of this Manual and how they will be applied to the specific mission;

11.1.1.2. The roles and responsibilities of the PIC, Observer, and Payload Operator for the specific mission;

11.1.1.3. The communication plan;

11.1.1.4. Any contingency plan;

11.1.1.5. Lost VLOS procedures;

11.1.1.6. Weather reports;

11.1.1.7. Proximity to potential air traffic;

11.1.1.8. Abort parameters in accordance with the Manufacturer's Manual;

11.1.1.9. Threats to current mission;

11.1.1.10. Any mission parameters impacted by the issuance of a Notice to Airmen (“NOTAM”).

11.1.2. Public safety must be addressed at every briefing to mitigate all risks from Johnson City flight operations. Identify all public safety hazards, whenever possible, prior to the day of the flight. All hazards must be identified and mitigated before the flight. If conditions change, flight personnel must re-brief to discuss the changing conditions.

11.2. The PIC is responsible for conducting a pre-flight assessment.

11.2.1. Local weather conditions.

11.2.2. Local airspace.

11.2.3. Any flight restrictions, including checking NOTAMS.

11.2.4. The location of persons and property on the surface, and

11.2.5. Other ground hazards.

11.3. Equipment check.

11.3.1. Ensure that all control links between the CS and the small UA are working properly.

11.3.2. Ensure there is sufficient power to continue controlled flight operations to a normal landing.

11.3.2.1. One of the ways that this could be done is by following the UAS manufacturer’s operating manual power consumption tables.

11.3.2.2. Another method would be to include a system on the UAS that detects power levels and alerts the remote pilot when remaining

aircraft power is diminishing to a level that is inadequate for continued flight operation.

- 11.3.3. Ensure that any object attached or carried by the small UA is secure and does not adversely affect the flight characteristics or controllability of the aircraft.
- 11.3.4. Ensure that all necessary documentation is available for inspection, including the remote PIC's remote pilot certificate, aircraft registration (if required), and Certificate of Waiver ("CoW") (if applicable).

12. Normal Flight Operations

12.1. General

- 12.1.1. A Normal Flight Operation is any flight that is not conducted for training or maintenance purposes.
- 12.1.2. A Normal Flight Operation does not include any flight conducted pursuant to Certificate of Waiver.
- 12.1.3. Normal Flight Operations are limited to speeds at or below 30 mph.
- 12.1.4. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough power for the UAS to conduct the intended operation and to operate for at least 5 minutes or with the reserve power recommended by the UAS manufacturer if greater.
- 12.1.5. The PIC shall be responsible for monitoring radio communication on guard channels (121.5 MHz and 243.0 MHz) and on the appropriate local aircraft frequencies. This shall be accomplished with a portable aviation radio with a minimum of 5 Watts TX Output Power.
- 12.1.6. The PIC shall be responsible for possessing either digital or paper copies of the relevant VFR sectional for the intended area of operations.

12.2. Visual Line of Sight (VLOS) Operations

12.2.1. General

- 12.2.1.1. The remote PIC, the person manipulating the controls, and the VO must be able to see the small UA at all times during flight.

12.2.2. Loss of VLOS

- 12.2.2.1. The person maintaining VLOS may have brief moments in which he or she is not looking directly at or cannot see the small UA, but still retains the capability to see the UA or quickly maneuver it back to VLOS.
- 12.2.2.2. These moments can be for the safety of the operation (e.g., looking at the controller to see battery life remaining) or for operational necessity.
- 12.2.2.3. For operational necessity, the remote PIC or person manipulating the controls may intentionally maneuver the UA so that he or she loses sight of it for brief periods of time. Should the remote PIC or person manipulating the controls lose VLOS of the small UA, he

or she must regain VLOS as soon as practicable. (For example, a remote PIC stationed on the ground utilizing a small UA to inspect a rooftop may lose sight of the aircraft for brief periods while inspecting the farthest point of the roof.)

- 12.2.2.4. If VLOS cannot be regained within a brief period time, the remote PIC or person manipulating the controls should follow pre-determined procedures for a loss of VLOS.

12.2.3. Unaided Vision.

- 12.2.3.1. VLOS must be accomplished and maintained by unaided vision, except vision that is corrected using eyeglasses (spectacles) or contact lenses.
- 12.2.3.2. Persons manipulating the controls, and VOs shall maintain 20/20 distant vision acuity (corrected) and normal field of vision.
- 12.2.3.3. Vision aids, such as binoculars, may be used only momentarily to enhance situational awareness. For example, the remote PIC, person manipulating the controls, or VO may use vision aids to avoid flying over persons or conflicting with other aircraft.
- 12.2.3.4. There are no restrictions or prohibitions on LASIK or other corrective measures provided that actual visual acuity meets the standards set forth above.

12.3. Altitude

- 12.3.1. The UA cannot be flown higher than 400 feet above ground level (“AGL”), unless flown within a 400-foot radius of a structure and does not fly higher than 400 feet above the structure’s immediate uppermost limit;

12.4. Visibility

- 12.4.1. Minimum visibility, as observed from the location of the CS, may not be less than 3 statute miles (sm); and
- 12.4.2. Minimum distance from clouds being no less than 500 feet below a cloud and no less than 2000 feet horizontally from the cloud.
- 12.4.3. One of the ways to ensure adherence to the minimum visibility and cloud clearance requirements is to obtain local aviation weather reports that include current and forecast weather conditions.
- 12.4.4. If there is more than one local aviation reporting station near the operating area, the remote PIC should choose the closest one that is also the most representative of the terrain surrounding the operating area.
- 12.4.5. If local aviation weather reports are not available, then the remote PIC may not operate the small UA if he or she is not able to determine the required visibility and cloud clearances by other reliable means.
- 12.4.6. The PIC shall not operate the UA above any cloud, or when obstructions to visibility, such as smoke or a cloud, are between the UA and the remote PIC.

12.5. Operations During Daylight and Twilight

12.5.1. General

- 12.5.1.1. All operations must be conducted during daylight or twilight.
- 12.5.1.2. Night operations are prohibited.
- 12.5.2. Determining night, day, and twilight hours.
 - 12.5.2.1. Night is defined as the time between the end of evening civil twilight and the beginning of morning civil twilight, as published in The Air Almanac, converted to local time.
 - 12.5.2.2. In the continental United States (CONUS), evening civil twilight is the period of sunset until 30 minutes after sunset and morning civil twilight is the period of 30 minutes prior to sunrise until sunrise.
 - 12.5.2.3. Air Almanac tables can be downloaded from the Naval Observatory at <http://aa.usno.navy.mil/publications/docs/aira.php>.
- 12.5.3. Lighting requirements.
 - 12.5.3.1. Any UA operating during civil twilight must be equipped with anti-collision lights visible for at least 3 statute miles.
 - 12.5.3.1.1. This distance may be reduced by the PIC in the interest of safety.
 - 12.5.3.2. No lighting is required for daytime operation.

12.6. Operational Permissions and Requirements

- 12.6.1. Whenever possible, all operations shall be conducted over private or controlled-access property with permission from the land owner/controller or authorized representative. Permission from the land owner/controller or authorized representative will be obtained prior to each operation.
- 12.6.2. All personnel will obtain permission from the land owner/controller or authorized representative prior to staging operations on private or controlled-access property, including take-offs and landings.
- 12.6.3. Before conducting operations, the radio frequency spectrum used for operation and control of the UAS must comply with Federal Communication Commission (“FCC”) or other appropriate government oversight agency requirements.

12.7. Take-Off/Flight

- 12.7.1. All flight operations will be conducted in accordance with the Manufacturer's Manual.
- 12.7.2. All Flight Personnel shall remain at his or her station during takeoff, landing, recovery, and other critical phases of flight, except when performing those duties required for the safe operation of the aircraft.
- 12.7.3. The UAS may not be operated by the PIC from any moving device or vehicle except in rural areas or from a boat on the water.
- 12.7.4. Under no circumstances will the UAS be operated from a moving aircraft.

12.8. Recovery

- 12.8.1. All UAS landing and recovery will be accomplished in accordance with the Manufacturer's Manual.
- 12.8.2. The UAS landing and recovery will take place at the pre-designated landing zone.

12.9. Shutdown/Post-Flight

- 12.9.1. UAS shutdown and post flight actions will be taken in accordance with the Manufacturer's Manual.
- 12.9.2. A flight personnel member shall complete a post-flight summary that documents the following information:
 - 12.9.2.1. Date;
 - 12.9.2.2. Flight Location;
 - 12.9.2.3. Project Name;
 - 12.9.2.4. PIC Name and Pilot's License Number;
 - 12.9.2.5. Observer Name;
 - 12.9.2.6. Payload Operator Name (if any);
 - 12.9.2.7. Launch and Recovery Times;
 - 12.9.2.8. Duration of Operation;
 - 12.9.2.9. Any issues encountered during the operation that should be addressed before subsequent operations.
- 12.9.3. The Operations Manager shall document any safety related incidents, including any mechanical irregularities encountered during the flight operation.
- 12.9.4. In the event a lost-link is encountered during the UAS operation, the Operations Manager shall document the event in the UAS Flight Log.
- 12.9.5. Flight personnel shall also take the following post-flight actions:
 - 12.9.5.1. Conduct post-flight aircraft inspection;
 - 12.9.5.2. Disassemble the UAS per the Manufacturer's Manual;
 - 12.9.5.3. Place the batteries in their chargers;
 - 12.9.5.4. Place the UAS securely in its storage case;
 - 12.9.5.5. Make an entry in a UAS Flight Log.
 - 12.9.5.6. Conduct a briefing of any issues or non-normal events encountered during flight operations.

13. Operations Conducted Pursuant to a Certificate of Waiver

13.1. General

- 13.1.1. A Certificate of Waiver (CoW) will allow a UAS operation to deviate from certain provisions of part 107.
- 13.1.2. All requests to obtain a CoW will be directed to the Johnson City UAS Program Manager.

- 13.1.3. All current waivers are contained in Appendix B.
- 13.1.4. All operations conducted pursuant to a CoW shall be governed by a specified supplemental CoW operational manual.
- 13.2. Waivable Sections of Part 107
 - 13.2.1. Operation from a moving vehicle or aircraft.
 - 13.2.2. Daylight operation.
 - 13.2.3. Visual line of sight aircraft operation.
 - 13.2.4. Visual observer.
 - 13.2.5. Operation of multiple small unmanned aircraft systems.
 - 13.2.6. Yielding the right of way.
 - 13.2.7. Operation over people.
 - 13.2.8. Operation in certain airspace.
 - 13.2.9. Operating limitations for small unmanned aircraft.
 - 13.2.9.1. Airspeed
 - 13.2.9.2. Altitude
 - 13.2.9.3. Weight

14. Abnormal and Emergency Flight Operations

14.1. General

- 14.1.1. An in-flight emergency is an unexpected and unforeseen serious occurrence or situation that requires urgent, prompt action. During an emergency, the PIC is permitted to deviate from this manual and from the rules in Part 107 to the extent necessary to respond to the emergency.
- 14.1.2. Emergency action should be taken in a way as to minimize injury or damage to property.
- 14.1.3. The recommended procedures for addressing various types of emergencies and critical situations are provided by this Section and in the Manufacturer's Manual. These procedures are suggested as the best practice for coping with the particular condition described, but are not a substitute for sound judgment and common sense. Pilots and all Flight Personnel engaged in UAS operations under this Manual should familiarize themselves with procedures given in this Section and the Manufacturer's Manual, and be prepared to take appropriate action should an emergency arise.

14.2. Policy and Procedure

- 14.2.1. It is the responsibility of the PIC to adequately brief all Flight Personnel on known possible threats surrounding the operation.
- 14.2.2. The Pre-flight brief shall cover the roles and responsibilities of all Flight Personnel in the event of an in-flight emergency.

14.3. Emergency Procedures

- 14.3.1. The UAS will abort the flight in the event of unpredicted obstacles or emergencies. Response to emergency situations related to the UAS shall be conducted in accordance with this Manual and the Manufacturer's Manual.
- 14.3.2. In an emergency situation involving the safety of persons or property, which requires immediate decisions and actions, the PIC or any other appropriate Johnson City Flight Personnel may take action that is considered necessary under the circumstances to ensure safety. The Operations Manager shall keep the appropriate ATC facilities fully informed when an in-flight UAS emergency could potentially impact operations of aircraft in navigable airspace.
- 14.3.3. Johnson City will investigate and document any such deviations. The PIC shall be prepared to provide any written report requested by the FAA concerning the emergency.

14.4. System Failures

- 14.4.1. Response to system non-normal situations related to the UAS shall be conducted in accordance with the predetermined, site-specific contingency plans and abort procedures for emergency flight termination, as well as any additional guidance provided by the Manufacturer's Manual.
- 14.4.2. Johnson City shall maintain a record of all system failures.

14.5. Lost-Link Procedures

- 14.5.1. If the aircraft loses communications or loses its GPS signal, the aircraft is equipped with failsafe hardware which allows the aircraft to “Go-Home” and land from its original launch location. Lost-link response procedures will be in accordance with the predetermined, site-specific contingency plans and abort procedures for emergency flight termination, as well as any additional guidance provided by the Manufacturer's Manual.
- 14.5.2. Johnson City shall maintain a log of all Lost-links encountered during flight operations.

15. Training Flights

15.1. General

- 15.1.1. Before performing any UAS operations described in this Manual, pilots, observers, sensor operators, and other Flight Personnel must complete required training to Johnson City standards. Training will afford employees the ability to safely work around a UAS and identify and mitigate risks and potential hazards that could be encountered during flight/filming operations.
- 15.1.2. Training flights are performed for the sole purpose of either gaining experience flying UAS in general or in meeting currency requirements for specific UASs used by Johnson City for operations under this Manual.
- 15.1.3. All training flights shall occur during designated training sessions on private property that is either owned/controlled by Johnson City or on third party property with the consent of the owner/controller.

- 15.1.4. All training flights are subject to the area and airspace control requirements of this Manual.

16. Accident/Incident Reporting

16.1. General

- 16.1.1. The remote PIC of the UAS is required to report an accident to the FAA within 10 days if it meets any of the following thresholds:

- 16.1.1.1. At least serious injury to any person or any loss of consciousness. A serious injury is an injury that qualifies as Level 3 or higher on the Abbreviated Injury Scale (AIS) of the Association for the Advancement of Automotive Medicine (AAAM). The AIS is an anatomical scoring system that provides a means of ranking the severity of an injury and is widely used by emergency medical personnel. Within the AIS system, injuries are ranked on a scale of 1 to 6, with Level 1 being a minor injury, Level 2 is moderate, Level 3 is serious, Level 4 is severe, Level 5 is critical, and Level 6 is a nonsurvivable injury. The FAA currently uses serious injury (AIS Level 3) as an injury threshold in other FAA regulations.

- 16.1.1.1.1. Note: It would be considered a “serious injury” if a person requires hospitalization, but the injury is fully reversible (including, but not limited to, head trauma, broken bone(s), or laceration(s) to the skin that requires suturing).

- 16.1.1.2. Damage to any property, other than the small UA, if the cost is greater than \$500 to repair or replace the property (whichever is lower).

- 16.1.1.2.1. Note: For example, a small UA damages a property whose fair market value is \$200, and it would cost \$600 to repair the damage. Because the fair market value is below \$500, this accident is not required to be reported. Similarly, if the aircraft causes \$200 worth of damage to property whose fair market value is \$600, that accident is also not required to be reported because the repair cost is below \$500.

16.1.2. Submitting the Report.

- 16.1.2.1. The accident report must be made within 10 calendar-days of the operation that created the injury or damage.
- 16.1.2.2. The report may be submitted to the appropriate FAA Regional Operations Center (ROC) electronically or by telephone.
- 16.1.2.3. Electronic reporting can be completed at www.faa.gov/uas/.
- 16.1.2.4. Telephone reporting may be conducted by calling 404-305-5156.
- 16.1.2.5. The report should include the following information:
- 16.1.2.5.1. UAS remote PIC’s name and contact information;

- 16.1.2.5.2. UAS remote PIC's FAA airman certificate number;
- 16.1.2.5.3. UAS registration number issued to the aircraft, if required (FAA registration number);
- 16.1.2.5.4. Location of the accident;
- 16.1.2.5.5. Date of the accident;
- 16.1.2.6. Time of the accident;
- 16.1.2.7. Person(s) injured and extent of injury, if any or known;
- 16.1.2.8. Property damaged and extent of damage, if any or known; and
- 16.1.2.9. Description of what happened.

16.1.3. National Transportation Safety Board (NTSB) Reporting.

16.2. In addition to the report submitted to the ROC, and in accordance with the criteria established by the NTSB certain UAS accidents must also be reported to the NTSB. For more information, visit www.nts.gov.

17. Maintenance

17.1. Maintenance and Inspection Procedures

17.1.1. Pre-flight inspection

- 17.1.1.1. Visual condition inspection of the UAS components;
- 17.1.1.2. Airframe structure (including undercarriage), all flight control surfaces, and linkages;
- 17.1.1.3. Registration markings, for proper display and legibility;
- 17.1.1.4. Moveable control surface(s), including airframe attachment point(s);
- 17.1.1.5. Servo motor(s), including attachment point(s);
- 17.1.1.6. Propulsion system, including power plant(s), propeller(s), rotor(s), ducted fan(s), etc.;
- 17.1.1.7. Verify all systems (e.g., aircraft and control unit) have an adequate energy supply for the intended operation and are functioning properly;
- 17.1.1.8. Avionics, including control link transceiver, communication/navigation equipment, and antenna(s);
- 17.1.1.9. Calibrate UAS compass prior to any flight;
- 17.1.1.10. Control link transceiver, communication/navigation data link transceiver, and antenna(s);
- 17.1.1.11. Display panel, if used, is functioning properly;
- 17.1.1.12. Check ground support equipment, including takeoff and landing systems, for proper operation;
- 17.1.1.13. Check that control link correct functionality is established between the aircraft and the CS;
- 17.1.1.14. Check for correct movement of control surfaces using the CS;

- 17.1.1.15. Check onboard navigation and communication data links;
- 17.1.1.16. Check flight termination system, if installed;
- 17.1.1.17. Check fuel for correct type and quantity;
- 17.1.1.18. Check battery levels for the aircraft and CS;
- 17.1.1.19. Check that any equipment, such as a camera, is securely attached;
- 17.1.1.20. Verify communication with UAS and that the UAS has acquired GPS location from at least four satellites;
- 17.1.1.21. Start the UAS propellers to inspect for any imbalance or irregular operation;
- 17.1.1.22. Verify all controller operation for heading and altitude;
- 17.1.1.23. If required by flight path walk through, verify any noted obstructions that may interfere with the UAS; and
- 17.1.1.24. At a controlled low altitude, fly within range of any interference and recheck all controls and stability.

17.1.2. Scheduled Maintenance

- 17.1.2.1. Prior to flight, the remote PIC is responsible for conducting a check of the UAS and verifying that it is actually in a condition for safe operation.
- 17.1.2.2. The operator should maintain the UAS and its components in accordance with manufacturer's instructions.

17.1.3. Unscheduled Maintenance.

- 17.1.3.1. During the course of a preflight inspection, the remote PIC may discover that a UAS component is in need of servicing (such as lubrication), repair, modification, overhaul, or replacement outside of the scheduled maintenance period as a result of normal flight operations or resulting from a mishap.
- 17.1.3.2. In addition, the UAS manufacturer or component software manufacture may require an unscheduled system software update to correct a problem.
- 17.1.3.3. In the event such a condition is found, the remote PIC should not conduct flight operations until the discrepancy is corrected.

17.1.4. Performing Maintenance.

- 17.1.4.1. In some instances, the UAS or component manufacturer may require certain maintenance tasks be performed by the manufacturer or by a person or facility (personnel) specified by the manufacturer. In such instances such specified personnel or facilities shall be used.

17.2. Documenting Maintenance

- 17.2.1. All maintenance performed on an aircraft shall be documented and recorded in a Maintenance Log, including any malfunctions encountered, parts removed,

parts replaced, and whether the aircraft is airworthy after any maintenance procedure. The UAS Maintenance Log entry shall contain:

- 17.2.1.1. Date the work was performed;
 - 17.2.1.2. Make, model, and serial or N-number of the aircraft;
 - 17.2.1.3. Maintenance technician name;
 - 17.2.1.4. Aircraft total time;
 - 17.2.1.5. Details of work performed;
 - 17.2.1.6. Details of any modifications to the aircraft;
 - 17.2.1.7. Details and total time of any replacement components;
 - 17.2.1.8. Details of any malfunctions encountered;
 - 17.2.1.9. Software or firmware version number if the existing software or firmware is updated, removed, or reinstalled;
 - 17.2.1.10. Status of the aircraft once maintenance procedures are completed;
 - 17.2.1.11. Any other matter affecting the aircraft's readiness for flight
- 17.2.2. All aircraft must be maintained in accordance with any Airworthiness Directive or required manufacturer's Safety/Service Bulletin.
- 17.2.3. Frequency of Maintenance Inspections
- 17.2.3.1. The period between routine maintenance inspections of the aircraft and its operational components, shall be in accordance with the appropriate Manufacturer's Manual.

17.3. Maintenance Technician

17.3.1. General

- 17.3.1.1. Johnson City will designate qualified maintenance technicians for all maintenance performed on the UAS and its components.

17.3.2. Responsibilities:

- 17.3.2.1. Oversee and be responsible for the airworthiness of the aircraft;
- 17.3.2.2. Maintain all required documentation for the aircraft in a timely fashion;
- 17.3.2.3. Be familiar with all aspects of aircraft operations, theory, and maintenance;
- 17.3.2.4. Be able to troubleshoot and solve issues related to all flight components;
- 17.3.2.5. The name of the Maintenance Technician performing the work shall be listed on all maintenance documents maintained by Johnson City.

17.3.3. Qualification:

- 17.3.3.1. Shall be familiar with the operation, theory of operation, and maintenance aspects of the aircraft;
- 17.3.3.2. Shall demonstrate qualification via written/oral and practical examination over relevant parts of this Manual, and the relevant

Manufacturer's Manual by a designee of Johnson City, to include, but not limited to:

- 17.3.3.2.1. Airframe / Structural Components;
- 17.3.3.2.2. Flight Controller or Autopilot / Stability Systems;
- 17.3.3.2.3. Radio Command and Control Systems, including Controllers, Transmitters, Receivers, Antennas, and/or Wiring;
- 17.3.3.2.4. Image-Capture Airborne and Ground-Based Systems;
- 17.3.3.2.5. Required On-Screen-Display and Telemetry;
- 17.3.3.2.6. Power Distribution Board, or Main Power Bus Wiring or Harness;
- 17.3.3.2.7. Motors;
- 17.3.3.2.8. Propellers;
- 17.3.3.2.9. Actuators or Servos;
- 17.3.3.2.10. Batteries;
- 17.3.3.2.11. Additional Ground-Station Hardware, Software, and/or Firmware.

17.4. Functional Test Flights

- 17.4.1. Any maintenance action or alteration performed that affects the aircraft's operation or flight characteristics, *e.g.*, replacement of a flight critical component, must undergo a functional test flight in accordance with this Manual.
- 17.4.2. Components that will require flight-testing after their replacement will include, but not limited to:
 - 17.4.2.1. Airframe/Structural Components;
 - 17.4.2.2. Flight Controller or Autopilot/Stability Systems;
 - 17.4.2.3. Radio Transmitters;
 - 17.4.2.4. Radio Transmitter Antennas;
 - 17.4.2.5. Power Distribution Boards;
 - 17.4.2.6. Power Wiring Harnesses;
 - 17.4.2.7. Servo Wiring or Flight Controller Wiring;
 - 17.4.2.8. Motors;
 - 17.4.2.9. Actuators or Servos;
 - 17.4.2.10. Controller Hardware, Software, or Firmware.
- 17.4.3. Flight tests will comply with all provision of this Manual and shall:
 - 17.4.3.1. Involve at least 15 minutes total of flight time;
 - 17.4.3.2. Initially be conducted at a low altitude.

- 17.4.4. The PIC whom conducts the functional flight test must make an entry in the aircraft Flight Log.

18. State Laws

18.1. General

- 18.1.1. Johnson City UAS operations will comply with all existing Tennessee laws.
- 18.1.2. It is the responsibility of the PIC to be aware of, and comply with all applicable Tennessee laws.

18.2. Contact with local authorities.

- 18.2.1. Johnson City will comply with any requests made by Federal, State, or local authorities in regard to UAS operations.
- 18.2.2. Operations will be terminated immediately if requested by Federal, State, or local authorities until further legal guidance is obtained.
- 18.2.3. All efforts will be made to provide notice to, and obtain prior approval from, Federal, State, and local authorities prior to conducting UAS operations.
- 18.2.4. The Johnson City UAS Program Manager will work to foster positive long-term relationships and, where applicable, Memoranda of Understanding, with relevant Federal, State, and local authorities.

19. Privacy and Notification

19.1. General

- 19.1.1. Johnson City is committed to respecting the privacy rights of third parties potentially impacted by flight operations.
- 19.1.2. No flight will be authorized if the operation would be in violation of any local, state, or federal law or regulation regarding privacy.
- 19.1.3. Johnson City shall minimize the possibility that images or information concerning third parties is collected by the UAS sensors.

19.2. Web Portal

- 19.2.1. Johnson City may, at its option, maintain a website for the purpose of providing information to the public regarding its UAS program.
- 19.2.2. When practical, Johnson City will provide notice of planned flight operations on the website. Such notices will include the location, purpose, time and date of the proposed flight and will indicate whether the public is invited to observe.
- 19.2.3. Where practical and not in violation of privacy laws, videos and photographs from past UAS operations will be posted on the website.
- 19.2.4. The website will also include a link the privacy policy referenced in 19.3.

19.3. Privacy Policy

- 19.3.1. Johnson City's privacy policy can be found at Appendix __ and online at _____.

19.4. Notifications

- 19.4.1. Johnson City is aware that the unannounced presence of UA can cause concern for its customers, potential customers, and the general public.
- 19.4.2. Prior to conducting any flights, the Operations Manager shall endeavor to ensure that individuals in the intended flight area receive advanced notice of the UA operations.
- 19.4.3. When operating in public spaces, such as when recording images of an accident scene on a public intersection, prior notification is not practical, and thus not required.
- 19.4.4. At times, the Operations Manager may determine that, in addition to providing notice of UA operations, Johnson City will also seek consent for UA operations prior to an intended flight. The determination of whether to request consent is solely within the discretion of the Operations Manager.
- 19.4.5. Notification and consent forms are included at Appendix ____.
- 19.4.6. The following chart is intended to assist Johnson City in its efforts to be a “good neighbor.” It is as a guide to providing notice and/or requesting consent. The selection of appropriate notification and consent forms is reserved exclusively to the UAS Operations Manager.

	Notice 1	Notice 2	Notice 3	Notice 4	Signage / Barriers
Intended Use	Incidental Fly-Over of Private Property	Incidental Fly-Over of Private Property	Fly-Over of Private Property at Owner’s Request	Fly-Over of Private Property with Large Facilities/Office Buildings	Flying Over Public Spaces
Received by	Impacted Property Owners	Impacted Property Owners	Impacted Property Owners	Property Point-of-Contact (POC) and Distributed by POC to Employees/Occupants	Public
Timing	Day Before Flight	Day Before Flight	Day of Flight	Day Before Flight	Day of Flight
Place / Means of Delivery	Mailbox	Mailbox	Hand Delivery	Hand Delivery, Email, or Postal	Hand Delivery
Additional Documents:	No.	Consent Form 1	Consent Form 2 (For Adjacent Owner)	None.	None

20. Recordkeeping

20.1. General

- 20.1.1. Johnson City will maintain documentation of all UAS activities conducted under the provisions of this Manual.
- 20.1.2. All documentation shall be made available for review upon request by the Administrator.

20.2. Flight Personnel Records

20.2.1. Johnson City will maintain individual qualification, training, and currency records for all flight personnel.

20.3. Pre-Flight Inspection Records

20.3.1. Johnson City will maintain records for each pre-flight inspection.

20.4. Post Flight Summaries

20.4.1. Johnson City will maintain Post Flight Summaries as required by this Manual. Post flight summaries may be used to establish the operational history of the UAS, as necessary.

20.5. Incident Reports

20.5.1. Johnson City will maintain a record of any accidents, incidents or deviations encountered during flight operations.

20.6. Lost-Link Report

20.6.1. Johnson City will maintain records of any lost-link encountered during flight operations.

20.7. Maintenance Records

20.7.1. Johnson City will maintain records of all UAS maintenance, preventative maintenance, inspections, repairs, modifications, alterations and overhauls.

20.8. Flight Logs

Johnson City shall maintain a record of all flights using a flight log.

Section Two—Public Safety Operations

21. General

21.1. Preface

- 21.1.1. This JCPD UAS Operations Manual (“Manual”) describes JCPD’s small Unmanned Aerial Systems (“UAS”) operations and related safety considerations. These procedures are intended to promote safe and efficient operation of UAS in accordance with Title 14 of the Code of Federal Regulations (14 CFR) part 107 and current state law. Safety, above all else, is the primary concern when conducting UAS operations.
- 21.1.2. The JCPD Unmanned Aircraft Systems Unit (“UAS Unit”) shall support other elements of the JCPD and other first responder agencies, by providing a safe and efficient aerial observation perspective on law enforcement and other public safety incidents. Missions will be accomplished efficiently and safely while respecting the law and the citizens of Johnson City.
- 21.1.3. This Manual should not be used as an occasional operating reference. Officers assigned to the UAS Unit should study the entire Manual to familiarize themselves with the limitations, procedures, and operational handling characteristics of the UAS before participating in any flight operations under this Manual.
- 21.1.4. This Manual does not address every possible contingency that may arise or every rule of safety and good practice. All UAS Unit personnel shall be in compliance with all applicable Federal Aviation Regulations (“FARs”), State and local laws, and the rules set forth in this Manual.
- 21.1.5. In the event of a discrepancy between any provision of this Manual and the provisions contained in Tenn Code 39-13-609 or 14 CFR, Part 107, the requirements of the Tennessee Statute and the Code of Federal Regulations shall take precedence and must be followed.
- 21.1.6. This manual is not intended to address the use of UAS under Section 333 of the 2012 FAA Modernization and Reform Act or under a Public Aircraft Certificate of Authorization or Waiver.
- 21.1.7. This manual contains appendices providing specific operational requirements for particular UAS missions as well as missions conducted pursuant to Certificates of Waiver (“CoW”).

22. Revision Control

22.1. General

- 22.1.1. JCPD will prepare and track revisions for this Manual. Each revision will contain a version number, and date. Revisions will be consecutively numbered.
- 22.1.2. All revisions will be in the form of complete page changes or additions. Upon receipt of a page change or addition, the holder of the Manual shall follow the page control chart to insert or remove pages as instructed.
- 22.1.3. The UAS Unit Supervisor or his/her designee shall be responsible revising and disseminating changes to this Manual.
- 22.1.4. Once a new version is issued, all prior versions may not be used, and any such copies must either be updated to the current version or destroyed. It is the responsibility of all holders of this Manual to ensure its currency prior to conducting UAS operations.

23. Distribution

23.1. General

- 23.1.1. A master copy of the current version of this Manual will be maintained by the UAS Unit Supervisor. Copies of this Manual will be furnished, in either hard-copy or digital format, to the following JCPD personnel:
 - 23.1.1.1. Pilot in Command (“PIC”);
 - 23.1.1.2. Payload Operators;
 - 23.1.1.3. Observers;
 - 23.1.1.4. Maintenance Personnel;
 - 23.1.1.5. Any other person necessary for the safe conduct of flight operations or flight planning.
- 23.1.2. It is the responsibility of all persons receiving copies of this Manual to ensure that they are current and have all revisions.

24. Unmanned Aircraft System

24.1. General

- 24.1.1. JCPD will operate the UAS specified by JCPD’s UAS Unit Supervisor and listed in Appendix A. No other make or model UAS may be operated by JCPD personnel.
- 24.1.2. All JCPD UAS will be registered with the FAA and marked with a registration number. Registration may be accomplished at <https://registermyuas.faa.gov/>.
- 24.1.3. Guidance regarding UAS registration and marking may be found at http://www.faa.gov/licenses_certificates/aircraft_certification/aircraft_registry/.
- 24.1.4. All UAS operated by JCPD must be maintained and flown in accordance with the UAS Manufacturer's Manual.

- 24.1.5. The term “Manufacturer's Manual” includes all manuals and publications provided by the relevant UAS manufacturer, including, but not limited to:
 - 24.1.5.1. User Manuals;
 - 24.1.5.2. Instruction Manuals;
 - 24.1.5.3. Training Manuals;
 - 24.1.5.4. Flight Manuals;
 - 24.1.5.5. Operations Manuals;
 - 24.1.5.6. Pilot Operating Handbooks;
 - 24.1.5.7. Component Maintenance Manuals;
 - 24.1.5.8. Service/Safety Bulletins;
 - 24.1.5.9. Service Information Letters.

25. Applicability

25.1. General

- 25.1.1. This operations manual applies only to commercial operations conducted pursuant to FAR Part 107.
- 25.1.2. The policies and procedures contained in this manual are issued by authority of the Chief of Police as such it is an official document of the agency.

25.2. Non-applicable operations

- 25.2.1. Conducted under the previously issued Part 333 exemption.
- 25.2.2. Model aircraft operations, meeting the following criteria:
 - 25.2.2.1. Flown strictly for hobby or recreation.
 - 25.2.2.2. Operated in accordance with community guidelines.
 - 25.2.2.3. Total aircraft weight below 55 pounds.
 - 25.2.2.4. Aircraft operated in a manner that does not interfere with and gives way to any manned aircraft.
 - 25.2.2.5. When flown within 5 miles of an airport, operator gives prior notice to airport operator and ATC prior to flight.
- 25.2.3. Outside of the United States.
- 25.2.4. Indoors.
- 25.2.5. Amateur rocket, moored balloon or kite.
- 25.2.6. Public aircraft.
- 25.2.7. Air carrier.

26. Definitions

26.1. Air Traffic Organization (“ATO”).

- 26.1.1. The Air Traffic Organization (ATO) is the operational arm of the FAA.

- 26.2. Control Station (“CS”).
 - 26.2.1. An interface used by the remote pilot or the person manipulating the controls to control the flight path of the small UA.
- 26.3. Corrective Lenses.
 - 26.3.1. Spectacles or contact lenses.
- 26.4. Model Aircraft.
 - 26.4.1. A UA that is
 - 26.4.1.1. Capable of sustained flight in the atmosphere;
 - 26.4.1.2. Flown within Visual Line-of-Sight (“VLOS”) of the person operating the aircraft; and
 - 26.4.1.3. Flown for hobby or recreational purposes.
- 26.5. Person Manipulating the Controls.
 - 26.5.1. A person other than the remote pilot in command (“PIC”) who is controlling the flight of a UAS under the supervision of the remote PIC.
- 26.6. Remote Pilot in Command (“Remote PIC” or “Remote Pilot”).
 - 26.6.1. A person who holds a remote pilot certificate with a UAS rating and has the final authority and responsibility for the pilot certificate with a UAS rating and has the final authority and responsibility for the operation and safety of a UAS operation conducted under part 107.
- 26.7. Small Unmanned Aircraft (“sUA”).
 - 26.7.1. A UA weighing less than 55 pounds, including everything that is onboard or otherwise attached to the aircraft, and can be flown without the possibility of direct human intervention from within or on the aircraft.
- 26.8. Small Unmanned Aircraft System (“sUAS”).
 - 26.8.1. A small UA and its associated elements (including communication links and the components that control the small UA) that are required for the safe and efficient operation of the small UA in the NAS.
- 26.9. Unmanned Aircraft (“UA”).
 - 26.9.1. An aircraft operated without the possibility of direct human intervention from within or on the aircraft.
- 26.10. Visual Observer (“VO”).
 - 26.10.1. A person acting as a flight crew member who assists the small UA remote PIC and the person manipulating the controls to see and avoid other air traffic or objects aloft or on the ground.

27. Obtaining a Remote Pilot Certification

- 27.1. General
 - 27.1.1. All Remote Pilots must meet JCPD training requirements in addition to the FAA requirements contained in this section.

27.2. First-Time Pilots

27.2.1. Qualifications

- 27.2.1.1. Be at least 16 years old.
- 27.2.1.2. Be able to read, speak, write, and understand English (exceptions may be made if the person is unable to meet one of these requirements for a medical reason, such as hearing impairment).
- 27.2.1.3. Be in a physical and mental condition to safely operate a small UAS.
- 27.2.1.4. Pass the initial aeronautical knowledge exam at an FAA-approved knowledge testing center.

27.2.2. Pilot Certificate Requirements

- 27.2.2.1. Must be easily accessible by the remote pilot during all UAS operations
- 27.2.2.2. Valid for 2 years – certificate holders must pass a recurrent knowledge test every two years

27.2.3. Application Process

- 27.2.3.1. Schedule an appointment with a Knowledge Testing Center (KTC), which administer initial and recurrent FAA knowledge examinations.
- 27.2.3.2. View the list of Knowledge Testing Centers (PDF) to find one near you. This list can be found at https://www.faa.gov/training_testing/testing/media/test_centers.pdf.
- 27.2.3.3. Applicants must bring government-issued photo ID to their test.
- 27.2.3.4. Pass the initial aeronautical knowledge test – initial knowledge test areas include:
 - 27.2.3.4.1. Applicable regulations relating to small unmanned aircraft system rating privileges, limitations, and flight operation
 - 27.2.3.4.2. Airspace classification and operating requirements, and flight restrictions affecting small unmanned aircraft operation
 - 27.2.3.4.3. Aviation weather sources and effects of weather on small unmanned aircraft performance
 - 27.2.3.4.4. Small unmanned aircraft loading and performance
 - 27.2.3.4.5. Emergency procedures
 - 27.2.3.4.6. Crew resource management
 - 27.2.3.4.7. Radio communication procedures
 - 27.2.3.4.8. Determining the performance of small unmanned aircraft
 - 27.2.3.4.9. Physiological effects of drugs and alcohol

- 27.2.3.4.10. Aeronautical decision-making and judgment
- 27.2.3.4.11. Airport operations
- 27.2.3.4.12. Maintenance and preflight inspection procedures
- 27.2.3.5. Complete FAA Form 8710-13 for a remote pilot certificate (FAA Airman Certificate and/or Rating Application) using the electronic FAA Integrated Airman Certificate and/or Rating Application system (IACRA)*
 - 27.2.3.5.1. Register using the FAA IACRA system.
 - 27.2.3.5.2. Login with username and password.
 - 27.2.3.5.3. Click on “Start New Application” and 1) Application Type “Pilot”, 2) Certifications “Remote Pilot”, 3) Other Path Information, 4) Start Application
 - 27.2.3.5.4. Follow application prompts
 - 27.2.3.5.5. When prompted, enter the 17-digit Knowledge Test Exam ID (NOTE: it may take up to 48 hours from the test date for the knowledge test to appear in IACRA)
 - 27.2.3.5.6. Sign the application electronically and submit to the Registry for processing.
- 27.2.3.6. A confirmation email will be sent when an applicant has completed the TSA security background check. This email will provide instructions for printing a copy of the temporary remote pilot certificate from IACRA.
- 27.2.3.7. A permanent remote pilot certificate will be sent via mail once all other FAA-internal processing is complete.

27.3. Existing Pilots

27.3.1. Eligibility

- 27.3.1.1. Must hold a pilot certificate issued under 14 CFR part 61
- 27.3.1.2. Must have completed a flight review within the previous 24 months

27.3.2. Remote Pilot Certificate Requirements

- 27.3.2.1. Must be easily accessible by the remote pilot during all UAS operations
- 27.3.2.2. Valid for 2 years – certificate holders must pass either a recurrent online training course OR recurrent knowledge test every two years

27.3.3. Application Process:

- 27.3.3.1. Complete the online training course “Part 107 small Unmanned Aircraft Systems (“UAS”) ALC-451” available on the FAA FAASafety website at <https://www.faasafety.gov/>. – initial training course areas include:

- 27.3.3.1.1. Applicable regulations relating to small unmanned aircraft system rating privileges, limitations, and flight operation
- 27.3.3.1.2. Effects of weather on small unmanned aircraft performance
- 27.3.3.1.3. Small unmanned aircraft loading and performance
- 27.3.3.1.4. Emergency procedures
- 27.3.3.1.5. Crew resource management
- 27.3.3.1.6. Determining the performance of small unmanned aircraft
- 27.3.3.1.7. Maintenance and preflight inspection procedures
- 27.3.3.2. Complete FAA Form 8710-13 (FAA Airman Certificate and/or Rating Application for a remote pilot certificate) Online or by paper (see instructions in previous section)
- 27.3.3.3. Validate applicant identity
 - 27.3.3.3.1. Contact a FSDO, an FAA-designated pilot examiner (DPE), an airman certification representative (ACR), or an FAA-certificated flight instructor (CFI) to make an appointment.
 - 27.3.3.3.2. Present the completed FAA Form 8710-13 along with the online course completion certificate or knowledge test report (as applicable) and proof of a current flight review.
 - 27.3.3.3.3. The completed FAA Form 8710-13 application will be signed by the applicant after the FSDO, DPE, ACR, or CFI examines the applicant's photo identification and verifies the applicant's identity.
 - 27.3.3.3.4. The FAA representative will then sign the application.
- 27.3.3.4. An appropriate FSDO representative, a DPE, or an ACR will issue the applicant a temporary airman certificate (a CFI is not authorized to issue a temporary certificate; they can process applications for applicants who do not want a temporary certificate).
- 27.3.3.5. A permanent remote pilot certificate will be sent via mail once all other FAA-internal processing is complete.

28. Call Out Procedures

- 28.1. JCPD, and other agencies' personnel, requesting UAS Unit support for planned events should submit the request to the UAS Unit Supervisor at least 5 working days in advance of the event.
- 28.2. Requests for immediate support of unplanned events shall be made to the Public Safety Answering Point (PSAP) via telephone, radio, or in-person. The decision to

respond UAS personnel will be made by the on-duty JCPD watch commander after consultation with the UAS Unit Supervisor or his designee.

- 28.3. Once a request for UAS response has been approved by the on-duty JCPD Watch Commander, PSAP personnel will notify UAS Unit Personnel via the radio, paging system or telephone. PSAP personnel will then dispatch any on-duty UAS Unit Officer to the incident. If there is no UAS Unit Officer on-duty, the PSAP dispatcher will advise the UAS Unit Supervisor.

29. Authorized Missions

29.1. General

- 29.1.1. Pursuant to Tenn. Code 39-13-609, law enforcement agencies are prohibited from using an unmanned aircraft to gather evidence or other information except in the circumstances authorized in the following paragraphs. All other mission-types will require the prior issuance of a search warrant signed by a judge authorizing the use of an unmanned aircraft.

29.2. Missions not requiring a search warrant.

- 29.2.1. To counter a high risk of a terrorist attack by a specific individual or organization if the United States secretary of homeland security determines that credible intelligence indicates that there is such a risk;
- 29.2.2. The officer possesses reasonable suspicion that, under particular circumstances, swift action is needed to prevent imminent danger to life;
- 29.2.3. To provide continuous aerial coverage when law enforcement is searching for a fugitive or escapee or is monitoring a hostage situation; or
- 29.2.4. To provide more expansive aerial coverage when deployed for the purpose of searching for a missing person.
- 29.2.5. Additional mission types such as crime scene and traffic accident documentation may be approved by a city attorney after review of the applicable statute and case law. Such additional authorized uses shall be included as an appendix to this document

29.3. Obtaining a search warrant

- 29.3.1. The search warrant affidavit must contain the following.
 - 29.3.1.1. The persons that will have the power to authorize the use of the unmanned aerial vehicle;
 - 29.3.1.2. The locations in which the unmanned aerial vehicle will operate;
 - 29.3.1.3. The maximum period for which the unmanned aerial vehicle will operate in each flight; and
 - 29.3.1.4. Whether the unmanned aerial vehicle will collect information or data about individuals or groups of individuals, and if so:
 - 29.3.1.4.1. The circumstances under which the unmanned aerial system will be used; and

- 29.3.1.4.2. The specific kinds of information or data the unmanned aerial system will collect about individuals and how that information or data will be used, disclosed, and otherwise handled.

30. Data Retention

- 30.1. No data collected on an individual, home, or areas other than the target that justified deployment may be used, copied or disclosed for any purpose. Such data must be deleted as soon as possible, and in no event later than twenty-four (24) hours after collection.

31. Mission Priorities

- 31.1. Several requests for air support may be received simultaneously. Given the limited number of unmanned aircraft and personnel available, it is necessary to prioritize calls for service.
- 31.2. In general terms, calls are prioritized as follows (listed in order of importance):
- 31.3. In-progress calls involving a threat to the safety of any person
- 31.4. Search and rescue of innocent victims
- 31.5. Searches for fleeing criminal suspects
- 31.6. Surveillance of criminal suspects
- 31.7. Traffic control operations
- 31.8. Requests to support other government agencies
- 31.9. Photo flights

32. Mission Planning

- 32.1. General
 - 32.1.1. The mission planning process is an important part of risk assessment and risk mitigation. The preparation of a flight operation is a multi-step process, and must be completed before any mission may be flown.
- 32.2. Operation Near Airports
 - 32.2.1. Controlled Airspace
 - 32.2.1.1. Operations in Class A airspace are prohibited.
 - 32.2.1.2. Operations in Class B, Class C, or Class D airspace, or within the lateral boundaries of the surface area of Class E airspace designated for an airport.
 - 32.2.1.2.1. Must obtain prior authorization from air traffic control (“ATC”).
 - 32.2.1.2.2. The link to the current authorization process can be found at https://www.faa.gov/uas/request_waiver/.
 - 32.2.1.2.3. Contact the FAA as early as possible.

32.2.2. Uncontrolled airspace.

- 32.2.2.1. No notification or authorization is necessary to operate at or near an airport in uncontrolled airspace.
- 32.2.2.2. Be aware of all traffic patterns and approach corridors to runways and landing areas.
- 32.2.2.3. Do not operate in the traffic pattern or published approach corridors used by manned aircraft.
- 32.2.2.4. Avoid operating anywhere that the presence of the UAS may interfere with operations at the airport, such as approach corridors, taxiways, runways, or helipads.
- 32.2.2.5. Yield right-of-way to all other aircraft, including aircraft operating on the surface of the airport.

32.2.3. Recurring or Long-Term Operations.

- 32.2.3.1. There is an area around Tri-Cities Regional Airport (KTRI), located north of JCPD, that is Class D airspace to the surface. The CTAF and Tower frequency is 119.5. The airport manager phone is 423-325-6001. Flight is prohibited within the Class D airspace without ATC authorization or waiver.
- 32.2.3.2. JCPD Airport (0A4) operates in uncontrolled airspace. The CTAF frequency is 122.9. The airport manager phone is 423-928-4500. The PIC shall notify the airport manager prior to operations within a 5 mile radius of this airport and shall monitor CTAF during operations.
- 32.2.3.3. A private helipad, Bell Helicopter Heliport (89TN) is located north of JCPD. The Unicom frequency is 123.075. The heliport manager phone is 423-538-5111. The heliport is in uncontrolled airspace. The PIC shall notify the heliport manager prior to operations within a 5 mile radius of this airport and shall monitor UNICOM during operations.
- 32.2.3.4. Elizabethtown Municipal Airport (0A9) is located east of JCPD. The CTAF frequency is 123.0. The airport manager phone is 423-543-2801. The PIC shall notify the airport manager prior to operations within a 5 mile radius of this airport and shall monitor CTAF during operations.
- 32.2.3.5. JCPD Medical Center (JCMC) operates an air ambulance from a helipad located next to the hospital emergency room. The PIC shall notify JCMC prior to conducting operations.
- 32.2.3.6. The JCPD UAS Unit Supervisor is encouraged to obtain a letter of agreement (“LOA”) with the Air Traffic Organization (“ATO”) for recurring or long-term operations in the Class D airspace associated with KTRI.

32.3. Temporary Flight Restrictions.

32.3.1. Certain temporary flight restrictions (<http://tfr.faa.gov/tfr2/list.html>) may be imposed by way of a Notice to Airmen (“NOTAM”) (<https://pilotweb.nas.faa.gov/PilotWeb/>).

32.3.2. The Remote PIC must check for NOTAMs before each flight to determine if there are any applicable airspace restrictions.

32.4. Type of Airspace.

32.4.1. The Remote PIC must also be aware of the type of airspace in which they will be operating their small UA. Referring to the B4UFly app or a current aeronautical chart (<http://faacharts.faa.gov/>) of the intended operating area will aid the UAS remote PIC’s decision making.

32.4.2. If the PIC is uncertain of the requirements for operation within given airspace, the operation must not be conducted until this uncertainty is resolved and all requirements are met.

33. Organization

33.1. General

33.1.1. The JCPD UAS unit shall be comprised of those personnel assigned by the Chief of Police to the Unit and those temporarily detailed to assist as needed. It may include the UAS Unit Supervisor, pilots, payload operators, visual observers, and others as deemed necessary.

33.1.2. Unmanned aircraft operations are under the command of the Chief of Police. Control and supervision of flight operations are hereby delegated to the UAS Unit Supervisor. The UAS Unit Supervisor may delegate such responsibility to UAS pilots and/or sensor system operators. Control and supervision of the law enforcement aspect of all UAS missions is retained by the Chief of Police. The Chief of Police may delegate such responsibility to other law enforcement personnel.

33.2. Flight Personnel

33.2.1. JCPD shall insure that all Flight Personnel are fully qualified to perform their duties safely and effectively in the conduct of UAS operations under this Manual. JCPD will evaluate the qualifications of individual Flight Personnel based on their experience with the UAS being operated, which will be verified through written, oral, and/or practical examination. JCPD will maintain training records for all Flight Personnel.

33.2.2. JCPD will retain documentation of prior training and experience used to qualify Flight Personnel in accordance with the record keeping requirements of this Manual.

33.2.3. JCPD employees shall notify their supervisor, or other responsible leadership, if they observe any work practices (by pilots, other employees, or contractors) that are considered unsafe or in violation of safety rules and regulations.

33.2.4. All Flight Personnel shall intend initial and recurrent compliance training.

33.3. Medical Conditions.

- 33.3.1. Being able to safely operate the UAS relies on, among other things, the physical and mental capabilities of the remote PIC, person manipulating the controls, VO, and any other direct participant in the UAS operation.
- 33.3.2. Though the person manipulating the controls of a UAS and VO are not required to obtain an airman medical certificate, they may not participate in the operation of a UAS if they know or have reason to know that they have a physical or mental condition that could interfere with the safe operation of the UAS.
- 33.3.3. Personnel shall not participate in UAS operational duties when experiencing any of the following:
 - 33.3.3.1. The temporary or permanent loss of the dexterity necessary to operate the CS to safely control the small UA.
 - 33.3.3.2. The inability to maintain the required “see and avoid” vigilance due to blurred vision.
 - 33.3.3.3. The inability to maintain proper situational awareness of the small UA operations due to illness and/or medication(s), such as after taking medications with cautions not to drive or operate heavy machinery.
 - 33.3.3.4. A debilitating physical condition, such as a migraine headache or moderate or severe body ache(s) or pain(s) that would render the remote PIC, person manipulating the controls, or VO unable to perform UAS operational duties.
 - 33.3.3.5. A hearing or speaking impairment that would inhibit the remote PIC, person manipulating the controls, and VO from effectively communicating with each other. In a situation such as this, the remote PIC must ensure that an alternative means of effective communication is implemented. For example, a person who is hearing impaired may be able to effectively use sign language to communicate.

33.4. Commanding Officer

- 33.4.1. The Chief of Police serves as the commanding officer of unmanned aircraft operations and is responsible for overall management and supervision of the operation, which includes budget preparation and control and personnel selection. Given the technical nature of aviation, the Chief of Police may, at his discretion, assign responsibility for unmanned aircraft operations to any member who has the knowledge, skills and abilities to safely and effectively manage the operation.

33.5. Remote Pilot in Command (PIC)

- 33.5.1. The Pilot of the UAS shall be the Pilot-in-Command (“PIC”) who has all the responsibility and authority of the PIC as described by 14 C.F.R. 91.3, *Responsibility and Authority of the Pilot in Command*.

- 33.5.2. The PIC has ultimate responsibility for the safe operation of the UAS. The PIC has the final decision on whether to initiate or terminate any flight.
- 33.5.3. The PIC shall maintain operational control throughout the flight through at least one of the following methods.
 - 33.5.3.1. The PIC is the sole person on the controls.
 - 33.5.3.2. Two or more PICs holding Remote Pilot Certifications are transferring operational control and:
 - 33.5.3.2.1. Both are capable on maintaining Visual Line of Sight
 - 33.5.3.2.2. Is able to positively communicate transfer of control.
 - 33.5.3.3. The PIC is directly supervising a person who does not hold a current, valid remote pilot certificate or the PIC has the ability to take immediate control through one of the following methods:
 - 33.5.3.3.1. The operation uses two control stations (CS): one for the person manipulating the flight controls and one for the remote PIC that allows the remote PIC to override the other CS.
 - 33.5.3.3.2. The remote PIC stands close enough to physically take over the CS from the other person.
 - 33.5.3.3.3. An automation system could be engaged by PIC to put the small UA in a pre-programmed “safe” mode (such as in a hover, in a holding pattern, or “return home”).
- 33.5.4. Duties and Responsibilities
 - 33.5.4.1. PICs will retain physical control and accountability for the Unmanned Aircraft whether on or off duty. Additional elements of the Unmanned Aircraft System, such as the sensors and related equipment will be issued by the Watch Commander at the beginning of each shift.
 - 33.5.4.2. PICs will evaluate all missions. It is the pilot’s responsibility to recognize and refuse to perform a mission that, in their judgment, is not safe. The pilot’s word is final as to whether the flight is feasible and can be conducted in a safe and efficient manner.
 - 33.5.4.3. If at any time, the UAS Unit Supervisor (as defined in Part 9.7, below) feels that a flight or operation is unsafe and request that it be terminated for safety reasons, it is the PIC’s responsibility to comply with such requests in a professional manner.
 - 33.5.4.4. Before departure, the PIC must understand the mission request and have all applicable and updated maps and charts and manuals at the ground control station. Additionally, the pilot is required to be aware of weather forecasts, winds, hazards, temporary flight restrictions, NOTAMs and all pertinent information necessary to perform the mission.

- 33.5.4.5. The PIC must conduct a check of the UAS and verify that it is in safe operating condition prior to each flight.
- 33.5.5. Qualifications
 - 33.5.5.1. The PIC must have a Remote Pilot Certificate with a small UAS (UAS) rating.
 - 33.5.5.2. The PIC must complete an aeronautical knowledge test every 24 months.
 - 33.5.5.3. The PIC shall maintain an understanding of the normal, abnormal and emergency procedures of the UAS.
 - 33.5.5.4. The PIC shall maintain an appropriate level of understanding of the Federal Aviation Regulations applicable to the airspace where UAS operations will occur.
 - 33.5.5.5. No one may act as PIC unless they have read and familiarized themselves with the contents of this Manual, as well as the Manufacturer's Manual for the UAS to be flown.
 - 33.5.5.6. The PIC shall comply with the ongoing training and certification standards established by JCPD.
- 33.6. Visual Observer.
 - 33.6.1. The use of a VO is required.
 - 33.6.2. The remote PIC must use a VO to supplement situational awareness and VLOS.
 - 33.6.3. Although the remote PIC and person manipulating the controls must maintain the capability to see the UA, using one or more VOs allows the remote PIC and person manipulating the controls to conduct other mission-critical duties (such as checking displays) while still ensuring situational awareness of the UA.
 - 33.6.4. The VO must be able to effectively communicate:
 - 33.6.4.1. The small UA location, attitude, altitude, and direction of flight;
 - 33.6.4.2. The position of other aircraft or hazards in the airspace; and
 - 33.6.4.3. The determination that the UA does not endanger the life or property of another.
 - 33.6.5. VO Responsibility
 - 33.6.5.1. Scan the airspace where the small UA is operating for any potential collision hazard,
 - 33.6.5.2. Maintain awareness of the position of the small UA through direct visual observation.
 - 33.6.6. Method of communication between VO and PIC.
 - 33.6.6.1. The communication method must be determined prior to operation. This effective communication requirement would permit the use of communication-assisting devices, such as a hand-held radio, to facilitate communication from a distance.

33.6.7. Qualifications

- 33.6.7.1. The VO shall have sufficient knowledge of the airspace in which the work detailed in this Manual will be performed to permit them to adequately assess the risks posed by other aircraft or objects.
- 33.6.7.2. The VO must have 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.
- 33.6.7.3. The VO shall have knowledge of basic Visual Flight Rules weather minimums.
- 33.6.7.4. The VO shall maintain a thorough understanding of all normal, abnormal, and emergency operational aspects of the UAS.

33.7. Payload Operator

- 33.7.1. It is the duty of the Payload Operator (if any) to control and direct the operation of any remote sensing equipment or mission payloads carried by the UAS.
- 33.7.2. The Payload Operator does not have the authority to require the PIC to maneuver the aircraft in any unsafe manner, or in any manner that violates the FARs.
- 33.7.3. No one may act as a Payload Operator unless they have read and familiarized themselves with the contents of this Manual, as well as any additional manuals for the sensor to be operated.

33.8. UAS Unit Supervisor

- 33.8.1. The JCPD UAS Unit Supervisor will be responsible for the overall development and maintenance of the JCPD UAS program.

34. Operational Area and Airspace Control

34.1. General Safety Policies and Procedures

- 34.1.1. Compliance with the policies and procedures of this Manual ensure compliance with JCPD's safety policies and procedures.
- 34.1.2. The Operations Manager has ultimate responsibility to ensure field operations are conducted within the tolerances of this Manual, the FARs, State and Local laws, and in accordance with applicable Manufacturer's Manuals.

34.2. Prohibited Operation Over Persons

- 34.2.1. The PIC shall not fly the UA directly over a person who is not under a safe cover, such as a protective structure or a stationary vehicle.
- 34.2.2. The UA may be flown over a person who is directly participating in the operation of the UAS, such as the remote PIC, other person manipulating the controls, a VO, or crewmembers necessary for the safety of the UAS operation, as assigned and briefed by the remote PIC.

34.3. Area Security

- 34.3.1. To the maximum extent possible, the PIC will select an operational area (site) that is clearly unpopulated/uninhabited.

- 34.3.2. If selecting a site that is populated/inhabited, the PIC shall have a plan of action which ensures persons remain clear of the operating area, remain indoors, or remain under safe cover until such time that the small UA flight has ended.
 - 34.3.3. Safe cover is a structure or stationary vehicle that would protect a person from harm if the small UA were to crash into that structure or vehicle;
 - 34.3.4. The remote PIC will take reasonable precautions to keep free of persons not directly participating in the operation of the UAS;
 - 34.3.5. The remote PIC will post prominent signs announcing the operation and, where applicable, use personnel on the ground to announce the unexpected presence of non-participants to avoid overflight.
- 34.4. Take-off and Landing Zones
- 34.4.1. All operations require a JCPD employee to designate a take-off zone, landing zone, and lost link/emergency termination zone; however, the pilot retains the right to change or modify that selection if potentially unsafe conditions exist.
 - 34.4.2. Take-off and landing zones shall be designated with the use of high-visibility markers in the form of traffic cones, caution tape or other appropriate signage.
 - 34.4.3. These zones may be the same location or different locations depending on the needs of the mission.
 - 34.4.4. Prior to operation, these zones shall be cleared of all persons not involved in the operation.
 - 34.4.5. All non-essential personnel and nonparticipating persons must remain outside of the landing zone while the UAS is taking off or landing.
 - 34.4.6. Markings and other appropriate measures will be taken to ensure that persons do not enter these areas while the operation is in progress.
 - 34.4.7. Site Selection
 - 34.4.7.1. The landing zones shall provide sufficient space to safely land and launch the aircraft in accordance with procedures in the Manufacturer's Manual.
 - 34.4.7.2. The landing zone should be as safe and secure as possible. The zones should be free of any obstacles or hazards to the safe conduct of the flight, including but not limited to:
 - 34.4.7.2.1. Nonparticipating persons
 - 34.4.7.2.2. Trees or tall brush
 - 34.4.7.2.3. Fences
 - 34.4.7.2.4. Large rocks
 - 34.4.7.2.5. Towers
 - 34.4.7.2.6. Poles
 - 34.4.7.2.7. Overhead wires
 - 34.4.7.2.8. Dust and small pieces of debris
 - 34.4.7.2.9. Vehicles

34.4.7.2.10. Fresh snow (snow can be tamped down)

34.4.7.3. When possible, locate landing areas so that takeoffs and landings may be made into the prevailing winds.

35. Pre-Flight Assessment

35.1. Briefings

35.1.1. Briefing is an essential part of conducting UAS operations in a safe and efficient manner. On the day of the flight prior to the start of UAS operations, the PIC shall brief all Flight Personnel on the goals, objectives and key safety considerations of the planned UAS operation. The intent is to cover all operation aspects of the mission and to promote full understanding among all flight personnel. The guidelines for conducting Flight Personnel briefings are listing below. The briefing shall include, but is not limited to:

- 35.1.1.1. Abnormal and emergency procedures as defined in Section 14 of this Manual and how they will be applied to the specific mission;
- 35.1.1.2. The roles and responsibilities of the PIC, Observer, and Payload Operator for the specific mission;
- 35.1.1.3. The communication plan;
- 35.1.1.4. Any contingency plan;
- 35.1.1.5. Lost VLOS procedures;
- 35.1.1.6. Weather reports;
- 35.1.1.7. Proximity to potential air traffic;
- 35.1.1.8. Abort parameters in accordance with the Manufacturer's Manual;
- 35.1.1.9. Threats to current mission;
- 35.1.1.10. Any mission parameters impacted by the issuance of a Notice to Airmen (“NOTAM”).

35.1.2. Public safety must be addressed at every briefing to mitigate all risks from JCPD flight operations. Identify all public safety hazards, whenever possible, prior to the day of the flight. All hazards must be identified and mitigated before the flight. If conditions change, flight personnel must re-brief to discuss the changing conditions.

35.2. The PIC is responsible for conducting a pre-flight assessment.

- 35.2.1. Local weather conditions.
- 35.2.2. Local airspace.
- 35.2.3. Any flight restrictions, including checking NOTAMS.
- 35.2.4. The location of persons and property on the surface, and
- 35.2.5. Other ground hazards.

35.3. Equipment check.

- 35.3.1. Ensure that all control links between the CS and the small UA are working properly.
- 35.3.2. Ensure there is sufficient power to continue controlled flight operations to a normal landing.
 - 35.3.2.1. One of the ways that this could be done is by following the UAS manufacturer’s operating manual power consumption tables.

- 35.3.2.2. Another method would be to include a system on the UAS that detects power levels and alerts the remote pilot when remaining aircraft power is diminishing to a level that is inadequate for continued flight operation.
- 35.3.3. Ensure that any object attached or carried by the small UA is secure and does not adversely affect the flight characteristics or controllability of the aircraft.
- 35.3.4. Ensure that all necessary documentation is available for inspection, including the remote PIC's remote pilot certificate, aircraft registration (if required), and Certificate of Waiver ("CoW") (if applicable).

36. Normal Flight Operations

36.1. General

- 36.1.1. A Normal Flight Operation is any flight that is not conducted for training or maintenance purposes.
- 36.1.2. A Normal Flight Operation does not include any flight conducted pursuant to Certificate of Waiver.
- 36.1.3. Normal Flight Operations are limited to speeds at or below 30 mph.
- 36.1.4. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough power for the UAS to conduct the intended operation and to operate for at least 5 minutes or with the reserve power recommended by the UAS manufacturer if greater.
- 36.1.5. The PIC shall be responsible for monitoring radio communication on guard channels (121.5 MHz and 243.0 MHz) and on the appropriate local aircraft frequencies. This shall be accomplished with a portable aviation radio with a minimum of 5 Watts TX Output Power.
- 36.1.6. The PIC shall be responsible for possessing either digital or paper copies of the relevant VFR sectional for the intended area of operations.

36.2. Visual Line of Sight (VLOS) Operations

36.2.1. General

- 36.2.1.1. The remote PIC, the person manipulating the controls, and the VO must be able to see the small UA at all times during flight.

36.2.2. Loss of VLOS

- 36.2.2.1. The person maintaining VLOS may have brief moments in which he or she is not looking directly at or cannot see the small UA, but still retains the capability to see the UA or quickly maneuver it back to VLOS.
- 36.2.2.2. These moments can be for the safety of the operation (e.g., looking at the controller to see battery life remaining) or for operational necessity.
- 36.2.2.3. For operational necessity, the remote PIC or person manipulating the controls may intentionally maneuver the UA so that he or she loses sight of it for brief periods of time. Should the remote PIC or

person manipulating the controls lose VLOS of the small UA, he or she must regain VLOS as soon as practicable. (For example, a remote PIC stationed on the ground utilizing a small UA to inspect a rooftop may lose sight of the aircraft for brief periods while inspecting the farthest point of the roof.)

- 36.2.2.4. If VLOS cannot be regained within a brief period time, the remote PIC or person manipulating the controls should follow pre-determined procedures for a loss of VLOS.

36.2.3. Unaided Vision.

- 36.2.3.1. VLOS must be accomplished and maintained by unaided vision, except vision that is corrected using eyeglasses (spectacles) or contact lenses.
- 36.2.3.2. Persons manipulating the controls, and VOs shall maintain 20/20 distant vision acuity (corrected) and normal field of vision.
- 36.2.3.3. Vision aids, such as binoculars, may be used only momentarily to enhance situational awareness. For example, the remote PIC, person manipulating the controls, or VO may use vision aids to avoid flying over persons or conflicting with other aircraft.
- 36.2.3.4. There are no restrictions or prohibitions on LASIK or other corrective measures provided that actual visual acuity meets the standards set forth above.

36.3. Altitude

- 36.3.1. The UA cannot be flown higher than 400 feet above ground level (“AGL”), unless flown within a 400-foot radius of a structure and does not fly higher than 400 feet above the structure’s immediate uppermost limit;

36.4. Visibility

- 36.4.1. Minimum visibility, as observed from the location of the CS, may not be less than 3 statute miles (sm); and
- 36.4.2. Minimum distance from clouds being no less than 500 feet below a cloud and no less than 2000 feet horizontally from the cloud.
- 36.4.3. One of the ways to ensure adherence to the minimum visibility and cloud clearance requirements is to obtain local aviation weather reports that include current and forecast weather conditions.
- 36.4.4. If there is more than one local aviation reporting station near the operating area, the remote PIC should choose the closest one that is also the most representative of the terrain surrounding the operating area.
- 36.4.5. If local aviation weather reports are not available, then the remote PIC may not operate the small UA if he or she is not able to determine the required visibility and cloud clearances by other reliable means.
- 36.4.6. The PIC shall not operate the UA above any cloud, or when obstructions to visibility, such as smoke or a cloud, are between the UA and the remote PIC.

36.5. Operations During Daylight and Twilight

36.5.1. General

36.5.1.1. All operations must be conducted during daylight or twilight.

36.5.1.2. Night operations are prohibited.

36.5.2. Determining night, day, and twilight hours.

36.5.2.1. Night is defined as the time between the end of evening civil twilight and the beginning of morning civil twilight, as published in The Air Almanac, converted to local time.

36.5.2.2. In the continental United States (CONUS), evening civil twilight is the period of sunset until 30 minutes after sunset and morning civil twilight is the period of 30 minutes prior to sunrise until sunrise.

36.5.2.3. Air Almanac tables can be downloaded from the Naval Observatory at <http://aa.usno.navy.mil/publications/docs/aira.php>.

36.5.3. Lighting requirements.

36.5.3.1. Any UA operating during civil twilight must be equipped with anti-collision lights visible for at least 3 statute miles.

36.5.3.1.1. This distance may be reduced by the PIC in the interest of safety.

36.5.3.2. No lighting is required for daytime operation.

36.6. Take-Off/Flight

36.6.1. All flight operations will be conducted in accordance with the Manufacturer's Manual.

36.6.2. All Flight Personnel shall remain at his or her station during takeoff, landing, recovery, and other critical phases of flight, except when performing those duties required for the safe operation of the aircraft.

36.6.3. The UAS may not be operated by the PIC from any moving device or vehicle except in rural areas or from a boat on the water.

36.6.4. Under no circumstances will the UAS be operated from a moving aircraft.

36.7. Recovery

36.7.1. All UAS landing and recovery will be accomplished in accordance with the Manufacturer's Manual.

36.7.2. The UAS landing and recovery will take place at the pre-designated landing zone.

36.8. Shutdown/Post-Flight

36.8.1. UAS shutdown and post flight actions will be taken in accordance with the Manufacturer's Manual.

36.8.2. A flight personnel member shall complete a post-flight summary that documents the following information:

36.8.2.1. Date;

- 36.8.2.2. Flight Location;
 - 36.8.2.3. Project Name;
 - 36.8.2.4. PIC Name and Pilot's License Number;
 - 36.8.2.5. Observer Name;
 - 36.8.2.6. Payload Operator Name (if any);
 - 36.8.2.7. Launch and Recovery Times;
 - 36.8.2.8. Duration of Operation;
 - 36.8.2.9. Any issues encountered during the operation that should be addressed before subsequent operations.
- 36.8.3. The Operations Manager shall document any safety related incidents, including any mechanical irregularities encountered during the flight operation.
- 36.8.4. In the event a lost-link is encountered during the UAS operation, the Operations Manager shall document the event in the UAS Flight Log.
- 36.8.5. Flight personnel shall also take the following post-flight actions:
- 36.8.5.1. Conduct post-flight aircraft inspection;
 - 36.8.5.2. Disassemble the UAS per the Manufacturer's Manual;
 - 36.8.5.3. Place the batteries in their chargers;
 - 36.8.5.4. Place the UAS securely in its storage case;
 - 36.8.5.5. Make an entry in a UAS Flight Log.
 - 36.8.5.6. Conduct a briefing of any issues or non-normal events encountered during flight operations.

37. Operations Conducted Pursuant to a Certificate of Waiver

37.1. General

- 37.1.1. A Certificate of Waiver (CoW) will allow a UAS operation to deviate from certain provisions of part 107.
- 37.1.2. All requests to obtain a CoW will be directed to the JCPD UAS Unit Supervisor.
- 37.1.3. All current waivers are contained in Appendix B.
- 37.1.4. All operations conducted pursuant to a CoW shall be governed by a specified supplemental CoW operational manual.

37.2. Waivable Sections of Part 107

- 37.2.1. Operation from a moving vehicle or aircraft.
- 37.2.2. Daylight operation.
- 37.2.3. Visual line of sight aircraft operation.
- 37.2.4. Visual observer.
- 37.2.5. Operation of multiple small unmanned aircraft systems.
- 37.2.6. Yielding the right of way.

- 37.2.7. Operation over people.
- 37.2.8. Operation in certain airspace.
- 37.2.9. Operating limitations for small unmanned aircraft.
 - 37.2.9.1. Airspeed
 - 37.2.9.2. Altitude
 - 37.2.9.3. Weight

38. Abnormal and Emergency Flight Operations

38.1. General

- 38.1.1. An in-flight emergency is an unexpected and unforeseen serious occurrence or situation that requires urgent, prompt action. During an emergency, the PIC is permitted to deviate from this manual and from the rules in Part 107 to the extent necessary to respond to the emergency.
- 38.1.2. Emergency action should be taken in a way as to minimize injury or damage to property.
- 38.1.3. The recommended procedures for addressing various types of emergencies and critical situations are provided by this Section and in the Manufacturer's Manual. These procedures are suggested as the best practice for coping with the particular condition described, but are not a substitute for sound judgment and common sense. Pilots and all Flight Personnel engaged in UAS operations under this Manual should familiarize themselves with procedures given in this Section and the Manufacturer's Manual, and be prepared to take appropriate action should an emergency arise.

38.2. Policy and Procedure

- 38.2.1. It is the responsibility of the PIC to adequately brief all Flight Personnel on known possible threats surrounding the operation.
- 38.2.2. The Pre-flight brief shall cover the roles and responsibilities of all Flight Personnel in the event of an in-flight emergency.

38.3. Emergency Procedures

- 38.3.1. The UAS will abort the flight in the event of unpredicted obstacles or emergencies. Response to emergency situations related to the UAS shall be conducted in accordance with this Manual and the Manufacturer's Manual.
- 38.3.2. In an emergency situation involving the safety of persons or property, which requires immediate decisions and actions, the PIC or any other appropriate JCPD Flight Personnel may take action that is considered necessary under the circumstances to ensure safety. The PIC shall keep the appropriate ATC facilities fully informed when an in-flight UAS emergency could potentially impact operations of aircraft in navigable airspace.
- 38.3.3. JCPD will investigate and document any such deviations. The PIC shall be prepared to provide any written report requested by the FAA concerning the emergency.

38.4. System Failures

38.4.1. Response to system non-normal situations related to the UAS shall be conducted in accordance with the predetermined, site-specific contingency plans and abort procedures for emergency flight termination, as well as any additional guidance provided by the Manufacturer's Manual.

38.4.2. JCPD shall maintain a record of all system failures.

38.5. Lost-Link Procedures

38.5.1. If the aircraft loses communications or loses its GPS signal, the aircraft is equipped with failsafe hardware which allows the aircraft to “Go-Home” and land from its original launch location. Lost-link response procedures will be in accordance with the predetermined, site-specific contingency plans and abort procedures for emergency flight termination, as well as any additional guidance provided by the Manufacturer's Manual.

38.5.2. JCPD shall maintain a log of all Lost-links encountered during flight operations.

39. Training Flights

39.1. General

39.1.1. Before performing any UAS operations described in this Manual, pilots, observers, sensor operators, and other Flight Personnel must complete required training to JCPD standards. Training will afford employees the ability to safely work around a UAS and identify and mitigate risks and potential hazards that could be encountered during flight/filming operations.

39.1.2. Training flights are performed for the sole purpose of either gaining experience flying UAS in general or in meeting currency requirements for specific UASs used by JCPD for operations under this Manual.

39.1.3. All training flights shall occur during designated training sessions on private property that is either owned/controlled by JCPD or on third party property with the consent of the owner/controller.

39.1.4. All training flights are subject to the area and airspace control requirements of this Manual.

40. Accident/Incident Reporting

40.1. General

40.1.1. The remote PIC of the UAS is required to report an accident to the FAA within 10 days if it meets any of the following thresholds:

40.1.1.1. At least serious injury to any person or any loss of consciousness. A serious injury is an injury that qualifies as Level 3 or higher on the Abbreviated Injury Scale (AIS) of the Association for the Advancement of Automotive Medicine (AAAM). The AIS is an anatomical scoring system that provides a means of ranking the severity of an injury and is widely used by emergency medical personnel. Within the AIS system, injuries are ranked on a scale of 1 to 6, with Level 1 being a minor injury, Level 2 is moderate, Level 3 is serious, Level 4 is severe, Level 5 is critical, and Level

6 is a nonsurvivable injury. The FAA currently uses serious injury (AIS Level 3) as an injury threshold in other FAA regulations.

40.1.1.1.1. Note: It would be considered a “serious injury” if a person requires hospitalization, but the injury is fully reversible (including, but not limited to, head trauma, broken bone(s), or laceration(s) to the skin that requires suturing).

40.1.1.2. Damage to any property, other than the small UA, if the cost is greater than \$500 to repair or replace the property (whichever is lower).

40.1.1.2.1. Note: For example, a small UA damages a property whose fair market value is \$200, and it would cost \$600 to repair the damage. Because the fair market value is below \$500, this accident is not required to be reported. Similarly, if the aircraft causes \$200 worth of damage to property whose fair market value is \$600, that accident is also not required to be reported because the repair cost is below \$500.

40.1.2. Submitting the Report.

40.1.2.1. The accident report must be made within 10 calendar-days of the operation that created the injury or damage.

40.1.2.2. The report may be submitted to the appropriate FAA Regional Operations Center (ROC) electronically or by telephone.

40.1.2.3. Electronic reporting can be completed at www.faa.gov/uas/.

40.1.2.4. Telephone reporting may be conducted by calling 404-305-5156.

40.1.2.5. The report should include the following information:

40.1.2.5.1. UAS remote PIC’s name and contact information;

40.1.2.5.2. UAS remote PIC’s FAA airman certificate number;

40.1.2.5.3. UAS registration number issued to the aircraft, if required (FAA registration number);

40.1.2.5.4. Location of the accident;

40.1.2.5.5. Date of the accident;

40.1.2.6. Time of the accident;

40.1.2.7. Person(s) injured and extent of injury, if any or known;

40.1.2.8. Property damaged and extent of damage, if any or known; and

40.1.2.9. Description of what happened.

40.1.3. National Transportation Safety Board (NTSB) Reporting.

40.1.3.1. In addition to the report submitted to the ROC, and in accordance with the criteria established by the NTSB certain UAS accidents must also be reported to the NTSB. For more information, visit www.nts.gov.

41. Maintenance

41.1. Maintenance and Inspection Procedures

41.1.1. Pre-flight inspection

- 41.1.1.1. Visual condition inspection of the UAS components;
- 41.1.1.2. Airframe structure (including undercarriage), all flight control surfaces, and linkages;
- 41.1.1.3. Registration markings, for proper display and legibility;
- 41.1.1.4. Moveable control surface(s), including airframe attachment point(s);
- 41.1.1.5. Servo motor(s), including attachment point(s);
- 41.1.1.6. Propulsion system, including power plant(s), propeller(s), rotor(s), ducted fan(s), etc.;
- 41.1.1.7. Verify all systems (e.g., aircraft and control unit) have an adequate energy supply for the intended operation and are functioning properly;
- 41.1.1.8. Avionics, including control link transceiver, communication/navigation equipment, and antenna(s);
- 41.1.1.9. Calibrate UAS compass prior to any flight;
- 41.1.1.10. Control link transceiver, communication/navigation data link transceiver, and antenna(s);
- 41.1.1.11. Display panel, if used, is functioning properly;
- 41.1.1.12. Check ground support equipment, including takeoff and landing systems, for proper operation;
- 41.1.1.13. Check that control link correct functionality is established between the aircraft and the CS;
- 41.1.1.14. Check for correct movement of control surfaces using the CS;
- 41.1.1.15. Check onboard navigation and communication data links;
- 41.1.1.16. Check flight termination system, if installed;
- 41.1.1.17. Check fuel for correct type and quantity;
- 41.1.1.18. Check battery levels for the aircraft and CS;
- 41.1.1.19. Check that any equipment, such as a camera, is securely attached;
- 41.1.1.20. Verify communication with UAS and that the UAS has acquired GPS location from at least four satellites;
- 41.1.1.21. Start the UAS propellers to inspect for any imbalance or irregular operation;
- 41.1.1.22. Verify all controller operation for heading and altitude;
- 41.1.1.23. If required by flight path walk through, verify any noted obstructions that may interfere with the UAS; and
- 41.1.1.24. At a controlled low altitude, fly within range of any interference and recheck all controls and stability.

41.1.2. Scheduled Maintenance

- 41.1.2.1. Prior to flight, the remote PIC is responsible for conducting a check of the UAS and verifying that it is actually in a condition for safe operation.
- 41.1.2.2. The operator should maintain the UAS and its components in accordance with manufacturer's instructions.

41.1.3. Unscheduled Maintenance.

- 41.1.3.1. During the course of a preflight inspection, the remote PIC may discover that a UAS component is in need of servicing (such as lubrication), repair, modification, overhaul, or replacement outside of the scheduled maintenance period as a result of normal flight operations or resulting from a mishap.
- 41.1.3.2. In addition, the UAS manufacturer or component software manufacture may require an unscheduled system software update to correct a problem.
- 41.1.3.3. In the event such a condition is found, the remote PIC should not conduct flight operations until the discrepancy is corrected.

41.1.4. Performing Maintenance.

- 41.1.4.1. In some instances, the UAS or component manufacturer may require certain maintenance tasks be performed by the manufacturer or by a person or facility (personnel) specified by the manufacturer. In such instances such specified personnel or facilities shall be used.

41.2. Documenting Maintenance

- 41.2.1. All maintenance performed on an aircraft shall be documented and recorded in a Maintenance Log, including any malfunctions encountered, parts removed, parts replaced, and whether the aircraft is airworthy after any maintenance procedure. The UAS Maintenance Log entry shall contain:
 - 41.2.1.1. Date the work was performed;
 - 41.2.1.2. Make, model, and serial or N-number of the aircraft;
 - 41.2.1.3. Maintenance technician name;
 - 41.2.1.4. Aircraft total time;
 - 41.2.1.5. Details of work performed;
 - 41.2.1.6. Details of any modifications to the aircraft;
 - 41.2.1.7. Details and total time of any replacement components;
 - 41.2.1.8. Details of any malfunctions encountered;
 - 41.2.1.9. Software or firmware version number if the existing software or firmware is updated, removed, or reinstalled;
 - 41.2.1.10. Status of the aircraft once maintenance procedures are completed;
 - 41.2.1.11. Any other matter affecting the aircraft's readiness for flight

41.2.2. All aircraft must be maintained in accordance with any Airworthiness Directive or required manufacturer's Safety/Service Bulletin.

41.2.3. Frequency of Maintenance Inspections

41.2.3.1. The period between routine maintenance inspections of the aircraft and its operational components, shall be in accordance with the appropriate Manufacturer's Manual.

41.3. Maintenance Technician

41.3.1. General

41.3.1.1. JCPD will designate qualified maintenance technicians for all maintenance performed on the UAS and its components.

41.3.2. Responsibilities:

41.3.2.1. Oversee and be responsible for the airworthiness of the aircraft;

41.3.2.2. Maintain all required documentation for the aircraft in a timely fashion;

41.3.2.3. Be familiar with all aspects of aircraft operations, theory, and maintenance;

41.3.2.4. Be able to troubleshoot and solve issues related to all flight components;

41.3.2.5. The name of the Maintenance Technician performing the work shall be listed on all maintenance documents maintained by JCPD.

41.3.3. Qualification:

41.3.3.1. Shall be familiar with the operation, theory of operation, and maintenance aspects of the aircraft;

41.3.3.2. Shall demonstrate qualification via written/oral and practical examination over relevant parts of this Manual, and the relevant Manufacturer's Manual by a designee of JCPD, to include, but not limited to:

41.3.3.2.1. Airframe / Structural Components;

41.3.3.2.2. Flight Controller or Autopilot / Stability Systems;

41.3.3.2.3. Radio Command and Control Systems, including Controllers, Transmitters, Receivers, Antennas, and/or Wiring;

41.3.3.2.4. Image-Capture Airborne and Ground-Based Systems;

41.3.3.2.5. Required On-Screen-Display and Telemetry;

41.3.3.2.6. Power Distribution Board, or Main Power Bus Wiring or Harness;

41.3.3.2.7. Motors;

41.3.3.2.8. Propellers;

41.3.3.2.9. Actuators or Servos;

41.3.3.2.10. Batteries;

41.3.3.2.11. Additional Ground-Station Hardware, Software, and/or Firmware.

41.4. Functional Test Flights

41.4.1. Any maintenance action or alteration performed that affects the aircraft's operation or flight characteristics, *e.g.*, replacement of a flight critical component, must undergo a functional test flight in accordance with this Manual.

41.4.2. Components that will require flight-testing after their replacement will include, but not limited to:

41.4.2.1. Airframe/Structural Components;

41.4.2.2. Flight Controller or Autopilot/Stability Systems;

41.4.2.3. Radio Transmitters;

41.4.2.4. Radio Transmitter Antennas;

41.4.2.5. Power Distribution Boards;

41.4.2.6. Power Wiring Harnesses;

41.4.2.7. Servo Wiring or Flight Controller Wiring;

41.4.2.8. Motors;

41.4.2.9. Actuators or Servos;

41.4.2.10. Controller Hardware, Software, or Firmware.

41.4.3. Flight tests will comply with all provision of this Manual and shall:

41.4.3.1. Involve at least 15 minutes total of flight time;

41.4.3.2. Initially be conducted at a low altitude.

41.4.4. The PIC whom conducts the functional flight test must make an entry in the aircraft Flight.

42. Recordkeeping

42.1. General

42.1.1. JCPD will maintain documentation of all UAS activities conducted under the provisions of this Manual.

42.1.2. All documentation shall be made available for review upon request by the Administrator.

42.2. Flight Personnel Records

42.2.1. JCPD will maintain individual qualification, training, and currency records for all flight personnel.

42.3. Pre-Flight Inspection Records

42.3.1. JCPD will maintain records for each pre-flight inspection.

42.4. Post Flight Summaries

42.4.1. JCPD will maintain Post Flight Summaries as required by this Manual. Post flight summaries may be used to establish the operational history of the UAS, as necessary.

42.5. Incident Reports

42.5.1. JCPD will maintain a record of any accidents, incidents or deviations encountered during flight operations.

42.6. Lost-Link Report

42.6.1. JCPD will maintain records of any lost-link encountered during flight operations.

42.7. Maintenance Records

42.7.1. JCPD will maintain records of all UAS maintenance, preventative maintenance, inspections, repairs, modifications, alterations and overhauls.

42.8. Flight Logs

JCPD shall maintain a record of all flights using a flight log.

