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PART 05: GENERAL OPERATIONS

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I. PURPOSE

The purpose of this policy is to provide the operational procedures of the unmanned aircraft system.

II. SCOPE

This policy shall apply to all San Diego Fire-Rescue Department (SDFD) personnel.

III. AUTHORITY

The fire chief authorizes the information within this policy.

IV. DEFINITIONS

- A. Aircraft Flight Log: Flight record book used to document individual flight activities.
- B. Preventive Maintenance: Simple, or minor adjustments or the replacement of standard parts not involving complex assembly operations.
- C. Scheduled Maintenance/System Upgrades: Periodic maintenance on system components including both hardware and software at known intervals, or when required and can be scheduled.
- D. System Maintenance Records: Comprehensive records documenting all maintenance to the UAS.
- E. Unscheduled Maintenance: Repairs to system in response to mechanical, or software deficiencies.

V. POLICY

UAS operations will be conducted in compliance with Part 107 of the Federal Aviation Regulations or under a Federal Aviation Administration (FAA) issued Certificate of Authorization (COA).

All flights will be approved by a supervisor and must be for a legitimate public safety mission that has been identified and approved in this manual.

No flights will be authorized if prohibited by this manual, by regulatory authority, or if in the judgment of the pilot it cannot be done safely.

- A. Authorized Uses of UAS

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1. Incident Command and Control
 - a. UAS can be used to give incident commanders (IC) an aerial perspective of the event being managed to get a more complete understanding of its nature and scope and to facilitate response planning.
 - b. Such incidents may include any evolving incident scene, including bomb incidents, fires, hazmat incidents, search and rescue incidents, lifeguard incidents and to provide hazard identification and overall situational awareness.
 - c. All requests for UAS support shall be routed through the incident commander and must conform to all policies and procedures contained in this manual.
2. Aerial Photography
 - a. A UAS may also be used to collect video/photographs or other sensor data to document natural disasters, training, or other events where an aerial perspective will be of value.

B. Requests for Air Support

1. Requests for planned events should be forwarded to the UAS program manager as far in advance as possible.
2. Requests for immediate assistance shall be made to on-duty bomb technicians, or referred to an on-call crew member(s) if such personnel are designated.
3. All requests for UAS deployment must be for a legitimate public safety mission described above and be authorized by a supervisor.

C. Mission Priorities

1. In general terms, calls are prioritized as follows (listed in order of importance):
 - a. Bomb squad incidents
 - b. Fire/hazmat incidents
 - c. Search and rescue operations
 - d. Situational awareness on incidents
 - e. Post incident documentation flights
 - f. Requests to support other government agencies

D. Flights Leaving Agency Jurisdiction

1. Requests for support from other government agencies within, or outside the department's jurisdiction shall be forwarded up the chain of command for consideration.

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2. In any case, the policies and procedures outlined in this manual will be followed regardless of what may be requested by the other agency.

E. UAS Crew Requirements and Qualifications

1. Minimum Flight Crew

- a. By FAA regulation, the required minimum flight crew consists only of a remote pilot in command (RPIC).
- b. Other crewmembers will include one or more visual observers.
- c. The number of personnel assigned to the UAS operation affects the ability to successfully complete the mission and the ability to comply with the requirement to be able to see the unmanned aircraft throughout the entire flight. The FAA recognizes that the person maintaining visual line of sight (VLOS) of the air vehicle may lose sight of the unmanned aircraft for brief moments of the operation. This may be necessary either because the small unmanned aircraft momentarily travels behind an obstruction or to allow the person maintaining VLOS to perform actions such as scanning the airspace or briefly looking down at the UAS control station. However, it is emphasized that even though the RPIC may briefly lose sight of the unmanned aircraft, he or she is responsible for the see-and-avoid provisions set out in Federal Aviation Regulations (FAR) Part 107.
- d. The RPIC should confer during pre-flight planning to determine the minimum number of personnel required to safely and effectively conduct the flight.
- e. Whatever the number of personnel used, all members of the flight crew, RPIC and the visual observer(s), must maintain effective communication with each other at all times.

F. Qualifications

1. Minimum qualifications for RPICs are established in FAR Part 107.
2. Minimum qualifications for other crewmembers are established by department policy.
3. Department UAS will only be operated by personnel who have been trained and certified in accordance with those standards and other training requirements set forth in this manual.

G. Remote Pilot in Command (RPIC)

1. The RPIC has final authority and responsibility for the operation and safety of a UAS operation.
2. Pilots have absolute authority to reject a flight based on weather, aircraft limitations, physical conditions, etc.
 - a. No member of the department, regardless of rank, can order a pilot to conduct a flight when, in the opinion of the pilot it cannot be done safely, or contravenes this manual, or aviation regulations.

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3. Pilots are responsible for compliance with this manual, Federal Aviation Regulations, FAA COA (if applicable) and any Letters of Agreement with air traffic control facilities and the system operating manual.
4. The pilot is not allowed to perform concurrent duties as pilot and visual observer.
5. The pilot shall remain at the controls of the system at all times during the flight.
6. The pilot shall be responsible for radio communications with air traffic control and other aircraft. The RPIC may delegate duties to VO or other qualified personnel as needed.
7. The pilot must land as soon as safely practical when any condition occurs that causes operations to be unsafe.
8. During operations, the pilot monitors the sensor feed/optical imagery and provides information to the incident commander, or captures video/still photography as dictated by mission requirements.
9. Post flight, the pilot is responsible for completing the Aircraft Flight Log and UAS Flight Report.

H. Visual Observer (VO)

1. The VO is considered a crewmember by FAA policy and must be a licensed pilot
2. The VO is not allowed to perform duties for more than one aircraft at a time.
3. The VO is responsible for maintaining visual line of sight with the aircraft at all times.
4. The VO will immediately communicate to the pilot information necessary to remain clear of conflicting air traffic, terrain, and obstructions, maintain proper cloud clearances and provide navigational awareness.
5. If visual contact with the air vehicle should be lost, the pilot shall command the aircraft to hover while the VO attempts to re-establish visual contact. If visual contact cannot be re-established immediately, the pilot shall command the air vehicle to return for landing.
6. During takeoffs and landings, the VO will communicate with the pilot only to the extent necessary to facilitate safe operations and will assist in keeping anyone else from attempting to communicate with the pilot. Such distractions during this critical phase of flight could lead to a mishap.

I. Crew Coordination

1. The pilot and VO will work together to form the crew, which will ultimately accomplish mission objectives.
2. In the interest of safety, both the pilot and VO must be comfortable with any decision made while working as a crew. This begins when deciding whether to accept a mission and continues throughout the mission. If there is genuine concern on the part of either the pilot, or VO, the mission should not be accepted or should be terminated.
3. Concern on the part of either crewmember should be immediately expressed to the other member. Communication is the key. Many times, reservations about something can be put to rest with a simple explanation.

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4. VO's have the right, as well as the responsibility, to question the pilot whenever they do not understand something, or are uncomfortable with certain procedures, weather, etc. Conversely, the pilot should honestly answer any questions posed to them and not feel as though he/she is being challenged, or threatened. If explanations are refused, or unclear, then it is incumbent on the VO to notify the supervisor.
5. THE CREW CONCEPT AND OPEN COMMUNICATION WILL HELP ACHIEVE SAFE AND EFFECTIVE OPERATIONS.

J. Pre and Post Flight Procedures

1. Preflight Mission Authorization
 - a. The mission requested shall be consistent with all policies and procedures defined in this manual.
 - b. The UAS program manager or their designee has approved the mission.
2. Mission Planning
 - a. The RPIC and visual observer shall familiarize themselves with all available information concerning the flight.
3. Ground Operations Site Selection Requirements
 - a. Given that the visual observer must be able to see the aircraft at all times when in flight, the ground operations location must be close enough to the incident scene to meet this requirement.
 - b. The RPIC and VO must be constantly aware of the dangers of spinning propellers and rotor blades, no matter how small. Thus, the ground operating area must be secured with only mission essential UAS personnel allowed within the perimeter.
 - c. The area must be large enough to safely allow flight operations. Size will depend on the type of air vehicle (rotary wing versus fixed wing) and launch and recovery process/equipment.
 - d. The operating area must be free of obstacles/obstructions that would present a hazard to flight and inhibit the ability of the visual observer to see the air vehicle in flight.
4. Pre-Flight Inspections/Briefings
 - a. The pilot shall conduct a thorough preflight inspection of the complete system, including sensors, in accordance with the instructions contained in the manufacturers operating manual.
 - b. The aircraft flight log shall be reviewed for mechanical discrepancies.
 - c. If during the course of the preflight any mechanical discrepancy is found, refer to the maintenance section.
 - d. The pilot and VO will assess their physical ability to conduct flight operations and will only initiate the flight or continue if they are physically able to do so.
 - e. Weather

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- 1) Prior to flight operations, the pilot shall obtain a full standard aviation weather briefing from the FAA. The pilot will ensure that he/she gathers enough information to make themselves familiar with current and forecast weather conditions existing throughout the area of operation.
 - 2) Subsequent to the original weather briefing, pilots will obtain, as necessary, sufficient weather information to ensure that the original briefing stays valid. The frequency of these additional weather checks will be determined by the severity of existing or forecast weather.
 - 3) Weather minimums, in terms of minimum ceiling and visibility will be established by FAR Part 107 or in the COA. Flight will not be attempted or continued if weather conditions do not meet these minimums, or the conditions exceed those contained in the UAS manufacturer's flight manual.
- f. If required by the COA, for operations over populated areas, a defined incident perimeter must be established from which people must be excluded to the extent possible during UAS flight. The UAS crew will work with the incident commander to establish the boundaries this perimeter. The use of a "Reverse 911" system or public address system may be used to aid in securing the area.
5. Post-Flight Procedures
- a. The pilot shall conduct a thorough inspection of the aircraft to ascertain if any damage was sustained during flight operations. If any damage is found, follow the maintenance procedures outlined below.
 - b. The pilot is responsible for proper handling of all digital multimedia evidence (DME) and/or imagery not considered DME in accordance with Section 03 Data Collection.
 - c. The pilot or VO shall complete the department flight report discussed in Section 01 Administration.

K. Communications/Notifications

1. The pilot/operator will make all required FAA notifications prior to flight.
2. Immediately prior to takeoff and after landing of the aircraft, an area wide broadcast will be made on the radio frequency used by personnel at the incident scene alerting them to the status of the air vehicle.

L. Emergency Response Plan

1. During flight, or ground operations, emergency situations may develop at any time. Examples could include an uncontrolled descent/crash of the air vehicle, someone being struck by the aircraft, or hit with a spinning propeller/rotor. The primary concern in such incidents is prevention or care of injuries to persons on the ground. Secondary concerns include protection of property, securing wreckage and conducting, or assisting with investigations.

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2. Should an emergency occur, immediately notify dispatch and request whatever assistance is needed.
3. Render first aid if required
4. Secure system wreckage if appropriate
5. Complete required agency reports

M. System Maintenance

1. A properly maintained system, including the aircraft, ground control station and other components is essential to safe operations.
2. Compliance with manufacturer's scheduled maintenance, preflight inspections and immediate repair of mechanical and/or software problems ensures the availability and safe operation of the unmanned aircraft.
3. Responsibilities
 - a. Maintenance Officer
 - 1) One member *may* be designated as the maintenance officer who will coordinate maintenance for unmanned aircraft. This assignment will be in addition to other duties. If a maintenance officer is not designated, the UAS program lead will complete the duties outlined here.
 - 2) If possible, maintenance will be scheduled when it will have the least impact on operations.
 - 3) The maintenance officer shall maintain the aircraft maintenance records.
 - 4) Prior to acting as a maintenance officer, personnel will receive proper training from the Department or manufacturer as required.
 - b. Pilot-in-Command/Operator
 - 1) Conduct a thorough preflight inspection of the entire system in accordance with the system checklist. The Discrepancy Reporting System shall be followed if problems are noted.
 - 2) The Aircraft Flight Log shall be reviewed prior to flight and the appropriate data entered at the conclusion of each flight.
 - 3) Pilots are generally not authorized to order repair work, parts, etc., from the commercial maintenance provider without prior approval. When exigent circumstances exist, pilots are authorized to order those repairs necessary to assure the aircraft is operational and safe. Such repairs shall be reported to the supervisor as soon as practical.
 - 4) In accordance with the Federal Aviation Regulations (refer to FAR Part 43.3), pilots can perform preventive maintenance. All such work must be entered into the maintenance records.

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- 5) The pilot is the final authority on whether an unmanned system is airworthy.
4. Discrepancy Reporting System
 - a. For minor problems not requiring grounding, note the problem in the Aircraft Flight Log and notify the maintenance officer, or UAS program lead.
 - b. For major problems requiring grounding, note the problem in the Aircraft Flight Log, notify the maintenance officer and UAS program lead and affix a placard to the air vehicle and ground control station indicating that the aircraft is not airworthy.
 - c. Software, hardware and firmware updates will be documented in the system maintenance records.
 5. Prohibitions
 - a. No member shall make any alterations, modifications, programming changes or perform any unauthorized maintenance to the unmanned system.