Drone as First Responder (DFR) Operations Protocol

600.1 PURPOSE

The Menifee Police Department (MPD) UAS Team's Drone as First Responder (DFR) operations is a specific use-case for drones by public safety for use in drone operations such as emergency response support, search and rescue, warrant, and special operation support.

DFR as employed by MPD consists of stationing drones with pilots within the city limits with the intent to immediately deploy them to reported emergency incidents, calls for service, or first responder requests. In many cases the drones would arrive at any given incident prior to first responders on the ground. The drone pilot, designee, and/or Incident Manager monitors the live video feed of the drone and relays intelligence to the ground units to assist in managing a safe, efficient, and effective response. The operation can be supported by a streaming option that allows others, including first responders at the scene or incident commanders at a remote location, to monitor the live feed via personal device (e.g. cell phone or tablet and app).To accomplish this, there must be drones ready to fly immediately to any location within a predetermined radius from the launch site. With the benefit of geofencing and GPS signaling from the drone, professional and experienced law enforcement or fire professionals can safely respond to and operate drones over any critical incident and tactically and safely manage the response.

600.2 LOCATION

Location: Menifee Police Department-Roof or suitable launch point

Service Location: VLOS Radius of the Police Department

600.3 EQUIPMENT

1. Flightworthy certified sUAS/drones under 55lbs
2. Radio Communications with ground personnel, MPD PSAP, Law Air
3. Telephone communications
4. Flight data recording device (computer)
5. CAD Data Access (MDC)
6. Various Operational Support Equipment (Batteries, Memory Cards, Supplies)

600.4 STANDARD DAILY ROOF_TOP (DFR) OPERATIONAL PROCEDURES

"Flight Operations Down"—There is no DFR capability, no air support available

"Flight Operational Ready" ---The UAS is ready for deployment:

1. NOTAMS completed
2. Weather conditions checked for suitability

3. Geofencing Confirmed
4. Dispatch advised
5. UAS pre-flight inspected (pre-flight checklist)
6. Power source Inspected
7. Data card inserted (empty)
8. Launch area clear for take-off
9. Relevant airspace clear (including flight path and destination point)

600.5 FLIGHT OPERATIONAL READY PROCEDURES

1. PIC determines a reported or known incident can be aided by Aerial Intelligence/Decision Quality Data (DQD) and fits one or more of the following criteria:

    a. Has a potential for Officer Safety Concerns
    b. Is a crime in progress
    c. Is an incident involving a threat or a reasonable potential threat to human life
    d. Is an incident involving fleeing subjects
    e. Is a report of a possible fire
    f. Is a report of a possible serious or no-detail vehicle accident
    g. The use of a UAS can reasonably be expected to assist in freeing up emergency personnel for response to other serious incidents
    h. At the request of any officer in the field, or the Watch Commander or any supervisor
    i. Is an incident that an officer can reasonably articulate the use of the UAS will enhance officer and community safety

2. In all cases the response will be for a known or reported incident and not for random patrol or surveillance (proactively in hopes of observing or detecting unreported criminal behavior)
3. The PIC will ensure that the UAS is recording video at the time of launch, and will continue the recording until the mission is complete and the UAS has landed
4. The PIC will ensure that the UAS has been made ready for take-off and that the launch crew is aware of the mission and intent to launch
5. The PIC will ensure that Police Dispatch is aware of the UAS response to the incident
6. The PIC and/or the RPIC will launch and navigate the UAS to the scene of the incident

7. The PIC, once the UAS is on scene, will relay relevant information via radio to assist ground units with relevant information, coordinate tactical response, and ensure the recording of police and suspect actions
8. During UAS operations, each pilot is responsible for the identical pre-flight inspections and operational protocols
9. Whenever a UAS lands after a mission, the RPIC will do the following to prepare the UAS flight ready again:
    a. Complete the pre-flight check list ensuring:
        i. Fresh batteries
        ii. New empty Data Card or sufficient space on current Data Card
        iii. Physical inspection
    b. Turn off temporarily to allow cooling when appropriate
    c. Turn on and ensure flight ready status
10. The RPIC is responsible to ensure the following occurs after and between each flight.
    a. Ensure the video data card is maintained and labeled for uploading to storage
    b. Ensure the flight data is recorded in the appropriate database (FAA spreadsheet)
    c. Ensure the video is eventually uploaded per department video evidence policy
    d. Ensure the launch area is free of hazards
    e. Assist other RPIC with VO or other flight operations
    f. Remain ready to become primary RPIC at any time
    g. Act as Safety Officer for the launch site
11. Although a Safety Officer may be formally assigned, flight operations may be stopped at any time by any crew member, supervisor, or watch commander due to identified safety reasons

600.6 EMERGENCY OPERATIONS

There are two main priorities for MPD UAS Pilots during any emergency:

1. Safety to other manned aircraft
2. Safety to people on the ground

Preservation of property on the ground is a concern, but a distant third one.

Well below all of these is the concern for the preservation of the aircraft/drone. Unlike manned aircraft, the total loss of the drone will not necessarily impact the safety of any person and should be held at the lowest priority.

Therefore, if there is a fear of a potential collision with any object in the air, especially manned aircraft, or if there is fear of potential imminent power loss to the aircraft, the pilot should immediately choose the nearest potential landing site. That type and quality of that site will depend upon the nature and urgency of the emergency.

Some factors for consideration by the pilot are:

During the incursion of manned aircraft into the airspace, the pilot should reduce altitude immediately at its current location without immediate concern for the landing area below. Once the drone is at an altitude where collision is clearly unlikely, decent can be stalled in order to determine the best location for landing with the above listed priorities in mind.

If there is any issue with the aircraft where loss of flight appears imminent, such as concern with battery health or power loss, the pilot should consider the following:

Areas of dense trees, brush, or even water may be a more suitable location to initially hover and descend over since a full power loss would minimize the risk to people and property below. A complete power loss would mean a rapid fall of the drone, and these areas are least likely to have people or damageable property below. In other words, open fields such as parks or parking lots may not always the most suitable location over which to start a decent, as people or traffic have the potential to move into that area at any given moment. Additionally, rooftops of houses or business may not be the best location over which to start a decent due to the potential for serious property damage.

Once over the selected decent location, reduce altitude as if to land. If the pilot is able to fully control the drone, and the altitude has been reduced to lessen the likelihood of serious injury or damage to people or property below, consider moving laterally to a location that is more suitable for landing a drone on its own power that would minimize the damage to the aircraft such as a driveway, open field, back yard, cul-de-sac, etc. Ideally ground personnel have been able to secure and deny access to a dedicated landing location by the time the drone must land.

600.7 EMERGENCY LANDING OPTIONS

Option 1: Reduce the drone to the minimum safe flight altitude (typically 100-150 ft. AGL):

1. This occurs whenever a manned aircraft comes in to the general flight area that could potential reduce to an altitude of 400 AGL or less.
2. This occurs regularly out of an abundance of caution as police, military, recreational aircraft, and HEMS can often been seen flying in the area, and this does not negatively impact MPD operations.
3. These typically remain well above 400 AGL and have never been observed to fly below 200 AGL except in landing or emergency situations

Option 2: Return to Home (RTH):

1. This option is appropriate whenever there is a concern about ongoing operations and the RTH can occur safely
2. This most likely would occur during a lost link incident, or when the teleoperator link between the teleoperator and the Part 107 pilot is degraded or broken

Option 3: Land Immediately (See description of process in **Immediate Landing Procedures** section below):

1. This option is appropriate whenever there is a concern about the ability of the aircraft to stay aloft or fly to a safe landing area
2. This may include incidents such as issues concern with battery health, permanent loss of camera feed, or a critical incursion into the airspace by other aircraft, birds, or any incident where a collision is with another object is possible

Option 4: Land in a safe location other than Home or directly below the drone at the time of the concern

1. Several open areas and large roof tops within the radius of the flight area have been pre-identified as safe landing areas for the drone when no ground crew is present, the drone is unable to safely RTH, and landing at the nearest safe location is unadvised

2. Due to the ability to land in almost any location safely given adequate drone control, supported by ground personnel who are able to coordinate and contain the area, this option is least likely. Additionally, these areas can change so the identification and discussion regarding these locations is ongoing during training and roll call debriefings

600.8 IMMEDIATE LANDING PROCEDURE

During an emergency such as a severe airspace incursion or a fear of imminent loss of flight, the pilot should do the following:

1. Stop all lateral movement of the aircraft
2. Point the camera down to the ground immediately below the drone (if camera is operational)
3. If the emergency involves an incursion into the airspace, immediately descend to a safe altitude (below other objects in the airspace and above objects on the ground
4. Identify and laterally move over the nearest site where, should the drone fall out of the sky, it would likely land in an area with the following criteria
    i. Will cause no or little potential injury to people on the ground
    ii. Will cause no or little potential damage to property

5. If during the decent the pilot can safely move laterally over any area that satisfies the above criteria and also will allow the drone to land with minimal damage, then the pilot may do so

i. The pilot should not do so if there is fear of imminent flight loss and the path to this landing area has people or property below
ii. The pilot is unable to fully and safely control the drone

6. At the earliest available moment, the pilot will notify all involved personnel via radio of the nature of the emergency, the intent to land immediately, and the location of the descent

7. Ground personnel should acknowledge the emergency, move the descent location, and secure the area below. If time permits, the ground personnel should also secure the nearest location where the drone can land safely and intact.

8. If the descent location and intended landing location change during the drone's decent the pilot will:
    i. Notify ground personnel of the intent to change the landing site
    ii. Move laterally over that site
    iii. Descend safely and land the aircraft

9. All emergency landings will be investigated by MPD Personnel in a manner similar to any crime or accident

    i. The scene will be secured
    ii. Evidence, including photographs, will be gathered
    iii. The incident will be recorded in the appropriate reporting manner
    iv. Supervision, including Department Command Staff will be notified
    v. An after-action review will be completed with all relevant personnel

600.9 TRAINING RELATED TO IMMEDIATE LANDING PROCEDURES

All training sessions will include discussion and practical application of emergency landing procedures.

Practical application will include the repeated demonstrated ability to:

1. Stop lateral movement
2. Move camera immediately to the downward position
3. Identify a safe decent location
4. Move laterally to that location
5. Notify via radio others of the nature of the incident and decent location
6. Safely descend the aircraft over that location

7. Once at a lower safe altitude, laterally move over a specific landing site
8. Notify others via radio of the new landing site
9. Safely land the aircraft at an exact location
10. Do so under simulated stress conditions such as
    i. Team competition
    ii. Time limitations
    iii. Forced landing activation