Mutual Aid Box Alarm Systems
Unmanned Aircraft Systems Program (UAS)

UAS Operational Application Guidelines - Firefighting

PURPOSE

The purpose of this document is to provide guidelines on operating a UAS at a structure or wildland fire incident. These guidelines shall coincide with the MABAS-IL UAS Flight Operations and Deployment Policy and Operational Application Guidelines – General document, and shall not supersede the AHJ. The document will be broken down into various tasks. A specific operation may use one or many of these tasks.

SCOPE

The document will offer non-compulsory guidance to facilitate the safe and successful completion of a number of objectives in the safe and effective deployment of UAS assets. Many of these tasks may need to be completed over a series of flights, dependent on the nature of the incident and number of units responding.

OPERATIONAL TASKS

There are three common tasks that can be performed at a structure or wildland fire: situational awareness, payload delivery or evidence collection. The following sections highlight proven techniques for situational awareness and payload delivery operational tasks.

Situational awareness

At a structure fire the primary purpose of a UAS should be to enhance fireground safety and provide information to command. The following are a list of non-compulsory proven practices for providing situational awareness at a fire incident:

1. Setup an emergency landing area in the warm zone so as not to contaminate the cold zone.
2. Have the ability to stream the remote pilots live view and telemetry to incident command / safety officer. (This prevents having Incident Command (IC) / safety looking over your shoulder.)
3. If no specific direction is giving by Incident Command (IC), provide situational awareness on the Charlie side of the structure / incident.
   - Keep the gimbal at a 45-degree angle from the ground, if possible.
     - If needed, increase altitude to ensure safe operations.
   - Maintain a distance of at least 1.5 times the width of the structure. To determine the current distance, the structure should take about 75% of the UAS live stream view.
   - Adjust the position of the aircraft, to keep it out of smoke and away from the heat and convection of the fire.
   - If possible, keep the aircraft, closest to the upwind side of the structure.
4. If roof operations are being performed, it is ideal to use a thermal camera to monitor the conditions of the roof.
   - Advise operations or Incident Command (IC) on the safe cooler locations on the roof.
   - Advise Incident Command (IC) if roof rafters in the thermal image are visible.
     - If the roof rafters' temperature matches the rest of the roof, advise Incident Command (IC) that the roof rafters are becoming compromised.

Payload delivery

Specific types of heavy lift, UAS can be used to bring tools to areas that are difficult to get to (or at). A risk assessment should be performed to evaluate the benefits of performing this task as there are many more risks that have to be taken into consideration. Next, are some non-compulsory guidelines that should be taken into account for delivering payloads with a UAS.

1. Ensure the aircraft and flight crew are capable of safely flying with the payload.
   - Ensure the payload and aircraft does not exceed the maximum takeoff weight.
   - Ensure that no payload is mounted to the UAS in a manner that would cause the UAS CG to fall outside the CG range limits imposed by the manufacturer.
   - When practicable, the aircraft should be equipped with a payload release mechanism that requires two-factor triggering (one input to arm, another input to release).
2. If the payload is attached to slung-load mechanism (as opposed to a hard mount) it is imperative to prevent positive feedback oscillations of the load by maintaining the load as close to the equilibrium position during flight as is practicable.
3. Insure the RPIC can maintain line of sight with the aircraft, payload and any receiving personnel.

Evidence collection

The following procedures are in line with NFPA 921 and should be followed as much as possible when collecting data for an investigation.
- Shoot an 18 percent gray card.
- Document and log location, date, or situational information.
- Log SD cards that are used.
- Keep used and unused SD cards separate.
- Never format a SD Card on the scene to ensure data is not accidentally erased.
- Always format the SD card before returning an SD card to service.
- Do not combine multiple incidents on one SD card. Complete each fire scene, remove the SD from the aircraft and log it before leaving the scene.
- Ensure chain of custody is documented.