

## Mutual Aid Box Alarm Systems

### B

## Unmanned Aircraft Systems Program (UAS)

### Equipment Selection Recommendations and Maintenance Guidance

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#### OVERVIEW

This document contains the UAS and support equipment recommendations for local and divisional UAS teams as well as guidance on keeping aircraft and support equipment in a mission ready state. This document is meant to be used as a guideline, as your agency or division needs may vary. However, these guidelines help responding agencies interop with each other.

#### RECOMMENDED UAS EQUIPEMENT SPECIFICATIONS

This document contains the UAS and support equipment recommendations for local and divisional UAS teams as well as guidance on keeping aircraft and support equipment in a mission ready state. This document is meant to be used as a guideline, as your agency or division needs may vary. However, these guidelines help responding agencies interop with each other.

##### A. Recommended general aircraft specification

- 2x DJI M210 Quadcopter (Includes aircraft body, remote controller, CrystalSky Monitor, props, 2 sets of batteries and charger.
  - The M200 can be purchased in lieu of the M210 as most components are interchangeable. (**Note:** Monitor will have to be purchase separately.)
- 4 sets of High Capacity TB55 batteries  
(**Note:** For 24/7 operability, 6 sets of batteries, 3 chargers and AC power are required.)
- DJI XT2 (640x512 30hz 13mm Radiometric with visual image overlay)
- DJI Z30 30x optical zoom camera
- DJI X4S camera
- 2 sets of extra props
- 3 charging hubs with power adapters
- Hard case
- Strobe light system for night operations

##### B. Recommended heavy lift aircraft specification

- 2x DJI M600 Hexcopter (Includes: aircraft body, remote controller, one set of TB47s batteries)
- 4 sets of high capacity TB48S batteries (24)  
(**Note:** For 24/7 operability, 6 sets of batteries, 3 chargers and AC power are required.)
- DJI XT2 (640x512 30hz 13mm Radiometric with visual image overlay)
- DJI Z30 30x optical zoom camera
- 1 set of extra props
- 2 charging TB48 charging hubs
- M600 channel 3xpansion
- PWM controlled drop release system
- Hard case
- CrystalSky Monitor with 3 batteries and Mavic Crystal Sky mount
- Strobe light system for night operations

### C. Recommended lightweight / indoor / training aircraft specification

- 2x DJI Mavic 2 Enterprise (Dual) Quadcopter (Includes: aircraft body and remote controller)
- 4 additional batteries  
(**Note:** For 24/7 operability, 6 sets of batteries, 3 chargers and AC power are required.)
- Prop guards
- Prop cages
- 1 set of extra props
- 3 chargers
- Hard case
- CrystalSky 5.5" or 7.8" Monitor with 3 batteries and Mavic Crystal Sky mount.
- Strobe light system for night operations

#### Example UAS support equipment:

The UAS will need support equipment such as generators, transport vehicles, monitors, etc.

- Dedicated transport vehicle
  - Preferably 4x4 SUV
- Division or regional command van
  - Typical command van configuration
  - Should support HDMI input for viewing
- Amimon Connex HD transmitter and receiver kit. 1600ft line of sight range
- 8 x 32 GB Sandisk Extreme Pro MicroSD Cards
- High-end laptop computer
  - 1 TB hard drive
  - 32GB of memory
  - Best processors available
  - Optionally Pix4d mapping software -may be a divisional or regional aAsset
- 17" field monitor with case
- Landing pad
- High vis vests for crew
- Caution tape and cones for defining landing and take-off zone
- Red lensed flash lights

## MAINTENANCE GUIDANCE

### A. Battery readiness

Below is recommended guidance to keep DJI batteries mission ready (unless otherwise specified by the manufacture):

- DJI Batteries should not all be charged 100% all the time. This reduces the life of the battery. Instead only 1/3 of batteries should be fully charged at all times.
- Other DJI batteries should be between full and 1/2 power due to smart discharge cycles.
- During weekly maintenance charge the lowest battery.
- If possible, use the lowest batteries for training purposes and charge them to 100%. This helps cycle batteries and keeps the most fully charged batteries ready for deployment.
- During deployment, start charging batteries below 85% once on scene. This will allow for continuous operations while increasing battery life.

For example, if you had 8 batteries and did not fly for four weeks this would be the charging cycle:

- Week one, fully charge batteries 1 & 2.
- Week two, fully charge batteries 3 & 4.
  - 1) Batteries 1 & 2 will start to discharge based on DJI battery design and will probably be at 85%.
- Week three, charge batteries 5 & 6.
  - 1) Batteries 1 & 2 will start to discharge based on DJI battery design and will probably be at 70%.
  - 2) Batteries 3 & 4 will start to discharge based on DJI battery design and will probably be at 85%.
- Week four, fully charge batteries 7 & 8.
  - 1) Batteries 1 & 2 will start to discharge based on DJI battery design and will probably be at 55%.
  - 2) Batteries 3 & 4 will start to discharge based on DJI battery design and will probably be at 70%.
  - 3) Batteries 5 & 6 will start to discharge based on DJI battery design and will probably be at 85%.
- Week five, repeat the cycle starting with batteries 1 & 2.
- Week six, hold a training.
  - 1) The lowest batteries should be 3 & 4, so use those first.
  - 2) Then use 5 & 6 and so on.
  - 3) Still just fully charge 3 & 4.