

# **Memorandum of Understanding Between Iowa Urban Search and Rescue Team and Iowa Homeland Security and Emergency Management**

**This agreement** is made and entered into on the date when last executed as shown below, by the Iowa Homeland Security and Emergency Management Department (HSEMD), hereinafter referred to as the "State;" and the Iowa Incident Management Team, hereinafter referred to as the "Iowa USAR Team."

## **I. Purpose of the Agreement.**

- A. The purpose of this agreement is to set out the respective rights and responsibilities regarding the ownership, possession, use, storage, transport, maintenance, and legal responsibility for the unmanned aerial systems (UAS) and their related equipment described in Section II of this document, possession of which HSEMD has, or will be distributed to the Iowa USAR Team.
- B. The purpose of this agreement is to also further reiterate HSEMD's approval and support for the Iowa USAR and its deployment of these UAS to supplement and enhance disrupted or overburdened local emergency and disaster operations during times of an emergency or disaster, and to provide assistance to other states pursuant to the Interstate Emergency Management Assistance Compact, as described in Iowa Code §§ 29C.8 (f), 29C.21.
- C. The purpose of this agreement is to also delineate responsibilities and procedures for the approval, support, activation, deployment, of the ongoing UAS operations by the Iowa USAR as activated in times of local disasters and emergencies under the authority of Iowa Code § 29C.8 and 605 Iowa Administrative Code Chapter 12.
- D. The further purpose of this agreement to set out the financial terms and conditions dealing with the activation, deployment, and operation of this Iowa USAR Team, when it utilizes the UAS that are the subject of this agreement.

## **II. Scope of this Agreement.**

- A. The scope of this agreement applies to the UAS and such related equipment as is necessary to operate the UAS, all of which are set out in the attached Attachment A.
- B. Provisions of this agreement and the protections and benefits supplied by it apply only to the following Iowa USAR activities:
  - 1. Activities performed during an emergency response initiated by a Governor's proclamation of disaster emergency and where the HSEMD director or his/her designee has activated the Iowa USAR Team.

2. Activities performed during training or exercises approved by HSEMD.

3. Activities specifically approved by the HSEMD director or his/her designee that relate to Iowa homeland security/emergency management or other public safety missions,

C. The provisions of this agreement shall not apply to Iowa USAR Team's use of the UAS outside the scope of any HSEMD activation order, through self-deployment, or mutual aid deployment to other governmental entities. The Iowa USAR shall assume all costs of any self-deployment. In no instances shall the UAS be used for commercial or non-governmental purposes.

D. Ownership of the UAS shall remain in HSEMD, subject to the possession of the Iowa USAR for so long as this agreement shall remain in effect.

### III. Definitions.

A. **Activation Order:** A written HSEMD directive specifically authorizing the Iowa USAR to act while receiving the benefits of this agreement and Iowa law in the following instances: 1) During the course of a disaster declared by the Iowa Governor pursuant to Iowa Code § 29C.6 (1), 2) For select training or exercise activities specifically authorized by HSEMD that will benefit local jurisdictions during a disaster, or 3) Otherwise upon the direct authorization by the HSEMD director, or his/her designee. The HSEMD activation order shall be in written form and shall designate the scope, location, expected duration or time frame, and other details deemed necessary to describe the nature of the activation.

B. **Deployment:** The activation and deployment of the UAS for emergency response pursuant to a Governor's disaster proclamation for certain select training or exercise activities specifically authorized by HSEMD, or for any other purpose authorized by the HSEMD director or his/her designee. A UAS shall be considered deployed by the Iowa USAR from the time of the team's initial activation until such time it has completed its mission, or such other time as HSEMD terminates its deployment, and it returns to its home base.

C. **Director:** The director of the Iowa Homeland Security and Emergency Management Department.

D. **UAS:** The Matrice 210 aircraft with base frames/components and sensor systems, optical cameras, thermal camera, extra battery packs, manuals and other manufacturers documentation, all as set out in the attached Attachment A, UAS Equipment Transferred.

E. **UAS Remote Pilot Roster:** A current listing of all Iowa USAR members that are qualified to act as UAS remote pilots in command, remote pilots, visual observers, or other ground crew members, including such identifying information that HSEMD shall require in order to ensure that Iowa USAR members are qualified to operate the UAS by this agreement and to compensate members of the Iowa USAR or their employers for activities under this agreement. Members of the remote pilot roster shall be regular members of the Iowa USAR or members added to the team solely to serve as qualified remote UAS pilots in command, pilots, visual observers, or other ground crew members.

F. **Standard Operating Procedures:** A set of guidelines or instructions that describe the deployment and use of the UAS that are the subject this agreement. A copy of the UAS Standard Operating Procedures are attached to this agreement and marked as Attachment B.

#### **IV. Allowable Uses.**

A. The parties agree that the UAS subject to this agreement may be used only for the following missions for events or incidents occurring anywhere within state of Iowa:

1. Search and rescue and related training.
2. Disaster and emergency response and related training.
3. Disaster damage assessment and related training.
4. Disaster loss avoidance or mitigation assessments and related training.
5. Hazardous material incident response and related training.
6. Firefighting operations, including situational awareness and post-fire investigations and related training.
7. Accident or crime scene investigations and/or reconstruction and related training.
8. Utility and infrastructure restoration and related training.
9. Law enforcement missions where officer safety is at issue and exigent circumstances or a search warrant specifically describing UAS activities authorize the use of the UAS and related training.
10. Any other legitimate public safety missions, training, or demonstration purposes.

B. In all allowable missions, the Iowa USAR shall take reasonable steps to protect the privacy rights of citizens who are not a part of the mission.

- C. The Iowa USAR may engage in the same allowable missions outside the state of Iowa pursuant to an Emergency Management Assistance Compact deployment.

## **V. The Parties' Responsibilities.**

- A. In respect to this agreement, the State shall do the following:

1. Comply with all applicable Federal Aviation Administration (FAA) aircraft registration requirement contained within 14 CFR § 91.203 (a) (2) in respect to the UAS that are the subject of this agreement.
2. If necessary, obtain and maintain such FAA certificates of waiver or authorization (COA) or emergency exemptions for public unmanned aircraft systems as are required or otherwise necessary or prudent under section 334 of the FFA Modernization and Reform Act of 2012 and section 2207 of the FAA Extension, Safety, and Security Act of 2016.
3. If necessary, obtain and maintain such waivers of FAA small unmanned aircraft system regulations under 14 CFR 107.200, 205, as are necessary and prudent to ensure the effective operation of the UAS that are the subject of this agreement, e.g. daylight operations, operations over people, operations in certain airspace, or BVLOS, etc.
4. Provide technical support for UAS equipment and training used by the Iowa USAR Team.
5. Reimburse the Iowa USAR member or the member's employer for eligible costs incurred in respect to a deployment.
6. In conjunction with the Iowa USAR Team, maintain, update, and share the standard operating procedures applicable to this agreement as set out in Attachment B.
7. Review the qualifications for the remote pilot in command, remote pilot, and visual observers, and approve the addition of new members to the remote pilot roster.
8. Review logs of UAS usage to ensure compliance with terms of this agreement and the standard operating procedures.
9. Assume the cost of liability and physical damage insurance coverage for the UAV for a period ending on November 1, 2018.

- B. The Iowa USAR shall do the following:

1. Comply with the allowable use of the UAS subject to this agreement as set out in Part IV above.

2. Follow the standard operating procedures in the attached Attachment B for all UAS uses.
3. Comply with all the requirements of FAA regulations set out in 14 CFR Part 107 for the operation of the UAS that are the subject of this agreement, unless those regulations have been waived under 14 CFR 107.200, 205, or otherwise subsumed under a FAA public COA issued pursuant to under sections 333 and 334 of the FFA Modernization and Reform Act of 2012 and/or an emergency exemption under section 2207 of the FAA Extension, Safety, and Security Act of 2016.
4. Complete and file any monthly FAA UAS usage reports required under any COA that applies to the UAS.
5. Routinely update all records to accurately reflect the UAS remote pilot roster, including training completed and qualifications obtained by individual members. The Iowa USAR shall update records anytime personnel are added to or removed from, the UAS remote pilot roster.
6. Respond in a timely manner to any formal activation request made by the State under the procedures set forth in the standard operating procedures and the terms of any activation order, subject to the provisions of Part VI below.
7. Perform all administrative, financial, and personnel management relating to the deployment of the UAS included in this agreement.
8. Assist the State in creating and updating the UAS standard operating procedure that shall be applicable to this agreement.
9. On November 1, 2018 and for so long as the Iowa USAR retains possession of the UAV, the Iowa USAR shall insure the UAV on an annual basis, with the State of Iowa and any rostered UAS remote pilots in command as the named insureds. The Iowa USAR shall provide HSEMD a certificate of insurance demonstrating that the specified coverage is in effect, subject to the following minimum coverage limits:
  - a) Liability: \$500,000.
  - b) Physical damage (hull): \$23,000.
  - c) Medical expense: \$5,000.

## **VI. Iowa USAR UAS Activation.**

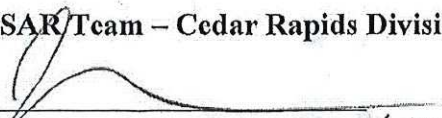
- A. The State may issue a written activation order to the Iowa USAR for deployment of the Iowa USAR and its assets during a Governor-declared disaster emergency, a training or exercise that HSEMD specifically authorizes, or other Iowa USAR activities specifically authorized by the HSEMD director or his/her designee. The mission's specific terms shall be set forth within the activation order.
- B. Prior to the receipt of an HSEMD activation order, the Iowa USAR shall inform the State whether the UAS resources are available for deployment.
- C. Upon the receipt of an activation order, the Iowa USAR shall initiate call-out procedures to deploy the UAS and its related equipment.
- D. The extent reasonable, the Iowa USAR shall give priority to HSEMD missions over competing UAS missions.

## **VII. Miscellaneous Conditions, Amendments, & Termination.**

- A. **Other terms:** Those provisions of the Memorandum of Agreements entered into with the city of Sioux City USAR Team on October 6, 2003, and the City of Cedar Rapids USAR Team on October 8, 2003, dealing with legal consequences of Iowa USAR activation, deployment, and reimbursement of eligible costs are incorporated herein by reference.
- B. **Amendment:** This agreement may be amended or modified only upon written agreement of the State and the Iowa USAR Team.
- C. **Termination:** This agreement may be terminated without cause by either party upon thirty (30) days written notice at which time the UAS and related equipment will be returned to HSEMD.
- D. **Duration:** This agreement will continue in force until terminated by one or both of the parties.
- E. **Compliance with Applicable Laws:** The Iowa USAR agrees to comply with all applicable local, state, and federal laws and administrative rules when deployed under this agreement.
- F. **Limitation of Scope.** No separate legal or administrative entity is created by this agreement.

**In witness whereof,** the parties' authorized representatives have signed their names effective the day and year set out below.

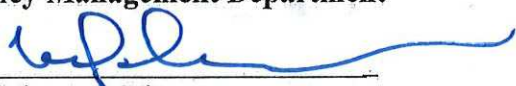
**Iowa USAR Team – Cedar Rapids Division**

By:   
Jeffery Pomeranz  
City Manager, Cedar Rapids Iowa  
acting on behalf of the Iowa USAR Team  
Eastern Division

*Schouten*  
01/23/18

Date: 1/26/2018

**Iowa Homeland Security and  
Emergency Management Department**

By:   
Mark J. Schouten, Director

**Iowa USAR Team – Sioux City Division**

By: XXXXXXXXXXXXXX

Tom Everett, Chief  
Sioux City Fire Department  
acting on behalf of the Iowa USAR Team  
Western Division

Date: XXXXXXXXXX

## Attachment A

*Attachment 3:* Equipment list as distributed to each team

- a. (1) DJI Matrice 210
- b. (1) DJI FLIR Zenmuse XT 336 X 256 13MM (30Hz)
- c. (1) DJI Zenmuse Z30
- d. (1) DJI Z5S M4/3 5.2K 30FPS – 20.8MP
- e. (1) DJI Cendence Remote Controller
- f. (1) DJI CrystalSky
- g. (4) DJI 4920mAh Intelligent Batteries
- h. (6) DJI TB55 Batteries
- i. (2) DJI TB50 Batteries
- j. (1) iPad Mini
- k. (1) DJI Zenmuse XT Gimbal Adapter
- l. (1) Lume Cube 1500 kit
- m. (1) DJI Single Upward gimbal
- n. (1) DJI Dual downward gimbal
- o. (1) DJI Single downward gimbal
- p. (1) DJI Matrice 210 External GPS
- q. (1) wch2 charging hub
- r. (1) DJI TB55 and TB50 Battery Charger Hub
- s. (2) SanDisk Extreme Pro microSDXC

## Attachment B

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### Iowa Homeland Security and Emergency Management Unmanned Aircraft System Standard Operating Procedure

December, 12 2017

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This policy establishes the authorized use and operational guidelines for Unmanned Aircraft Systems (UAS). The following procedures are intended to promote safe, efficient and lawful operation of the Iowa Homeland Security and Emergency Management UAS. Safety, above all else, is the primary concern in each and every operation, regardless of the nature of the mission. This policy is designed to minimize risk to people, property, and aircraft during the operation of the UAS while continuing to safeguard the right to privacy of all persons. The SOP is designed to be a 'living' document, with updates made on a regular basis (as driven by changes to FAA regulations, feedback from users, and lessons learned in the field). It will serve as the common core document, from which SOP addendums for specific UAS operations will be developed.

#### I. **Definitions:**

**Program Coordinator (PC):** The individual responsible for assisting the Field Support and Aviation Section commander with administrative functions related to the UAS program, including maintaining a current list of all certified crew members to include Pilots and Observers. The PC is responsible for maintaining the training records for crew members. The PC is also responsible for the condition, maintenance, and flight records of the UAS and its associated equipment.

**Pilot:** The individual exercising control over the UAS during flight.

**Pilot in Command (PIC):** The individual responsible for the overall flight operations for a specific mission.

**Observer:** The individuals trained to maintain the line-of-sight and 360 degree hazard awareness around the UAS at all times and assist the PIC in carrying out all duties required for the safe operation of the UAS.

**Defined Incident Perimeter:** A defined incident perimeter is to be determined based on the scope of the operation and a defined operational ceiling at or below 400 feet Above Ground Level (AGL) unless a waiver is active issued under FAA § 107.51B or emergency avoidance measures are being taken.

**Unmanned Aircraft System / Vehicle (UAS/UAV):** An aircraft without a human pilot on board. Its flight is controlled either autonomously by computers in the vehicle or under the remote control of a pilot on the ground, or in another vehicle.

**Night Flight:** Flight of a UAS that occurs between the hours of one half hour after sunset and one half hour before sunrise. The time of sunset and sunrise are determined by the National Oceanic and Atmospheric Administration (NOAA).

**Pre-Flight Briefing:** A briefing led by the PIC prior to aircraft launch, which includes, but is not limited to:

- Review of the mission's goals and expected outcomes
- Review of current and forecasted weather conditions
- Review of current Notice to Airmen (NoTAMs) and Temporary Flight Restrictions (TFRs) that have been issued for the proposed flight area
- Identification of mission limitations and safety issues such as battery charge, GPS strength, and potential for radio interference
- Review of proposed flight area, including maximum ceiling and floor
- Review of communication procedures between PIC, Observer, and other personnel who support the mission. Includes verifying cell phone numbers used to communicate with Air Traffic Control in the event of a fly-away or other flight emergency
- Review of emergency/contingency procedures including aircraft system failure, flight termination, divert, and lost link procedures
- Review of required video or digital images
- Execution of a pre-flight check utilizing an approved checklist.

**Approved Uses/Missions:** All UAS mission requests shall be authorized by the PC, or designee. Once a mission is approved, the PC will assign a PIC and Observer to the mission. Generally, the following are missions that will be considered for approval:

- Accident Reconstruction
- Aiding in search and rescue operations
- Disaster and emergency response and training
- Disaster damage assessment
- Hazmat scene deployment
- Major disaster scenes
- Storm damage
- Fire scenes
- Disaster loss avoidance or mitigation assessments
- Utility and infrastructure restoration
- Law enforcement missions where officer safety is at issue and exigent circumstances or a search warrant specifically describing UAS activities authorize the use of the UAS.

Other missions may be approved by the Program Coordinator, or his or her designee, if those missions are necessary to preserve the health, safety, and welfare of people or property within the state of Iowa.

**Maintenance:** UAS maintenance is the responsibility of the PC in accordance to manufacturer recommendations. If maintenance outside of routine is performed, a test flight shall be conducted and documented. No third party attachments shall be added to the airframe without approval from the PC.

**Storage:** UAS shall be kept at local USAR facilities or an offsite location approved by Iowa Homeland Security and Emergency Management. UAS shall be stored in accordance to manufacturer recommendations.

**Pilot Requirement:** All pilots assigned to UAS operations must, at a minimum, meet all of the following FAA UAS pilot requirements:

- Be at least 16 years old
- 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)
- Be in a physical and mental condition to safely operate a small UAS
- Pass the initial aeronautical knowledge exam at an FAA-approved knowledge testing center
- Hold a valid Part 107 pilots license

**Visual Observer Duties and Requirement:**

- Be at least 16 years old
- 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)
- Observers must have been provided with sufficient training to communicate clearly to the operator any turning instructions required to stay clear of conflicting traffic and obstacles. Observers receive training on rules and responsibilities described in 14 CFR 91.111, Operating Near Other Aircraft, 14 CFR 91.13, Right-of-Way Rules, cloud clearance, in-flight visibility, and the pilot controller glossary including standard ATC phraseology and communication. 14 CFR 91.17, Alcohol or Drugs, applies to UAS observers
- An observer's primary duty is to operate the UAS's equipment including cameras, FLIR, radio communications with other crew members and property owners as well as be an observer for anything that may affect the operator's primary duty (see and avoid)

**II. Equipment:**

Equipment list as distributed to each team is included as Attachment #3.

**III. Policies/Procedures:**

- a. The UAS shall only be deployed at the instruction of the PC or their designee.
- b. All UAS operations are mandated to comply with FAA regulatory and legal policies as well as any state and local policies.
- c. All UAS PIC must meet the Pilot Requirement.
- d. All UAS Observers must meet the Observer Requirement.
- e. The UAS PIC is responsible for the overall direction and performance of the UAS unit and exercises command and control over it. A single PIC must be designated at all times.
- f. A PIC may control only one UAS at a time.
- g. Operators of the UAS shall be trained to safely operate and maintain the UAS equipment (reference section III).
- h. The PC is responsible for maintaining a current pilot roster to be on file with Iowa HSEMD.
- i. Flight logs maintained
  - i. Before each deployment of the UAS a pre-flight checklist shall be completed by the PIC. The pre-flight checklist must contain, at a minimum, the following: Mission statement, time of deployment, name of flight team (PIC & Observer), and Weather conditions. The record of the operation shall be maintained by the PIC. During this process the PIC must make the determination that the UAS meets general and mission specific airworthiness requirements. Reference Attachment 1.
  - ii. All training records shall be maintained by the PC and include the following: Name of operator, date, nature of training, location, date completed. Reference Attachment 2.
  - iii. Any technical issues and maintenance performed shall be recorded in the corresponding log.
  - iv. All logs must be submitted to Iowa HSEMD on a yearly basis for review.
- j. Documentation and Data Retention
  - i. All flights shall be recorded. All recordings are to begin prior to take off and are to end after landing.
  - ii. All recordings become the property of Iowa Homeland Security and Emergency Management. Any recordings obtained from flight operations including training, shall be uploaded onto the Department's cloud storage and shall be stored indefinitely.
  - iii. Unless exempt by law; retained images should be subject to FOIA (Freedom of Information Act) requests.

- iv. Any request for public comment should be directed to Iowa Homeland Security and Emergency Management Public Information Officers.
- k. UAS Emergency Procedures (lost-link procedure)
  - i. If lost-link occurs, and the radio-control system does not employ its assigned fail-safe mode of operation, the UAS control system will be required to place control surfaces of the UAS into a continual turning position at reduced throttle level in order to maintain the UAS within the assigned operating area, while the PIC attempts to reestablish the link.
  - ii. The PIC will contact cognizant airspace ATC on the assigned frequency, providing notification to fly-away/lost-link condition, and the UAS's last known position, heading, airspeed, and altitude.
  - iii. The PIC will broadcast a warning on the local UNICOM frequency every 3 minutes, stating the type of UAS and its estimated location/altitude.
  - iv. The Observer will contact/assemble a chase team to initiate a search for the UAS, unless the UAS has remained within the Visual Line of Sight of the UAS PIC. The PIC cannot be a part of the chase team.
  - v. If communications are reestablished, the PIC will initiate the 'return to home' procedure. The UAS will be recovered and all future flight operations will cease until the cause has been determined and remedied. A full written report will be provided to the PC within 24 hours of the incident.

#### IV. Training:

- a. Observers will have a current working knowledge of the airspace intended for operations, Air Traffic Control phraseology and communication requirements, specific UAS aerodynamic factors, and the ability to obtain and interpret weather information. The Observer will receive specific training on relevant Code of Federal Regulation regulations (14 CFR Part 91), such as the obligation to see and avoid other aircraft and the ability to identify position for purposes of relaying position reports to the PIC.
- b. All PIC candidates must attend an initial flight school training by a trainer certified through the manufacturer. The training will be specific to the UAS make/model being used.
- c. An Observer is required for all training and mission flights of the UAS.
- d. Quarterly flight training of all rostered pilots is required. Pilot must demonstrate the ability to assemble, fly and utilize camera systems.

**V. Reporting:**

- a. Immediately after an incident or accident, and before additional flight, the proponent must provide initial notification of the following to the FAA via the UAS COA On-Line forms (Incident/Accident).
- b. All accidents/mishaps involving UAS operations where any of the following occurs must be reported:
  - i. Serious injury, where the operation of a UAS results in a hospitalization of more than 48 hours, the fracture of any bone (except for simple fractures of fingers, toes, or nose), severe hemorrhage or tissue damage, internal injuries, or second or third-degree burns.
  - ii. Total unmanned aircraft loss.
  - iii. Substantial damage to the unmanned aircraft system where there is damage to the airframe, power plant, or onboard systems that must be repaired prior to further flight.
  - iv. Damage to property, other than the unmanned aircraft.
- c. Any incident/mishap that results in an unsafe/abnormal operation including, but not limited to, the following must be reported:
  - i. A malfunction or failure of the unmanned aircraft's on-board flight control system (including navigation).
  - ii. A malfunction or failure of ground control station flight control hardware or software (other than loss of control link).
  - iii. An in-flight fire.
  - iv. An aircraft collision.
  - v. Any in-flight failure of the unmanned aircraft's electrical system requiring use of alternate or emergency power to complete the flight.
  - vi. A lost control link event resulting in a Fly-away or execution of pre-planned/unplanned lost link procedure.

Attachment 1: Pre-flight checklist

| Pre-Flight Checklist                                                                                                                                                                                      |                        |                                                             |            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------|------------|
| Pilot In Command:                                                                                                                                                                                         |                        | FAA Reg. No.:                                               | Date/Time: |
| Observer:                                                                                                                                                                                                 |                        | Mission/Location/Weather Conditions:                        |            |
| UAS Model:<br>DJI Matrice 210                                                                                                                                                                             |                        |                                                             |            |
| Purpose of Flight: <input type="checkbox"/> Operations <input type="checkbox"/> Training <input type="checkbox"/> Other (Describe):                                                                       |                        |                                                             |            |
| Authorization for flight in restricted airspace (AIRMAP or Emergency SGI COA):                                                                                                                            |                        |                                                             |            |
| <b>A. Pre-Start Checklist</b><br><b>Important:</b> Complete all check list items in the order they are presented. If you cannot check off an item <b>STOP!</b> and correct the problem before continuing. |                        |                                                             |            |
| No.                                                                                                                                                                                                       | Item                   | Acceptable Condition                                        | Sat.       |
| 1                                                                                                                                                                                                         | Airspace               | Unrestricted airspace or flight authorized                  |            |
|                                                                                                                                                                                                           |                        | Potential obstructions near intended flight path identified |            |
| 2                                                                                                                                                                                                         | Weather                | Visibility $\geq 3$ miles/500 ft., Wind $\leq 30$ mph       |            |
| 3                                                                                                                                                                                                         | sUAS Airframe/Props    | No structural defects visible                               |            |
| 4                                                                                                                                                                                                         | sUAS Battery           | Sufficient for intended flight, not less than 75%           |            |
| 5                                                                                                                                                                                                         | Controller Battery     | Sufficient for intended flight, not less than 75%           |            |
| 6                                                                                                                                                                                                         | Display Device Battery | Sufficient for intended flight                              |            |
| 7                                                                                                                                                                                                         | Memory Card            | Installed, sufficient memory space available for flight     |            |
| 8                                                                                                                                                                                                         | Observer               | Present, briefed and ready                                  |            |
| 9                                                                                                                                                                                                         | Camera Gimbal Lock     | Removed                                                     |            |
| 10                                                                                                                                                                                                        | Display Device         | On                                                          |            |
| 11                                                                                                                                                                                                        | Controller Power       | On                                                          |            |
| 12                                                                                                                                                                                                        | sUAS Power             | On                                                          |            |
| 13                                                                                                                                                                                                        | sUAS Status Lights     | Flashing GREEN                                              |            |
| 14                                                                                                                                                                                                        | Camera Check           | FPV camera view normal                                      |            |
| 15                                                                                                                                                                                                        | Compass Calibration    | Compass calibrated for current location                     |            |
| 16                                                                                                                                                                                                        | Flight Limits Set      | Alt. $\leq 120$ meters, Dist. $\leq 500$ meters             |            |
| 17                                                                                                                                                                                                        | Flight Mode Set to GPS | Controller mode switch in "P", display status GREEN - RTF   |            |
| 18                                                                                                                                                                                                        | Take-Off Location      | Clear for $\geq 25$ ft. radius, no overhead obstructions    |            |

| B. Motor Start Checklist |                  |                                                      |      |
|--------------------------|------------------|------------------------------------------------------|------|
| No.                      | Item             | Acceptable Condition                                 | Sat. |
| 1                        | sUAS Motor Start | sUAS motors start and run at idle, no abnormal noise |      |
| 2                        | Home Point       | Home Point Set                                       |      |
| 3                        | Hover Check      | Flight and Camera Gimbal control responses normal    |      |
| 4                        | Flight Telemetry | Telemetry normal (Bat, Alt, Dist., etc.)             |      |
| <b>READY FOR FLIGHT</b>  |                  |                                                      |      |
| Notes:                   |                  |                                                      |      |



*Attachment 3: Equipment list as distributed to each team*

- a. (1) DJI Matrice 210
- b. (1) DJI FLIR Zenmuse XT 336 X 256 13MM (30Hz)
- c. (1) DJI Zenmuse Z30
- d. (1) DJI Z5S M4/3 5.2K 30FPS – 20.8MP
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