ConnexiCore

FLY. UPLOAD. ANALYZE. PRESENT

SAFETY AND OPERATIONS MANUAL

Commercial UAS Drone Services

1. Preface

The following procedures are intended to promote safe, efficient and lawful operation of the CONNEXICORE unmanned aerial system (UAS). Safety, above all else, is the primary concern in each operation, regardless of the nature of the mission. This Standards document is designed to provide intelligent business practices fundamental to operate a Drone Service operation or business and to provide quality services and value to our clients. While this Standard represents the input of numerous experts with countless hours of experience and meeting with IT businesses to learn about them, the outcome will be dependent on execution. Only with honest self-reflection can a business effectively evaluate itself against our well thought out standards. Throughout our process, CONNEXICORE and its management team embrace incremental improvements, focus on establishing and meeting the ever-increasing expectations of our clients, and create a highly professional and safe environment for employees. The CONNEXICORE Standard for Drone Services provides intelligent business practices for the core operational, management, and delivery functions of an elite UAS services firm.

2. Philosophy & Mission Statement

It shall be the mission of those personnel of CONNEXICORE who are trained in the use of unmanned aircraft systems (UAS), to use this resource to conduct aerial commercial inspections (agriculture, construction and infrastructure), and aerial surveying, mapping and 3D modeling.

It shall be the intent of every UAS operator to make reasonable effort to not invade a person's reasonable expectation of privacy when operating the UAS. When operating the UAS, CONNEXICORE operators abide by all FAA Regulations for flight and receive the proper authorization for flight.

3. Protection of Rights and Privacy

UAS operators and observers ensure the protection of private individuals' civil rights and reasonable expectations of privacy before deploying the UAS. UAS operators and observers ensure and are held accountable for ensuring that operations of the UAS intrude to a minimal extent upon the private persons and businesses. To accomplish this primary goal, CONNEXICORE observes the following:

1. When the UAS is flown, the onboard cameras are turned to be facing <u>away from occupied structures,</u> etc. to minimize inadvertent video or still images of uninvolved persons or property.

2. CONNEXICORE <u>does not</u> conduct random surveillance activities. The use of the UAS is tightly controlled and regulated.

3. All authorized missions for CONNEXICORE UAS are for:

    o Aerial photography, videography, commercial inspections (agriculture, buildings and infrastructure), and aerial surveying, mapping and 3D modeling.

4. A CONNEXICORE committee is formed and meets semi-annually for the purpose of reviewing the existing UAS procedures as well new technologies, laws, and regulations on UAS usage. The committee consists of personnel from CONNEXICORE and business partners and advisors.

5. CONNEXICORE UAS operate strictly within the law and regulations. If in doubt, prior to operating the UAS we ensure that the proper airspace waivers and applications are applied for and obtained. We balance all operations with the need to accomplish the mission while maintaining public privacy and the freedom from intrusion.

4. Definitions

Aircraft: any contrivance invented, used, or designed to navigate, or fly in, the air.

Airport: a landing area used regularly by aircraft for receiving or discharging passengers or cargo.

Civil aircraft: an aircraft except a public aircraft.

Control Station: (CS). An interface used by the remote pilot or the person manipulating the controls to control the flight path of the small UA.

Crew Resource Management: (CRM). Crew Resource Management, also known as CRM, is training methodology that focuses on interpersonal communication, leadership and decision making.

Flight Boundaries: Flight boundaries shall be determined by the Remote Pilot in Command (RPIC) based upon airspace considerations, shall set maximum altitudes and determine the outside boundaries vertically and horizontally of the flight operations.

Flight Logbook: The Flight Logbook shall be the paper or digital version of the document or application which records flight activities for a specific flight operation.

Operator: The Operator shall mean the personal responsible for physically piloting the sUAS during the mission as the RPIC, or under direct supervision and responsibility of the RPIC.

Person Manipulating the Controls: A person other than the RPIC who is controlling the flight of a sUAS under the supervision of the remote PIC, also referred to as the Operator.

Visual Observer: (VO). A person acting as a flight crew member who assists the small UA remote PIC and the person manipulating the controls to see and avoid other air traffic or objects aloft or on the ground.

Remote Pilot in Command: (Remote PIC or Remote Pilot). A person who holds a remote pilot certificate with a sUAS rating and has the final authority and responsibility for the operation and safety of a sUAS operation conducted under part 107.

Small Unmanned Aircraft System: (sUAS). An UA weighing less than 55 pounds, including everything that is onboard or otherwise attached to the aircraft, and can be flown without the possibility of direct human intervention from within or on the aircraft.

Landing area: a place on land or water, including an airport or intermediate landing field, used, or intended to be used, for the takeoff and landing of aircraft, even when facilities are not provided for sheltering, servicing, or repairing aircraft, or for receiving or discharging passengers or cargo.

Abbreviations:

AGL: Above Ground Level.

ATC: Air Traffic Control.

CFR: Code of Federal Regulations.

FAA: Federal Aviation Administration.

FSDO: Flight Standards District Office.

GPS: Global Positioning System.

NAS: National Airspace System.

PIC: Pilot in Command.

UA: Unmanned Aircraft.

UAS: Unmanned Aircraft System.

VO: Visual Observer

5.   Administration

5.1   Operations Manual

1. The policies and procedures contained in this manual are issued by CONNEXICORE. As such it is an official business document of CONNEXICORE.

2. This manual is not intended to be all-inclusive, but as a supplement to other company guidelines, Federal Aviation Administration regulations, pre-flight safety checklists, aircraft manufacturers' approved flight manual, etc.

3. This manual has been written to address UAS operations as they existed when it was

drafted. Equipment, personnel, environment (internal and external), etc., change over time. The management of change involves a systematic approach to monitoring organizational change and is a critical part of the risk management process. Given this, it is essential that this manual be continually updated as necessary. The entire manual <u>must be reviewed</u>, at a minimum, annually to assure it is up to date. Any changes to the manual will be communicated as currently dictated by company policy.

4. A copy of the manual (electronic and/or paper) is issued to every associate of CONNEXICORE having UAS responsibilities.

Organization

1. The UAS team (unit) is comprised of those personnel approved by CONNEXICORE and includes operators, observers and others deemed necessary and an have assignment as part of the UAS crew.

2. Assignment to the UAS crew is carefully selected by CONNEXICORE from specially trained staff members of CONNEXICORE with knowledge of the airspace within which the operation will take place and how that airspace fits into the National Airspace System (NAS).

5.2   Personnel

<u>Remote Pilot-in-Command ("RPIC")</u> For every flight operation, there will be an RPIC. The RPIC of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft as well as the flight operation. The RPIC is responsible for the overall direction and performance of the UAS and must exercise command and control over the operations. The RPIC is also responsible for entering information in the Flight Logbook. The RPIC may authorize the person manipulating the controls to deviate from this manual or any regulation in response to an emergency. Any deviation must be reported to the management.

The RPIC is responsible for the following minimum activities, which shall be recorded in the Flight Logbook or similar another maintained checklist:

o Conducting a pre-flight thorough inspection of the UAS, and reviewing all maintenance, software updates and operational documentation.

o Conducting a pre-flight site survey to assess risks and plan flight operations and determine Flight Boundaries.

o Conducting a mission briefing with the flight crew to review all operations, Flight Boundaries, safety issues, and regulatory compliance.

o Conducting a weather analysis both before and during the flight operations. Before each flight operation, the RPIC shall be familiar with the weather situation existing throughout the flight operation and surrounding area. The RPIC shall utilize FAA approved weather resources to obtain the latest and most current weather conditions.

1. Ensuring all required documents are on site prior to flight operations.

2. Ensure regulatory compliance and record any inadvertent deviations from regulations.

3. Any other tasks deemed necessary by management to ensure safe and legal flight operations.

4. The RPIC has the authority to reject any flight operation based on personnel, safety or FAA regulation issues.

5. Conducting a debriefing after the conclusion of the flight operations to review any operational or regulatory compliance issues.

In order to fulfill the role of RPIC, the RPIC must:

1. Possess, at a minimum, a valid Remote Pilot Certificate and valid photo identification. The RPIC must recertify for the UAS Operator certificate by passing an aeronautical knowledge test every 24 calendar months.

2. Maintain proficiency in the make/model of sUAS to be flown.

3. Be at least 16 years of age.

4. Be able to read, speak, write, and understand the English language.

5. Be in a physical and mental condition that would not interfere with the safe operation of a sUAS.

6. The UAS flight coordinator or pilot-in-command (PIC) is responsible for the overall direction and performance of the UAS unit and exercises command and control over it. The PIC must be **FAA part 107 certified**.

5.3   UAS Coordinator Responsibilities:

1. maintaining all training, flight and maintenance records for each operator and observer as well as individual airframes;

2. maintain contact with the FAA and regulations as they change and maintain current FAA certification as needed and required by US law for civil UAS operations.

3. evaluate airframes based on mission needs;

5.4   Operators:

1. To be considered for selection as an operator, applicants must meet the requirements for and successfully pass a CONNEXICORE administered UAS Operators Course AND **be FAA part 107 certified** in order to be accepted into the UAS crew.

2. Operators interacting with **Air Traffic Control (ATC)** or Terminal Radar Approach Control Facilities (TRACON) shall have enough expertise to perform that task readily. Operators must understand and comply with FAA Regulations applicable to the airspace where the UAS operates.

3. An operator's primary duty is the safe and effective operation of the UAS in accordance with the manufacturers' approved flight manual, FAA regulations and company policy and procedures. Operators must remain knowledgeable of all FAA regulations; UAS manufacturer's flight manual and bulletins and company policy and procedures.

4. Operators may be temporarily removed from flight status at any time by the UAS coordinator, for reasons including performance, proficiency, physical condition, etc. Should this become necessary, the operator will be notified verbally and in writing of the reason, further action to be taken and expected duration of such removal.

5. The UAS Coordinator shall maintain a file for each operator which shall include copies of training records, flight incidents, etc. This file is reviewed in accordance with current company policy and procedures.

The Operator is responsible for:

1. Receiving a briefing from the RPIC.

2. Adherence to this Manual and all checklists.

3. Conducting the preflight checks.

4. Ensuring all required documents are on site prior to flight operations.

5. Abiding by all RPIC directives for the flight operations.

6. Flying the mission.

7. Coordinating with the RPIC on all post flight checks, paperwork and maintenance.

8. The operator, along with the RPIC, has the authority to reject any flight operation based on personnel, safety or FAA regulation issues.

5.5. Visual Observer:

A visual observer (VO) is not required under Part 107 but may be required for certain waivers or other operations. Moreover, the RPIC may decide that a VO is required for safety reasons for a flight operation. If a VO is used, or required, the VO will adhere to the following guidelines.   The VO assists the drone operator by monitoring the worksite for potential safety hazards. The VO will assist the drone operator as required to conduct a safe and efficient flight.

If there is a VO, the VO is responsible for:

1. Monitoring the airspace around the worksite to prevent interference with manned aircraft.

3. Monitoring the Ground area around the worksite to ensure the drone avoids flying over any nonparticipating person that is not under shelter.

4. Acting as a communication relay for the UAV operator to ensure an environment free from distractions.

5. If required by a waiver, airspace authorization or safety standard, monitoring Air to Ground radio for the presence of manned traffic or coordinate communications with Air Traffic Control (ATC) or other controlling authority. Observers must have been provided with enough 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.

6. 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)**

7. The UAS Coordinator maintains a file for each observer, which includes copies of training records, UAS incidents, etc.

In order to fulfill the role of Visual Observer, the VO must:

o Have adequate hearing, eyesight and any other sense required to observe and detect change at the area of the flight operation that may adversely affect safety.

o Receive instruction from the RPIC on crew resource management principles including, but not limited to:

  ▪ Concise 'go/no go' criteria and communication.

  ▪ Clear responsibilities and roles.

  ▪ Common language for standard emergency procedures.

  ▪ Communication strategy during flight operations, including communication of affirmatives and negatives.

  ▪ Be able to operate an air to ground radio or any other communication system required by the operation.

5.6. Facilities

o UAS operations are housed and maintained at a facility designated by CONNEXICORE.

o Personnel must not leave the designated facility without making sure the UAS equipment is secured.

o All personnel are equally responsible for maintaining the facility in a neat,

clean and orderly fashion.

5.7 Scheduling

1. To facilitate the broad use of the UAS, it shall be made available to all UAS flight crew members.

2. To maintain a level of proficiency with the UAS, operators are required, as part of their acceptance into the UAS flight crew, to attend training every two months. Training is coordinated through the UAS flight crew and announced in advance for scheduling purposes.

5.8 Miscellaneous

1. Inquiries from the news media must be forwarded to the CONNEXICORE owner Frank Segarra. Operators/Observers shall follow currently established company policy regarding interactions and inquiries from the media.

2. Requests for support from third parties will be responded to by the UAS coordinator. Should the request involve an immediate threat to life, or property, the operator is authorized to accept or decline the request. Proper policy and procedure, as well as FAA regulations must be followed when accepting mutual aid support for the UAS.

3. Complaints or inquiries regarding UAS operations must be referred to the UAS coordinator.

6. Training

6.1. Objective
The key to continued safe operations is by maintaining a professional level of competency. The first step in this process is establishing minimum qualifications for selecting members, and the second step involves training those personnel.

6.2. Instructors

1. If any members are FAA certified flight instructors, they are given instructor duties. Such duties can include developing training courses, provide training, and student evaluation and documentation.

2. Duties of instructing new members shall fall upon those who have the most flight time and knowledge of UAS operations. Instructors are designated by those within the unit and approved by the UAS Coordinator.

6.3. Training Plans

- All members have a training plan on file that outlines training objectives for the upcoming year. This training plan will be held in conjunction with the member's normal training file per company policy.

- The approved training plan is developed by the UAS coordinator.

- All deployments or exercises are documented and count toward a member's training.

- It is the member's responsibility to verify their training file contains all pertinent information.

Initial Training

- o <u>Observers and Operators</u> must have completed enough training to communicate to the pilot any instructions required to remain clear of conflicting traffic. This training, at a minimum, shall include knowledge of the rules and responsibilities described in 14 CFR 91.111, Operating Near Other Aircraft; 14 CFR 91.113, Right- of-Way Rules: Except Water Operations; and 14 CFR 91.155, Basic VFR Weather Minimums; knowledge of air traffic and radio communications, including the use of approved ATC/pilot phraseology; and knowledge of appropriate sections of the Aeronautical Information Manual.

- o In conjunction with fulfilling all training requirements for operator/observer duties, the new member must also become familiar with UAS operations, the aircraft and its equipment.

- o Any new member who fails to successfully complete the initial training may be denied as a member of the UAS flight crew.

- o Before a member can fly as an operator, they must complete at least enter number (e.g., 10, 15, 20, etc.) hours of flight training with the UAS instructors to show proficiency of the flight training exercises and the airframe. This must be accomplished to show their ability and knowledge of the UAS.

6.4. Recurrent Training

- o All members within the unit shall maintain proficiency in their operator/observer abilities. Members who do not have any documented training or flight time within a span of 90 days will have to show proficiency before being an operator/observer during a deployment or exercise.

- o Recurrent training is not limited to actual operating/observer skills but includes knowledge of all pertinent UAS/aviation matters.

- o Failure to prove proficiency can result in removal from UAS responsibilities.

6.5. Miscellaneous

o Depending on the nature of the training request, all efforts are made to accommodate the hours of training so as little impact is made to staffing levels.

o All requests for training shall be approved through the member's chain of command and timekeeping during those training hours are marked by the UAS coordinator.

o Members are encouraged to attend, and forward information on FAA sponsored safety seminars.

o Training shall only be conducted at approved locations and follow the provisions within the approved FAA regulations.

7. General Operating Procedures

7.1 Request for UAS Support

o Requests for UAS support shall be made through the UAS coordinator who has the most current list of UAS operators and observers to contact.

o Requests for UAS support can be made at any time during the day or night.

o The UAS coordinator will submit a written Plan of Activities to the local FAA FSDO three days before the proposed mission.

o If a request is made for UAS support during the night, CONNEXICORE must contact the FAA to obtain a waiver if one isn't on file for the location and time of the mission.

7.2 Call-out Procedure

o The UAS coordinator will screen all initial requests to use a UAS.

o The UAS coordinator will then contact the PIC to request the deployment of the UAS.

o The UAS Coordinator will also contact the UAS flight crew who will screen the request using the following factors:

o Is the proposed use of UAS within the capabilities of the UAS equipment and personnel to perform?

o Does the proposed use of the UAS fall within the FAA and department policies and regulations for UAS usage?

o Can the UAS be deployed safely given current weather conditions?

o If the UAS deployment requires a warrant has one been requested and approved?

o Are enough trained and qualified personnel available to safely operate the UAS?

- o The UAS flight crew will either accept or decline the request for UAS support. If the request is denied the UAS flight crew will provide a reason for declining the support request to the UAS Coordinator who will provide the requestor this information along with the reason for declining. If the UAS Coordinator accepts the support request they will contact a UAS operator who will be provided all available mission information.

- o The UAS operator will contact a certified observer from the list of available trained observers. The UAS operator is responsible for transporting the UAS and all required equipment to the scene. Upon arriving at the requested location, the UAS operator will contact the requestor to check in and receive a briefing on the mission requested. The UAS operator will make an on-scene determination of the ability of the UAS to perform the requested mission safely and within company and FAA policies and procedures.

- o If the UAS operator determines that the use of the UAS would violate company policy or directives, then the UAS operator will inform the requestor of the potential conflict along with recommendations for modifying the requested mission to conform to company policies and procedures. As this is a change from the original approved mission the UAS operator will contact the UAS coordinator for direction on how to proceed. As soon as possible after the completion of the mission, the UAS operator will make a full report of the circumstances and their concern through the UAS coordinator.

- o UAS operators will have sole discretion for declaring safety or violation of FAA rules. If the UAS operator determines that a requested mission would violate FAA rules or endanger person or property, then the UAS operator will respectfully inform the requestor of the reasons for refusing to operate the UAS and contact the UAS coordinator immediately. The UAS will not be flown in this circumstance and the authority of the UAS operator is absolute.

- o If the UAS operator determines that the requested mission will potentially damage the UAS or its associated equipment the UAS operator will inform the requestor of their concerns. The UAS operator will fully document and send a report to the UAS coordinator.

7.3   Deployment Priorities

- o The UAS shall not be used for the purpose of random surveillance.

- o If several separate requests for UAS support are received simultaneously, they shall be prioritized.

- o In general terms, requests for UAS support are prioritized as:

- o List priorities of company's business generally.

7.4   Flight Boundaries

- o Although there may be requests for UAS support in restricted airspace, FAA regulations for UAS restrict UAS deployment inside restricted airspace.

- o At no time shall UAS support be granted inside restricted airspace without first obtaining permission from the local FAA FSDO and approval by local authorities.

- o Maximum altitude shall not be set more than 400 feet per the FAA regulatory standards.

- o The operator will obtain the consent of all persons involved in the mission and ensure that only consenting persons will be allowed within 100 feet of the flight operation, and this radius may be reduced to 30 feet based upon an equivalent level of safety determination.

7.5   Minimum Personnel Requirements

- o Due to the nature of the mission, the minimum personnel required on ALL missions will be an operator and observer. Under no circumstances will an operator attempt to complete a deployment alone.

- o Although training is not considered a mission, an observer shall be used.

7.6   Operator

- o The operator is directly responsible for and is the final authority over the actual operation of the UAS.

- o Operators have absolute authority to reject a flight based on personnel safety or violation of FAA regulations. No member of CONNEXICORE, regardless of status, shall order an operator to make a flight when, in the opinion of the operator, it poses a risk to personnel or is in violation of FAA regulations.

- o Operators are responsible for compliance with this manual, company policy and procedure and FAA regulations.

- o The operator's main duty during the deployment of the UAS is to operate the UAS safely while accomplishing the goals of the deployment.

- o Operators shall see-and-avoid any obstacle that will lessen safety during the mission.

- o Operators shall be responsive to the requests of the observer in order to accomplish the deployment.

- o Operators shall be responsible for documentation for mission training and updating of flight books.

7.8   Observer

- o   Observers shall see-and-avoid any obstacle that will lessen safety during the mission.

- o   Observers are responsible for the operational aspect of the deployment.

- o   Observers shall operate any attachments to the UAS, allowing the operator to maintain complete focus on the operation of the UAS.

- o   Observers shall remain alert for suspicious persons or activities on the ground and coordinate response by other UAS flight crewmembers.

- o   Observers shall assist the operator in the main objective of safe operations of the UAS.

- o   Observers shall be responsible for documentation for mission training and updating of flight books.

8.   <u>Safety</u>

8.1   Safety Policy

CONNEXICORE is committed to having a safe and healthy workplace, including:

- o   The ongoing pursuit of an <u>accident free workplace</u>, including no harm to people, no damage to equipment, the environment and property.

- o   A culture of open <u>reporting of all safety hazards</u> in which management will not initiate disciplinary action against any personnel who, in good faith, disclose a hazard or safety occurrence due to unintentional conduct.

- o   Support for safety training and awareness programs.

- o   Conducting regular audits of safety policies, procedures and practices.

- o   Monitoring the UAS community to ensure best safety practices are incorporated into the organization.

- o   It is the duty of every member within the UAS flight crew to contribute to the goal of continued safe operations. This contribution comes in many forms and includes always operating in the safest manner practicable and never taking unnecessary risks. Any safety hazard, whether procedural, operational, or maintenance related must be identified as soon as possible after, if not before, an incident occurs. Any suggestions in the interest of safety should be made to the UAS Coordinator.

- o   If any member observes or has knowledge of an unsafe or dangerous act committed by another member, the UAS coordinator is to be notified immediately so that corrective action may be taken.

8.2   Operational Hazard and Occurrence Report (OHOR) and Investigations

o   Occurrences are unplanned safety related events, including accidents and incidents that could impact safety. A hazard is something that has the potential to cause harm. The systematic identification and control of all major hazards is foundational to safety.

o   The OHOR concept provides a mechanism to report hazards and occurrences, real and perceived, to those responsible for UAS operations.

o   There is no specific format for the OHOR as the information provided is what is important, not the format and should be used without hesitation to report any anticipated, current, or experienced safety hazard, or occurrence. Further, the OHOR can be submitted anonymously, and to whatever level in the chain of command, to get the matter proper attention, without fear of reprisal.

o   Written memorandums fully explaining the problem will be given to the UAS coordinator for investigation.

o   Every hazard and/or occurrence is investigated, with the results and corrective action taken communicated to all members. The investigation will be conducted by the UAS coordinator or any other member of the company who has the technical skill necessary to do it. The services of an independent subject matter expert may be necessary in some cases to assure a thorough and complete investigation.

o   Hazards requiring immediate attention will be brought to the attention of the UAS coordinator, verbally, without delay.

o   **ALL MEMBERS ARE AUTHORIZED TO TAKE ACTION TO CORRECT A HAZARD** if in that member's opinion delay will result in accident or injury. The UAS coordinator will be notified immediately in such situations.

8.3   Safety Officer - Operator/Observer/Coordinator

Regarding safety, <u>all members</u> of the UAS flight crew are responsible for the following:

o   Ensuring all flight operations personnel understand applicable regulatory requirements, standards and organizational safety policies and procedures.

o   Observe and control safety systems by monitoring all operations.

o   Review standards and the practices of company personnel as they impact operational safety.

o   Communicate all reported safety related problems and the corrective action taken. If there were any in-flight problems (or learned experiences), the proper procedures for handling that problem should be discussed.

o   Copy and circulate pertinent safety information.
o   Copy and circulate emergency safety bulletins.

o   Place any electronic copies of safety information or bulletins in a conspicuous location for all employees to access.

o It is emphasized again that safety is the responsibility of ALL members of the UAS unit.

8.4   Crew Resource Management

Crew Resource Management (CRM) is the interaction between crewmembers and actions that are necessary in order to perform tasks efficiently, effectively, and safely. The following elements are important to achieving CRM:

<u>**Communicate positively**</u>: Good teamwork requires positive communication between crew members. Communication is positive when the sender directs, announces, requests, or offers; the receiver acknowledges; and the sender confirms. Crewmembers must use positive communication procedures for essential crew coordination actions identified in the description of each task. Positive communication is quickly and clearly understood. It permits timely actions. Due to multiple crew locations and other environmental factors, crew members should use a limited vocabulary of explicit terms and phrases to improve understanding.

<u>**Direct assistance:**</u> A crewmember will direct assistance when he cannot maintain UAV control, position, clearance or properly operate UAV systems without help from another crew member. Directives are necessary when one crew member cannot reasonably be expected to know when or what assistance is needed by another crewmember. Directives are not normally needed when the assistance required is part of an individual's assigned responsibility in the task description.

<u>**Announce actions:**</u> To ensure effective and well-coordinated actions all crewmembers must be aware of expected UAV movements and unexpected individual actions. Crewmembers will announce any actions that affect the actions of other crewmembers. Such announcements are essential when a decision or action is unexpected and calls for supporting action from other crew members to avoid a potentially hazardous situation.

<u>**Offer assistance:**</u> A crewmember will provide assistance or information requested. He will also offer assistance when he sees another crewmember needs help. All crew members must be aware of the flight situation. The non-flying crewmember must know when the flying crew member deviates from normal or expected actions. He must never assume the flying crew member always recognizes a hazard or the need for assistance.

<u>**Acknowledge actions:**</u> Communications must include supportive feedback to ensure that all crewmembers correctly understand announcements and directives. Acknowledgments need to be short and positively indicate that the crew member received and understood message. The preferred method is to repeat critical parts of the message in the acknowledgment.

8.5   Risk Management and Mitigation
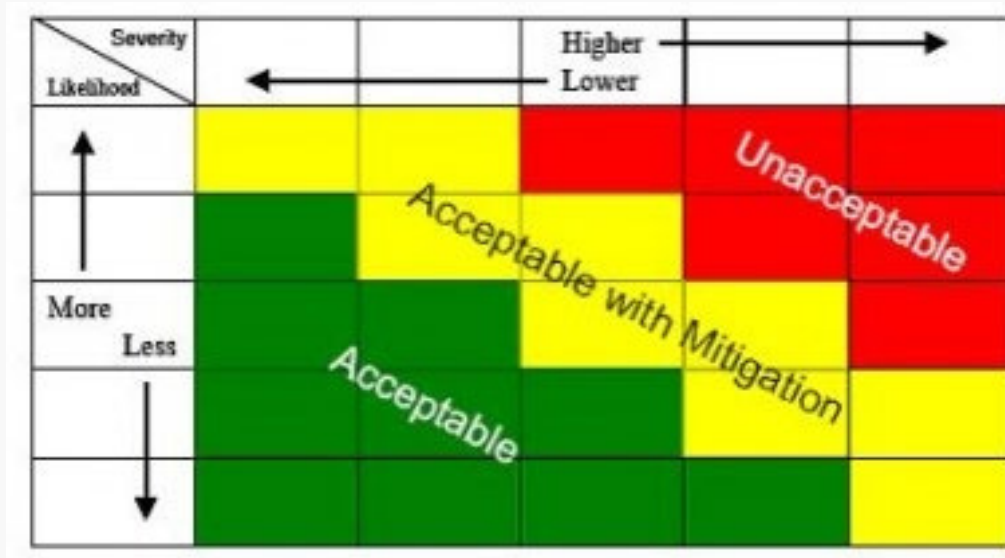
<u>**T.E.A.M.**</u> (Risk Mitigation): When examining risk potential of each specific risk item, ask these questions:

1.) Can I **Transfer** the risk to someone/something else? (Instead of using a drone, could I use a ladder, crane, boom arm.)
2.) Can I **Eliminate** the risk entirely? (Rarely so, but sometimes not flying is the best mitigation process.)
3.) Do I **Accept** the risks as they are presented and have taken steps to mitigate to an acceptable level?
4.) Have all avenues of **Mitigation** been explored?

<u>**P.A.V.E.**</u> (Risk Mitigation) When examining self and flight line, ask these questions:

1.) Is this flight within my skill set as a **Pilot**?
2.) Is my **Aircraft** up to the task? Have I properly pre-flighted?
3.) What are the **environmental** conditions? Have I checked the weather? Have I checked crowd control/pedestrian/traffic for control and issue? What are my weather standards and am I well within them or on the fringes of maximum variables?
4.) Am I being **Externally Pressured** by a boss, coworker, colleague, or client?

<u>**C.A.R.E.**</u> (Risk Mitigation) When examining risk potential, ask these questions:

1.) What are the **Consequences** if this mitigation fails? Think through all possible outcomes.
2.) Are there **Alternative** means of accomplishing this task? Have I examined alternatives to this action/mission?
3.) What are the **Realities** of consequences if things fail? Degree of consequence? Death? Injury? Bruised ego? Acknowledge the accepted realities and avoid wishful thinking. The moment a pilot begins saying "it's unlikely this could occur" or "I don't think that could happen" that the realities are perhaps being ignored.
4.) Am I being **Externally Pressured** by a boss, coworker, colleague, or client?

Step 1: Identify Risks

Identify major events of the flight. This process will aid in the detection of specific risks associated with all specified and implied tasks. Safety can be built into an operation by first seeing the operation in its entirety.

Step 2: Assess Risks

Determine the magnitude of risks by estimating loss probability and cost.
Assess each event, determine whether it is routine, and make an initial risk assessment.
Determine an acceptable level of risk.

Step 3: Make Decisions and Develop Controls

Make risk acceptance decisions by balancing risk benefits against risk assessments. Eliminate unnecessary risks. Reduce the magnitude of mission essential risks by applying controls. Controls range from hazard awareness to detailed operational procedures. Focus on high hazard events not covered by a good set of standards. Complete a preliminary hazard analysis of these events.

Step 4: Implement Controls

Integrate specific controls into SOPs, training performance standards, and rehearsals. Knowledge of risk controls down to the individual employee is essential for successful implementation and execution of these controls.

Step 5: Supervise

Determine the effectiveness of standards in controlling risk. Managers must enforce standards. Follow these basic guidelines:

- No unnecessary risk should ever be accepted. If a risk can be eliminated or reduced and the mission still be accomplished, the risk is unnecessary and must not be accepted.

- Risk decisions must be made at the appropriate level. The leader who will answer for an accident is the person who should make the decision to accept or reject the risk.

- The benefits of taking a risk must outweigh the possible cost of the risk. Management must understand the risk involved and have a clear picture of the benefits to be gained from taking the calculated risk.

Step 6: Site Survey

Prior to flight, the RPIC must assess the operating environment, considering risks to persons and property in the immediate vicinity both on the surface and in the air. This assessment must include:

- Local weather conditions.
- Local airspace and any flight restrictions.
- The location of persons and property on the surface.
- Other ground hazards.

<u>Step 7</u>: ATC Notification

When contacting ATC be prepared to provide the controller with the follow information:
- o RPIC name and contact information.
- o Time and duration of flight.
- o Location of flight.
- o Altitudes.

ATC has the authority to approve or deny any operation within controlled airspace. A waiver may be required to secure reliable access to controlled airspace.

8.6 Safety Training

All members shall receive training in the following subjects prior to operating the UAS:

- o Company commitment to safety

- o Company policy

- o UAS member's role in safety

- o Emergency safety procedures

  All members shall review the company safety policy and procedures on an annual basis and that review shall be noted in their training history.

8.7 Medical Factors

- o Operator and Observers shall only deploy the UAS when rested and emotionally prepared for the tasks at hand.

- o Physical illness, exhaustion, emotional problems, etc., seriously impair judgment, memory and alertness. The safest rule is not to act as an operator or observer when suffering from any of the above. Members are expected to "stand down" when these problems could reasonably be expected to affect their ability to perform flight duties.

- o A self-assessment of physical condition shall be made by all members during pre- flight activities.

- o Performance can be seriously hampered by prescription and over-the-counter drugs. The UAS Coordinator must be advised anytime such drugs are being taken. If it is determined that the medication being taken could hamper an operator or observer, that member shall be prohibited from the deployment or exercise.

- o No member shall act as an operator or observer within eight hours after consumption of any alcoholic beverage, while under the influence of alcohol, or while having an alcohol concentration of 0.04 (FAR 91.17)

8.8   Weather Planning

Weather should be obtained from official government weather sources to ensure reliability. Some reliable sources include:

- o   DUATS: https://www.duats.com/
- o   1-800-WXBRIEF: https://www.1800wxbrief.com/Website/
- o   National Weather Service: https://www.aviationweather.gov/
- o   Local ATIS or airport weather station

8.9   Crew Briefing

Ensure that all persons directly participating in the UA operation are informed about the operating conditions, emergency procedures, contingency procedures, roles and responsibilities, and potential hazards.

9.0   Preflight Procedures

The preflight will consist of, at a minimum, the following items:

1. Visual condition inspection of the UAS components.
2. Airframe structure, all flight control surfaces, and linkages.
3. Registration markings, for proper display and legibility.
4. Moveable control surface(s), including airframe attachment point(s).
5. Servo motor(s), including attachment point(s).
6. Propulsion system.
7. Verify all systems have an adequate energy supply for the intended operation and are functioning properly.
8. Avionics, including control link transceiver, communication/navigation equipment, and antenna(s).
9. Calibrate UAS compass prior to any flight.
10. Control link transceiver, communication/navigation data link transceiver, and antenna(s).
11. Display panel, if used, is functioning properly.
12. Check ground support equipment, including takeoff and landing systems, for proper operation.
13. Check that control link correct functionality is established between the aircraft and the CS.
14. Check for correct movement of control surfaces using the CS.
15. Check onboard navigation and communication data links.
16. Check flight termination system, if installed.

17. Check fuel for correct type and quantity.
18. Check battery levels for the aircraft and CS.
19. Check that any equipment, such as a camera, is securely attached.
20. Verify communication with UAS and that the UAS has acquired GPS location from at least four satellites.
21. Start the UAS propellers to inspect for any imbalance or irregular operation.
22. Verify all controller operation for heading and altitude.
23. If required by flight path walk through, verify any noted obstructions that may interfere with the UAS.
24. At a controlled low altitude, fly within range of any interference and recheck all controls and stability.

9.2   Operating Rules

Flight crew must adhere to the following operational rules:

1. Flight crew must use caution to avoid careless or reckless flight.
2. Operations from land or water vehicles must occur in sparsely populated areas.
3. Operation from another aircraft is prohibited.
4. No person may act as a crewmember of a sUAS under the following conditions:
5. Within eight hours after the consumption of any alcoholic beverage.
6. While under the influence of alcohol.
7. While using any drug that affects the person's faculties in any way contrary to safety.
8. While having an alcohol concentration of 0.04 or greater in a blood or breath specimen.
9. Night operations are forbidden without a waiver.
10. Aircraft must remain within visual line of sight of the RPIC, person manipulating the controls and VO, if appropriate.
11. One pilot and, if required, VO per aircraft is required.
12. Carriage of hazardous material is forbidden.
13. UAS will always yield to manned aircraft.
14. UAS will not be flown directly over unprotected people.
15. Flight within controlled airspace requires permission from ATC or a waiver.
16. Flight within any Temporary Flight Restriction is forbidden.
17. Maximum allowed groundspeed is 87 knots (100 miles per hour).

18. Maximum allowed altitude is 400 feet AGL, unless flown within a 400-foot radius of a structure and not higher than 400 feet above the structure's immediate uppermost limit.

19. The minimum flight visibility, as observed from the location of the Control Station must be no less than 3 statute miles.

20. The minimum distance of the UA from clouds must be no less than 500 feet below the cloud and 2,000 feet horizontally from the cloud.

9.3   Post flight Procedures

The post flight is an abbreviation of the preflight, which is designed to verify no damage, occurred during flight. This prevents discovery of a fault condition, which might inhibit a future mission. Inspection items include:

o   Visual condition inspection of the UAS components.
o   Airframe structure, all flight control surfaces, and linkages.
o   Moveable control surface(s), including airframe attachment point(s).
o   Servo motor(s), including attachment point(s).
o   Propulsion system.
o   Check that any equipment, such as a camera, remain undamaged from operation or landing.

10.0   Non-standard Operating Procedures

10.1   Waivers – General

The following forbidden operations can be allowed with a waiver:

o   Operation from a moving vehicle or aircraft.
o   Night flight.
o   Beyond visual line of sight.
o   Foregoing a VO.
o   Operation of multiple sUAS.
o   Yielding the right of way.
o   Operation over people.
o   Operation in controlled airspace.
o   Operating limitations for UA.

10.2   Controlled Airspace Waivers
[Client maintains a list of authorized waivers and associated limitations]

o   Night Waivers
o   BVLOS Waivers
o   Operations Over People Waivers
o   Altitude Waivers
o   Other Waivers

10.3   Recordkeeping

<u>Maintenance Records</u>:

- A maintenance logbook will be created for each UAS.

- Scheduled maintenance will be performed in accordance with all manufacturer guidelines or industry best practices if such guidelines do not exist.

- Unscheduled maintenance will occur as required.

- A description of the maintained performed will be documented in the logbook and the aircraft will undergo a functional test flight prior to return to service for commercial operations.

<u>Training Records</u>:

Each crew member will have a training record which will contain:

- Copies of certifications

- A log of hours flown for the company

- A training record of make/model checkouts given by the management.

- A record of any training required per waiver

- Any other documents mandated by the FAA.

<u>Logging Crew Time</u>:

Crew time should be logged by the pilot and documented to the nearest tenth of an hour.

<u>Logging Equipment time</u>:

In order to develop an in-house maintenance schedule, equipment time must be documented to determine operational patterns such as mean time before failure of company equipment and individual parts/components.

11.0 Emergency Procedures:

An in-flight emergency is an unexpected and unforeseen serious occurrence or situation that requires urgent, prompt action. In case of an in-flight emergency, the remote PIC is permitted to deviate from any rule of Part 107 to the extent necessary to respond to that emergency. Emergency action should be taken in such a way as to minimize injury or damage to property.

Pilot (PIC) in charge will ensure that sUAV has home point is set and ensure a safe minimum obstruction clearance altitude (MOCA). Pilot in charge will configure and set (MOCA) prior to each launch. If a situation arises where (PIC) experiences a loss of communication between the sUAV and the main controller, the sUAV will establish an automatic programmed return-to-home (RTH) sequence which will bring the sUAV into an auto-hover mode for up to 20 seconds. If sUAV communication is not regained the vehicle will descend slowly to the home point. Upon reaching the home point the sUAV will automatically land. I the (PIC) reacquires communication of the sUAV before landing then the (PIC) will bring the sUAV into land at home point. If the absolute cause of any communication error is not discovered and confirmed the (PIC) will terminate the mission immediately. In ANY event of an uncontrolled fly-away, the visual observer (VO) will immediately contact ATC and inform them of last recorded location, altitude, and direction of sUAV. Simultaneously the (PIC) will continue to attempt to regain control of the sUAV and/or follow it to determine location.
In the event of unpredicted obstacles or emergencies, or instructed by ATC to do so, the (PIC) will immediately terminate mission by returning sUAV to home point or landing in a predetermined location if required.

The operation will not take place if the ceiling is below 1000' AGL or weather and visibility limits are not maintained.

11.1 Loss of Link or GPS:

In the event GPS is lost in flight the RPIC should land the aircraft, if possible, to determine if the mission can continue to be conducted safely. Often, fail safe systems on UAS rely on GPS signal to function. The mission should only continue if the RPIC determines that the loss of GPS does not adversely affect safety.

11.2 Mishap Plan:

An important aspect of the safety management system is to identify actions in the event of a mishap.

11.3   Pre-Mishap Plan:

Immediate Response Actions:

- o   Notify 9-11 if damage or injury occurs.
- o   Take action to prevent further damage or injury.
- o   Contact Primary and/or alternate responsible managers.

Secondary response actions:

- o   Guard the wreckage
- o   Obtain photographs
- o   Gather and secure flight, maintenance and training records.
- o   Prepare written statement of events.
- o   Notify NTSB if required.

Information to collect:

- o   Location.
- o   PIC name.
- o   UAS / Registration.
- o   Date / Time of incident.
- o   Description of events.
- o   Description of damage.
- o   Description of persons involve and associated injuries.
- o   Witness information.

12.0   Required Reports

Flight crew must report within 10 days any accident that results in serious injury to any person or any loss of consciousness or any damage to any property, other than the UA. The report may be submitted to the appropriate FAA Regional Operations Center (ROC) electronically or by telephone. The report should include the following information:

- o   sUAS remote PIC's name and contact information;
- o   sUAS remote PIC's FAA airman certificate number;
- o   sUAS registration number issued to the aircraft, if required (FAA registration
- o   number);
- o   Location of the accident;
- o   Date of the accident;
- o   Time of the accident;
- o   Person(s) injured and extent of injury, if any or known;
- o   Property damaged and extent of damage, if any or known; and
- o   Description of what happened.

12.1   Personal SAFETY Equipment

o   Operators/Observers shall always wear eye protection while the UAS is in flight.

o   Although there is no specific uniform for the UAS unit or required for proper operation of the UAS, the operator/observer should take necessary measures to deploy in a professional matter, wear Hi-Visible vests when appropriate, and take into consideration that all deployments are subject to media requests.

o   Operators/Observers will take into consideration the current weather conditions when planning to deploy and wear appropriate clothing to deploy comfortably.

o   There are no documented issues with the use of the radio or cellular phones during the deployment of the UAS, but the operator/observer should at all times take into consideration safe operation of the UAS when using a radio or another device (use of the radio or other device is strictly prohibited by the operator during flight).

o   Operators/Observers shall wear clothing that easily identifies them as CONNEXICORE UAS Flight Crew members.

13.0   Pre-Flight/Post-Flight Actions

13.1   Inspections

o   Operators/Observers are both responsible for a thorough preflight inspection of the UAS.

o   Before and after each deployment (whether a mission or training), the operator and observer shall conduct a thorough inspection of the UAS in accordance with the instructions contained in the manufactures user's manual.

o   Any issues found that will put in jeopardy the safe operation of the UAS shall be documented and resolved immediately prior to flight.

o   It has been recognized that the use of a checklist is a significant method to combat UAS accidents. A pre-flight checklist is contained with each UAS Base Station and is utilized prior to each flight.

o   Any physical equipment that cannot be resolved on-site, and which have an impact on safety or the mission, will override the deployment. These issues will be resolved before flight.

13.2   Weather

o   Before each deployment, the operator/observer will ensure that he/she gathers enough information to make themselves familiar with the weather situation existing throughout the area of deployment. The operator shall utilize FAA approved weather resources to obtain the latest and most current weather conditions.

o   An anemometer should be utilized in order to better estimate the wind speed and determine if it is within the capabilities of the airframe being flown.

- Operators/Observers should use the Beaufort Scale when making deployment decisions regarding wind conditions.
- The weather conditions reported for the operation shall be recorded in the pre-flight checklist.
- The operator shall ensure that the flight will occur within FAA VFR weather requirements.

13.3   Documentation

- Inspection and weather will be documented prior to flight within the logbook.
- After each flight, the operator will complete a statement documenting the UAS operations.

13.4   Planning

- The operator/observer shall familiarize themselves with all available information concerning the deployment including, but not limited to, the weather conditions, hazards, description of the incident, deployment goals, etc.
- Operators will ensure that the location for take-off and emergency landing is adequate for a safe deployment.
- The take-off/landing area should be clearly marked and identifiable with short cones.
- At least one emergency landing area should be identified per deployment.
- Operators will ensure that they are aware of their surroundings if an emergency landing is necessary. This includes the ability to recover the UAS.

13.5   Checklists

- Operators shall utilize pre-flight checklists to ensure the highest level of safety for deployment.
- Prior to flight, the flight log shall be initiated.

13.6   Maintenance

- Although there are few parts on the UAS that need servicing, it is necessary that the manufacturer's maintenance schedule is followed and properly documented.
- Any issues that arise during maintenance that cannot be resolved by routine methods shall be forwarded to the manufacturer for further technical support.

13.7   Other

- Operators/Observers will ensure that no items are attached to the UAS prior to flight that are not required for safe operation and to complete the mission goal.