RSAR STANDARD OPERATING PROCEDURES FOR UNMANNED AIRCRAFT SYSTEM

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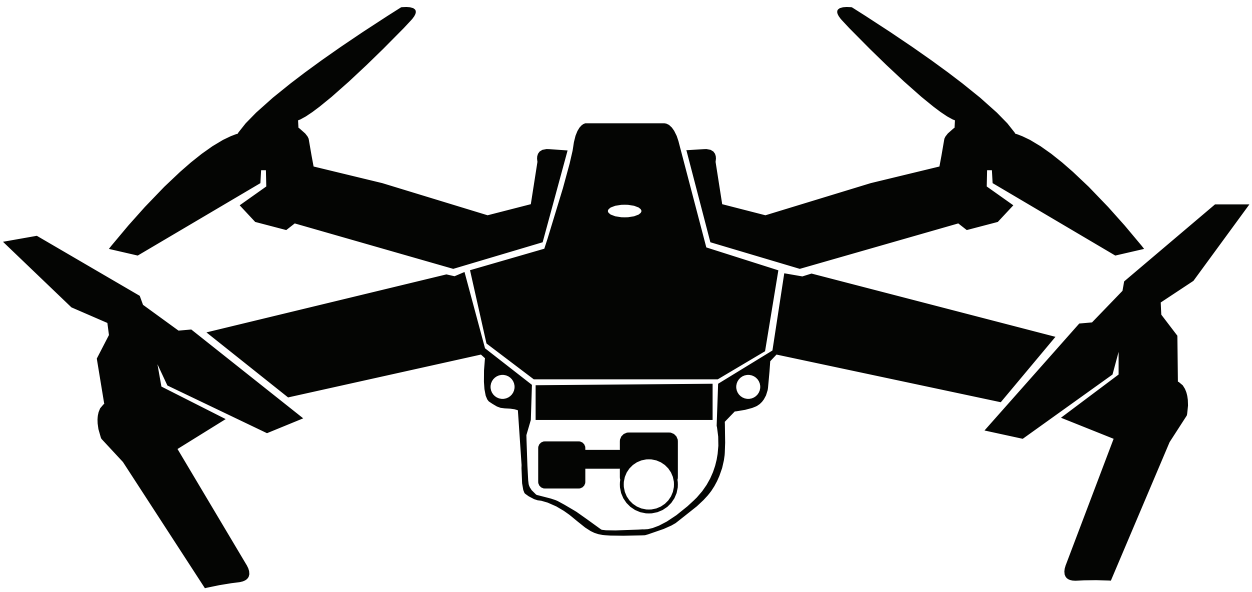


Responsibility

It shall be the responsibility of all personnel to familiarize themselves and consistently apply the provisions of this policy.

Rampart Search and Rescue shall meet FAA size requirements to operate legally during emergency situations as declared by the on-scene mission coordinator, incident commander or their designee. Rampart will engage in the use of drone aircraft following the tenants of the proposed FAA rules and regulations related to this equipment. Rampart shall ensure UAV operations requiring a Certificate of Authorization (COA) from the FAA. Rampart will train individuals on the safe operation of drones which may eventually require those individuals to pass an aeronautics test and be vetted by the Transportation Security Administration (TSA), but a certificate wouldn't require the flight hours or medical rating of a private pilot's license.

Mission

The mission of the UAS program is to provide strategic aerial support for Search and Rescue teams while performing search and rescue operations. The UAS will facilitate ground search of large areas which normally might be inaccessible to search personnel. UAS will be utilized in high-risk situations where the operating environment is hazardous to health and safety of first responders. These can include, but are not limited to; structure collapse, adverse terrain or hazardous environments. The use of the unmanned aircraft system (UAS) by the Rampart Search and Rescue (RSAR) is expected to enhance, not replace ground operations. Depending on the situation UAS operations may be integrated with ground operations to provide the most successful response.

The Rampart UAS program will provide support for the Adams County Sheriff's Office. Working with and in conjunction with the Adams County Sheriff's Office UAS program to supplement the strategic and tactical needs when requested.

General Operating Rules

All Unmanned Aircraft System (UAS) operations will be conducted in accordance with all applicable FAA, local and national laws, manufacturers' manuals/limitations and this Manual. Aircraft will be operated in an airworthy condition at all times. Safe use of UAS technology is the primary objective of the agency. In excess of statutory flight rules, agency UAS operators will only fly their UAS under the following conditions:

1. During the time defined as day and twilight (30 minutes prior to sunrise to 30 minutes after sunset)
2. The operator must be in visual line of sight of the aircraft when operating solo (able to determine the direction of flight with the unaided eye)
3. Below 400 feet AGL (above the ground level)
4. Avoid direct overflight of people, vehicles, vessels, or structures.
5. Greater than 5 nautical miles (30,000 feet) from an airfield without coordination with Air Traffic Control (ATC) facility
6. No UAS crew may operate an aircraft in a careless or reckless manner so as to endanger the life or property of another.
7. The UAV shall operate within the sightline of the operator Area of Operation – limited to the incident unless there is a search for a lost hiker or other such operations requiring the UAV to operate out of the sightline of the operator

Privacy

UAS technology is considered controversial by some. It is therefore important to use UAS in an ethical and safe manner. The agency has issued a detailed policy on privacy, however as UAS operators you are the agency's representative and should be familiar with the details of the privacy policy and follow the following steps:

1. Take precautions not to film, image, or encroach on the personal space of individuals when there is a reasonable expectation of privacy.
2. For imaging operations on private land, obtain a written consent from the landowner and all persons present on the property.
3. For imaging operations on public lands, post signage indicating that aerial photography or imaging is taking place. When reasonable obtain written consent from all persons present.
4. In all cases discard and do not distribute, publish, or transfer images captured with a UAS that clearly show people that have not consented to having their likeness captured.
5. UAS crews will keep digital copies of consent forms with the raw data files.

UAV operations shall not infringe upon the rights and liberties of individuals Civil Rights and Civil Liberties Protections. The agency shall during UAV operations protect civil rights and civil liberties:

- ensure that policies are in place to prohibit the collection, use, retention, or dissemination of data in any manner that would violate the First Amendment or in any manner that would discriminate against persons based upon their ethnicity, race, gender, national origin, religion, sexual orientation, or gender identity, in violation of law;
- ensure that UAV activities are performed in a manner consistent with the Constitution and applicable local and State laws,
- ensure that adequate procedures are in place to receive, investigate, and address, as appropriate, privacy, civil rights, and civil liberties complaints.

Safety of Operation

It is the goal of RSAR to eliminate hazards and accidents through a process of continuous assessment, vigilance, and adaptation. By identifying and eliminating hazards RSAR can reduce or prevent injuries and damage to property and/or equipment.

RSAR's dedicated safety officers will collect and disseminate important safety data to all crews and flight operations staff. The safety officer will use the Safety Management System (SMS) to create a safe work and flight environment. Safety is our number one priority and all UAS crews will undergo initial safety training prior to performing flight duties.

1. Safety of the UAS operations (including persons and property) is the responsibility of the entire team. UAS team members should bring to the attention of other members any condition which they feel is a safety concern.
2. Except as required by the mission, all UAS team members will ensure that no persons are in the vicinity of the UAV during operations to avoid flying over non-mission persons or vehicles.
3. Under no circumstances shall the UAV be utilized directly over large gatherings of people or operated from a moving vehicle.
4. Except for the purpose of training or with Mission Coordinator approval, only UAS personnel who meet the requirements set forth will be permitted to act as a team member.

5. UAS team members will comply with the UAS Operator Manual, warning, limitations, placards, and/or checklists at all times unless an emergency dictates otherwise.
6. UAS OICs are authorized to evaluate and accept or decline any mission or portion thereof which the safety of operations.
7. All UAS operations will be conducted in Day/Visual Meteorological Conditions only.
8. UAS night operations are not authorized.

Procedure

RSAR personnel authorized to operate the UAS must meet the required minimum qualifications as put forth by the Federal Aviation Administration (FAA) for the operation of UAS craft. This requires at a minimum that the pilot holds a valid pilot FAA certificate of operation for UAS aircraft and the certificate is active. Additionally, authorized pilots must possess a valid County ID issued by the Adams County Sheriffs Office.

RSAR UAS pilots will operate the aircraft at all times with the safety of the public as the primary goal while making all efforts to accomplish the specific mission at hand.

The RSAR pilot will operate under the designation of (Drone 1) and be labeled as the aviation unit of RSAR. RSAR will appoint a Direct of Flight Operations to be responsible for the oversight and operational use of all UAS operated by RSAR.

Flight Administration

Professionalism

All Rampart volunteers are to present themselves in a professional manner, reflecting the values of their agency and the Sheriff's Office. Professionalism is embodied in both the way volunteers conduct operations as well as in the way they interact with other agencies and members of the public. To this end:

1. Crews will dress in accordance with the agency dress code or uniform.
2. The crew will report to the staging area ready to fly. Aircrew readiness is an important part of safety and individuals should be free from the effects of medication or alcohol (at least eight hours), in a mental and emotional state required to perform their duties. All UAS crews will use the go/no-go checklist to determine readiness for duty.
3. Crew duty time will be considered from crew show to equipment "tear down" and stowing. In no circumstance will this crew duty time be longer than 12 hours.

Organizational Structure

The RSAR unmanned aviation group has established a chain of authority and accountability for day to day UAS flight operations.

Director of Flight Operations
The Director of Flight Operations is responsible for the training, staffing, scheduling, and supervision of the UAS crews. The Director of Flight Operations is responsible for the efficient operation of the UAS fleet. The UAS Operator in Command and crew will report directly to the Director of Flight Operations.

Safety Officer
RSAR has designated a Safety Officer who acts independently from the chain of authority. The Safety Officer is responsible for performing risk assessments for new areas or types of

operations, collecting safety data, investigating accidents, as well as developing and administering safety training to UAS crews. In the event of a safety accident or incident the Safety Officer will oversee the emergency response and notify the director of flight operations of the status of the response effort. UAS crews will not openly discuss any particulars of an accident or incident with anyone other than the Safety Officer, the FAA, or law enforcement/ public safety officials.

Crew Complement

Each UAS team, consisting of an air vehicle, a control station, and all associated equipment necessary for safe operation will ideally have the minimum crew complement of one operator in command (OIC) and one visual observer; although some operations may require several observers, and supplemental crew members such as relief operators and payload specialists.

Each member of the team will be assigned a specific role during UAS operations. Roles may be rotated when more than one flight will be completed during an operation. Each member should be clearly designated with an assignment prior to any flights taking place.

Operator in Command (OIC)
The OIC will function as the team leader and the operator of the UAS. The OIC will be responsible for the safe execution of the operation and therefore is given authority to make go/ no-go, air vehicle recall decisions. Additionally, the OIC can implement risk mitigation strategies based on real-time changes and onsite conditions. The OIC can release supplemental crew members from their duties or ground a UAS due to lack of airworthiness.

The OIC is accountable to RSAR, Adams County Sheriff's Office and involved agencies. The OIC will be ultimately responsible for the operation and solely responsible for input of commands/piloting of the UAS during flight. The OIC will be responsible for assembly, Flight Preparation, Post Flight Procedures, and Disassembly/ Storage. Additionally, the OIC will appoint the observer and safety officer at his discretion.

The OIC will operate under the direction of the mission coordinator/scene commander but the OIC maintains the sole and exclusive responsibility of operating the UAS in a manner acceptable to the OIC. This might mean the refusal to fly if the situation is determined to be unsafe in the sole discretion of the OIC.

Observer
The observer will maintain a visual observation of the UAS while it is in flight and alert the OIC of any conditions (obstructions, terrain, structures, air traffic, weather, etc.) which affect the safety of flight. Additionally, the observer will be responsible for all aviation-related communications. To accomplish this effectively, the observer will be in close proximity to the OIC to ensure instant relaying of information. Visual observers are responsible for assisting the OIC in the setup and tear down of UAS equipment, reading checklists, providing safety oversight and all safety-related functions.

Crew Qualification

All agency UAS crews will be appropriately trained and qualified in the UAS they operate. Refer to the agency training manual for guidance on initial qualification and recurrent training. In addition to training, UAS operators must be current and proficient for flight operations.
UAS operators/team members must be certified in the operation of the UAS by successfully completing a manufacturer approved training course or by completing training conducted by RSAR UAS Instructor. They must meet the standards required by the FAA.

1. All UAS OICs will be both tested annually in the type of UAS being flown and must demonstrate proficiency in the safe manipulation of controls, programming of the autopilot (if able), and accurate execution of procedures.
2. No UAS OIC will operate a UAS 'Live Mission' until they have completed 100 flight cycles in the UAS type at a training facility or appropriate test site (reference training manual).
3. All OICs need to document recent operational experience in UAS being operated or an FAA certified simulator; at a minimum, 3 Launch and Recoveries in the previous 90 days.
4. All UAS crew members will have demonstrated medical readiness to operate a UAS by being evaluated in the areas of vision, hearing, mental readiness, and a review of the operator's medical history.
5. **Automation Policy** All UAS have automation to assist the crew in performing the operation. UAS operators should utilize autonomy to the maximum extent possible. Systems capable of autonomous take-off and landing should be operated in such mode (except for training and proficiency flights). The OIC will make it known what mode of control is being employed.
6. **Aircraft Markings** ALL RSAR UAS must be registered with the FAA and should be clearly labeled with the registration number in accordance with current regulation. In addition to unique identification, all UAS should be marked with high contrast markings, decals, paint, or lighting to maximize aircraft visibility.

Required Documentation

Airworthiness Statements

Each component of a UAS should have established airworthy requirements that cover minimum installed equipment, approved supplemental payloads, physical condition of the equipment as well as limitations and hazards associated with the equipment. If the UAS has received airworthiness certification from civil aviation authority or approved delegate, these certificates should be displayed within the control station or be accessible on site.

For UAS without certification, a statement of airworthiness should be posted and accessible on site. These statements should include:

1. All notes, cautions, and warnings associated with operation of the UAS;
2. All operating limitations, and
3. Configuration and installation details

Flight Manual and Checklists

UAS crews will carry a current copy of the UAS flight manual in traditional paper form or digital as part of an electronic flight bag. All UAS crews will operate the system in accordance with the operational limits stated in the flight manual. UAS crews will use checklists provided by the manufacturer or developed specifically for the type and configuration of UAS being used in operations. The agency checklist philosophy is to use a "call–do–respond" method in which OICs will be directed by a non-flying crew member (VO) on each step of the checklist. The OIC will complete the step ("do") and then respond to the non-flying member that the checklist item is complete.

Flight and Maintenance Logs

It is the responsibility of maintenance personnel or the OIC (if maintenance is unavailable) to keep up to date maintenance logs, including recording the date, part, serial number, and condition. The OIC will keep accurate flight logs detailing the number of flight hours, date, and location of every flight. The OIC will sign that these times are truthful and accurate.

Call-Out Procedures

1. Upon notification of a request for the UAS, a Mission Coordinator will gather the facts and decide if a response is warranted. The Mission Coordinator will then contact the UAS team for response.

2. Team members (preferably the Mission Coordinator and/or OIC) will be contacted and advised to report to the call out location. The UAS team members that respond to the scene will determine the response necessary from the Mission Coordinator in order to support the request. The Mission Coordinator or designee along with the UAS team members will determine if safe operation of the UAS can be accomplished as requested. The decision will be contingent upon several factors to include the ability of the UAS team to operate within a secure perimeter, physical features of the area, obstructions to flight, terrain, and the weather.

3. If it is determined that the UAS can be safely operated at the location, the Mission Coordinator or designee will contact the remaining UAS team members for response.

4. One (1) or more team members (preferably the Safety Officer and/or Observer may be directed to respond to an UAS location to retrieve the UAS and its related operating equipment and transport it to the location. Upon completion of each mission, the UAS will be returned to an UAS location for storage.

5. The OIC is authorized to evaluate and accept or decline any mission request, or portion thereof, made by personnel not assigned to the UAS. The basis for declining a mission shall be verbally communicated to requesting personnel and the Mission Coordinator immediately notified. Additionally, the OIC declining the mission will be required to document the circumstances upon request by the Mission Coordinator.

When arriving at the scene of an RSAR mission, the OIC will position his vehicle in such a location that would permit for the safe launch and recovery of the UAS. The launch and recovery location of the UAS will be determined by the OIC and may not be colocated with the scene commander location if, at the sole discretion of the OIC, the mission can be better and safer accomplished from an alternative launch and recovery location.

If members of the public are nearby the OIC or crew will then tape off a no-entry zone for all others to not enter. This will be at least a 10-foot radius around the proposed takeoff and recovery point.

Missing Persons

Depending on the target search area of the missing person search area, it will most likely require the UAS to fly autonomously conducting a grid search pattern. This procedure will require additional configuration and planning. An additional crew member may be required to review live feed or recorded footage.

Post Disaster Assessment

As soon as practical for aerial operations and under the guidance of Command, the UAS will start damage assessment over areas that would be deemed a priority for damage assessment. Video and photos would be evaluated for secondary flights.

The utilization of the UAS at a post-disaster assessment will allow the mission coordinator and municipality to determine the extent of the damage caused by large-scale disasters to determine priority of resources and response.

Communications

1. All radio communications required by the FAA will be complied with.
2. Communications with UAS team members during operations will be limited to operationally necessary communications in order to minimize disruptions to UAS team members.
3. If operating in the vicinity of an airfield (5 nautical miles or less). Contact will be made with Air Traffic Control.
4. The OIC will be required to be in radio contact with the Mission Coordinator and RSAR visual observer at all times.
5. The visual observer will always be in contact with the OIC.

Flight and Operations Planning

Agency crews will NOT fly any UAS without properly planning for each flight. For operations requiring several flights within the same day crews must plan for the operation and make conservative judgments based on changing conditions.

1. The OIC will gather weather data prior to flight (within 24 hours of operations) from traditional weather sources (METAR, TAFs) in the vicinity of the operational area.
2. The OIC will need to view the Federal Aviation Administration's Notices to Airman (NOTAM) to ensure the absence of flight activity that could interfere or pose a danger to UAS operations (and vice versa).
3. The OIC will need to identify all types of airspace within a 5 nautical mile radius from the UAS operational site. If the OIC identifies an airport within the 5 nautical mile radius they must contact the local air traffic control facility prior to flight.
4. The OIC will need to identify all non-standard aircraft and air vehicle operations within a five nautical mile radius of the UAS operational site. These non-standard operations include, but are not limited to: aerial advertisement, aerial spray, military training/low-level areas, moored and free balloons, rockets, gliders and ultralight activity. If the OIC identifies this type of activity contact must be made with the operator to coordinate a segregation procedure.
5. In addition to abiding by all federal laws, UAS operators must check local and state laws pertaining to UAS use and comply as directed with local authority.
6. The UAV shall be operated in accordance within manufacturer specifications and applicable FAA limitations and restrictions.
7. Care shall be taken in the operation of the UAV to avoid overflying persons and property that could result in injury or damage whenever possible.
8. For all operations, the observer shall utilize a distance from the UAS that will adequately permit them to maintain a visual observation on the UAS and maintain Officer safety.

Site Preparation (non-emergent)

In non-emergent flights, UAS technology should not be used without conducting a site survey and in some cases preparing the site for operations. A physical site visit is required prior to flight. During the site visit the OIC or an appropriately trained coordinator (same level of qualification as the OIC) will at a minimum:

1. Check the property for obstructions and obstacles such as trees, towers, and buildings.

2. Determine the ability of the UAS crew to restrict public/spectator access to the area under the planned flight route.
3. Identify both primary and alternative launch and recovery sites on the property that will limit risks.
4. Identify industry hazards (firing, gas venting, radio or high voltage) recreational activities, and proximity of dwellings on adjacent properties.
5. Obtain permission from the landowner and the owner of adjacent properties to overfly.

Operations Area

The operation area selected by the UAS team shall be located within a secure perimeter, whenever possible. The area should be evaluated for adequate space and clearances in order to safely assemble, launch, and recover the UAS. Attention should be given to overhead obstacles and obstructions that may pose a risk to the UAS during operation. The site selected and utilized by the UAS team should be restricted and access granted to personnel for operational purposes only.

Waypoint Controlled Operations

Independent of the level of automation provided by the system or ease of use, the OIC is responsible for planning and double checking computer calculated waypoint flight plans. OICs will select waypoints for semi-autonomous navigation that:

1. Account for forecasted or observed winds, maximizing turns into the prevailing wind and minimizing flight paths that will require crosswind control.
2. Guarantee minimum separation distances from persons, vessels, and structures.
3. Use sound energy management principles to ensure a UAS can return to the launch location with the required energy reserve.
4. Aircraft is placed at a sufficient distance from the launch and recovery site to allow for system specific climb out and let down profiles.
5. Aircraft is placed clear of any loss of control interference area (if applicable).
6. Meet the operational needs.

Stabilized (GPS Hold) Only Operations

For UAS using stabilized hold (Air Vehicle will maintain lateral and horizontal position aided by technology such as Global Positioning System), operators will need to plan for these type operations. At a minimum the OIC will:

1. Account for forecasted or observed winds, placing the system 150 feet downwind of structures, non-crew members and/or vehicles.
2. Guarantee minimum horizontal and vertical separation distances from persons, vehicles, and structures.
3. Use sound energy management principles to ensure a UAS can return to the launch location with the required energy reserve.
4. Predetermine altitude for engaging stabilized hold.
5. Have cleared the Return to Launch area (if applicable) in case of loss of control\ link.

Control (Data Link) Frequency

The integrity of the UAS' data link is essential to safe flight operations. OICs will consider the data link during the planning phase and:

1. Allocate frequencies that will not interfere or "crowd out" other vehicles (if applicable).

2. Conduct a sweep of the spectrum that includes the intended active frequency (if equipment available) and verify reliable link is established prior to aerial operations.
3. Plan for power settings appropriate for the type of operation, environment, and license.
4. Attempt to minimize data link interference.

In addition to planning for the safe and effective use of the data link, OICs will need to prepare for a loss of data link contingency:

1. Review loss of link procedures in the Flight Manual.
2. Select loss link flight profiles that DO NOT overfly people, structures, or vehicles.
3. Plan to clear the area under the Return to Launch (RTL) or System Salvo areas.

Launch Planning

The OIC will use performance data and guidance provided in the Flight Manual to select a launch direction and area that:

1. Is free of people, structures, vehicles, and obstacles.
2. Will ensure vertical clearance during the launch and ascent.
3. Accounts for winds and mechanical forces.

Recovery Planning

The OIC will use performance data and guidance provided in the Flight Manual to select a recovery direction and area that:

1. Is free of people, structures, vehicles, and obstacles.
2. Will ensure vertical clearance during the descent and transition to recover ascent.
3. Accounts for winds and mechanical forces.
4. Has enough room to “go around” and climb in the opposite direction (if applicable).

Preflight Decision Making

UAS personnel are expected to utilize sound, conservative judgment in their approach to their duties and avoid any undue risk. Hazardous attitudes, poor airmanship, routine lack of readiness, or any actions that violate the privacy and/or rights of individuals will be grounds for immediate dismissal.
The Safety Officer will use the Safety Risk Management (SRM) process outlined in the Safety Manual which includes; assessing risks, developing alternatives and mitigation strategies, and choosing appropriate course of actions. The OIC will use a similar strategy to make a go or no-go decision on the day of the flight by using the Operational Risk Management matrix (on the next page).

On the day of the flight, the OIC will gather data about the crew, aircraft, environment, and nature of the operation. OICs will:

1. Review each identified hazard by row and circle the scenario that most closely matches the current situation.
2. Use the worst case weather, crew condition, mission details, etc. to fill out the matrix.
3. Tally the number of circles for each column (green, yellow, red).
4. Five or more in the yellow moderate risk column will require a change of plans and notifying a supervisor (off-site) for approval.
5. Any circled items in the far right should be considered a “no-go” situation and the operation should be cancelled.

Factor	Low Risk	Moderate Risk	High Risk
People			
Illness	Clean bill of health, no signs of illness	Common cold, under the weather, allergies, coughing	Very sick, eyes watering, flu-like symptoms, loss of balance, feeling spacey
Alcohol, drugs, or medication use	No alcohol, prescription drugs in the past 12 hours, free from all effects	Feeling dizzy or have a headache, sluggish and/or tired	Feeling the effects of drugs or alcohol, visibly hung-over, have consumed alcohol or drugs in the past 12 hours
Outside physiological stressors	No outside pressure	Significant other is pregnant (less than 7 months), having problems with significant other, and/or work stress is high	Significant other is greater than 7 months pregnant, just had a fight with significant other or coworker, just received bad news
Proper rest	Eight hours of uninterrupted sleep, well rested and energetic	Less than seven hours of uninterrupted sleep, showing physical signs of fatigue like yawning	Little to no sleep, showing physical signs of exhaustion, nodding off or having trouble keeping eyes open
Currency and proficiency	Above 100 FC*. Flown in the last 30 days, familiar with operation type	Less than 100 FC*. Flown in the last 60 days but not in the last 30 days, training flight or low proficiency at operation type	Less than 25 FC*, or flying alone without a flight in the last 61-90 days, unfamiliar with operation
Operational			
Mode of communications	Use voice (if less than 100 meters) or dedicated intercom system for crew to crew, Use an aviation radio for crew to ATC or Aircraft	Use voice (if greater than 100 meters but less than 500 meters) or hand held radios system for crew to crew, Use an aviation radio for crew to ATC or Aircraft	Use voice (if over than 500 meters) or cell phones for crew to crew, No way of contacting ATC or conflict Aircraft
Planning Time	Complete site survey, and more than two hours of planning and preflight time	Complete site survey, and less than two hours of planning and preflight time	no site survey, and less than two hours of planning and preflight time
Scale and complexity	1 take off and recovery, single air vehicle	2-4 takeoff and recoveries per day, single air vehicle in proximity of other UAS with frequency management plan	5 or more takeoff and recoveries per day, Several air vehicles without a frequency and airspace management plan
Mission duration	Under 2 hours	2-6 hours	>6 hours
System automation	Fully autonomous (autopilot controls all aspects of flight)	Full manual (but operator is experienced in manual 200 FC* or remote control)	Full manual (inexperienced operator, less than 200 FC*) or switching modes of control
Ground operations	Improved surface and area has been cleared of foreign object debris and obstacles (100x aircraft width)	Unimproved surface but foreign object debris has been cleared (50x aircraft width), first time operation at site	Unable to control people's access to the launch are recovery site, site cleared only 10x aircraft width or less
Launch and Recovery	No additional launch or recovery equipment required	Systems requires a launcher, is hand tossed, or needs a recovery area	Launch and or recovery off of a structure or vehicle (needs contingency plan)
Navigation	Auto generated waypoints, overflight of land only, or launch and GPS hold only	Mixed method, overflight or property and/or water, transition <5 min	Manual waypoint entry, overflight of people or roads, transition >5 min
Mission delay complexity	Simple and familiar with operation	Complex operation but familiar, or not familiar but simple operation	Not familiar and complex
System			
Lost data link	Dedicated frequency outside of ISM band, data link security, no detected interference, and no observed lost link events during previous flights in the operating area	Shared frequency, ISM band, or self-selecting frequency, detect interference in data link band; or new to the operating area and unable to scan frequency	Have observed lost link events due to interference or unknown origin at the operation area
Maintenance and status	Aircraft is mission ready with no new critical components	Aircraft has critical components with less than two hours of flight time or within two hours of Time Between Overhaul (TBO), MTBF, or replacement	New aircraft checkout, new equipment checkout, or equipment is past a service interval and maintenance is required
Environment			
Terrain and obstacles	Flat terrain, clear of obstacles, towers, structures and or spectators	Moderate terrain or few buildings or towers that must be avoided, areas adjacent to the flight area have obstacles or property that could be a factor, may have onlookers, but contained to a specified area out of harm's way	High topography, several obstacles, antennas and/or structures; areas adjacent to the flight area have tall obstacles or property that pose a risk or need to be flown around, operation is planned in proximity of spectators
Launch elevation	Low elevation (sea level to 1000'). No noticeable loss of performance or difference in energy consumption	Medium elevation (1001' to 3999'), and/or suspect UAS performance may be degraded	High altitude (4000' and above), noticeable loss of UAS performance and/or high energy consumption
Ceiling and visibility	Visibility greater than five miles and clear skies, UAS has aircraft lighting and brightly colored panels visible at one mile	Visibility greater than one mile but less than 5 miles low clouds (1000'), UAS is visible at half of a mile	Visibility less one mile low clouds (below 500'), UAS does not have aircraft lighting or brightly colored panels that are visible at half of a mile
Winds	Winds are well within the manufacturer recommended limits, less than 10 knots for systems without published limits	Forecast wind near or out of manufacturer recommended limits, observed/measured winds at site are within limits but variable (wind gusts)	Actual winds greater than UAS manufacturer recommended limits, unable to set up equipment, requires full defection of controls on equipment test
Temperature	Able to keep crew and equipment between 51 and 79 degrees F, have environmental conditioning available or in-use	Less than 50 degrees or greater than 80 degrees F without environmental conditioning equipment	Less than 32 degrees or greater than 100 degrees F without environmental conditioning equipment
Airspace	Class G, below 400', greater than 10 miles from the closest airport. If in special use airspace - familiar with special instructions	Glass G, below 400', 5 to 10 miles from a public or private airfield, in the proximity of non-traditional aircraft activity (ultralights, balloons, aerial spray aircraft), first time in special use airspace	Class E (C or D), above 400', inside of 5 miles of an airfield, operating adjacent to special use airspace without notifying the controlling authority
*FC= Flight Cycles	If all or almost all items are in this column the risk score is low, proceed as planned	4 or more in this column represents an overall risk of moderate; you may need to change the plan; formulate a strategy to reduce the risk or accept and proceed with caution	Any in this column represents a high risk! You must change the plan! Do not proceed unless you have developed contingencies and risk mitigation plans to reduce or control the risk

Preflight and Ground Operations

After the “go decision” has been made the UAS crew will need to prepare the UAS and LR site for operations. This preflight and ground operations phase has several components outlined in the following paragraphs.

Observed Weather

The OIC will use field weather observation tools to determine the wind intensity and direction of origin. Crews should note that mechanical forces such as tree lines and the orientation of buildings can disrupt the airflow close to the ground and create mechanical wind that differs from the forecasted or observed winds and nearby airfields.

The OIC will scan the sky for cloud formations, precipitation, and/or other weather hazards and make a judgment call on any hazards present. UAS crews will NOT fly in visible precipitation, with cloud ceilings less than 500 feet, or anytime lightning has been observed within 5 NM of the Launch and Recovery site. If thunder is heard, lightning is close enough to strike crew members.

If during flight operations lightning is observed the crew will immediately abort the operation and seek shelter. NO PLACE outside is safe when thunderstorms are in the area. While sheltered, computers and other electrical equipment that put crew members in direct contact with electricity should be avoided. Safe shelter should be maintained until at least 30 minutes after the last sound of thunder is heard.

Exposure hazards

Environmental operating conditions can pose a hazard to the UAS and crew. DO NOT plan flight activities in conditions that are considered dangerous.
Hot Weather Operations

- Be cognizant of the heat index (see NOAA chart). DO NOT conduct flight activities in heat above 103 degrees F.
- Slow down. Reduce, eliminate or reschedule strenuous activities until the coolest time of the day.
- Wear a brimmed hat as well as lightweight, light-colored clothing to reflect heat and sunlight.
- Drink plenty of water, non-alcoholic and decaffeinated fluids. Drink water every 15 minutes, even if you are not thirsty.
- During excessive heat periods, spend more time in air-conditioned places. If air-conditioning is not available, rest in the shade to cool down.
- Don't get too much sun. Sunburn reduces your body's ability to dissipate heat.
- Keep an eye on fellow crew members.

Cold Weather Operations

Prolonged exposure to freezing or cold temperatures may cause serious health problems such as trench foot, frostbite and hypothermia.

1. Immediately abort the operation and seek emergency help if you observe uncontrolled shivering, slurred speech, clumsy movements, fatigue and confused behavior in either yourself or crew members.
2. Wear clothing for cold, wet and windy conditions, including layers that can be adjusted to changing conditions.
3. Schedule flights during the warmest part of the day.
4. Take shelter to reduce exposure to wind.
5. Do not drink alcoholic or caffeinated beverages; drink warm beverages instead.

6. Be cognizant of the heat index (see NWS chart). DO NOT conduct flight activities in temperatures below 15 degrees F.

Note: Cold temperatures significantly decrease the useful life of batteries

Personal Protective Equipment

UAS crews will wear the appropriate Personal Protective Equipment (PPE) during selected phases of operation. During system setup, ground operations, and servicing, all crews within the safety zone will wear:

1. Agency issued uniforms to clearly delineate operation essential from non-operation essential personnel.
2. Safety glasses to protect the eyes from moving objects, earth and soil, and/or hazardous materials.
3. Gloves while moving large equipment, setting up launch and recovery equipment.
4. Closed-toe shoes or boots.

System Setup

To ensure safety the UAS and all associated/support equipment will be set up in accordance with the flight manual. In the interest of safety, UAS crews should:

1. Wear Personal Protective Equipment.
2. Ensure all wires and cables are clearly marked and protected (if able).
3. System components are not “armed” during set up.
4. Visually inspect each component during set up.

Safety Zones

Safety zones are areas on the ground relative to the UAS that have associated hazards, i.e. an area around the rotor blades. Establishing safety zones will reduce the risk of injury to crew members and bystanders. Safety zones should be clearly marked with cones, placards, or flagging tape.

A. Zone A is the area directly around the rotor blades.
B. Zone B is the surface area under the launch and recovery area 10 times the rotor diameter.
C. Zone C Not used for rotorcraft.
D. Zone D is the surface area directly under the operation flight path plus a buffer equal to the planned altitude.

Final Preflight Inspection and Airworthiness Determination

The final responsibility for determining airworthiness of the UAS rests with the OIC. In addition to completing a pre-flight inspection, the OIC shall thoroughly review the UAS Maintenance Log. The OIC will combine information obtained during the preflight inspection with the maintenance history to determine whether the UAS is in an airworthy condition. These responsibilities include but are not limited to ensuring:

1. Compliance with all applicable Airworthiness Directives (AD) and mandatory service bulletins.
2. That the planned flight or series of flights will not exceed any maintenance requirements such as inspections, overhauls, or part changes.
3. That the deferred items do not render the aircraft unsuitable for the planned flight or series of flights.

4. That all required equipment is installed and documents are accessible on site

Crew Briefing

Crew briefings are an essential part of an effective team. The OIC will take orders from the Mission Coordinator (MC) at all times and will under no circumstances operate until cleared to fly by the MC. The OIC will perform a crew briefing just prior to calling for the pre-flight checklist. OICs will cover the following information as part of their crew briefing:

1. Explain the operational intent or objectives of the flight.
2. Weather or hazards associated with the flight (to include risk score).
3. Assign crew duties and responsibilities.
4. Stress the importance of maintaining vigilance when scouting for hazards.
5. Explain what to do in the event of a loss of situation awareness.
6. Detail the max altitude for the operation.
7. Detail any additional “Callouts” desired from the crew.
8. Explain crew member’s roles and responsibilities in the event of an emergency.
9. Locate possible evacuation routes in case of a disaster and establish a rally point.
10. Reinforce the ability for anyone to call for an abort or to stop an operation because of an unsafe condition.

Pre-Flight System Check

The OIC will accomplish the pre-flight system check in accordance with the UAS’ Flight Manual. It is required that the OIC:

1. Check ground control software is up to date and in working order.
2. Conduct a spectrum sweep on the operating frequency to determine noise and/or interference.
3. Establish and ensure the data link is working.
4. Ensure the system’s power supply is adequate.
5. Program any required fail safes, vertical boundaries, and/or altitude limits.
6. Follow pre-flight checklist on operational forms.

Establishing a Sterile Area

Prior to launching the UAS the OIC will establish a "sterile" area. This includes limiting communication to only that which is required for the safe execution of the planned operations. Ensure non-essential crew members are clear of the first safety zone. (Zone A), and non-crew members are free from the area of operation (zone D). The OIC will initiate the sterile area protocols by declaring loudly “Clear Prop" or "Clear Rotor” as applicable.

Launch, Climb out, and Transit

The OIC will arm the system and make a note of the time. The OIC will complete a visual scan of the system and surrounding area prior to initiating the launch. After the OIC and visual observer have completed the scan, the crew will launch the air vehicle in accordance with the Flight Manual. The UAS crew should use standard terminology (see table) during this critical phase of flight.

Operator In Command	Visual Observer	Action
“System armed”		The OIC will arm the UAS
"Ready for launch"		After the OIC has ensured the launch area is secure

Operator In Command	Visual Observer	Action
	"Ready"	The visual observer will verify the area is clear and relay the area is safe for launch
"Launch in 3...2...1...Launch"		The OIC will then throw the aircraft and follow launch checklist or flight manual protocols
"Standby Launch"		If the system fails to launch the crew will consider the system armed and hazardous. No crew member will approach the UAS until it has been disarmed, and is considered safe
“Abort, abort, abort”	“Abort, abort, abort”	If any of the crew members see cause to delay or to stop the launch
"Aborting"		If any of the crew members see cause to delay or stop the launch s/he will reject the launch by calling out “abort" three times. The OIC (unless calling the initial abort) will acknowledge and respond with "aborting" and disarm the system
“Level, 50 feet”		The OIC will ensure a steady rate of climb to the briefed altitude. Upon reaching the desired altitude the OIC will notify the crew the system is level and at what altitude
	"Clear of obstacles"	If the system is climbing over a set of obstacles the VO will state when clear
"Copy, clear"		The OIC will acknowledge the VO’s message

Operational Delays

Operational Delays (for Systems Flying Waypoints)

For systems with high levels of autonomy, the OIC’s function will be one of systems monitoring rather than system control. This functional difference does not reduce the OIC’s responsibility or the fact that s/he is accountable for the safe execution of the operation. In order to reduce complacency and ensure errors are mitigated during this highly automated phase of flight UAS crews should:

1. Maintain vigilance by actively watching the system’s telemetry as the UAS proceeds from waypoint to waypoint.
2. Verify the system is flying the programmed or desired altitude, heading, and airspeed.
3. Pay close attention to turn points and verify the UAS turns in the correct direction.
4. Keep a watch out for obstacles and other air vehicles that may intersect with the UAS’ flight path.
5. Conduct routine operational checks for energy state and system’s health

Operational Delays (for Systems Flying Direct Control)

When flying in direct remote control (RC) the OIC will be actively controlling the aircraft and will focus his or her attention on the air vehicle. In order to increase the situation awareness of the operator and reduce errors during this type of flying, the UAS crew should:

1. Utilize visual observers to keep a watch out for obstacles and other air vehicles that may intersect with the UAS’ flight path.
2. Ensure no one is near or under the air vehicle during direct control operations.

3. Work as a crew to conduct routine operational checks for energy state and system's health. Operational Delays in Areas with People, Structures, or Vehicles UAS crews operating the air vehicle in the vicinity of people, structures, and/or vehicles should exercise extreme caution and mitigate risk by ensuring the air vehicle has minimum separation from all hazards.

Operational Delays Near Airport

When operating approximately 10 NM in the vicinity of an uncontrolled airport, the OIC or controlling authority should ask ATC if there is any conflicting traffic and monitor the ATC frequency for traffic alerts. If unable to make contact with ATC on an aviation radio, Operators shall broadcast in the blind, their UAS position and intentions on the Common Traffic Advisory Frequency (CTAF) or Local Airport Advisory (LAA).

When operating approximately 5 NM in the vicinity of a controlled airport, the OIC or controlling authority will contact the local ATC facility and inform them of their position and operating parameters to include;

1. Size of UAS
2. Working altitude
3. Position in reference to the airfield

Mode of communication

In the event of an air traffic conflict, attempt to make contact with the traffic on tower frequency using an aviation radio.

Minimum Energy/Fuel Reserve

OICs will ensure that no UAS will fail to complete the assigned operational task due to insufficient fuel/energy.

To help OICs, the agency has established the following minimum fuel energy requirements:

1. RTL with [20%] percentage of energy
2. Plan to land with [10%] percentage of energy

Descent and Recovery

The descent and recovery phase can be the most difficult and hazardous for the UAS and crew. The OIC should notify the crew as to:

1. Any changes or unidentified hazards affecting the recovery.
2. Mode of control during the descent and recovery.
3. Verbalizing beginning of descent.

Autonomous Recovery

The OIC will complete a visual scan of the system and surrounding area prior to initiating the autonomous recovery. UAS crew must maintain vigilance during the autonomous recovery and be ready to manually takeover at any point. It is also important that the UAS crew use standard terminology during the recovery phase.

Manual Recovery
Many UAS require a manual recovery, where the OIC directly controls the air vehicle until the system is in a configuration and position to be considered recovered. During a manual recovery, the OIC should take into account the following:

1. Control the rate of descent
2. Maintain crew vigilance during approach
3. Plan to go around on every approach
4. Account for winds and crosswind
5. NEVER catch a UAS as a method of recovery!
6. The UAS crew should use standard terminology during the manual recovery.

Post Flight

The OIC shall be responsible for completion of the Flight Log following each flight. Each flight will be listed on the Flight Record along with the Operator in Command, the flight time and engine time for purposes of maintenance, proficiency and reporting/documentation to the FAA

Engine Shutdown Checks The OIC will complete the engine or system shutdown in accordance with the Flight Manual. The UAS crew will only approach the air vehicle after the blades or moving parts have stopped and the OIC has taken his or her hands off the controls. The UAS crew should use standard terminology to denote the system is safe.

Post Recovery Procedures
After the air vehicle is safely on the ground and engines/motors are stopped, the OIC will conduct a post flight inspection of the air vehicle noting any discrepancies or wear. If this is the final flight of the day the UAS Crew will:

1. Tear down all support equipment, antennas, control station equipment, etc.
2. Save the data log in a file folder identifiable by the date.
3. Retrieve all payload data or imagery (comply with privacy procedure).
4. Complete the flight time logs [or fill out the field notes sheet and complete the online log when able].
5. Complete any maintenance logs (as required) [or fill out the field notes sheet and complete the online log when able].
6. Follow all safety procedures outlined in the Flight Manual [or supplemental information] for securing UAS components.

Quick Turnaround
For quick turnaround flight (flights in which the air vehicle will be refueled or battery swapped and immediately re-launched) UAS crews should:

1. Reevaluate the conditions based on changes to weather, operating environment, presence of spectators, etc.
2. Comply with all parts of this manual governing ground, flight, and LR operations.
3. Comply with all checklists detailed in the flight manual.
4. Record all servicing actions or minor repairs to the systems.
5. Make a fresh judgment as to the airworthiness of the UAS and crew.

Debrief
OICs should conduct post-flight debriefings after each flight in order to continuously evaluate and improve flight operations, procedures and enhance interpersonal skills. These debriefings should include all crew members of the flight and cover at a minimum:

1. Operational objectives and the crew's ability to meet the objectives.
2. Construct a time line of events.
3. Any incidents, near misses, or violations. a. Collect documentation of any accidents, incidents, near miss events or violations of Federal Aviation Regulations and collection of necessary witness statements.
4. Any breakdowns in communication.
5. Review of procedures that are insufficient for the operation.

Emergency or Abnormal Operations

In the event of an emergency situation arising from a system's malfunction, the UAS crew will comply with the appropriate emergency or abnormal procedures prescribed in the Flight Manual.

For emergencies not covered in the flight manual, UAS crews will comply with the Emergency Response Plan. After any emergency or incident and complying with agency guidance the OIC will notify the Safety Officer or Director of Flight Operations and file a formal report.

Flight Termination
Flight termination is the intentional scuttling of an air vehicle because it posed a real and present hazard to the environment, people, structures, or vehicles. Flight termination can be accomplished by an intentional controlled flight into terrain where less damage will occur, a programmed feature that puts the air vehicle into an unusual attitude or stall to make it crash directly below the current flight path, a landing directly below current flight path, or a return to launch. Inadvertent flight termination that leads to destruction of the vehicle or property should be reported to the Safety Officer. Normal flight termination that leads to destruction of the vehicle or property should be reported to the Safety Officer.

A. **Loss of Control** — The UAV lost link procedures shall be set for 15 seconds to the rally point response which shall automatically cause the UAV climb to its ceiling altitude and return to and land at the launch site. If positive control of the UAV cannot be maintained and the UAS is leaving the operation area or the UAV poses a risk to life and/or property the OIC will issue an Engine Kill command

B. **Loss of Visual Contact** — If visual contact with the UAV is lost, the OIC shall command the aircraft into a hover mode and the Observer shall try to re-establish visual contact. If visual contact cannot be re-established within a reasonable amount of time to determine by the OIC, then lost link procedures shall be executed.

C. **Loss of GPS Signal** — Should the UAV loose GPS signal during autonomous operations, the OIC must immediately command the UAV into manual mode and land as soon as practical. If positive control of the UAV cannot be maintained and the UAV is leaving the operation area or the UAV poses a risk to life and/or property the OIC will issue an Engine Kill command.

D. **Loss of Power (Engine Failure)/UAV Crash** — In case of an engine failure, the UAV will not be able to maintain flight. UAV Team Members will immediately attempt to locate the UAV, assess the scene for injuries, and render first aid as necessary.

Incidents / Accidents

PRIORITY During an incident/accident, efforts will be focused on:

1. Minimizing risk to life
2. Care for the injured
3. Protect property

Notifications

The following notifications will be made as soon as practical:

1. Contact emergency personnel (Fire Rescue) if necessary.
2. Notify FAA and /or National Transportation Safety Board as necessary.
3. Notify RSAR Safety Officer.
4. Notify Adams County Sheriff's Office (if appropriate).

Damage

Any damage to the UAS or its support equipment shall be immediately reported to a Mission Coordinator. Any damage to the UAS or its equipment that is determined to render the system un-airworthy shall be labeled (ex.- utilizing a red tag) so as to be visually observable. The Mission Coordinator and Director of Flight Operations will be contacted and advised.

UAS Maintenance

The UAS will be required to be held in an operational status at all times practical. This will require regular review of hardware and software and inspection of all components to maintain operational use and mission readiness.

Crew Responsibilities

Proper maintenance of the UAS and all associated components rests with the maintenance crew. The maintenance crew is responsible for airworthiness of aircraft and equipment maintenance of UAS. As such, the Crew Chief shall maintain a logbook for each aircraft and another logbook for associated UAS equipment. Open discrepancies must be signed off by maintenance prior to aircraft being flown. If maintenance staff is not applicable, the OIC will be responsible for all maintenance tasks. The OIC will be responsible to determine if an aircraft meets the MEL and shall have final say in operational capacity of aircraft as indicated by thorough risk assessment and FAA regulations. Unairworthy components may be flown if aircraft is not in violation of the MEL. The OIC of each flight will be responsible for reporting all maintenance discrepancies or concerns to the maintenance crew for inspection.

Training:

The purpose of maintenance training is to improve the proficiency of equipment operators and mechanics. Recurring annual training must be conducted to refresh safety oriented culture and train best practices for specific applications. Enhancing maintenance practices and procedures encourages UAS longevity and reliability.

Record Keeping:
Logbook table and example of proper logbook entry

I. Aircraft Maintanance Log

UNMANNED AIRCRAFT SYSTEM

MAKE / MODEL_____ NICKNAME_____ ID NUMBER_____ AGENCY_____

DATE	ITEM / ISSUE	RESOLUTION / MAINTANANCE	NOTES	COST
			PAGE TOTAL	
			TOTAL	

Recurring Maintenance:
Recurring maintenance shall be completed according to manufacturer recommended practices. Recurring maintenance is critical to the longevity of component and aircraft attachment life, tracking reliability of components, and identifying components reaching the end of their operational life cycle. Reporting and logbook entries are critical to maintain a positive, proactive maintenance culture.

Unscheduled Maintenance
Repairs and overhauls shall be completed according to manufacturer recommended procedures. Unairworthy aircraft or aircraft components must be tagged as “UNAIRWORTHY” or “DO NOT FLY”.

Batteries
UAS batteries will be cycled through a charger on a monthly basis (or as recommended by the manufacturer) to ensure immediate operability upon deployment. Batteries will be labeled and replaced as necessary.

UAS Functional Test Flights

A Functional Test Flight (FTF) is an operational “check out” of an entire system after the system has undergone maintenance of a primary component. A FTF should be conducted over a designated test area and NOT on customer property or in the vicinity of people, structures, or vehicles. These FTFs are considered high risk activities and should be conducted by a FTF

qualified crew and completed in accordance with the Functional Test Flight Checklist. FTFs should be performed regularly to ensure proper working order of the UAS.

New UAS Acceptance Flights

A New UAS Acceptance Flight (NUAF) is for newly acquired UAS from an Original Equipment Manufacturer (OEM). A NUAF is to ensure the newly acquired UAS works as designed and procedures designed for that system are suitable for the operational environment. A NUAF should be conducted over a designated test area and NOT on customer property or in the vicinity of people, structures, or vehicles. These NUAFs are considered high risk activities and should be conducted by a NUAF qualified crew and completed in accordance with the New UAS Acceptance Checklist.

Deviations from this Manual

Flight crews are not authorized to deviate from agency procedures unless the deviation is in the best interest of safety. All such deviations shall be reported to the Safety Officer or Mission Coordinator Additional safety reports shall be made for accidents, incidents, near miss events, and violations of Federal Aviation Regulations. Any incident involving injury or loss of property of over $500 USD will be reported to the FAA.

Safety reports are used to help improve the overall safety of the organization and our procedures.

Appendix A

Abbreviations and Acronyms

AD – Airworthiness Directive
ATC – Air Traffic Control
CTAF – Common Traffic Advisory Frequent
FAA – Federal Aviation Administration
FCC — Federal Communications Commission
FTF – Functional Test Flight
GPS – Global Positioning System
LAA – Local Airport Advisory
LR – Launch and Recovery
MC — Mission Coordinator
MEL – Minimum Equipment List
METAR – Meteorological Aerodrome Report
MX – Maintenance
NM – Nautical Mile
NUAF – New UAS Acceptance Flight
OEM – Original Equipment Manufacturer
OIC – Operator in Command (interchangable with PIC - Pilot in Command)
PPE – Personal Protective Equipment
RC – Remote Control
RTL – Return to Launch
RSAR — Rampart Search and Rescue
SMS – Safety Management System
TAF – Terminal Aerodrome Forecast

UAS – Unmanned Aircraft System
UAV – Unmanned Aircraft Vehicle
VO – Visual Observer

Definitions

Caution – an operating procedure, practice, or condition, etc. if not strictly observed, may cause damage to the aircraft.
Flight Cycles – an alternative measurement for small UAS flight experience (normally measured in flight hours). A flight cycle consists of system setup, launch, and operational flight in excess of 10 minutes, recovery and system stowing.
Flight Hours – a measurement of system usage or Operator experience considered the time from power on/engine start to power down/engine shutdown.
Nautical Mile – a unit of distance that is one minute of arc along the meridian or 1852 meters (6000 feet).
Note – an operating procedure, practice, or condition, etc., which is essential to emphasize.
Should – used to express expectations and guidance that is not mandatory but expected.
Unmanned Aircraft System – a device used or intended to be used for flight in the air that has no onboard pilot (operator) and its associated elements related to safe operations, which may include CSs (ground, ship, or air-based), control links, support equipment, payloads, and launch/recovery equipment.
Warning – an operating procedure, practice, or condition, etc., which may result in injury or death if not carefully observed or followed.
Will – used to express an imperative command that is mandatory

Appendix B

I. Flight Record

UNMANNED AIRCRAFT SYSTEM

MAKE / MODEL_____ NICKNAME_____ ID NUMBER_____

PILOT_____ AGENCY_____

*Mem Card (1,2,3)Batteries[A,B,C] Time Conversion .1=6 .2=12 .3=18 .4=24 .5=30 .6=36 .7=42 .8=48 .9=54 TO/L-Takeoff/Landing

FLIGHT ID	DATE	TIME	LOCATION	WEATHER	TYPE OF FLIGHT		NOTES	TO/L	FLIGHT TIME

I certify that this record is true and corrrect to teh best of my knowledge.

PILOT_____ DATE_____

Notes:

PAGE TOTAL

TOTAL

I. Flight ID / NO.: _____

FLIGHT LOCATION_____

WEATHER_____ VISIBILITY _____ WIND_____

UNMANNED AIRCRAFT SYSTEM

MAKE / MODEL_____ PILOT_____

ID NUMBER_____ SPOTTER_____

PREFLIGHT CHECKLIST:

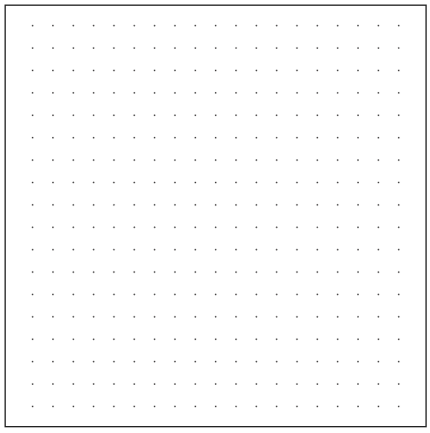
- ☐ Batteries Charged
- ☐ Aircraft Hardware OK
- ☐ Equipment / Gear OK
- ☐ Transmitter OK
- ☐ Software/Firmware OK
- ☐ Gimbal OK
- ☐ Camera/FPV OK
- ☐ Props OK
- ☐ Aircraft Power OK
- ☐ Transmitter Power OK
- ☐ Status Lights ON
- ☐ Compass Calibration
- ☐ Satellite Connection
- ☐ GPS / Home Lock
- ☐ Check Obstructions

DATE	TIME	SESSION FLIGHT/ TYPE	NOTES	FLIGHT TIME

*Mem Card (1,2,3)Batteries[A,B,C] Time Conversion .1=6 .2=12 .3=18 .4=24 .5=30 .6=36 .7=42 .8=48 .9=54

II. Flight MAP

Month_____ Day_____ Year_____



POSTFLIGHT NOTES:

I certify that this record is true and corrrect to teh best of my knowledge.

PILOT_____ DATE_____