AIRBORNE PUBLIC SAFETY ASSOCIATION

ADVANCING PUBLIC SAFETY AVIATION

Airborne Public Safety Accreditation Commission

Standards for Remotely Piloted Aircraft Systems (RPAS)

Forward

1.0 PURPOSE OF STANDARDS

1.1 General

This publication represents a standard for United States, and international public safety aviation units operating remotely piloted aircraft in support of their respective agency's public safety mission. The Standards for Remotely Piloted Aircraft Systems (RPAS) aviation programs were developed and are maintained by the Airborne Public Safety Accreditation Commission, Inc. (APSAC).

1.2 Applicability

This document contains professional standards for public safety RPAS programs applicable to all US, Canadian and international public safety agencies regardless of size or level of government (federal/national, state/provincial, or local).

APSA has adopted the Remotely Piloted Aircraft Systems Standards as best practices and supports the need for the standards to be used as a guide for new aviation units, and as recommended practices to be reviewed and adopted by all public safety aviation units.

Where reference is made to US Federal Aviation Regulations (FARs), international agencies should interpret as the appropriate governmental aviation authority having jurisdiction over such matters within their respective country.

1.3 Intent

These standards are intended to provide a foundation of safe operating practices in the performance of the agency's mission. The standards were formulated based on what has been identified as the two highest priorities of a public safety agency:

1. "Safety First" in all aspects of the operation
2. Provide excellence in aviation services in support of the agency's mission.

1.4 Scope

The scope of this document is intended to encompass all aspects of airborne public safety and has been divided into five major sections: Administration; Operations, Safety, Training and Maintenance. The subsections are intended to encompass the primary aspects of public safety aviation unit operations for both fixed and rotary wing unmanned aircraft. For the purpose of Accreditation, the standards have been separated into two categories: Mandatory (M) and Recommended (R), which are classifications to identify the importance of each Standard.

1.5 Accreditation

APSAC has also developed a voluntary assessment, certification, and accreditation program to work with agencies and to assess their compliance with these standards. The process of accreditation provides a method of ensuring compliance with the standards, providing a vital structure that becomes the measuring device of excellence, safety, and quality of service. The process provides order, guidance, and stability to agencies going through the program and recognition of professional achievement and excellence through verification of compliance with the standards.

2.0 MAJOR BENEFITS OF ADOPTING THESE STANDARDS

Agencies are strongly encouraged to adopt and implement the standards contained in this publication. They have been designed as industry standards intended to foster a universal application of best practices throughout the airborne public safety community. Although adoption and implementation of these standards is strictly voluntary, agencies that choose to adhere to these standards set themselves apart from others, providing an example of RPAS aviation safety and operational excellence.

2.1 Safe, Effective and Cost-Efficient Law Enforcement Aviation Operations

Compliance with the Standards provides agencies with a foundation upon which a culture of safe operating practices may be formulated, and a mark of excellence established to further develop and enhance the aviation unit's professionalism, efficiency, and overall effectiveness.

2.2 Greater Accountability within the Agency

The Standards provide the respective agency chief, sheriff, or department head a proven management system of written policies and directives, safe operating practices, sound training principles, personnel qualification requirements, clearly defined lines of authority and examples of accepted industry standards that support decision-making and resource allocation.

2.3 Controlled Liability Insurance Costs

Compliance may allow for agencies to more easily purchase public safety aviation and liability insurance, increase the limit of their insurance coverage; and in many cases, lower their insurance premiums and/or gain other financial incentives.

2.4 Stronger Support from Government Officials and the Community

Agencies establish credibility as a professional operation, which provides safe, cost-effective and essential aviation support to public safety operations in a variety of missions.

LIMITATION OF LIABILITY

The Airborne Public Safety Accreditation Commission, a Commission of the Airborne Public Safety Association (APSA), a California Public Benefit Corporation, makes no warranty, expressed or implied, for the benefit of any person or entity with regard to any aspect of the standards contained herein. These standards were adopted for the sole use of the Commission for the exclusive purpose of their application to the agencies seeking to obtain or maintain accreditation, there being no intended third-party beneficiaries hereof, expressed, or implied. Nothing herein shall be construed so as to create any right, cause, property interest, or entitlement on the part of any applicant agency or third party. These standards shall in no way be construed to be an individual act of any commissioner, director, employee, agency, member, individual, or a legal entity associated with the Commission, or APSA or otherwise be construed so as to create any liability in an individual or official capacity on the part of any commissioner, director, employee, agency, member, individual, or a legal entity associated with the Commission or APSA.

TABLE OF CONTENTS

Section 1 Administrative Standards

01.01.00	GENERAL	Compliance
01.01.01	**Mission Statement:** There shall be a written mission statement for the RPAS program. **Commentary:** *A mission statement sets broad parameters and identifies the key functions, or services to be performed by the RPAS Program. Care must be taken to ensure that the mission statement does not exceed current RPAS program capabilities. Given that the RPAS program is a support function for the agency, development of the mission statement must be a departmental process.*	***(M)***
01.01.02	**Chain-of-Command:** There shall be a well-defined chain-of-command: 1. There shall be an organizational chart that defines where the RPAS program fits within the agency. 2. There shall also be a chart that defines the structure of the program. 3. The organizational chart shall identify a program manager who shall serve as the accountable executive. 4. For public safety agencies that contract for RPAS services, there shall be a policy that specifies lines of authority between the agency and the contractor. Further, the agency is responsible for assuring that the contractor meets these standards as they relate to the service they provide. **Commentary:** *The chain-of-command in the RPAS program must be well defined and understood by each member. Unit members must know to whom they report and how they fit into the function of the agency. all agencies utilize organizational charts to depict this, and the agency's RPAS function must be included into any organizational charts. The organization must identify an accountable executive who has command responsibility for all aspects of the RPAS program. For contract aviation services, the agency must assure the provider meets all of the applicable standards for services they provide the agency.*	***(M)***
01.01.03	**RPAS Program Budget:** There shall be evidence of an approved budget or funding source for the operation of the program. **Commentary:** *Operational efficiency, safety and effectiveness are enhanced by the support of a comprehensive budget or funding source.*	***(M)***

01.01.04	**Transparency:** The agency shall have a policy that it will engage their governing body and community regarding acquisition of RPAS and policies governing its use. **Commentary:** *For the public to accept and support the use of RPAS, the agency must be transparent about the acquisition and uses of the equipment.*	***(M)***
01.01.05	**Annual Report:** The agency shall have a policy that mandates an annual report that summarizes all RPAS operations. This report shall evaluate the effectiveness of the equipment and be made available to the public. **Commentary:** *An annual report allows the agency to evaluate the effectiveness of the program and by making the report available to the public, it keeps them informed of how the agency is utilizing the technology. The report could include such things as the number of RPAS deployments, types and categories of missions and the number of each, review of privacy concerns and adequacy of policy to ensure privacy, assistance to other agencies, etc.*	***(M)***
01.01.06	**Inquiries and Complaint Processing:** There shall be a written policy that describes how inquiries and complaints about RPAS operations are to be handled. This specific policy shall supplement general agency policies regarding complaints/investigations. This policy, at a minimum, shall contain the following: 1. That any member of the agency, to include employees and/or contractors hired to provide RPAS services, are required to immediately report suspected cases of misuse of RPAS. 2. Any complaint alleging a violation of a person's civil rights by use of the RPAS must result in a formal, documented investigation. **Commentary:** *Given the sensitivity of public safety RPAS operations, the agency must ensure that complaints concerning their use are fully investigated. In most agencies, there are different types of internal investigations for complaints, based on the nature of that complaint. RPAS related investigations should be thorough and complete in order to assure accountability and community acceptance of the technology.*	***(M)***
01.01.07	**Liaison:** The RPAS Program shall have a written plan to maintain liaison with other aviation entities operating on a regular basis within the same airspace. **Commentary:** *Coordination between the RPAS program and other aircraft (law enforcement, fire, EMS, SAR, news media), military and civilian operators that operate within the same airspace is important to ensure safe flight operations including RPAS. Liaison shall also be maintained with air traffic control facilities within the area of operations.*	***(R)***

01.01.08	**Media Relations:** The agency, or RPAS Program shall have a media-relations policy. **Commentary:** *RPAS operations are a high-profile operation. As such, they are frequently the subject of media inquiries. A media relations policy that facilitates a good working relationship with the media can be beneficial to the agency.*	***(M)***
01.02.00	**OPERATIONS MANUAL**	**Compliance**
01.02.01	**Manual:** The program shall have an operations manual, or other policy documents, which at a minimum, address the following: 1. Administrative, including: a. Statement that establishes the manual as a formal agency document. b. Accountable Executive as the Issuing Authority – signature page c. RPAS Program Manager/Accountable Executive Operational Philosophy d. Mission Statement e. Scope of Authority f. Resolution of agency conflicts g. Procedures to amend the manual or policy documents h. Mandatory annual review i. Distribution j. Unit organization k. Record keeping and retention (personnel, training, and maintenance) l. Personnel, including: i. Qualifications and selection standards ii. Duties and responsibilities iii. Documentation of performance iv. Requirement for aviation medical certificates v. Uniforms and safety equipment 2. Operations 3. Safety Management System 4. Training 5. Maintenance 6. Special Operations (if applicable) 7. Appendix a. Letters of Agreement b. Glossary of terms c. Training syllabi d. Report forms e. Miscellaneous items **Commentary:** *A comprehensive manual supports safe, cost-efficient operations, and standardizes agency policies and procedures. The manual clearly defines operational practices and sets parameters for*	***(M)*** ***(R)***

	decision-making. It must be an official agency document, to which all RPAS program members can be held accountable. The document must be reviewed and amended to reflect the changing circumstances of unit operations and equipment.	
01.02.02	**Manual/Document Distribution:** All members shall receive a copy of the manual, either electronically or a paper copy, and shall acknowledge receipt of same.	***(M)***
01.02.03	**Document Control Policy:** The Operations Manual and policy documents shall be controlled documents that show revisions that have been made in the manual/documents. They shall contain a revision control page and list of effective pages unless the entire manual /documents are reissued with each revision and the manual has an effective date on it. **Commentary:** *It is imperative that the unit tracks all changes in all policy documents to ensure that unit members are able to determine what policies are up-to-date and the most current revision of this document.*	***(M)***

Section 2 Operational Standards

02.01.00	**GENERAL**	**Compliance**
02.01.01	**Aviation Regulatory Compliance:** Public safety RPAS programs shall comply with applicable regulations established by the aviation authority having jurisdiction. These regulations include: 1. For U.S. civil operations, 14 Code of Federal Regulations (CFR), Part 107. 2. For U.S. Public Aircraft operations, a Certificate of Authorization issued by the FAA. 3. Canadian Air Regulations (CARs), or other international civil/government aircraft operations other aviation authority having jurisdiction. Further, operations shall comply with any state, or local laws or regulations that apply to RPAS. **Commentary:** *In the U.S., RPAS missions can be conducted as a civil or public regulations aircraft. The RPAS program shall identify the classification of each mission and assure compliance with the appropriate regulations. Further, some states and local governments have enacted laws to restrict the use of RPAS by public safety and the RPAS program must comply.*	***(M)***

02.01.02	**Authorized Uses of RPAS:** The agency shall have a policy that lists all authorized uses of the RPAS. That policy must ensure that RPAS operations are legal, appropriate to support the agency mission and are an ethical use of this technology. The following shall apply to all missions performed by the RPAS Program: 1. Missions shall be specifically defined, documented, and approved by the public safety agency. 2. Missions specifically prohibited shall be defined and documented. 3. Any deviation from the established list of authorized missions shall require supervisory approval and review by the RPAS program manager. 4. Policy shall require that every use of the RPAS will be carried out in a manner consistent with the requirements of the U.S. Constitution (or other national equivalent) and federal, state, and local laws. 5. Crewmembers shall be trained and equipped in accordance with the standards as set forth in this document, for any and all missions they are authorized to perform. **Commentary:** *The agency must define the appropriate uses for RPAS. All missions must be conducted in a manner that protects the rights of citizens and in compliance with all applicable laws. By carefully developing a list of specific authorized missions the agency can evaluate its needs and capabilities. The agency can also use this list of missions to assure the community it serves that RPAS will be used for legitimate public safety missions. The list gives direction to RPAS crews and provides for accountability for unauthorized missions. Once missions have been defined, all RPAS personnel must be properly trained, equipped, and have demonstrated their proficiency to perform those missions.*	***(M)***
02.01.03	**Mission Authorization:** The agency shall have a policy that identifies when a mission requires prior supervisory approval. The mission approval process will be predicated on risk and identify the level of supervisory approval commensurate with the risk level. **Commentary:** *Every RPAS operation shall be subject to pre-mission risk assessment and have the corresponding level of authorization.*	***(M)***
02.02.00	**OPERATIONAL PROCEDURES**	**Compliance**
02.02.01	**Pre-Flight Actions:** The program shall have a policy dictating tasks to be completed prior to initiating flight activities. At a minimum, the policy shall include:	***(M)***

	1. Determination of the classification of the airspace in which the flight will be conducted. 2. Completion of any required notifications to air traffic control. 3. Issuance of any required Notice to Air Missions (NOTAM). 4. A comprehensive flight risk assessment, to include a standard weather briefing and a visual assessment of the flight operations area to identify hazards, such as man-made obstacles and terrain (consistent with Section 3). 5. A thorough pre-flight inspection of the RPAS, utilizing, at a minimum, the RPAS manufacturers checklist (consistent with Section 5). 6. A pre-mission briefing to all RPAS crewmembers. **Commentary:** *Careful pre-flight planning, notifications and briefing of crewmembers will assist in ensuring the safety of operation and a successful mission outcome.*	
02.02.02	**Minimum Standoff Distances and Maximum Altitudes:** Minimum standoff distances from people and objects and maximum altitudes shall be established to ensure safe operations. These distances/altitudes shall be specified for both day and night operations. Maximum altitudes shall be based on applicable regulations of the aviation authority having jurisdiction. **Commentary:** *Taking into consideration the capabilities of the RPAS being operated and the nature of the mission, the agency must establish minimum and maximum lateral distances and altitudes requirements to assure safe operations.*	***(M)***
02.02.03	**Aircraft Refueling, Defueling and Battery Recharging Procedures:** There shall be a written policy regarding aircraft refueling, defueling and battery charging procedures. At a minimum, the policy shall include, but not be limited to: 1. Aircraft refueling and defueling shall be conducted in compliance with federal, state, and local laws and specific procedures as outlined by the aircraft manufacturer. 2. Fuel storage, handling and dispensing on airports shall be in compliance with the requirements of the authority having jurisdiction. 3. A documented, verifiable training program shall be in place to ensure that all personnel who are authorized to refuel aircraft have been trained to operate the fuel supply and firefighting systems. 4. Smoking prohibitions. 5. Batteries shall be recharged in accordance with the manufacturers' recommendations. Lithium-Ion batteries shall not remain in a charger unattended, due to risk of fire.	***(M)***

	Commentary: *For aircraft powered by liquid fuel engines, refueling requires specific training and equipment. Policies should address refueling procedures for all RPAS crewmembers authorized to refuel aircraft. The National Fire Protection Association (NFPA) Pamphlet 407 is an excellent guide to fire safety during aircraft refueling. NFPA could be a useful guide to units who refuel their own aircraft. Lithium-Ion batteries have proven to be volatile when charged incorrectly. They shall be allowed to cool prior to charging; not left unattended when charging; and removed promptly from the battery charger when charging is complete.*	
02.02.04	**Fuel and Battery Storage and Transportation Procedures:** There shall be a written policy regarding liquid fuel and battery storage and transportation, whichever is applicable for the type(s) of RPAS being operated. At a minimum, the policy shall include, but not be limited to: 1. The on-site handling and disposal procedures of waste fuel, oil, and any other hazardous material. 2. Fuel-spill procedures. 3. Mandate utilization of an approved storage container. 4. Fuel storage, handling and transportation shall be in accordance with applicable laws and regulations. 5. Smoking prohibitions. **Commentary:** *Proper handling of liquid fuel and lithium-ion batteries is essential to prevent fires and environmental contamination.*	***(M)***
02.02.05	**Fire Extinguishers:** Fire extinguishers, or fire mitigation procedures and equipment appropriate for the types of hazards encountered, shall be readily available, consistent with laws and regulations. All personnel shall have both initial and annual recurrent training on the proper use of the equipment. **Commentary:** *Equipment and training in responding to a fire shall be considered mandatory in aircraft operating environments. This is particularly important for aircraft using liquid fuel engines. However, aircraft that are powered by lithium-ion batteries present threat of fire, thus crewmembers must be equipped and trained to respond to a fire emergency.*	***(M)***
02.02.06	**Post Flight Actions:** The program shall have a policy dictating the tasks to be completed upon the conclusion of flight activities. At a minimum, the policy shall include: 1. Accounting for personnel and equipment. 2. Completion of notifications of air traffic control that flight activities have ended. 3. Removal of NOTAM from the NOTAM system, if applicable.	***(M)***

	4. Downloading and transfer of any digital media evidence (video, photographs, etc.) in accordance with the agency's digital media evidence policies. 5. A thorough post-flight inspection of the RPAS, including the recording of any discrepancies. 6. A post-flight mission debriefing, to include emphasis on lessons learned. **Commentary:** *Thorough post-flight procedures will ensure that the RPAS is prepared for subsequent flights, capitalize upon the ability to learn from the flight, and safeguard the evidence collected.*	
02.03.00	**CREW QUALIFICATIONS AND MINIMUM CREW REQUIREMENTS**	**Compliance**
02.03.01	**Pilot-in-Command:** A remote pilot-in-command shall hold a remote pilot certificate, with a small, unmanned aircraft systems RPAS/UAS class rating issued by the aviation authority having jurisdiction, and be appropriately trained, qualified and current in the system being flown. **Commentary**: *While Public Aircraft operations in the U.S. allow for the agency to self-certify pilots, it is critical that the agency assure itself and its community that its pilots are certified to industry standards regulatory requirements, the same as other RPAS pilots. To do this, the agency must assure its pilots hold a pilot certificate issued by the aviation authority having jurisdiction. Also, initial pilot certification must be followed by regular, realistic scenario-based training in system operations.*	***(M)***
02.03.02	**Pilot Currency Requirements:** The program shall have a policy that establishes currency requirements for day and night missions for pilots. 1. At a minimum, the intervals between operational performance shall not exceed 90 days. 2. The policy shall state that if the pilot exceeds the 90-day period, they are prohibited from conducting operational flights until currency is established. 3. The policy shall identify the actions necessary to achieve currency. **Commentary:** *The skills necessary to perform RPAS flight operations diminish if not performed at regular intervals.*	***(M)***
02.03.03	**Other RPAS Crew:** Other RPAS crew includes supervisors, visual observers, sensor operators, etc. The agency should have a policy that specifies the minimum qualifications required to perform these functions. **Commentary:** *At present, there are no regulatory requirements for any position other than the RPIC. It is incumbent upon the agency to*	***(R)***

	determine the minimum qualifications for those who will be trained to conduct RPAS operations to assure safe, legal, and ethical operations.	
02.03.04	**Minimum Crew Composition for RPAS Operations:** There shall be a policy that states the minimum crew shall consist of a Remote Pilot-in-Command (RPIC) and at least one other crewmember performing the duties of a Visual Observer (VO). The VO requirement can be waived if the risk assessment required in 02.03.01 includes assessment of the risk of operating without a VO. **Commentary**: *In many cases a remote pilot alone cannot safely and effectively perform all the duties of RPIC and visual observer simultaneously. Therefore, a visual observer is considered essential during all operations, unless a risk assessment specific to this requirement indicates the mission can be flown safely without one.*	***(M)***
02.03.05	**Crew Coordination and Communications:** There shall be a policy that assures that regardless of the number of personnel used, all members of the flight crew (RPIC and the visual observer) must maintain effective communication with each other at all times. The policy shall include the following: 1. RPIC must be able to communicate "hands free." 2. Require the aviation equivalent of a "sterile cockpit" during launch and recovery where non-essential communications are prohibited to avoid distracting the crew. 3. The use of personal electronic devices (PEDs) for non-mission related communications shall be prohibited during any phase of flight operations by any member of the RPAS crew. **Commentary:** *With more than one crewmember, each with specific responsibilities, effective communications are essential, especially during the takeoff and recovery phase of flight. Distractions created by extraneous conversations, or PEDs must be controlled to assure safety of flight. When possible, the placement of crew members in relation to the command post or other potential distractions should be considered.*	***(M)***
02.03.06	**Crew Rest Policy:** The RPAS program shall have a crew rest policy for all crewmembers relative to their individual flight duties. The crew rest policy shall at a minimum, address the following conditions: 1. A crew rest policy shall be established appropriate to the mission of the agency. 2. The policy shall determine the maximum number of flight hours for aircrews during a normal duty period within a 24-hour cycle based on mission factors, flight conditions and day/night operations.	***(M)***

	3. A minimum of eight hours of rest between or within duty periods shall be required. 4. A crewmember may terminate or decline a mission if, in the member's determination, they would be unsafe to perform the flight due to fatigue. 5. Fatigue shall be evaluated during the flight risk assessment process. **Commentary:** *Risk to the mission will increase proportionally due to the lack of rest of the crew members. Fatigue affects judgment, vision, and physical coordination. Scheduling practices shall reflect consideration to minimize duty time, fatigue, type of mission, flight environment, length of duty period, number of duty periods per week, amount of flight time within a 24- hour period and day to night rotations.*	
02.04.00	**ENVIRONMENTAL CONDITIONS**	**Compliance**
02.04.01	**Weather Minimums**: RPAS weather minimums shall be established that comply with regulatory requirements, or are more restrictive, to ensure safe operations. These minimums shall be specified as a minimum distance from clouds and visibility in a written policy for both day and night operations. If the minimums deviate from regulatory requirements, the policy shall establish a requirement that mandates the agency obtains a waiver from the aviation authority having jurisdiction prior to conducting operations. Crewmembers shall comply with their agency's or regulatory minima, whichever is more restrictive. **Commentary:** *It is important to recognize that visibility measurements should be taken from the remote pilot-in-command's location, rather than a distant weather reporting station.*	***(M)***
02.04.02	**Wind Limitations:** Maximum wind limitations shall be established pursuant to the RPAS manufacturer's recommendations. **Commentary:** *In addition to system recommendations, consideration should be given to establishing tiered maximum wind limitations based upon the individual remote pilot's level of experience.*	***(M)***
02.04.03	**Night Operations:** Programs operating at night will have a policy addressing night operations. At a minimum, the policy shall include: 1. Initial training in the use of RPAS during hours of darkness for all crewmembers 2. Require all aircraft have equipment necessary for night operations. 3. Night operations emergencies. 4. Have a training program that addresses physiological factors and visual illusions.	***(M)***

	5. Mission specific currency requirements for all non-pilot crewmembers on at least an annual basis. (for pilot night currency requirements, see 02.02.02.) **Commentary:** *Night operations affect crew members situational awareness and visual acuity. A policy addressing the concerns and managing the risk will be critical for these operations.*	
02.04.04	**Night Vision Devices:** Programs operating with Night Vision Devices (NVD) to enable RPAS operations shall have a written policy governing their use. At a minimum, the policy shall include: 1. Initial training in the use of night vision devices for all crewmembers authorized to use the device. 2. Care, maintenance, inspection, and security requirements of NVD's. **Commentary:** *The use of night vision devices requires specific policies concerning all facets of their use and crewmember training and qualifications. The use of NVDs may or may not be allowed by the aviation authority having jurisdiction. and it is important that the RPAS program complies with all regulations relative to their use.*	***(M)***
02.05.00	**DATA COLLECTION**	**Compliance**
02.05.01	**Data Collection Minimization:** The agency shall have a policy that states that the agency shall only collect information using RPAS to the extent that such collection is consistent with and relevant to the authorized purpose. **Commentary:** *All RPAS data collection activities will be performed in a manner consistent with the Constitution, applicable laws, and regulations in order to protect the privacy rights of citizens.*	***(M)***
02.05.02	**Digital Media Evidence (DME):** The program shall have a policy that all DME shall be handled in accordance with existing policy on data and record retention, where applicable. **Commentary:** *DME presents unique challenges to public safety to assure the integrity of the data. RPAS gathered data is just one of many sources of DME and the agency must have sound, legally compliant policies, and procedures to manage that evidence.*	***(M)***
02.05.03	**Disposition of Non-DME**: The agency shall have a policy that requires all digitally recorded imagery (video, or still photography), or other data not required as evidence or for use in an on-going investigation shall be managed in accordance with agency policy. That policy shall include:	***(M)***

	1. Mandate compliance with state or local records retention schedules. 2. That agency personnel may not edit, alter, erase, duplicate, copy, share or otherwise distribute the data, and 3. Whether the imagery is available for public inspection. **Commentary:** *Sensors carried aboard RPAS capture large amounts of imagery that is not DME. The management and disposition of that imagery is important to the credibility and success of the RPAS program.*	
02.05.04	**Personally Identifiable Information (PII):** The agency shall have a policy that states that any non-DME imagery that contains PII shall not be retained for more than 180 days, or in compliance with state or local record retention schedules. **Commentary:** *Retention of non-DME imagery that contains PII shall only be retained if necessary. As with all non-DME imagery, management of this data is important to the credibility and success of the RPAS program.*	***(M)***
02.06.00	**OPERATIONAL REPORTING REQUIREMENTS**	**Compliance**
02.06.01	**Mission Reporting Requirements:** The program shall have a policy that mandates reporting requirements for all RPAS operations. At a minimum, the policy shall require: 1. That all flights are documented in an agency report or database. 2. The documentation shall include: a. Date b. Time c. Location of the flight d. Purpose of flight e. Supervisor approving flight f. Duration of flight g. Pre/Post Flight Time Meter/Calculator Readings h. Disposition of digital media evidence, or other data gathered during flight i. Crewmembers assigned j. Summary of activities k. Outcome of Deployment l. Supervisor approving the report **Commentary:** *As with most public safety operations, documentation is required to assure proper use, accountability, effectiveness of the processes and procedures used and technology itself.*	***(M)***

02.06.02	**Monthly Audit Responsibilities:** The program shall have a policy that mandates an audit of mission reports every calendar month. This audit shall be conducted by a program supervisor and shall assure that all missions and flight time are documented and approved. Audit reports shall be forwarded to the agency CEO or his/her designee. Inappropriate use or undocumented flight time will be investigated per agency policy. **Commentary:** *It is essential that all RPAS flight operations be audited on a regular basis to assure accountability to evaluate effectiveness.*	***(M)***
02.06.03	**After Action Reporting (AAR):** The program shall have a policy that requires after action review of any significant incident where RPAS were deployed. The policy will define a significant incident as an event that involves a violent encounter between agency members and others, use of force that causes death or serious injury, public demonstrations, crowd control events, etc. If not part of an agency review of the entire incident, this review shall specifically evaluate the role of the RPAS and the effectiveness of its use. **Commentary:** *An after-action critique of a major incident is a routine public safety practice.*	***(M)***
02.07.00	**SPECIAL OPERATIONS**	**Compliance**
	Over Water Operations: If missions are routinely flown over water the RPAS should be equipped for water recovery. If the aircraft is not equipped with equipment for a water landing, a risk mitigation strategy should be in place. **Commentary:** *Programs that operate over water should have the ability to safely recover the RPAS in the event that it lands in the water. As such, RPAS should float or should be equipped with external flotation equipment.*	***(R)***

Section 3 Safety Standards

03.01.00	GENERAL STANDARDS	Compliance
3.01.01	**Safety Management System (SMS):** The RPAS safety program shall be based on the principles of an SMS. It can be incorporated into the operations manual, or a stand-alone document. SMS is the formal, top-down, organization-wide approach to managing risk and assuring the effectiveness of safety risk controls. It includes systematic procedures, practices, and policies for the management of risk (FAA). The four components of an SMS program include: Safety Policy and Objectives; Safety Risk Management; Safety Assurance and Safety Promotion and Training. **Commentary:** *The principles of an SMS must be integrated into every facet of RPAS operations. It defines the safety culture to include every member of the RPAS program and their responsibility to operate in the safest manner possible. The APSA SMS Tool Kit is a good source document for development of the unit's SMS Program.*	***(M)***
03.01.02	**Management Responsibility:** The program manager/accountable executive shall be responsible for implementing and managing the SMS. 1. The program manager may designate another member to serve as the manager of the safety program but remains responsible for the SMS. 2. Both the program manager and if designated, the safety manager will receive formal training in SMS. Such training shall be documented and occur within one year of being assigned to this function. **Commentary:** *The RPAS program manager/accountable executive is directly responsible for assuring the effectiveness of the safety system. Formal training in SMS is essential to understanding how to implement and monitor the safety program.*	***(M)***
03.02.00	**SAFETY POLICY AND OBJECTIVES**	**Compliance**
03.02.01	**Program Manager's Operational Safety Policy:** 1. The RPAS program manager shall issue a policy that places the highest emphasis on safety, ethics, and the rule of law in all aspects of the program's operation. It shall articulate that management is committed to providing safe, healthy, secure	***(M)***

	conditions and attitudes with the objective of having an accident-free work environment. 2. The policy shall promote a "Just Culture" of open reporting all hazards in which management will not initiate disciplinary action against any personnel who, in good faith, discloses a hazard or safety occurrence due to unintentional conduct. 3. A "Turn Down Policy" shall be incorporated that allows any aircrew member the opportunity to turn down or terminate a mission task, when an aircrew member determines that the mission is unsafe, and they are unable to negotiate an alternative solution to mitigate risks. Turning down a mission is one possible outcome of managing risks. 4. The policy shall also contain the following principles: a. Always operate in the safest manner possible b. Never take unnecessary risks c. Recognize that safe does not mean risk free, however that no mission is so critical that would justify acceptance of risk that cannot be mitigated or require deviation from safety policies, procedures, training standards or the prudent judgment of the aircrew. Further, no mission is so critical that unethical, or legally questionable tactics are permitted. d. Hold everyone accountable and responsible for the identification and management of risk. **Commentary:** *The RPAS program manager is the individual who defines the program's safety policy and conveys its expectations and objectives to all personnel. Safety must be integrated into all facets of RPAS operations. The Operational Policy are the program manager's way of establishing the importance of safety as it relates to the overall scope of operations.*	
03.02.02	**Emergency Response Plan (ERP):** The program shall have a written plan detailing the actions to be taken in the event of an accident or incident as defined in 14 CFR Part 107 (FAA), 49 CFR Part 830 (NTSB) or the reporting requirements of the aviation authority having jurisdiction. An emergency may also include any event outside flight operations and may include other property damage, sudden illness/injury of a participant, serious system malfunction, safety breach/concerns requiring cessation of operations, etc. The plan shall include, but not limited to: 1. Responsibility for initiating the ERP. 2. Individual actions that shall be taken in the event of an accident. 3. NAA reporting requirements of the remote pilot. 4. Initiate log of events and actions	***(M)***

	5. Scene security and containment, identification of, collection and preservation of evidence, and first at scene checklist. 6. Current contact information for all RPAS program personnel. 7. Immediate response checklist and notification procedures, including telephone numbers for: a. EMS/fire/rescue/law enforcement b. Command notification c. Forensics/Crime Lab b. FAA/TC/NAA Air Traffic Control facilities c. Medical care facilities d. Legal advisor/risk manager e. Medical Examiner/Coroner f. Aircraft manufacturer g. Other equipment manufacturers, if applicable h. Media 8. If appropriate, request to be a party to the investigation of the aviation authority having jurisdiction and assign an agency representative to serve in that capacity. 9. Accident/incident investigation kit with responsibilities and procedures 10. Witness statement forms 11. Availability of services at key locations 12. Implementation of Critical Incident Stress Management for all personnel involved in the incident/accident 13. Damaged aircraft recovery procedures 14. All RPAS personnel shall be trained in the implementation of the emergency response plan. There shall be a record of the training in the members' training records. **Commentary:** *An emergency response plan acknowledges the potential for incident or accident and defines the roles and responsibilities of members when responding to and investigating the occurrence. The plan identifies the process for preparing reports, determining the cause(s) of the accident and develops recommendations to prevent similar occurrences. The ERP should be distributed outside the unit, as necessary (communications center, command staff, other agencies, etc.) and exercised as required by SMS. This standard recognizes that given the nature of RPAS, the potential for a catastrophic event is minimal, but not impossible. Given this, the ERP will be applicable to and scalable to the nature of any unusual occurrence involving RPAS.*	
03.03.00	**SAFETY RISK MANAGEMENT**	**Compliance**
03.03.01	**Hazard Identification & Analysis:** The program shall establish procedures to collect data and investigate hazards, incidents, accidents, and instances of potential non-compliance with regulatory requirements, policies, or procedures to identify root cause and recommend risk control measures. **Commentary:** *Every member of the RPAS program must understand their role in identifying, reporting, and mitigating hazards. The reporting*	***(M)***

	system must process hazard reports in a timely manner in order to communicate hazard information to all concerned members.	
03.03.02	**Safety Risk Assessment & Mitigation:** The program shall develop and maintain a formal process that ensures analysis, assessment, and control of the safety risks in operations. It shall also determine and analyze the risk factors related to the severity and likelihood of potential events associated with known hazards and identifies appropriate risk mitigation strategies. At a minimum, the risk assessment process shall: 1. Use a strategy that considers the severity and probability of a hazard. 2. Identify, assess, and calculate an overall level of risk associated with the hazard. 3. Determine when to elevate the decision for risk acceptance to a higher level. 4. Analyze the risk and develop mitigation measures (such as using a Flight Risk Assessment Tool, or FRAT) to reduce the risk to As Low as Reasonably Practical (ALARP). 5. Develop a means to track corrective actions and their effectiveness. **Commentary:** *By their very nature, public safety RPAS operations involve some element of risk. In keeping with the Program Manager's operational and safety policy, the Safety Risk Assessment and Mitigation Program is an essential element of the primary safety goal, which is the elimination of all accidents.*	***(M)***
03.04.00	**SAFETY ASSURANCE**	**Compliance**
03.04.01	**Safety Performance, Monitoring and Reporting:** The RPAS program manager shall monitor operational data to ensure the effectiveness of safety risk controls and assess system performance. An annual evaluation of the effectiveness of the safety program shall be conducted. If the agency contracts for services, they shall be monitored on a regular basis and inspected annually to ensure compliance with the standard. **Commentary:** *Regular evaluation of safety related issues including training; operations; maintenance; equipment and communications supports the identification of hazard and risks. When mitigated, risk is reduced to the lowest possible level.*	***(M)***
03.04.02	**Management of Change:** A change management process shall be established in order to monitor changes in operational procedures, processes, training, documentation, equipment, or any other significant change impacting the RPAS program. At a minimum, the process shall be documented, and: 1. Include all individuals affected by the change and ensure they have an opportunity to review the change and provide their comments.	***(M)***

	2. Conduct appropriate risk assessments of the recommended changes. 3. Determine who is responsible for approving the change and put the change into effect. The agency policy addressing management of change shall require a thorough review of policies and procedures governing the RPAS program prior to the deployment of new RPAS technology and annually (as required in 01.02.02). **Commentary:** *Change is inevitable, especially given the rapid advancement in RPAS technology. Any one change can trigger changes in all the elements of a program. For example, a new RPAS system, incorporating different technology and capabilities, will require additional training of crewmembers and may also require changes to policy, maintenance procedures, etc. Therefore, it is essential that a process be put into place to manage change to assure the policies and procedures governing every aspect of program operations is up to date and program personnel are aware of the changes.*	
03.05.00	**SAFETY PROMOTION AND TRAINING**	**Compliance**
03.05.01	**Training and Education:** At a minimum, the following safety associated training shall be conducted annually or as needed based on assignment of personnel: 1. Risk Control Measures: The RPAS program manager shall develop a training component to instruct RPAS personnel on risk control measures (interventions) that are developed during the Risk Management Process. This will ensure crewmembers are familiar with those mitigations. 2. SMS Indoctrination Training: Safety Indoctrination Training shall be provided to all members of the RPAS program and shall address the purpose of the SMS, individual responsibilities, and general hazards associated with RPAS operations. Initial safety training shall be completed prior to assuming RPAS duties. All training shall be documented. **Commentary:** *Safety training and education are essential for the SMS program to achieve its goals. SMS Indoctrination Training and Safety Orientation Training for new personnel are intended to familiarize new personnel with the purpose and process of SMS as well as hazards associated with unit operations.*	***(M)***

03.05.02	**Safety Information:** The RPAS program should provide safety-related information, which shall be accessible to all personnel. Types of information that could be provided include, but not limited to the following: 1. Safety bulletins 2. SMS library 3. Hazard information 4. Hazardous material lists 5. Regulatory updates 6. Technology updates **Commentary**: *There should be a system in place to ensure that members of the RPAS program receive timely information on safety related issues. They can be maintained in physical form in a fixed location or electronically, accessible from remote locations.*	***(R)***

Section 4 Training Standards

04.01.00	**PROGRAM MANAGER AND SUPERVISORS**	**Compliance**
04.01.01	**RPAS Program Manager and Supervisor(s) Initial Training:** RPAS program managers and supervisor(s), shall successfully complete a formal training program, to include: 1. Fundamentals of aviation. 2. RPAS technology and operations. 3. Applicable Federal Aviation Regulations (FAR's), Canadian Air Regulations (CARs) or those issued by the aviation authority having jurisdiction. 4. Agency policies and procedures specific to RPAS operations 5. Public Aircraft operations 6. Safety Management Systems (SMS) 7. Community concerns regarding the use of RPAS by government agencies. 8. Liability and legal issues including airborne use of sense enhancing technology. **Commentary:** *RPAS program managers must have training on topics specific to RPAS operations. The training is necessary to acquaint*	***(M)***

	program managers with issues that affect the safe, legal, and ethical operation of the program.	
04.01.02	**Completion of Training:** The manager and supervisor's training shall be completed within six months after being assigned to the RPAS program. **Commentary:** *Management/supervisory personnel assigned to any aviation operation must receive appropriate training as soon as possible after assignment.*	***(M)***
04.01.03	**Continuing Education:** Continuing professional development in aviation subjects should be provided and documented for program managers and supervisors. **Commentary:** *Continuing education is an important part of any profession. This is particularly true for managers and supervisors of RPAS programs given the evolving nature of the technology, legal and regulatory environment.*	***(R)***
04.02.00	**INITIAL AND ANNUAL TRAINING**	**Compliance**
04.02.01	**Training on Policies and Procedures:** The agency shall have a policy that requires the following personnel to receive initial and annual training on the policies and procedures governing the use of RPAS. The policy shall require initial training be completed prior to engaging in any RPAS operations: 1. Pilots 2. Sensor operators 3. Any person who authorizes or supervises the use of RPAS Visual observers used to facilitate a specific operation are not required to receive this training. Visual observers who regularly support RPAS operations shall be trained as soon as practical. All training shall be documented. **Commentary:** *In order to assure compliance with established policies and procedures and to facilitate accountability, all personnel must receive training before being given RPAS responsibilities and regularly thereafter.*	***(M)***
04.03.00	**REMOTE PILOT IN COMMAND (RPIC)**	**Compliance**
04.03.01	**RPIC Initial Training:** In addition to the certification requirements of the aviation authority having jurisdiction, before a pilot may act as a RPIC,	***(M)***

	they shall receive training and demonstrate proficiency in the following areas: 1. RPAS regulatory review 2. Legal use of airborne sense enhancing technology 3. Agency RPAS policies and procedures 4. Orientation to the airspace in the operating areas, including airports and heliports. 5. Flight Operations: a. Safe and effective mission planning, including launch/recovery location (for each type of system operated). b. Agency flight approval process c. Safety Management Systems, including, flight risk assessment and hazard mitigation (to include judgement and decision-making skills) d. Pilot proficiency i. The proper and effective use of RPAS checklists ii. The safe operation of the aircraft throughout all phases of flight for each system to be operated (platform and equipment specific competency) iii. Mission specific competency, for each type of mission identified by the agency. e. Situational awareness f. Crew Resource Management g. Stress management in all phases of flight h. Workload management i. Ground control station distractions j. Emergency Procedures Training i. System emergency procedures per the OEM flight manual ii. System specific hazardous materials handling and response, to include lithium-ion battery fires. 6. Post-flight procedures a. System inspection b. Reporting maintenance discrepancies c. Processing digital media evidence **Commentary:** *In the course of their duties, the public safety RPIC will be exposed to missions that require specific training to be as safe and effective as possible. Many of the training anchors listed in this section are essentially part of a crew resource management program unique to public safety aviation. Additionally, specialized equipment, such as first-person view goggles/operations (FPV) require specialized training. Public safety RPICs should receive internal and external training for the missions they perform. It is recommended the program consider use of the NIST basic proficiency evaluation for remote pilots (BPERP) test and scenario-based training for RPICs.*	
04.03.02	**Recurrent Training:** There shall be a program to evaluate the practical skills of pilots in the performance of unit missions. This evaluation shall be conducted annually, and the results documented.	***(M)***

Further, there shall be objective performance standards relevant to the duties of the pilot, the unit's mission statement and scope of service. The following shall apply:

1. The safe operation of the aircraft throughout all phases of flight
2. Pilots shall demonstrate proficiency by successfully completing a recurrent flight evaluation at least once each year administered by a designated evaluator within the RPAS program
3. The recurrent flight evaluation will include, but not limited to, the following:
    a. The proper and effective use of aircraft checklists
    b. Effective crew coordination
    c. Demonstrated proficiency in tasks associated with the missions performed by the unit (scenario-based training) for which they are qualified.
    d. Safe and effective mission planning, including launch/recovery location (for each type of system operated).
    e. Program policies and procedures.
    f. Legal and regulatory update.
    g. Demonstrated pilot proficiency in the operation of the aircraft in accordance with the applicable OEM manual.
4. Hazard identification & risk management which includes:
    a. Judgment and decision making
    b. Human factors
    c. Stress management in all phases of flight
    d. Interpersonal communications between crewmembers, to include prioritization and crew coordination.
    e. Workload management
    f. Ground Control Station distractions
5. Situational awareness
6. Emergency Procedures/Recurrent Training:
    a. Shall be conducted annually.
    b. Includes an oral exam on aircraft limitations and emergency sections of the aircraft's flight manual.

Commentary: *Recurrent evaluations are an effective method of ensuring that unit pilots are flying safely, performing missions in accordance with operating procedures and the RPAS flight manual. Emergency procedure training is recommended at no more than six-month intervals.*

04.04.00	NON-PILOT CREWMEMBERS	Compliance
04.04.01	**Sensor Operator (SO):** Before anyone may act as a sensor operator, they shall receive training and demonstrate proficiency in the following areas: 1. Aircraft and sensor preflight procedures 2. Aircraft launch and recovery procedures 3. Battery change or refueling procedures 4. Proper use of relevant aircraft/sensor checklists 5. Sterile cockpit procedures 6. Program policies and procedures 7. Digital Media Evidence (DME) chain of custody policy 8. Non-DME data handling procedures 9. Crew resource management (CRM) 10. Hazardous materials handling and response (batteries and fuel) 11. Fire safety and response 12. Emergency procedures 13. Legal and regulatory issues 14. Sensor specific training (i.e., thermography, photogrammetry, etc.) **Commentary:** *Management shall assure that sensor operators are thoroughly trained and qualified to perform prior to assigning them to RPAS duties.*	***(M)***
04.04.02	**Visual Observer (VO):** Before anyone may act as a visual observer they shall be sufficiently briefed prior to flight with emphasis on: 1. Maintaining effective communication with the RPIC. 2. Clear definition of launch and recovery location. 3. Scanning airspace for potential collision hazards and maintain awareness of the position of the aircraft through direct visual observation. **Commentary:** *Visual observers may or may not be members of a permanent RPAS crew but may be selected by an RPIC to perform those duties during a specific mission. It is critical that the VO be briefed as to their role in the operation and an assessment made by the RPIC as to their capability to perform this role.*	***(M)***

04.05.00	FLIGHT OPERATIONS CURRENCY	Compliance
04.05.01	**Pilot Currency Requirements:** The program shall have a policy that establishes currency requirements for day and night missions for pilots. 1. At a minimum, the intervals between operational performance shall not exceed 90 days. 2. The policy shall state that if the pilot exceeds 90 days, they are prohibited from conducting operational flights until achieving current status. 3. The policy shall identify the actions necessary to achieve currency. **Commentary:** *The skills necessary to perform RPAS flight operations diminish if not performed at regular intervals.*	***(M)***
04.06.00	**TRAINING RECORDS**	**Compliance**
04.06.01	**Training Records:** Training records shall be maintained for all agency personnel with RPAS responsibilities, and all required training shall be documented. Records shall be maintained in accordance with regulations issued by the aviation authority having jurisdiction. Records can be kept in written or electronic form. Records shall include the following information at a minimum: 1. Name, pilot certificate number and a listing of all ratings, if applicable 2. Documentation showing the date of successful completion of initial and recurrent training for all personnel required to receive such training and shall include copies of certificates of training, or other proofs of compliance. 3. For pilot proficiency, the documentation or checklist used to record at a minimum the last three pilot proficiency check flights or examinations. For non-pilot crew, evaluations, and certifications, where applicable. 4. Documentation related to any training failures or inability to successfully complete any required training, including check flights, and what remedial action was taken to satisfactorily complete the required training. 5. The make, model and type of aircraft or flight training equipment used to conduct the training. 6. The agency shall retain these records and copies of all pilot proficiency check flights, crewmember evaluations and certifications for a minimum of five years after the individual leaves the RPAS program or longer if required by law or policy. **Commentary:** *Training records are essential to proper program management and protection against claims of negligence in personnel hiring, retention and training. In accordance with the FAA's Pilot Records*	***(M)***

	Improvement Act (PRIA) of 1996, all pilot records should be maintained for at least five years past transfer or termination of employment.	

Section 5 Maintenance Standards

05.01.00	REMOTELY PILOTED AIRCRAFT SYSTEMS	Compliance
05.01.01	**RPAS Maintenance:** RPAS programs shall have a policy that requires their systems to be maintained in compliance with requirements of the Federal Aviation Administration, Transport Canada or aviation authority having jurisdiction, should they have those regulations and/or OEM maintenance requirements or recommendations. Absent maintenance regulations, or OEM requirements, the agency shall establish a maintenance program for the RPAS being operated. **Commentary:** *Most national aviation authorities neither certify the design, or manufacture of RPAS, nor do they have regulations for on-going maintenance. Further, some manufacturers of RPAS do not have maintenance programs established for the systems they sell. The airworthiness of RPAS must be assured and is dependent upon scheduled maintenance, thorough inspections, and timely correction of discrepancies. It is incumbent on the agency operating RPAS to ensure their system(s) are airworthy at all times, even if they have to establish a maintenance program of their own design.*	***(M)***
5.01.02	**Excess Military Unmanned Aircraft Systems:** Programs operating excess military RPAS shall, at a minimum, maintain them in accordance with the appropriate military continued airworthiness program for the specific RPAS. **Commentary:** *Military aircraft, including RPAS, are designed and built to comply with strict airworthiness requirements in order to perform the military mission. Any RPAS released from military service must be maintained in accordance with the military maintenance program in order to assure safe operations.*	***(M)***
5.01.03	**Pre-Flight Inspections:** For all RPAS, there shall be a written policy that outlines the specific actions to be performed during pre-flight inspections to determine that the system is airworthy and ready for flight. **Commentary:** *The policy shall identify the specific pre-flight actions required to determine that the complete system is airworthy.*	***(M)***

05.01.04	**Safety of Flight Bulletins:** There shall be a system in place to ensure that the program is in compliance with all applicable airworthiness bulletins, or directives from either a regulatory agency, or the system manufacturer. **Commentary:** *Compliance with Airworthiness Directives and/or Military Safety of Flight Bulletins is mandatory before their due date. Service Bulletins and Military Advisory Bulletins are issued when a potentially hazardous condition may exist, and compliance is strongly recommended. Since they are not issued on a scheduled basis, it is very important that a tracking mechanism exist to ensure compliance.*	***(M)***
05.01.05	**Operational Flight Check:** An operational flight check or return to service test flight shall be performed by a Remote Pilot in Command designated by the program manager to validate the maintenance that was performed and ensure that the results of the test flight are documented in the appropriate maintenance records. **Commentary:** *Operational flight checks, when required, are intended to ensure that maintenance performed has been properly completed and the aircraft is ready to be returned to service.*	***(M)***
05.01.06	**Prohibiting the Altering of RPAS:** There shall be a policy that prohibits anyone from altering, or modifying the RPAS in any manner, without authorization from the program manager. **Commentary:** *Any modifications or alterations to complex technology could affect its ability to operate safely and effectively. Such actions must be done in accordance with regulatory, OEM or agency standards and performed by authorized personnel.*	***(M)***
05.01.07	**Prohibiting the Arming of RPAS:** The program shall establish a written policy specifically prohibiting attaching or deploying lethal weapons of any kind from the RPAS. **Commentary:** *The ability to accurately deploy weapons from many small RPAS is questionable. Further, the concept of weaponized public safety RPAS has not yet been accepted culturally.*	***(M)***
05.02.00	**PERSONNEL AUTHORIZED TO PERFORM MAINTENANCE**	**Compliance**
05.02.01	**Personnel Authorized to Perform Maintenance:** The RPAS program shall have a policy that determines who is authorized to perform maintenance on agency RPAS. **Commentary:** *Even the most basic RPAS involve complex technology. It is essential that the RPAS program identify who is authorized to perform maintenance on any system component.*	***(M)***

05.02.02	**Maintenance Technician Qualifications:** Maintenance technicians shall meet the following minimum requirements: 1. Maintenance technicians/engineers shall be trained to install, maintain, upgrade, remove and replace any system part, software, firmware, etc. in accordance with the manufacturer's maintenance standards. 2. Maintenance technicians/engineers should be factory trained (or equivalent) in an approved program on each type of RPAS they are required to maintain. **Commentary:** *Operational safety requires a highly proficient and properly trained maintenance staff. These qualifications will instill confidence in the aircrews and enhance professionalism throughout the RPAS Program.*	***(M)*** ***(R)***
05.02.03	**Outsourced Maintenance:** If the program outsources RPAS maintenance, they shall have a written policy assuring that the maintenance contractor, at a minimum, complies with all applicable maintenance standards in this section. For the purpose of accreditation, the program shall provide documentation verifying that the maintenance contractor is in compliance with the Standards as outlined in this section. **Commentary:** *It is recommended that the agency include compliance with the Standards in this section as part of the terms and conditions of the maintenance contract.*	***(M)***
05.03.00	**MAINTENANCE RECORDS**	**Compliance**
05.03.01	**RPAS Maintenance Records:** There shall be a written policy that assigns responsibility for maintaining aircraft maintenance records. Logbook entries shall be made in accordance with regulatory requirements, military maintenance standards, if applicable, OEM instructions, or agency policy. **Commentary:** *The airworthiness of the vast majority of RPAS are not certified by the national civil aviation authority. Documenting maintenance is essential to assure airworthiness. When documenting maintenance, logbook entries will, at a minimum, include the date the maintenance was performed, a description of the maintenance performed, and the signature of the person performing and making the logbook entry.*	***(M)***
05.03.02	**Maintenance Discrepancy Reporting:** There shall be a written policy that outlines procedures for written reporting of RPAS discrepancies, taking RPAS out of service, tracking repairs and providing feedback to reporting persons. The policy must also mandate that discrepancy	***(M)***

	reporting complies with regulatory requirements, military maintenance standards, if applicable, OEM instructions, or agency policy. **Commentary**: *Often a pilot verbally reports a discrepancy to a maintenance technician, and it gets overlooked. The discrepancy, along with any corrective action taken, must be recorded in the aircraft's maintenance records.*	
05.03.03	**Deferred Maintenance:** There shall be a procedure to track and complete all deferred maintenance. **Commentary:** *When any maintenance has been deferred, it is critical to have a procedure in place to track and ensure completion of the deferred maintenance in a timely manner.*	***(M)***
05.04.00	**SPECIALIZED MISSION EQUIPMENT**	**Compliance**
05.04.01	**Specialized Mission Equipment Maintenance:** The program shall have a policy that ensures that all special mission equipment is inspected and maintained in accordance with regulatory requirements, military maintenance standards, if applicable, OEM instructions, or agency policy. The following are examples of special mission equipment: 1. Laser Range Finders 2. UAS Payloads 3. Night Vision Devices 4. First Person View goggles 5. Communications Equipment **Commentary:** *Inspection and maintenance of specialized equipment are critical to safe and effective operations and requires a record keeping process that ensures compliance with OEM and regulatory requirements.*	***(M)***
05.05.00	**SYSTEM REQUIREMENTS**	**Compliance**
05.05.01	**General System Requirements:** The agency should have a process to evaluate the capabilities of both the RPAS and its manufacturer during the program development/purchase process. Such evaluation should validate the ability of the system to accomplish the identified missions of the RPAS program. **Commentary:** *Acquiring a RPAS that is capable of performing the identified mission is critical to the success of the program.*	***(R)***
05.05.02	**Evaluation of the System Manufacturer:** As part of the evaluation process, the agency should evaluate the manufacturer's history and	***(R)***

	ability to support the RPAS. The manufacturer of the RPAS should be able to provide the following, at a minimum: 1. Operations and maintenance manuals/information 2. Operator and maintenance training 3. Parts lists 4. Sensors necessary to complete the identified mission 5. Ability to upgrade system software and firmware **Commentary:** *With a multitude of companies offering RPAS for sale, with vastly different levels of experience, it is incumbent on the agency to assure the wise expenditure of public funds by making good purchase decisions. This includes evaluating the manufacturer of the system to verify their ability to design and manufacture airworthy, mission capable systems and to provide essential support for the system over its anticipated useful life. The United States National Institute of Justice, in their December 2016 document, "Considerations and Recommendations for Implementing an Unmanned Aircraft System (UAS) Program," includes many factors to consider during the acquisition process.*	
05.05.03	**Recommended System Requirements:** The program should have a policy that the RPAS meets the following minimum requirements: 1. Standardized, operational checklists for all aspects of pre-flight/flight/post-flight. 2. Ability to verify the connectivity/control link between the ground control station (GCS) and the aircraft. 3. Ability to monitor the battery or fuel level of the aircraft at the GCS. 4. Ability to monitor the altitude of the aircraft at the GCS. 5. A tamper-proof flight time recorder. 6. Flight telemetry, including date, time, altitude, GPS coordinates, etc. 7. Ability of the aircraft to autonomously execute a specific protocol in the event of loss of the command-and-control link with the GCS. 8. Ability to conduct flight operations in the weather conditions routinely encountered in the agency's area of operations. 9. Video streaming 10. For sunset to sunrise operations, a position/anti-collision lighting system (standard aviation lighting configuration) visible for no less than 3 statute miles. 11. Remote identification **Commentary:** *These specifications are essential to perform the public safety mission and to provide for accountability.*	***(R)***

05.05.04	**Performance Testing:** The agency should consider performance testing to assure the system(s) being considered for acquisition has the capabilities to actually complete the tasks required to perform the identified mission. **Commentary:** *The system should be evaluated to determine if it can perform the identified public safety missions. The National Institute of Standards and Technology (NIST) has developed tests and performance standards for RPAS and may be a good resource for this standard.*	***(R)***
05.05.05	**Network AND DATA Security Requirements:** The agency should define the communications and data link security requirements for the RPAS that meets the needs of their identified mission and the environment in which they will operate. **Commentary:** *All RPAS use wireless communication links between the aircraft, telemetry box (base station) and/or a control tablet. Those links can be compromised either intentionally, or accidentally by other devices using the same frequencies if those data links are not protected with a suitable level of encryption. Further, sensitive video/senor data being downlinked from the aircraft could be intercepted. Encryption protocols vary greatly by manufacturer and range from those with little, or no encryption for systems using open-source autopilots to the Advanced Encryption Standard (AES) established by the U.S. National Institute of Standards and Technology (NIST). Programs should consider requiring AES 256-bit encryption, the highest level of encryption, for sensitive public safety operations. Finally, consideration should also be given to ability of the system manufacturer to access telemetry and other data captured by aircraft sensors.*	***(R)***

APPENDIX A

Glossary

ACCOUNTABLE EXECUTIVE - the accountable executive is the person within the organization who is officially designated as being responsible for RPAS operations. This includes all aspects of RPAS program management, including safety, regulatory compliance, resource acquisition, training, efficiency, and effectiveness of operations.

CERTIFICATE OF WAIVER OR AUTHORIZATION (COA) – Document issued by the Federal Aviation Administration that authorizes public aircraft operations in the National Airspace System (NAS). A certificate of waiver will also allow a civil RPAS operation to deviate from certain provisions of Part 107 if the Administrator finds that the proposed operation can be safely conducted under the terms of that certificate of waiver.

CIVIL AIRCRAFT – All aircraft not public aircraft.

CONTROL STATION - A “control station” is the interface used by the remote pilot to control the flight path of the aircraft.

DATA COMMUNICATIONS LINKS - All links between the aircraft and the control station, which includes the command, status, communications, and sensor/payload links.

DIGITAL MEDIA EVIDENCE (DME) - Digital recording of images, sounds, and associated data with probative value stored or transmitted in binary form. The term DME used in this document refers specifically to video and the metadata associated with that form of DME.

FEDERAL AVIATION REGULATIONS, PART 107 – SMALL UNMANNED AIRCRAFT SYSTEMS – Regulations that apply to REMOTE PILOT certification, and operation of civil small, unmanned aircraft systems.

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) - ICAO is a United Nations agency which coordinates the use of airspace worldwide.

NATIONAL AIRSPACE SYSTEM (NAS) - The common network of airspace — air navigation facilities, equipment, and services; airports or landing areas, etc., of a nation.

PERSONALLY IDENTIFIABLE INFORMATION (PII) – Information that can be used to distinguish or trace an individual’s identity, either alone or when combined with other personal information that is linked or linkable to a specific individual.

REMOTE PILOT IN COMMAND (FAA) – The remote pilot in command has the final authority and responsibility for operation and safety of a small RPAS operation.

REMOTELY PILOTED AIRCRAFT (ICAO) – an unmanned aircraft which is piloted from a remote pilot station.

REMOTELY PILOTED AIRCRAFT SYSTEM (RPAS/ICAO) – a remotely piloted aircraft, its associated remote pilot stations, the required command and control links and any other components as specified in the type design.

SMALL UNMANNED AIRCRAFT (FAA) - A small, unmanned aircraft is an unmanned aircraft weighing less than 55 pounds, including everything that is on board or otherwise attached to the aircraft.

SMALL UNMANNED AIRCRAFT SYSTEM (FAA) – An unmanned aircraft and its associated elements (including communication links and the components that control the unmanned aircraft) that are required for the safe and efficient operation of the unmanned aircraft in the NAS.

RPAS FLIGHT CREWMEMBER - A RPAS flight crewmember includes the remote pilot in command, person manipulating the flight controls of the RPAS and visual observers (VO). It may also include other persons as appropriate or required to ensure safe operation of the aircraft.

UNMANNED AIRCRAFT (FAA) – An aircraft that is operated without the possibility of direct human intervention from within or on the aircraft.

VISUAL LINE-OF-SIGHT (VLOS) – The RPIC, the visual observer (if one is used), and the person manipulating the flight control of the small RPAS must be able to see the aircraft throughout the entire flight in order to: (1) know the aircraft's location; (2) determine the aircraft's attitude, altitude and direction of flight; (3) observe the airspace for other air traffic or hazards; and (4) determine that the aircraft does not endanger the life or property of another. This VLOS ability must be exercised throughout the entire flight of the aircraft by either: (1) the visual observer; or (2) the RPIC and person manipulating the flight controls of the aircraft (if that person is not the RPIC).

VISUAL OBSERVER – If used, a RPAS flight crewmember designated by the RPIC to assist with the responsibility to see and avoid other air traffic or objects aloft or on the ground.