

UAS Program Development & Implementation

Unmanned Aircraft Systems (UAS), commonly referred to as drones, are becoming a frequent tool used by Emergency Service Organizations (ESOs) for a variety of tasks. These tools can be a vital asset to an ESO. To help ensure the success of their UAS operation, VFIS recommends that ESOs develop a UAS program before purchasing a UAS platform, as the intended use for the drone may impact platform selection.

The process for developing and implementing a UAS program is complex. To assist with the process, VFIS recommends ESOs consider the following focus areas to help launch a successful UAS program.

Identify Program Goals & Operations Development

The foundation of any UAS program starts with identifying the intended goals for the UAS program and beginning the process of Operations Development. Start by mapping out the features of your UAS program. Consider the following best practices.

- Designate a Program Coordinator and team members for the UAS program. Include the roles of the team members in the written operational procedures, outlining the parties responsible for training, maintenance, data retention, and public privacy associated with the UAS program.
- Define the types of operations your drone will perform and the services the UAS team will provide. For instance, will the platform be used for obtaining pictures only, deploying personal flotation devices, or some other task? The predetermined operations will dictate the equipment and training that will be needed.

Note: ESOs should not engage in flight activities that are not part of their operational guidelines. Operators should not engage in tasks they have not been trained to perform.

- Identify where you will operate the drone to ensure compliance with any applicable air space restrictions. For commercial operators/public entities, operations in Class G airspace are allowed without alerting Air Traffic Control (ATC). However, operations in Class B, C, D, & E airspace require ATC permission for commercial operators/public entities.
- Assemble a designated team of those who are authorized to fly the UAS. The flight personnel should include the Program Coordinator, Remote Pilot in Command (PIC) positions, Visual Observers (VO), and those permitted to inspect/maintain the equipment.
- Determine the intended flight time and distance. The desired performance will impact the type of platform needed, the number of spare batteries required, and battery charging equipment. Flight time and distance will also play a significant role in establishing the maintenance plan.
- Evaluate all of the information gathered from the preceding focus areas to determine the platform requirements for your UAS program. The information collected will help direct you to the type of UAS that will best fit the needs of your operations.

UAS Operations by ESOs

There are a vast number of uses for drones in the emergency services. Some of these tasks include:

- Structure fire surveillance
- Wild land surveillance
- Fire investigations
- Search and rescue
- Assistance with law enforcement operations
- Evidence collection
- Accident documentation
- Situational awareness for incident commanders
- Severe storm damage assessment

All of these operations are possible with the use of a drone. ESOs should determine which of these tasks their UAS program will conduct and develop a plan that is specific to their intended application.

Equipment Selection

Base the selection of equipment on the needs identified during Operations Development. In addition to fulfilling the needs of the operations, consider the following factors when selecting equipment.

- Consider the two classes of UAS: fixed wing and rotary wing. Determine which will best fit your intended application. For instance, for payload activities, it is more common to use rotorcraft.
- Factor maintenance requirements into the platform selection, including replacement blades, spare batteries, battery chargers, and equipment calibration. Create a formal procedure for maintaining records and assign someone to this designated role. Establish a routine program as well.

Note: Treat UAS maintenance programs with the same level of importance as standard vehicle fleet inspections and portable equipment inspections programs.

Regulation Requirements

Certain regulatory requirements must be met to operate a drone. The governing body in the United States is the Federal Aviation Administration (FAA). In 2016, the FAA adopted formal requirements for UAS operations, dividing them into three operational categories: recreational operators, commercial operators and public entities. (Operation and Certification of Small Unmanned Aircraft Systems, 14 C.F.R. part 107, 2016).

Note: The FAA considers the operations of ESOs, including volunteer organizations, to be Commercial or Public Entity UAS activities.

Although FAA restrictions apply to commercial applications as well as recreational applications, each of the three operational categories has its own regulatory and operational requirements. These rules pertain to pilot requirements, flight certification, location requirements, and other operating rules.

ESOs must decide if flight authorization will be obtained through the Part 107 licensing process or via a Certificate of Authorization (COA). Please see the VFIS resource on [UAS Operation Suggestions](#) for additional information regarding the flight authorization process available to ESOs.

Standard Operating Procedures

Establish Standard Operating Procedures (SOPs) for deployment of UAS in the same manner as Fire and EMS response procedures. Some suggested areas of focus include:

- UAS flight procedures allowed under the program (video, PFD deployment, etc.)
- Use and deployment policies (including mutual aid)
- Pilot qualifications (Remote Pilot Airman Certification required or COA in place?)
- Duties during flight (Pilot in Command (PIC), visual observer(s), data documentation, etc.)
- Flight planning and logging
- Safety precautions (proximity to other aircraft, flying over crowds, proximity to airports)
- FAA Operating Rules
- Data collection, storage, and processing policies
- Accident/incident procedures
- Equipment maintenance (including decontamination)

Adopting SOPs allows for standardization of UAS operations, providing greater efficiency and effectiveness of the program. The development of the SOPs will likely be an ongoing process as the needs of the UAS program change.



Personnel Training

Training is a major component of implementing any new program. Develop a training program for UAS pilots that focuses on the ESO's particular aircraft, platform attachments, and proper application of the UAS for procedures outlined in the SOPs. Training should include initial operator training as well as an ongoing refresher program. There are two ways to administer UAS training.

- Internal Training – Internal training programs should include an orientation to the platform the pilot will be working with, the minimum number of flight hours, maintenance training, and recordkeeping. There is no flight test required by the FAA to become a UAS pilot. Therefore, it is important that ESOs test and train their pilots to verify they are proficient in operating the system well before placing the pilot into an emergency situation.
- Contract Training – Contract training is available from third party vendors, ranging from consultation in equipment selection, test preparation for pilot examinations, and staff training, up to complete UAS program development. There are numerous vendors already, and the list will continue to grow as the technology expands.

DISCLAIMER: This is a sample guideline furnished to you by VFIS. Your organization should review this guideline and make the necessary modifications to meet your organization's needs. The intent of this guideline is to assist you in reducing exposure to the risk of injury, harm, or damage to personnel, property, and the general public. For additional information on this topic, contact your VFIS Risk Control Representative at (800) 233-1957.

Flight Planning and Logging

Flight planning is a major component of a UAS program because it can play a significant factor in whether or not the UAS is going to fly. Some factors to consider include:

- **Location** – Does ATC need to be contacted? If in a wildland fire situation, are there aircraft in the area working the fire? Is the flight path over a large gathering of people? Are the appropriate waivers in place, if necessary?
- **Weather Conditions** – Are weather conditions satisfactory for safe flight? What weather conditions are required for the drone to be grounded? Also, what were the weather conditions at the time of flight? This information may be beneficial to performance data and the maintenance plan.
- **Airspace** – In what airspace is the flight taking place; and, does the nearest ATC tower need to be notified? The FAA has restrictions regarding proximity to airfields. While some newer drones come preprogrammed with software that automatically grounds the device if it gets too close to an airfield, there are still many models that do not have this feature.
- **Personnel Requirements** – How many personnel are needed for the flight to satisfy operational requirements?
- **Equipment requirements** – What equipment does the task require? The nature of the event will dictate what equipment will be needed such as general cameras, thermal imaging cameras, or grippers for equipment deployment such as life vests.

Log all flights once completed, including the aircraft utilized, the pilot, notes of the flight (successes/failures), and the post-flight inspection. Log any post-flight required maintenance as well. Keep this information in a file along with all pre-flight inspections and other maintenance records.

Equipment Maintenance

Equipment maintenance is an essential part of any UAS program, and the associated cost is significant to the overall cost of purchasing the respective drone. Parts of these systems will break. Consider keeping spare parts such as rotors and backup chargers readily available.

Establish a formal maintenance program for each UAS in the fleet. Include the following items in the maintenance program.

- Aircraft inspections (pre-flight and post-flight)
- Battery inspections and replacement
- Sensor calibrations
- Inspections of attachments (cameras, grippers, etc.)

Base the plan on the number of flights, time of use, etc., as a thorough maintenance program will help ensure longer life of the equipment. Review manufacturer's maintenance suggestions when developing the service schedule.

It is also important to establish decontamination procedures for UAS equipment as it may be exposed to soot, chemicals or other hazardous materials during use. Decontamination will help minimize the transfer of harmful materials that may accumulate on the equipment and may also help to preserve the equipment. Establish a decontamination program for UAS equipment. The decontamination program should include designated areas for cleaning equipment, appropriate decontamination methods for UAS equipment, and any special instructions for cleaning provided by the equipment's manufacturer.

Note: Treat UAS decontamination programs with the same level of importance as personal protective equipment decontamination.

Summary

The key to implementing a successful UAS operation is to develop the program details well before the platform takes flight. The best practices outlined here are intended to help ESOs navigate through the complex process of developing and implementing a UAS program specific to their intended application of a drone. The information gathered during this process may also help direct ESOs to the types of UAS platforms that best fit the needs of their operations.

VFIS does not recommend developing a UAS program based on the flight capabilities of a drone already purchased. For ESOs already using drones, VFIS recommends they review their current UAS program to ensure it meets the current best practices and regulatory requirements.

Additional Resources

The U.S. Federal Aviation Administration | Unmanned Aircraft System Website

www.faa.gov/uas

FAA | Federal Drone Registration

www.federaldroneregistration.com

FAA | sUAS Part 107: The Small UAS Rule

www.faa.gov/uas/media/Part_107_Summary.pdf

NFPA 2400 | Small Unmanned Aircraft Systems (sUAS) used for Public Safety Operations - Details the minimum requirements for the safe operation, deployment, and implementation of sUAS.

www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=2400

Transport Canada | The governing body for regulations, policies, and services of transportation in Canada

www.tc.gc.ca/eng/civilaviation/drone-safety.html

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