sUAS Advisory Guide to Launching & Maintaining Public Safety Drone Programs

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Introduction/Background

Rapid deployment of first responders within 60 minutes of an incident can mean the difference between life and death (Clark, 2017). Over the last 15 years, drones were used in all sectors of public safety to speed this first response, ensure the safety of personnel, and save lives. Drones can be a valuable tool in making a first assessment before personnel enter a scene. They also dramatically reduce the time personnel must spend on-scene by helping to capture evidence and provide intelligence quickly. While a disaster is ongoing, drones can be extremely useful in aiding emergency services to figure out how best to plan their rescue efforts. Drones allow quick, sterile interactions between responders and suspects, fires, downed power lines, and other dangers. The probability of injury for all personnel involved in incidents, chance of excessive use of force or accidental weapon discharge and spread of viral or bloodborne transmissions are all greatly reduced by drone utilization.

Use of Drones: Past & Present

The first documented use of a drone to aid public safety in the U.S. occurred in 2005 in Ocilla, Georgia when a public safety agency used a drone to resolve the missing person case of Tara Grinstead (Pilot Institute, 2021). The Center for the Study of the Drone at Bard College in Annandale-on-Hudson, NY published a comprehensive report on Public Safety Drones. According to the third edition of this report, more than 1,578 state and local public safety agencies in the U.S. have acquired drones. Use of drones in the public safety sector has risen exponentially since 2014 (Figure 1). Law enforcement (LE) agencies account for nearly 70% of users among public safety agencies, while fire and rescue and emergency management agencies account for 20.7% and 9.4%, respectively (Figure 2). In the U.S., drones have become an important asset for public safety agencies, having saved more than 350 lives worldwide.

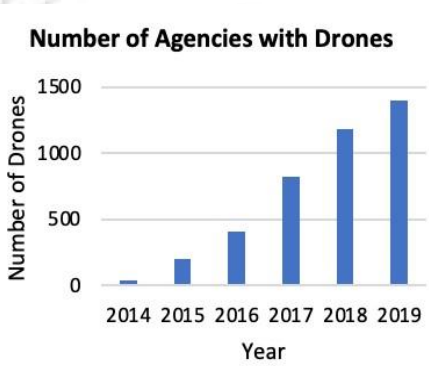

Figure 1. Number of agencies with drones.

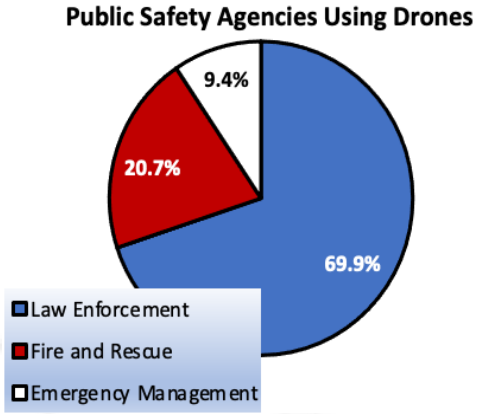

Figure 2. Percentages of agency types using drones.

Drone Costs & Capabilities

Several public safety use cases are fueling investments in drones. First responders routinely use drones for active shooter, drug interdiction, lost hiker, accident investigation, prison escapes, pursuit, surveillance, and search and rescue operations. So, more and more agencies are investing in drone programs. This encompasses personnel resources for planning the program, purchasing equipment, training the unit, hiring personnel, training drone pilots, implementing preventive maintenance and repair programs to maintain the drones. A new drone with remote controller and accessory kit cost can range from $550 to $35,000 In comparison, a new search and rescue Bell 206 JetRanger helicopter costs $700,000 and costs over $1500 per hour to fly.

Drones can also be equipped with thermal imaging, infrared, and daylight cameras. Thermal imaging can enhance aerial search and rescue. These cameras allow operations to continue through the night. Many advanced image analysis software tools exist to enhance drone programs. This technology uses machine learning to identify defined features in photos. Once the drone takes photos, the software can analyze thousands of photos in minutes to pick out specific clothing, cars, or other features.

Applications in Public Safety

The most popular uses of drones among the public are benevolent applications: search and rescue (87%), identifying and tracking criminals (80%), and supporting other emergency service efforts (84%). (UAV Coach, 2019). This list includes just a few ways that drones are being used positively in the public safety sector:

Damage Assessment. Following Hurricane Mathew, a drone was used to complete a damage assessment of the entire city of Daytona Beach Shores in two hours.

Search and Rescue. Drones can be deployed and cover a large area quickly with thermal cameras. Once a person has been found, teams can use the information captured through drone images and videos to plan an access route.

Supply Deliveries. Drones can be used to deliver supplies, such as medicine, food, water, clothing, and lifejackets.

Firefighting. Drones can be used by firefighting teams to evaluate a blaze and plan a response strategy. Thermal imagery can recognize hot spots to mitigate regrowth of fires caused by smoldering embers. Some drones can carry a payload of over 600 pounds of water or be tethered to a water supply for firefighting.

Surveillance. Drones can simply be stored in the back of a squad car and deployed to provide visibility before entering potentially dangerous situations, then proper resources and manpower can be optimized for a proper response.

Acquisition of Evidence. A pilot flew a drone 700 feet horizontally to capture a license plate tag on a car suspected to be involved in crime. Imagery enabled officers to confirm the car was involved in the crime and make an arrest of armed and dangerous suspects without harm to any parties.

Active Shooters. Drones with thermal and zoom cameras can identify humans from safer distances, which can be instrumental in planning an approach and resolving a conflict with as little risk as possible.

Crime Scene & Accident Documentation. High-resolution videos and photos of crime scenes and accidents can be captured quickly and preserved, allowing for a post-scene review and creation of 3D models to reconstruct scenes.

Event security. Americans are anxious about attending large events. In a survey, 69% of Americans were concerned about safety when attending large events. Then asked, 87% of respondents stated that they would feel safer at large events if the agency in charge of safety used drones (Pilot Institute, 2021).

Disaster Pre-planning. Drones can be used to map and create a digital surface model to understand how hazardous liquids would flow from factories and take necessary prevention measures.

Hazardous Materials Response. Personnel can be eliminated from hazmat scene investigations and appropriate, safe responses can be planned using imagery captured by a drone.

Manpower Reduction. Drones reduce manpower needed during commercial alarm responses and searches. Rural searches in fields require officers to walk ten feet apart, but a drone can search using GPS grid squares and provide feedback, freeing personnel on the ground to focus on specific areas.

Overview of Obstacles When Launching Drone Programs

Launching a drone program can prove exceedingly difficult and time-consuming, especially within the public service industry. Just a few of these challenges include:

1. Public Perception
2. Convincing Brass/Council
3. Manpower/Mutual Aid
4. Training
5. Federal Aviation Administration (FAA) Regulations
6. Drone Options
7. Maintenance
8. Program Development
9. POC Changes
10. Funding Needs

Problem Statement

If a program manager is well-informed before starting a new program, then the program will have a higher rate of success. There are many roadblocks that may be encountered when starting a drone program. The purposes of this paper are to inform readers about the potential hurdles that could be encountered when planning and implementing a new drone program and to present possible solutions to overcome these challenges.

Recommendations for Building a Successful Drone Program

Challenge 1: Public Perception

Recent Changes in Public Perception

More than 35% of business leaders believe drones are not being adopted in their industry because of negative public perceptions, despite 43% of those surveyed arguing that their industry would benefit from drone use (UAV Coach, 2019). A large factor driving drone use across the public safety industry is the improvement of the public's perception of drone technology. Concerns about them getting spied on or the danger of drones crashing into houses are being outweighed by the benefits of drone use as positive outcomes increase.

Shifts in Public Perception of Drones

Recently, public safety drone programs have gained notoriety and public awareness. Efforts to visibly recognize challenges and inspire public and community officials to think positively about drone uses have impacted the public perception of drones. In 2012, a National Constitution Center poll found that 30% of the public feared that police using drones for surveillance would erode privacy. But negative sentiment is changing. More recently, an RTI International survey found that:

- 88% of the public supports drone use in search and rescue operations, • 67% support drone use in homeland security missions, and
- 63% support drone use in fighting crime (Drone Life, 2021).

Another survey by UAV Coach in 2019 found that 68% of respondents believed that commercial drone use over communities will be safe, 70% of respondents expected home delivery within the next ten years, 51% supported neighborhood drone deliveries while 49% thought they were too dangerous, 82% believed commercial drones used for small scale and cargo deliveries would cause a serious accident sooner or later, 71% had privacy concerns, and 93% wanted some form of regulation (UAV Coach, 2019).

An agency seeking to stand up a program should proactively use all available resources to inform the public of their plans for a program, its purpose, and its benefits to the community. This is better done in a proactive manner rather than waiting for an issue to arise from a public safety mission and then trying to mitigate it after the fact. The increasing use of drones by public safety has caused the public to become more aware and educated on drone use and anxiety over privacy concerns has decreased.

Create Deliberate Public Demonstration Events

Building public trust is crucial in causing a positive shift in public perception. It is critical that safety organizations educate the public to remove any reservations that they might have against drones. Sharing stories of past successes is a great way to do this. Demonstrations at local schools and public events for public officials and residents are the easiest way to communicate your plan with the largest number of people quickly. Drone teams can attend community meetings and other scheduled events to fly planned scenarios. Pilots at events should be friendly, welcome questions, and thoroughly explain the technology along with potential uses and benefits. Teams can also find local places to practice flying with the intention of being in the public eye. Utilizing drones in non-incident response settings like public events and conducting training in public areas where constituents can see them in use and ask questions helps to foster public acceptance. Still, there are those that will see it as an invasion to their privacy and

agencies must be prepared to deal with individual cases as they arise (Boggus & V. Lunsford, personal communication, April 19, 2021).

Use Radio, Television, and Social Media to Distribute Information

Changing public perception is best accomplished by reaching as many people as possible. Television, radio, and social media are the most efficient outlets. Create television and radio commercials to advertise events. Post videos on social media and the news of road closures, traffic, and construction jobs to convey positive uses of drones to the public. Distribute news and case studies about positive impacts drones have made across the country.

Attend Public Meetings

Personnel familiar with drone programs should go to community, city council, and neighborhood association meetings to distribute information about how the program will improve the community.

These meetings are a great place to show off the drones and solicit various groups for support. It is also important to ensure the program representatives attending public meetings are highly respected influencers in the community.

Challenge 2: Convincing Brass/Council

Begin with Executive Support

Public agencies in the U.S. favor novel approaches to improve public safety. Changes in tactical philosophy over the last few years have caused public service teams to slow down and use technology as a primary resource. Placing technology into violent situations first, and people second, saves lives and dramatically reduces the time required on scene by helping to resolve matters, capture evidence, and provide intelligence quickly. The ability to provide these benefits cultivates support from local Brass and Councils (M. Rogers, personal communication, April 19, 2021).

Gaining support from executive staff during the program planning stage is an essential component of any effort to stand up a public safety drone program. Backing from upper-level leaders ensures a stable funding source is available to sustain the program long-term and guarantees the drone program leadership has the support they need to integrate all components of the program within the agency's overall operations (G. Smith, personal communication, April 19, 2021).

Choose the Right Representative

When planning meetings, be sure to ask a high-ranking person that the Brass likes to be the face of your program, especially if your organization is highly political. Allow them to submit the drone program idea and deliver presentations. Then, as the program accelerates, have them delegate all ideas, inquiries, and activities back to the program manager. Integrate the program manager to answer all questions and drive the program (V. Lunsford, personal communication, April 19, 2021).

Present Case Studies to Public Officials

When planning your program, invite Brass and other high public officials to watch pilots fly drones and discuss the value of drones with them (L. Boggus, personal communication, April 19, 2021). Presenting

case studies to support this knowledge is instrumental in changing minds and promoting positive community relations (M. Mocerino, personal communication, April 19, 2021).

These case studies are examples of scenarios that can be used to promote positive thought:

Cecil County's Sheriff's Office, Elkton, MD - Stolen construction equipment valued at $400,000 was recovered as part of a joint investigation into a construction-centered theft ring.

SWAT Team, Campbell, CA – A drone was used to form a tear gas deployment strategy to confront an armed man inside a Denny's restaurant. The man gave himself up and the issue was resolved with less risk to personnel.

Fire Department, New York City, NY – Uses tethered drones to relay live images of active fires to the ground, allowing personnel to coordinate movements and optimize firefighting efforts.

Sichuan Earthquake - Rescue teams used drones to differentiate between usable and unusable routes to safety and identify population-dense buildings for rescue teams to target.

SOARIZON, Scottish Highlands – A medical drone delivery trial to deliver PPE supplies and COVID test kits proved that delivery time could be reduced from up to six hours by road and ferry, to just 15 minutes by drone.

Firefighters Association, Austin, TX – Firefighters were hunting a serial arsonist and used a drone to quickly locate new fires, analyze the patterns, forecast where the next fire would be, and locate the suspect.

North Tahoe Fire District, Tahoe, CA – A 5,000-gallon hydrochloric acid tanker truck accident occurred with a fatality and all contents of the full tank spilled onto a state highway and dynamic waterway. A drone was deployed to survey the incident, define threats to adjacent areas, monitor the hazmat team's entry into the "hot zone" and minimize risk to all responders, and deliver comprehensive documentation for investigation (G. Smith, personal communication, April 19, 2021).

Involve the Community

Going above and beyond to help members of the community does wonders for gaining support of influencers. Relationships can be established by completing projects for schools, like taking aerial photos of buildings and events. Local businesses like car dealerships, banks, and restaurants can also benefit from aerial photography and mapping. Drones can support emergency planning by providing detailed, high-definition, current mapping for critical infrastructure and transportation sites within a jurisdiction. This service could be offered to businesses, schools, and other infrastructure within the community. These contributions of time and resources may deliver immeasurable support as well as donations to the program (L. Boggus, personal communication, April 19, 2021).

Challenge 3: Manpower/Mutual Aid (Pilot Retention, Finding Pilots, Having a Pilot in Charge (PIC) on Scene)

Be Creative if Understaffed

Generally, incidents start to de-escalate within the first 20 minutes of arrival of the first unit. Most agencies do not have the luxury of pulling a responder/PIC from the overall incident mitigation effort to

launch and fly a drone in this timeframe because most public safety agencies are understaffed. This is an on-going issue that affects drone programs. There is no quick solution for needing people to operate the systems. However, many members of the agency's team will want to be users of the new technology.

Agencies with drone programs have resorted to finding creative ways to get a pilot in position in a timely manner. Examples of this include having Community Emergency Response Team (CERT) volunteers and other non-safety classified personnel, such as Fire Prevention and Law Enforcement Reserve or Volunteer staff, trained as skilled pilots able to deploy a drone quickly to an incident (G. Smith, personal communication, April 19, 2021).

Program managers can also reach out to the academies to find and train community service aides who are too young to go to police academy, but who are trained as Visual Observers and can take accident and vandalism reports in the field. Training these Visual Observers as pilots is an excellent skill combination in the field.

Limit Calls Until the Program is Developed

Communicate with surrounding agencies to advertise your drone program. Until you have enough pilots trained, limit responses to active shooters, homicides where the offender is present in the area or perimeter, missing children or elderly, and kidnappings. Establish a priority list for dispatchers so that

decisions can be made immediately during calls for help (V. Lunsford, personal communication, April 19, 2021). Developing a Drone Task Force that is listed in a Computer-Aided Dispatch or Automatic Vehicle Location system is also important so that the nearest drone unit can respond to an emergency regardless of agency (C. Bachman, personal communication, April 19, 2021).

Doing More with Less

On the other hand, drones can reduce manpower needs. Drones allow agencies to do more with less. For example, one pilot can send in a drone to investigate a hazmat scene instead of placing two or more personnel in danger. The number of resources is also drastically reduced during search and rescue missions (M. Mocerino, personal communication, April 19, 2021).

Challenge 4: Training (Obtaining Part 107, Stick Time, Expanding Capabilities)

Finding Pilots within Current Staff

Finding officers who want to fly drones is usually not a problem. A progressive, adequately funded drone program with strong leadership will attract potential pilots and retain pilots who are motivated to be involved in training others and growing the program. Begin by researching staff members to learn if someone already on staff has a Part 107 pilot's license. Ensure each pilot on duty that deploys the drone oversees the flight and is the PIC. This will empower them to share the program and train others. All pilots should report to the Drone Coordinator who is a lieutenant rank or higher. The Drone Coordinator should report to the Sheriff, Chief, or his designee (V. Lunsford, personal communication, April 19, 2021).

Training New Pilots

Some agencies choose to hire drone pilots certified by the FAA to conduct operations for them. If your agency wants to conduct its own drone operations or create a program with multiple pilots and drones, this primer can help get your program started.

Your agency has two options for certifying personnel to operate drones. First, individual members of your team can be designated to obtain FAA drone pilot certificates and fly under the rules for small, unmanned aircraft systems (sUAS). This is also known as a Part 107 license. Agencies and/or departments can also receive an FAA certificate of authorization (COA) to function as a "public aircraft operator" and can self-certify drone pilots and drones (FAA, 2021). Most departments will pay for Part 107 testing.

Skyfire can assist your program with navigating the following options:

- COA Filing and Renewal
- Blanket COA
- Jurisdictional COA
- Beyond Visual Line of Sight (BVLOS) COA
- COA Related Waivers
- Drones Over 300 Pounds
- Flight Over 400 Feet

- Flight Faster Than 100 Miles Per Hour
- Hazardous Materials Waiver
- Tactical BVLOS Waiver
- Part 107 Waivers
- Controlled Airspace Assistance
- Regulatory Updates Email Subscription

Public Safety Officials Should Obtain a Part 107

Most departments require that pilots obtain a Part 107 license. The Part 107 license was created by the FAA and is the one true standard test a drone pilot can take. This test requires no hands-on training but requires a thorough understanding of aviation basics including topics such as airspace, weather, aerodynamics, and regulations. Some departments then require pilots to go through basic and expanded flight training.

Finding Time for Training

Public safety agency personnel have many demands on their time ranging from incident response and general training to career growth and meetings. Finding sufficient time for pilot training is just one more challenge. An organization must be able to balance these demands. Pilot stick time is often a direct reflection of how successful the agency has been in integrating the drone program into daily incident operations. Those agencies who utilize drone resources frequently in incident response provide better opportunities for pilots to get stick time and develop individual skills to the benefit of the pilot and agency (G. Smith, personal communication, April 19, 2021).

Time Needed for Sufficient Training

The Brass may only agree to give skilled pilots one eight-hour training shift every quarter, but one training day a month is better. It is best, at first, to have new pilots to practice once a week if they have not flown a mission. Pilots may also need to practice on their own time to become proficient. Once comfortable, then allow new pilots to fly missions that are easy and build up to more complicated calls until everyone can fly well. After flying missions once or more a night, practice once a month or quarter is feasible. During periodic training, address issues or concerns related to calls or areas that need work and focus on improving abilities and confidence. Have pilots complete 30-minute scenarios, fly obstacle courses, and train with other agencies with drone programs to share ideas. Agencies can make training fun by sponsoring competitions among pilots for small prizes or just bragging rights. Periodic training should include a training course with a practical flight scenario that must be passed to be able to fly missions. Licensed pilots should prove they can fly in the field (V. Lunsford, personal communication, April 19, 2021).

Training Schools

It is a great idea to empower staff enlisting pilots in advanced specialty schools, like SWAT Drone Training. Sometimes it is more beneficial to bring the training company to your team and train everyone at once. Some training companies have a facility they like to train in while others will train anywhere. Skyfire offers onsite or at a Training Academy in Marietta, GA. Training includes Online Part 107, a two-

day Basic Training, a three-day Intro to LE Operations, a four-day SWAT training, thermography and mapping, and other specialty courses.

Challenge 5: FAA Regulations (Navigating FAA Websites, COAs, Regulatory Updates)

Use Resources to Your Advantage

Joining a regional inter-agency drone operator group can allow access into how other agencies are addressing regulatory and program challenges. Additionally, some groups host regional training events. These groups can also aid efforts among its members (G. Smith, personal communication, April 19, 2021). Regional drone meeting groups have an abundance of information to share from established departments. Skyfire can help your team find a local meeting group.

Communicate FAA Regulations

The FAA controls the skies and has created regulations (safety standards) governing the operation of aircraft. Updates, new regulations, and contacts with the FAA should be managed by the Drone Coordinator. This team member should make sure all program capabilities, SOPs, and policies are current. When new regulations are announced, they should communicate and train the staff on these changes. This person should also be aware of when each pilot's Part 107 licenses expire and when to renew the department's COAs. Flight logs must be maintained. An Assistant Drone Coordinator should also be assigned in case the Drone Coordinator is not available, gets moved around, or retires (V. Lunsford, personal communication, April 19, 2021).

Challenge 6: Drone Options

Diversify Assets Based on Needs

Asset diversification is an important aspect of drone programs. If restrictions are placed on one manufacturer and your fleet only contains that type of drone, then your entire program is grounded. (M. Mocerino, personal communication, April 19, 2021). Available options evolve quickly with new technology entering the market (G. Smith, personal communication, April 19, 2021). Most public service agencies do not go onto Department of Defense (DoD) properties, so protecting national security is not of high concern; however, the FAA does place restrictions on foreign-built drones, and this should be taken into consideration when building your fleet.

Several drone options are approved by the DoD. As you begin establishing your program, call company representatives and test fly products to determine if the product is a good fit for you and your program. Autel and Parrot have expanded their product lines and many other choices are gradually entering the market.

When mixing and matching drone brands, the controls should all be the same (Mode 2) and they can be mission specific, including fixed wing drones for more coverage areas or search and rescue. Pilots should be trained on the different models monthly (V. Lunsford, personal communication, April 19, 2021).

Challenge 7: Maintenance

Maintaining drones is difficult because no one can be trained to maintain the fleet. Only distributors provide drone maintenance. Some programs like *Refresh* are offered by distributors and are worth buying and extending. Some distributors will even ship a replacement drone overnight while your drone is maintained or repaired, so it is kept on duty (V. Lunsford, personal communication, April 19, 2021).

Software Issues (Drones, Updates, Geofencing)

There are many products out there that do not use geofencing technology. Designing a program that places the responsibility for hardware/software readiness on the individual pilot for that aircraft goes a long way to preventing a situation where the aircraft cannot participate in an incident response due to a software or hardware update issue. Public safety personnel are accustomed to making sure their equipment is always ready for incident response, a public safety drone is just another tool at their disposal (G. Smith, personal communication, April 19, 2021).

It is best practice to have the graveyard squad check for updates when they are slow. If on patrol and a firmware update is needed, it should be ignored until downtime occurs (V. Lunsford, personal communication, April 19, 2021).

Program Requirements

A process must be put in place to ensure all drones are operating properly and maintained. An inventory of spare parts must be available and software updates need to be managed (S. Worsham, personal communication, April 19, 2021). It is especially important to have a good working relationship with vendors since replacing parts in a pinch can be difficult. Establishing a vendor that conveys realistic delivery times is crucial to the success of your operation (M. Mocerino, personal communication, April 19, 2021).

Challenge 8: Program Development

Defining Needs

The coolest gadgets and newest models may not be needed to make your program successful. Focus on mission planning and ensure the drone and accessories chosen for your program meet the needs of those missions. The drone should be forecasted to achieve mission requirements for at least five years before upgrades or replacements are needed to grow with the program. Batteries are the part of the drone replaced most often, so ensure batteries will be produced for the drone over the next five years before purchasing the drone (V. Lunsford, personal communication, April 19, 2021).

Support of executive management and a recurring funding sources are instrumental in developing a strong drone program. Apply for all available grants, knowing each one will not be successful, and keep all personnel motivated and involved in program development (Greg G. Smith, personal communication, April 19, 2021). It is best to approach program development in five-year increments. Begin with 20 goals for the program plan and grow goals as the program develops and goals are accomplished (V. Lunsford, personal communication, April 19, 2021).

Announcing the Program

The method you use for announcing commencement of your program depends on if your Head of Agency is elected or not. Each agency must decide the best way to proceed.

Make Policies & Procedures Public

Starting a new program requires creating a standard operating procedures manual to guarantee compliance with regulations and State and Federal laws, planning data security, establishing a training program to train qualified operators to fly drones for the department, and establishing program funding.

Policies and procedures for the use of drones should be aligned with body cam and dashcam policies. These videos produce transparency and improve public trust of LE when interactions are shown to the public. Interactions between drones and all personnel should be recorded via video (M. Rogers, personal communication, April 19, 2021).

Multiple agencies may need to share resources. Additional policies and procedures must be established to balance use time and aid in defining the nearest drone unit that can respond to an emergency (C. Bachman, personal communication, April 19, 2021).

Further, safety organizations can also consider involving the local organizations that traditionally rally against drone use to review and provide feedback on drone program policies. Creating safeguards to ensure privacy and having a clearly defined training and safety regimen will also help push the cause forward.

Challenge 9: POC Changes (Lapse of Program)

Public safety agencies do experience significant personnel turnover issues. This is an unavoidable fact. A progressive agency will always ensure there are backups for trained personnel and knowledge sources. Each person within the organization should know and understand the jobs of the people above and below their current position. Being able to fill multiple roles within an agency's operation is one of the cornerstones to a successful drone program (G. Smith, personal communication, April 19, 2021). When new Brass arrives, be sure to explain the program and deliver presentations again to gain their approval (V. Lunsford, personal communication, April 19, 2021).

Challenge 10: Funding Needs

Funding

Funding sources are available to help cities and towns grow their drone programs for the betterment of their communities. Most drone programs can be started for under $25,000. Fully funding a comprehensive program is difficult at first. For most public safety budget processes, it takes one or two budget cycles once the program is approved to start forming an annual budget. The program should be started with any seed money that is available, such as grants, donations, and fundraising events. Once the program has a few successes to showcase to the Brass, program leaders can build the argument for funding increases (M. Rogers, personal communication, April 19, 2021).

Create a Sustainable Funding Source

Establish a line-item drone program budget within the agency's recurring annual operating budget. An on-going drone program should not be launched without a secured recurring source of funding. Most grants are non-recurring and are prone to bureaucratic delays and lack of secure recurring funding sources. Over time, without a reliable dedicated program budget, money becomes harder to obtain with competing agency priorities and team morale and motivation diminish. Grants are a great source to meet "one time" funding needs such as equipment purchases and training needs, but for overall program stability there needs to be reliable, stable, and recurring funding sources to keep the program viable and progressive (G. Smith, personal communication, April 19, 2021).

Use Partnerships as Funding Sources

Reaching out to critical infrastructure companies, such as natural resource companies, power generation facilities, water treatment plants, transportation companies, and large event facilities, to offer drone technology in response to emergencies is a great resource for gaining support from the community and Brass. The partnerships can also deliver valuable long-term recurring funding to support the drone program.

Many of these entities, like Railroad Companies, have grant programs or funding for partners. While there is usually a $10,000 cap, multiple partnerships can generate enough money to fund the program for many years. As cases and responses occur, more money can be requested to grow the program. Referrals from corporate leaders outlining how the program helped them in a time of need can assist programs with attaining more grants.

Contact businesses that you have helped in stopping crime and catching offenders or reach out to public clubs that support LE like the Lions Club and ask for donations. Work with Universities doing research to obtain free training and product usage. Contact City and County Commissioners to request a one-time payment to start the drone program. Reach out to the State Legislature and ask the Congressmen in your jurisdiction for a one-time payment to help get the drone unit started. Each Congressman has a budget for personal projects and if you get a little from a lot of people it adds up (V. Lunsford, personal communication, April 19, 2021).

Grants

Grants are a great source to meet "one time" funding needs such as startup equipment purchases and training. Grants do not provide overall program stability because they are not a reliable and recurring source of funds to keep the program viable and progressive. Funding sources are available to help cities and towns grow their drone programs for the betterment of their communities. Grants are available from the following organizations:

- U.S. Department of Commerce
- Department of Homeland Security
- Federal Emergency Management Agency
- Department of Justice
- Corporate and Family Foundation Grants
- The Firefighter’s Charitable Foundation

- DARTdrones Public Safety Grant
- Mountain Rescue Association
- The EQT Foundation
- SPCA International
- Railroad Companies

Agencies may also create a Police Foundation so people in the community can donate money for the Drone Program in remembrance of someone. Naming a drone after someone may encourage donations and recognition with the community (Larry L. Boggus, personal communication, April 19, 2021).

Conclusion

Today, the use of drones by public safety agencies has become commonplace. From event security to disaster response, and search and rescue, drones have been leveraged to give responders rapid and real-time situational awareness even in areas that are inaccessible. This has resulted in an increase in the quality and speed of their response, a reduced hazard for personnel, and a better sense of safety for the public.

A factor driving the adoption of drones for public safety is the improvement of the public's perception of drone technology. Many other obstacles exist when developing drone programs. These challenges include convincing your Brass/Council that the program is needed, finding manpower for the program, training personnel and pilots, obtaining FAA certifications, selecting the correct drones for your missions, obtaining program funding, maintaining, and repairing the drones, developing a sustainable program, keeping the program running through personnel turnovers, and defining your program needs.

Skyfire offers many solutions to these issues and is here to help you with establishing and maintaining your drone program.

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