Best practices

Building a drone as first responder (DFR) program

Introduction

In an era where technology is increasingly pivotal in shaping public safety strategies, the integration of [drones in law enforcement](#) marks a significant advancement. Not only do drones offer an unparalleled vantage point; but they also enhance operational efficiency and increase safety so officers can get home safely. Law enforcement agencies nationwide have begun to echo the benefits these aerial tools bring to their policing efforts.

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> Drones are a huge force multiplier for agencies. 90% of the time, they'll reach a scene before an officer can... Drones can help us clear a lot of calls and reduce the number of officers needed per call. The future is bright for this technology in law enforcement."
>
> **Chad Karlewicz of Renton PD**

Communities benefit, too. Drones are helping save becoming well known for saving the lives of community members. like an elderly community member who wandered into a forest and de-escalating the potential shooting of a suicidal individual experiencing a mental health crisis.

Did you know?

Drones can cover up to 50 times the area one ground team can cover in the same amount of time, making them invaluable for search and rescue operations.

Chula Vista Police Chief Roxana Kennedy has called her DFR program, "one of her most important tools in improving situational awareness, de-escalating dangerous situations and protecting her officers and community."

Not only are these agencies finding tremendous success with their programs, but they are multiplying police force output and saving taxpayer dollars at the same time.

Chief Gina Hawkins of The Fayetteville Police Department stated, "One pilot (officer) and observer can search an area with the drone quicker than 20 officers on foot," Hawkins said. "If you were to research an entry-level police helicopter program, you would find the cost to be approximately $1.3 million, while the cost of the Fayetteville Police Department's program was under $100,000."

There is a growing consensus on the vital role of drones in modern policing.

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Unmanned aerial systems (UAS) are going to fundamentally change law enforcement operations.. In all likelihood, the technology will be commonplace in police departments within the next five to 10 years."

Police1

This guide aims to arm law enforcement agencies with the knowledge to implement a comprehensive Drone as First Responder program that meets the needs of their organization now and in the future by addressing key aspects of program development such as vendor selection, operational protocols, managing public perception, and more.

Assessing the need for a drone program

When considering the implementation of a drone program within law enforcement, most agencies start by identifying specific use cases where drones can add significant value. The most progressive and innovative agencies have found a wide range of uses for drones, enhancing both the effectiveness and safety of law enforcement and the communities they serve. Evaluate the following list and identify which use cases your agency sees most often;

1. [Crime scene documentation](#) can be performed in a fraction of the time with drones. They enable comprehensive examination without disturbing physical evidence and produce highly detailed evidence in the form of video, images, or even comprehensive 3D models of the scene.

2. In [missing-person cases](#), drones equipped with thermal imaging can be swiftly deployed to locate lost and/or elderly members of the community. This is particularly useful in vast or challenging terrains and when speed is of the utmost importance.

3. [Drones quickly and safely document traffic collisions](#). Providing comprehensive scene overviews aids subsequent investigations while also reducing time-on scene reducing the impact on traffic and stoppages.

4. For public events or demonstrations, [drones offer real-time crowd monitoring](#) and streaming to anywhere in the world with a wifi connection.

5. [Drones provide critical intelligence](#) during tactical/hostage/mental health situations where standoff distance is key to a safe de-escalation.

6. In [natural disasters](#), drones assess the damage, locate survivors, and identify safe routes for first responders.

7. [Monitoring borders](#) and [coastal areas](#) with drones helps curb illegal activities.

"
The most common responses to what police agencies are using the technology for were: Missing persons (83 percent); Natural disaster response and assessment (79 percent); SWAT response (76 percent); Crime and traffic accident scene analysis (71 percent)."

Police1

Each of these use cases presents unique benefits and demonstrates the versatility, adaptability, and multi-use nature of drones for public safety. However, you should evaluate the needs of your organization to make an informed decision on which drones to buy for your program based on the needs of the community you serve.

Did you know?

Drones equipped with high-resolution cameras and thermal imaging can provide clear, detailed images and support nighttime operations, essential for search and rescue missions. Real-time video streaming capabilities ensure timely decision-making and extended flight times reduce the need for frequent landings, ensuring continuous surveillance (UAV Coach).

Public safety drone selection

Selecting the right [drones for a public safety program](#) is a critical decision that can significantly impact the effectiveness, efficiency, and safety of operations. It can also mean the difference between failure or success of the program as a whole.

Introducing new technology is hard enough, and incidents like crashes can kill a program before it even starts. However, the most common side-effect of choosing the wrong public safety drone vendor is that the drone sits on a shelf due to improper due diligence when selecting the right vendor to support your organization's goals.

1. Evaluate operational needs

Identify specific tasks the drones will perform (e.g., search and rescue, surveillance, crowd monitoring, night operation, real-time streaming, etc). This will inform the type of drone and features needed to meet your program goals.

2. Environmental considerations

Consider the typical operating environments — larger cities may require operation in complex frequency environments like Urban Canyons, while others might need drones with a longer range, supported by [5G cellular connectivity](#).

3. Technical specifications

Flight time and range should be considered when evaluating platforms to reduce the impact of swapping batteries or losing connection due to interference. Camera/sensor quality and zoom capabilities are almost always essential for public safety operations. Thermal imaging is a necessity for effective [search & rescue](#), tracking suspects, or for any [night operations](#). [Obstacle avoidance](#) varies greatly by platform but AI-enabled is crucial for safely navigating complex environments. The ability to carry additional equipment like lights, speakers, or sensors can expand the drone's utility based on your intended use.

4. Autonomy and ease of use

Public safety drones with [autonomous capabilities](#) enable operators to do more with less, making the drone program and policing as a whole more effective and sustainable over the long term. User-friendly interfaces ensure that officers can operate the drones effectively, even under stress. Selecting a drone platform that officers feel comfortable using is essential to accelerate adoption and reduce program-killing incidents like crashing.

> "
> Current drone technology has already surpassed manned aircraft in endurance, range, safety and cost efficiency — but research and development is far from over. The next generation of drones will widen the gap between manned and unmanned flight even further, adding greater stealth, sensory, payload, range, autonomous, and communications capabilities."
>
> **Goldman Sachs Research**

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1. **Durability and reliability**

[Hardware & software interoperability](#) and reliability are critical for drones to be effectively utilized by public safety. Weather resistance should be a priority to enable operation in a variety of weather conditions, including rain and wind to maximize program effectiveness and success.

2. **Scalability and integration**

Ensure the platform you select can [integrate well with existing or planned technology systems and workflows](#). Consider how easily new drones, pilots, or use cases can be added and/or replaced as the program grows and the deployment strategy evolves.

3. **Feedback from other agencies**

Look at how [similar agencies have utilized drones](#), including any lessons learned, vendor selection, community engagement, and best practices for getting started or scaling a drone program.

4. **Programs of record & endorsements**

Vendors with programs of record or other endorsement by government agencies serve as a testament to the vendor's credibility and the effectiveness of their solutions in real-world scenarios. Consider where your drones are made and what support will be available as you grow your program.

Did you know?

The use of drones reduces the need for costly manned aircraft operations and can significantly lower operational costs while increasing efficiency.

Align program vision & goals

The selection of a drone technology provider for a public safety program should be a careful balance of technical capabilities, cost, ease of use, and [regulatory support](). It's crucial to choose a technology provider whose vision and goals align with the long-term strategic goals of your program and agency.

Consider the pace of innovation

With the fast-paced development of [innovative drone technology](), agencies should regularly review and update the selection criteria based on technological advancements, and changing operational requirements is also advisable to ensure the continued effectiveness of the drone program.

DFR Deployment methods

Understanding unique [strategies for drone deployment]() such as specialized units, patrol-led deployment, patrol-led drone as first responder (DFR), dock-based DFR, and/or fully automated dock-based DFR is critical for long-term success. Select method(s) that aligns with your agency's unique needs and challenges so your program can sustain itself and grow by proving the value of DFR as early and often as possible.
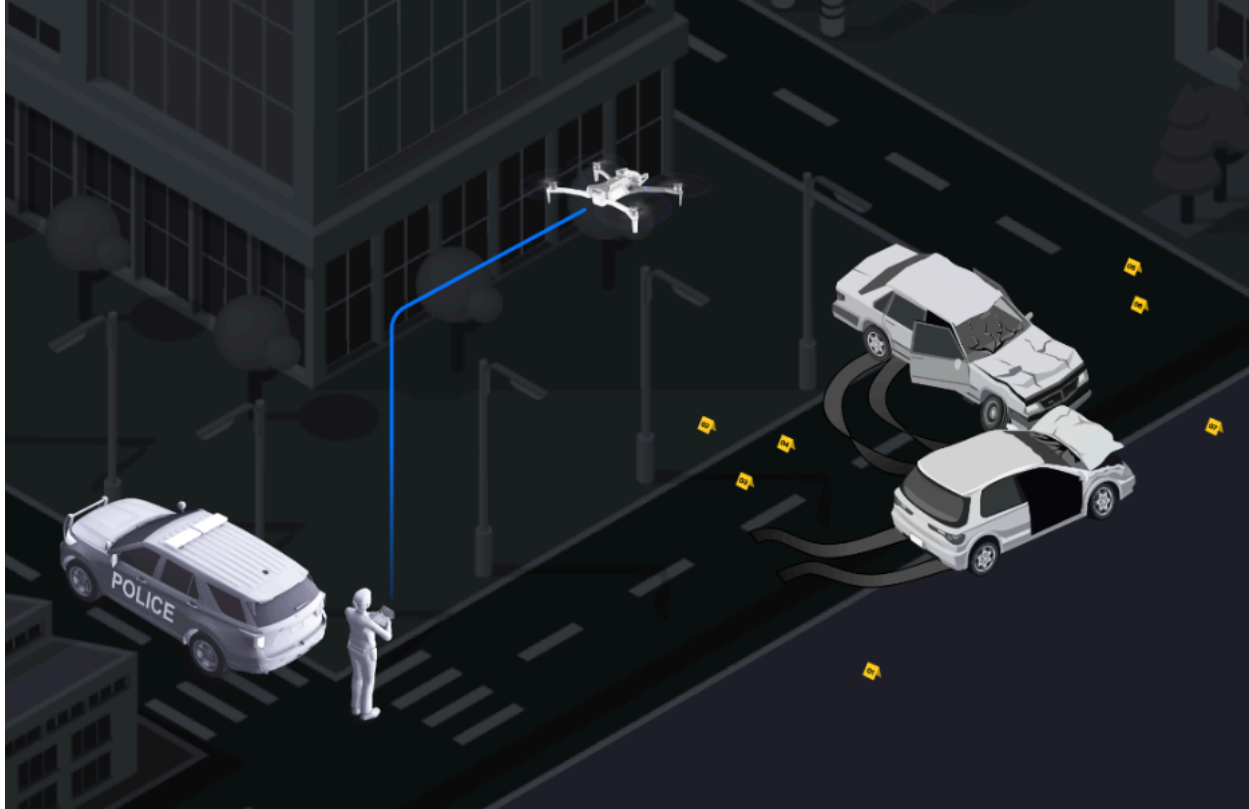
Specialized units (drone on a shelf)

Operate drones within specific units inside the agency, such as SWAT or search and rescue teams. Focus on advanced training for unit members, and equip drones with specialized tools (e.g., thermal cameras for search and rescue). For maximum value choose drones that fly autonomously and navigate well day or night, expanding opportunities for drones to provide value. Look for a modular design that provides flexibility in mission types.
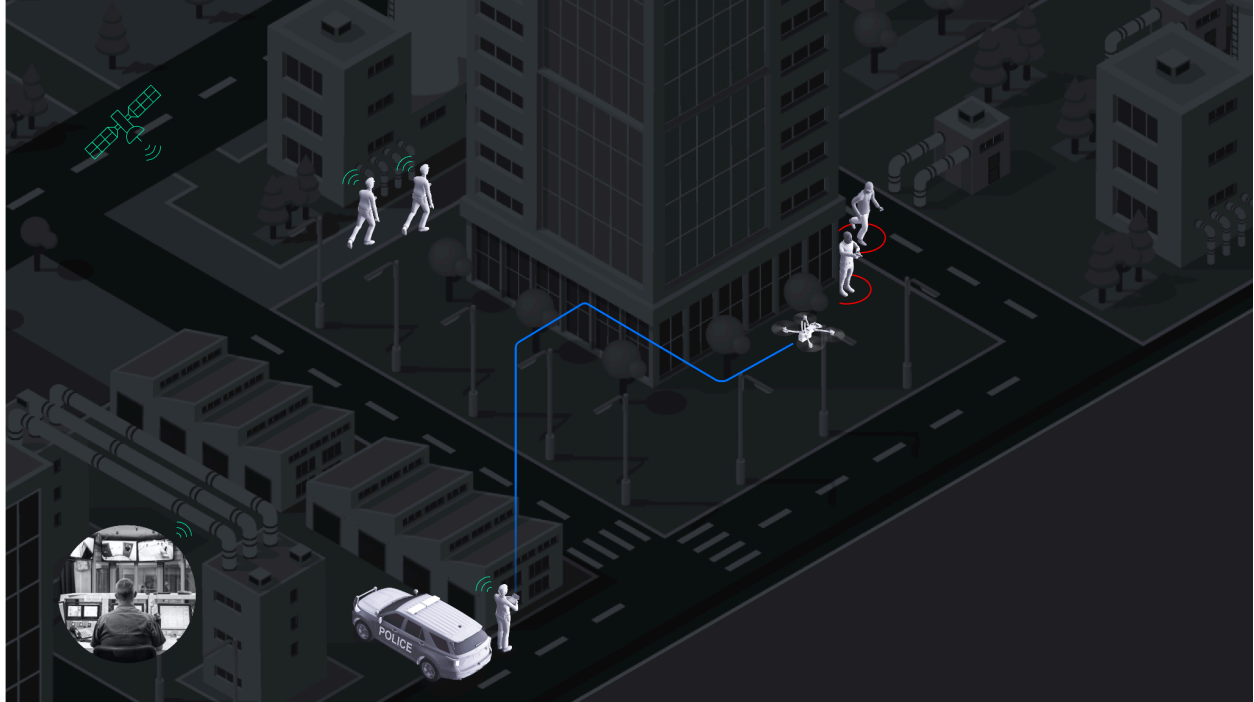
Patrol-led deployment (drone in patrol car, piloted by patrol officer)

In this method, drones are deployed by regular patrol officers as part of their daily duties. Departments provide basic drone operation training to all patrol officers and ensure drones are easy to deploy and operate so they are readily available in the field where they can be most impactful at a moment's notice.

Tips for patrol-led deployment success

1. You'll want drones that are intuitively designed to be easy to fly and hard to crash so that any officer can confidently fly with the mission in mind.

2. Fast deployment time is also an important consideration at this stage, as every second counts when officers are deploying drones from patrol vehicles.

3. The ability to stream video anywhere with an internet connection enables immediate oversight for leadership and is a critical element to the success of this deployment method.


Patrol-led DFR (launched by an officer, piloted remotely)

Officers deploy drones from their patrol cars in response to emergency calls and hand off control to a remote operator who provides real-time intelligence and/or aerial video streaming to officers before arriving on the scene.

Tips for patrol-led DFR success

1. Platforms offering remote piloting over 5G is essential to get the most value out of this deployment method.

2. Vendors with regulatory support teams can navigate FAA Beyond Visual Line of Sight (BVLOS) requirements for you.

3. End-to-end UAS solutions designed for public safety will empower easy & accessible evidence data-management.
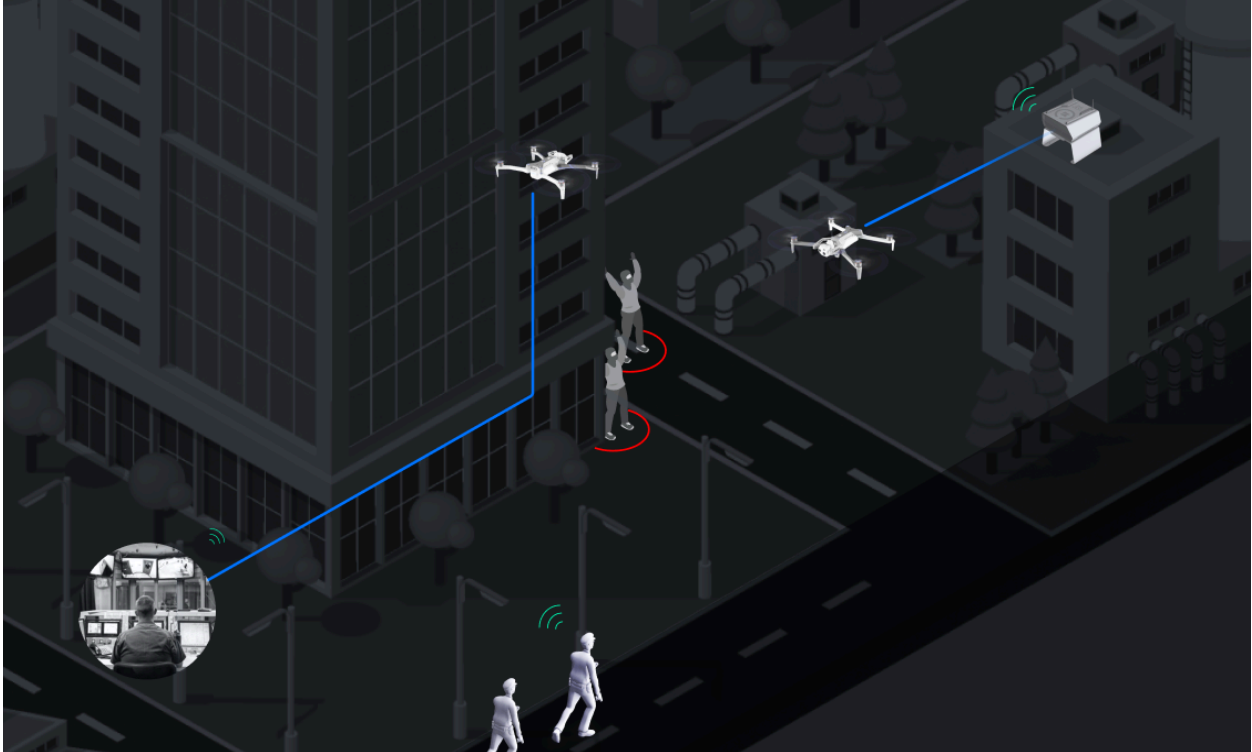
Dock-based DFR (remote pilot with observer)

Accelerate response with [docked drones](#) that are piloted remotely, with an on-site remote observer. Requires an automated dock-based system for drone deployment and retrieval.

Tips for dock-based DFR success

1. Focus on the strategic placement of [drone docks](#) to cover key areas as you continue to prove the value of drones in emergency response.

2. Selecting a [DFR solutions provider](#) with a record of successful dock deployments is crucial for any agency considering this method.

3. Ensure you have access to experts who can advise you on strategy for dock placement and partner with vendors who [provide training & implementation support](#) to streamline dock deployments.
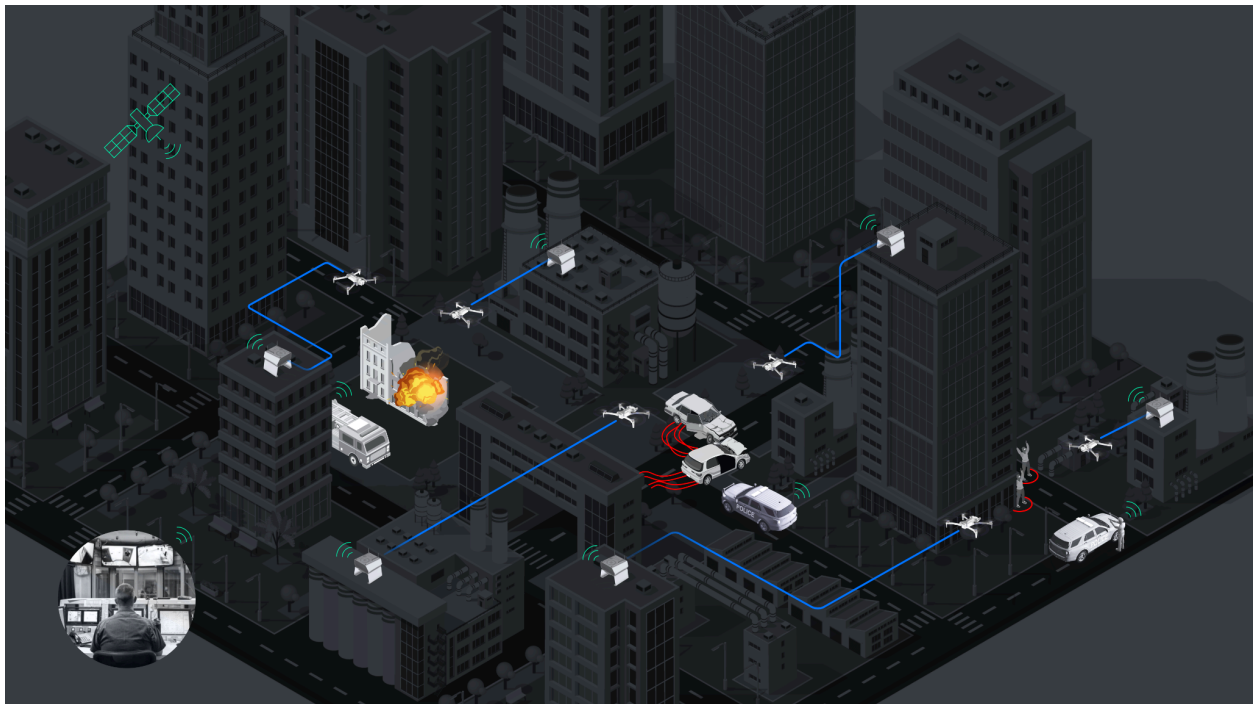
Dock-based DFR (fully automated response)

Drones automatically launch and pilot themselves to the scene via emergency response triggers, often arriving before officers and sometimes before the 911 call is over.

Tips for automated dock-based DFR success

1. [Integrate drone response with current incident and emergency response systems](#) like ShotSpotter, ALPRs, etc.

2. Ensure mission efficiency by ensuring the right pilot is in command in every situation.

3. Work with [regulatory teams](#) to enable safe and routine autonomous flight by creating regulatory pathways.

Hybrid approach

Combining strategies for a hybrid approach can be effective. Specialized units can handle complex missions, while patrol-led deployment can offer broader coverage. Dock-based systems can provide rapid response capabilities in key locations. If you want to scale fast, combining methods of deployment is a popular option for agencies that already understand the value of drones in emergency response.

Deployment pitfalls

Drone programs that fail to scale to their full potential are usually due in part to incorrectly assessing their needs, selecting the wrong drones for their intended/future use, or misunderstanding of deployment strategies currently being utilized today.

DFR today, not tomorrow

While some argue that the current technology and regulatory environment have yet to set the stage for drones as first responders, [DFR is not a future vision anymore. It's a reality for](#)

[progressive law enforcement agencies](#) today by combining these methods of deployment with the correct DFR solutions provider.

End-to-end DFR solutions

[Fully integrated DFR solutions are available today](#), combining autonomous drones paired with advanced software tailored for public safety operations. Comprehensive program and regulatory support are provided by [trusted technology vendors](#), enabling agencies to see the value of DFR today, not tomorrow.

Deploy today to build for the future

The choice of deployment strategy should align with the agency's specific needs and capabilities, and a combination of different strategies can often yield the best results, especially as the program develops and grows. Continuous evaluation, adaptation, and support from vendors in implementing these protocols and strategies is essential to keep pace with the evolving technology and operational needs of public safety operations.

Did you know?

Drone as First Responder (DFR) programs exemplify how drones can address staffing shortages, rising crime rates, and the need for reduced use-of-force incidents. By providing immediate aerial views of crime scenes or emergencies, drones help in making informed decisions that can de-escalate potentially volatile situations, making public interactions safer.

Drone program protocols

While your chosen deployment strategy is the face of your program, it's just as critical to design the following downstream protocols that support your program's success;

Equipment maintenance

1. Conducting regular pre- and post-flight inspections to check for damage or malfunctions is essential to include in all drone program best practices.

2. Adhering to a regular maintenance schedule as recommended by the manufacturer will prolong the life of your hardware.

3. Have a system in place for quick repair or replacement of damaged drones if/when the need arises so your fleet doesn't stay grounded.

Data management workflows

1. [Secure storage of data](#) is crucial and begins with Implementing best practices for how drones collect data.

2. Data handling policies will help establish clear guidelines for data access, sharing, and retention.

3. Ensure data management practices comply with relevant privacy laws and regulations.

Emergency response strategy

1. Emergency Protocols should be developed for the use of drones in emergencies, including natural disasters, search and rescue operations, and critical incidents.

2. Establishing rapid deployment protocols and training can be the difference between life and death in emergencies.

3. The inter-agency collaboration plans use of drones in emergencies should be discussed as early as possible to prove the value and impact of your program.

Establishing the right safety protocols for maintenance, data management, and emergency response alone can save your municipality millions by implementing these best practices as early as possible. Operational protocols and best practices form the backbone of a successful public safety drone program, ensuring that drone operations are safe, efficient, and compliant with legal standards as they navigate the path to the path to fully automated DFR.

Did you know?

The rapid pace of technological advancements in drone capabilities means that investing in a drone program now prepares agencies for future developments in autonomous operations and AI-driven analytics, ensuring they remain at the forefront of public safety innovations.

Program implementation & management

Implementing and managing a public safety drone program requires careful consideration of various factors to ensure its effectiveness and sustainability. Key aspects include pilot selection, budget planning, and monitoring program effectiveness.

Pilot selection

1. Choose individuals with the aptitude for operating technical equipment and who can remain calm under pressure.

2. Consider selecting pilots from different units to bring diverse perspectives and operational experiences.

3. Pilots should be committed to the program and available for regular training and missions.

Budget planning

1. Account for the initial purchase of drones, accessories, training, and infrastructure.

2. Balance the cost of the equipment with the quality and features needed for public safety operations.

3. Include ongoing costs such as maintenance and pilot training.

4. Explore various funding options, including grants, government funding, or partnerships.

Monitoring program effectiveness

1. Measure how the use of drones affects the response time to incidents. Faster response times can be a key indicator of the program's success.

2. Track the rate at which incidents are resolved with the aid of drones. An increase in resolution rates can signify effective drone usage.

3. Assess how the data collected by drones is used in operational decision-making and evidence collection.

4. Regularly gather feedback from pilots, ground teams, and community members.

Continual evaluation and adaptation

1. Continuously review the program's performance against set goals and objectives.

2. Stay updated with technological advancements in drone technology and adapt the program accordingly.

3. Regularly update training programs to incorporate new equipment, technologies, and learnings.

Structured path to scaling DFR

Effective program implementation and management hinge on meticulous planning, continuous monitoring, and adaptability. A well-structured drone program can significantly enhance public safety operations, but it requires an ongoing commitment to training, policy development, community engagement, and program evaluation to successfully scale.

By focusing on these key areas, a public safety drone program can achieve its objectives of improving response times, incident resolution rates, overall operational efficiency, and community safety while developing and scaling the program into the future.

Compliance with regulatory frameworks

Familiarity with FAA Part 107 rules, which govern the commercial use of drones, including public safety operations, is foundational. This includes rules on drone weight, altitude limits, keeping the drone within visual line-of-sight (VLOS), and operation hours.

Did you know?

The FAA's support for public safety drone operations through streamlined regulations and waivers signifies a growing recognition of their importance in public safety missions.

Special waivers and authorization assistance

Obtaining waivers for operations that go beyond the standard regulations, such as Beyond Visual Line of Sight (BVLOS), night operations, or flights over people is required The process for obtaining these waivers requires detailed safety plans and justifications, however, vendors with [regulatory services can pave the regulatory path for you](). This support is crucial for expanding operational capabilities legally and safely, especially for remotely operated or dock-based deployment methods.

Professional services

Vendors often provide [professional services]() to help manage different aspects of drone programs, including training, fleet management, and data security. Leveraging these services can help public safety agencies to focus on their core mission while ensuring their drone operations are efficient and compliant.

Community engagement and transparency

Engaging the community through education and transparent practices is vital to the long-term success of a drone program. Addressing privacy concerns as early as possible while proactively demonstrating the program's benefits in enhancing emergency response for citizens is key to gaining public trust when unveiling new policing technologies.

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> The common thread in all of these approaches is helping the public understand how the technology keeps them safe; you need to break the Orwellian stigma usually associated with drones."
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> **Police1**

Build a foundation of trust

1. Proactively disclose plans to implement a drone program. This includes the objectives, types of drones to be used, their capabilities, and intended use.

2. Make drone policy documents publicly accessible. These should detail operational procedures, data handling, and privacy protection measures.

3. Elaborate on the measures taken to protect collected data and how the program complies with privacy laws and regulations.

Demonstrating program benefits

1. Share examples where drones have significantly contributed to public safety — such as locating missing persons or quickly assessing emergencies.

2. Present data and statistics showing the positive impact of the drone program on public safety, such as reduced response times or increased incident resolution rates.

3. Work with local media to spread awareness about the program, highlighting successes while providing visibility on program objectives to reach a broader audience.

Open communication channels

1. Publish regular reports on the operations and effectiveness of the drone program, maintaining a commitment to transparency.

2. Organize community feedback forums and show a willingness to adjust policies and operations based on community feedback and concerns.

3. Use public forums and social media to maintain an open line of communication with the community.

4. Conduct surveys to gauge public perception of the drone program and identify areas for improvement.

Did you know?

Public safety drone programs often receive positive public support, especially when their benefits in emergencies and disasters are communicated effectively. Public understanding of drone benefits in emergencies contributes to a positive perception, fostering community support for drone programs.

Mitigated a
Shooting Incident

Located
6 Missing People

Responded to
1 Traffic Collision

Located
2 Auto Burglary Subjects

11 Day Event | **341** Flights | **900,000+** Attendees

For public safety leadership, the emphasis on community engagement and transparency in a police drone program is crucial. Public safety agencies can build trust and ensure the program's success by proactively addressing privacy concerns, educating the community, and demonstrating the benefits of the program. Open communication and community involvement are key to fostering a positive perception of the drone program and its role in enhancing community safety.

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"Drones can help us clear a lot of calls and reduce the number of officers needed per call. The future is bright for this technology in law enforcement."

Chad Karlewicz, Commander of Special Operations, Renton Police Department

Conclusion and future outlook

The integration of drones into public safety represents a strategic necessity in the modern operational landscape. Looking forward, advancements in autonomous technologies, AI, and communication systems will continue to elevate the operational capabilities of public safety drones. Innovations like Dock-based DFR systems are set to further revolutionize response

times and operational efficiency. As law enforcement agencies embrace these technologies, ongoing research and development in drone capabilities and regulatory frameworks will be essential to fully realize the potential of drones in enhancing community safety and operational effectiveness.

About Skydio

[Skydio's](#) pioneering advancements in autonomous drone technology have established it as a trusted partner for public safety agencies across the United States. Our commitment to operational excellence, security, and innovation positions Skydio drones as indispensable tools for a wide range of public safety applications, from enhancing aerial surveillance to advancing search and rescue operations.

Discover the future of autonomous flight with Skydio and embark on a journey towards smarter, safer, and more [efficient public safety operations with drones](#).

Learn more at [Skydio.com](#).