Addressing Crime through Innovative Technology

Chula Vista Police Department's Unmanned Aircraft System Program

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Introduction

Unmanned aerial vehicles (UAV), more commonly known as drones, are remote-controlled aircraft. As the name implies, drones do not have any human pilot or other crew on board; instead, a human operator controls the drone remotely from the ground. UAV is a term that refers to the aircraft, which is one part of an unmanned aircraft system (UAS). The UAS includes the UAV (i.e., the drone), its human operator, and a communication system between the human operator and the UAV. The Federal Aviation Authority (FAA) classifies all remote-controlled aircraft, regardless of size or sophistication, as UAVs. It is currently estimated that about 1,100 of the 18,000 law enforcement agencies in the United States have developed drone programs.[1] However, the Chula Vista (California) Police Department (CVPD) UAS program is unique in its comprehensive approach to using drones.

The CVPD operates drones for three purposes through its UAS program: (1) drones as first responders (DFR), (2) tactical drones, and (3) traffic mapping drones.

The CVPD operates drones for three purposes through its UAS program: (1) drones as first responders (DFR), (2) tactical drones, and (3) traffic mapping drones. These drones complement one another; the DFR and tactical drones are often used in conjunction to respond to calls for service, for example. Without UAS programs, law enforcement agencies typically send uniformed officers to respond to calls for service, and these officers have limited time to strategically plan their response before arriving at a scene. The DFR drone provides initial information to first responders, allowing them to approach a situation with a sounder operational strategy and appropriate resources. Then, once the officers arrive on the scene, the tactical drones contribute supplemental information such as different camera angles and situational details.

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1. Dan Gettinger, *Public Safety Drones, 3rd Edition* (Washington, DC: Center for the Study of the Drone at Bard College, 2020), https://dronecenter.bard.edu/projects/public-safety-drones-project/public-safety-drones-3rd-edition/.

The CVPD is a mid-size law enforcement agency in San Diego County, California, serving a population of about 277,220 residents.[2] The department has 270 sworn officers, in addition to more than 100 civilian employees.[3] The CVPD's jurisdiction covers approximately 52 square miles. In 2020, Chula Vista had a crime rate of 332 violent crimes per 100,000 inhabitants.[4]

Chula Vista's geographical features make it particularly well suited for a drone program. First, the area does not have much inclement weather (e.g., snow, rain, or fog), allowing more days per year than in other locations that drones can be used. Second, the FAA has designated the entirety of Chula Vista as class G airspace[5] with no flight-restricted zones. This designation allows the department to fly drones without interfering in restricted airspace, although three square miles of the CVPD's jurisdiction are unsuited for drone activity because the lack of cell tower reception impacts the drones' broadcasting functions.

A CNA team conducted a three-day site visit with the CVPD in September 2021. During this visit, the team conducted eight interviews with CVPD personnel, participated in a four-hour ride-along with a tactical drone pilot, and participated in demonstrations of the different drone programs. While on site, the team also watched recordings of video feed from prior DFR flights while CVPD personnel explained how the footage was used in real time. Using information gleaned from this site visit, the team developed this case study, which describes the key features of the CVPD drone program and key takeaways for other agencies interested in implementing or enhancing UAS programs.

2.   "QuickFacts: Chula Vista city, California," U.S. Census Bureau, accessed September 15, 2022, https://www.census.gov/quickfacts/chulavistacitycalifornia.

3.   "About the Police Department," City of Chula Vista, accessed September 15, 2022, https://www.chulavistaca.gov/departments/police-department/about-us.

4.   "Crime Statistics," Automated Regional Justice Information System, accessed September 15, 2022, https://crimestats.arjis.org/default.aspx.

5.   FAA (Federal Aviation Administration), "Section 3. Class G Airspace," *Aeronautical Information Manual* (Washington, DC: U.S. Department of Transportation, 2023), https://www.faa.gov/air_traffic/publications/atpubs/aim_html/.

Implementation of the UAS Program

The UAS program at the CVPD is overseen by a sergeant who works on the project full time. Other full time staff includes two UAS pilots. The sergeant is supervised by a lieutenant assigned to the program at 50 percent time. As a collateral part-time duty, 20 CVDP sworn personnel are assigned to the UAS program as trained drone pilots. To support the program, all patrol officers receive visual observer training twice a year to recognize potential hazards of and to the drones. There is currently no pay incentive to participate in the CVPD's UAS program, but one supervising sergeant told us that there is enough interest from people who want to "be involved in something innovative" that they do not need incentives. The following sections describe each drone program—DFRs, tactical drones, and traffic mapping drones—in detail and identify the important features contributing to successful implementation. In figure 1, a DFR drone is shown.

Figure 1. CVPD DFR program drone (weight: 19.84 lbs; speed: 51 mph; flight time: 55 min; dimensions: 810mm x 670mm x 430mm)

Photo by CNA Team

The overall goals of the drone program in CVPD are to facilitate de-escalation in police response to calls for service and to increase officer safety. The UAS program achieves these goals by using drones to generate decision-quality information about calls for service before officers arrive on-scene.

Drones as First Responders program

The DFR program began with one rooftop site in 2018, later expanding to four locations after receiving FAA approval. Currently, the program deploys drones from the police department headquarters, a hospital, a hotel, and a community college campus. The overall goals of the drone program in CVPD are to facilitate de-escalation in police response to calls for service and to increase officer safety. The UAS program achieves these goals by using drones to generate decision-quality information about calls for service before officers arrive on-scene.

From the four launch sites, the drones can respond to calls for service across 90 percent of the city. This coverage is possible, in part, because CVPD applied for and received a beyond visual line of sight (BVLOS) waiver from the FAA. The BVLOS waiver allows drones to fly up to three nautical miles from a launch site as long as the drones remain within city limits. Before receiving this waiver, the drones were permitted to fly only one mile from the launch site.[6]

To operate the DFRs, CVPD must have a drone pilot present at the rooftop location where it launches the drones. From the FAA's perspective, the individual on the rooftop is the pilot of the drone, even though a CVPD officer is likely controlling the drone's movement from the pilot room inside police headquarters. The individual on the rooftop is the drone **pilot**, and the police officer controlling the drone is the **operator**. Rooftop pilots under the DFR program are contractors and typically control launch and landing. However, they can also take over control of the drone from the operator. In addition, contracted roof pilots perform daily maintenance on drones.

CVPD personnel noted that having police officers operating the drones is critical to the success of the DFR program because police are trained in investigation, surveillance, and situational awareness. Because of these job-specific skills, the CVPD plans to continue to train its own officers to operate the drones and communicate with the responding officer(s) rather than contracting out this duty to non-CVPD individuals. In 2021, the CVPD could deploy DFRs for 10 hours per day, seven days per week. CVPD personnel told the CNA team that this window would be increased to 20 or 24 hours per day.

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6.   14 CFR part 107 Small Unmanned Aircraft Systems (2016),
https://www.ecfr.gov/current/title-14/chapter-I/subchapter-F/part-107.

Emergency Call Livestreaming Service

Live911 is software that enables officers to do the following:

- **Listen to 911 calls for service in real time**

- **Turn off or pause livestreaming**

- **Dismiss a specific call if it is not pertinent to them**

- **Rewind audio from 911 calls**

- **See the location of the call and location of other on-duty officers**

The CVPD deploys DFRs in response to tier one or two 911 calls for service, which are the highest priority calls. Notably, the DFR drones are never used to perform routine patrols or surveillance. As shown in figure 2, there are two primary ways to initiate the deployment of a DFR. First, after dispatch assigns a call to an officer, the responding officer can request the DFR. Alternatively, the drone pilot can deploy the drone if it seems appropriate based on the call information. When asked, CVPD personnel said the 911 dispatcher could theoretically suggest the deployment of the DFR but that this typically does not happen.

Figure 2. CVPD DFR program operations

DRONE PILOT — Hears Live911 call → DEPLOYS DRONE — Assesses live situation / gathers on-site intelligence

911 DISPATCH — Assigns call → OFFICER — Requests drone assistance → DRONE PILOT DEPLOYED — Assesses live situation / gathers on-site intelligence
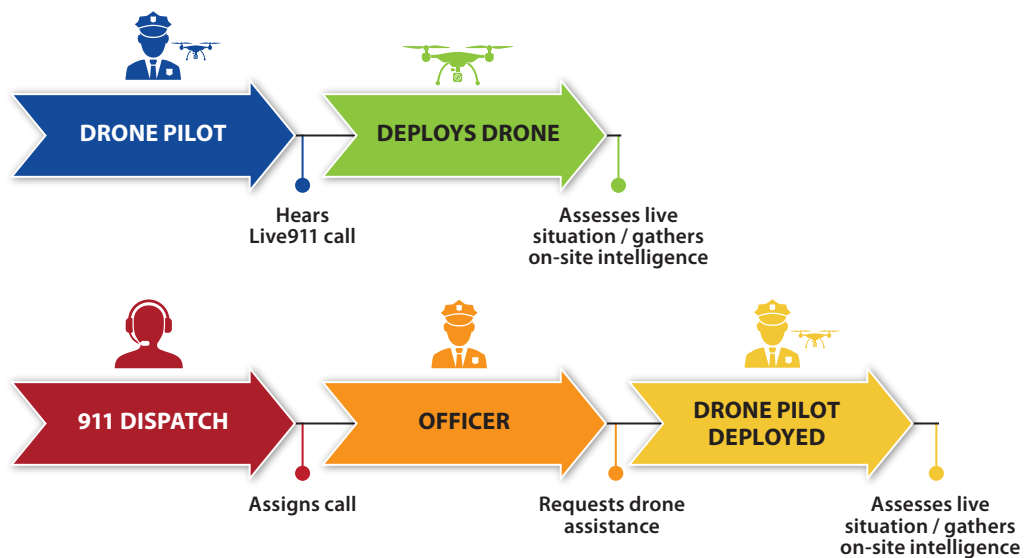
The CVPD can rapidly deploy the DFRs in response to calls for service, sometimes even before dispatch has reported out the call. CVPD uses a technology called Live911, which allows officers to hear 911 calls in their assigned patrol areas in real time. Further, Live911 can provide the GPS location of the call using most mobile phones' built-in GPS. Using Live911 allows the CVPD to deploy the drone prior to dispatch assigning a call to an officer. This head start allows the drone to gather situational intelligence before officers arrive. Using the GPS coordinates from Live911, the CVPD deploys the drone from the closest launch site. Any officer can see the live video feed from the DFR on their cellular phone or in-car computer system. Once a responding officer is assigned, they communicate with the CVPD drone operator to get as much intelligence as possible. While watching the video feed, the officer can instruct the operator to perform tasks like getting different video angles or, in some circumstances, making an announcement through a loudspeaker. CVPD DFR operators' law enforcement training often allows them to anticipate the responding officer's needs without explicit instruction. Information gathered by the drone can then be used to make strategic decisions about call responses. The sidebar on page 7 provides a few examples to demonstrate the versatility of the DFR program in different call types.

There are several important features of the DFRs and associated policies that contribute to their success. First, the CVPD was able to obtain a **BVLOS waiver** from the FAA, allowing the department to fly its drones three nautical miles from the launch point instead of the usual one, providing more flexibility for officers as they respond to calls.

Second, **geofencing** allows the CVPD to map out areas where the drone is allowed to fly, ensuring that drones do not hit buildings, other structures, or one another. Third, the **livestreaming** capability allows all CVPD department members to view the DFR drones from an app on their phones. Fourth, the camera on the DFR drones has a **high-quality zoom lens** that allows officers to zoom in closely in the video feed.

This real-time information from the live feed and zoom lens provides extra context as officers respond to calls for service. Finally, DFR drones also have a **speaker**, allowing for one-way communication from the CVPD to the individuals at the scene when necessary.

Key features of DFR program

- **Beyond visual line of sight (BVLOS) waiver**

- **Geofencing**

- **Live video streaming**

- **High-quality zoom lens**

- **Speaker allowing for one-way communication**

Examples of DFR Responses from CVPD

1. Woman with a gun in a public parking lot

A DFR was launched in response to a 911 call indicating that someone had a gun and was shooting it from an oceanside public parking lot. The DFR quickly identified a woman standing with a gun near a red SUV with about four passengers, then walking toward the ocean firing the gun. Because police had her exact location and physical description and knew which car was hers, they were able to send in two police cars to block off both entrances to the parking lot. By the time the police arrived on the scene, the woman with the gun had re-entered the back seat of the SUV. The police instructed the passengers to exit the vehicle with their hands raised; all passengers complied. Realizing the likely reason for the police presence, the passengers shouted, "It's an airsoft gun." The police secured the gun and confirmed it was an airsoft gun and not a firearm; once everyone was safe, they were able to discuss proper use of an airsoft gun with the passengers. CVPD personnel said without greater situational awareness the officers drew from the drone feed, the scenario could have ended very differently—potentially fatally for the person wielding the airsoft gun.

2. Finding a runaway child

CVPD launched a DFR in response to a 911 call from a mother reporting that her nine-year old son with autism had run away from her car into the streets and she was unable to find him. The DFR was able to find the child within minutes, and the CVPD deployed an officer to his location. The child was walking in the middle of a busy street. The officer blocked traffic, secured the child, and waited for the mother to arrive.

3. Gun at a fast-food restaurant

In a third video, the CVPD launched a DFR in response to a 911 call that a man was playing with a gun in the crowded outdoor seating area of a fast-food restaurant. The DFR quickly ascertained that the gun in question was actually a cigarette lighter shaped like a gun. Because they were not concerned about imminent danger to themselves or to other community members in the area, police could respond calmly to the scene. CVPD personnel said without the drone footage, the response would not only have been more stressful for the officers but could also have resulted in an officer shooting the man with the lighter had he not complied with police orders.

Tactical drone deployment program

The CVPD also operates a tactical drone deployment program. Tactical drones are smaller than DFRs and are stored in the trunks of officers' vehicles. The tactical drone program flies small and medium-sized drones (83mm x 83mm x 198mm and 322mm x 242mm x 84mm, respectively), allowing more flexibility than the drones used in the DFR program. The CVPD may use a smaller drone to fly indoors or in tight spaces, while the medium-sized drone allows visual surveillance in outdoor spaces. The responding officers on duty determine whether a drone can be useful based on information from Live911 and dispatch. If it is appropriate to use a drone and the responding officer does not have one in their vehicle, they can request that a tactical drone pilot respond to the call with them. Similarly, the drone pilot may hear the call information over Live911 and offer to respond with the drone. As with the DFR, the tactical drone pilot can connect the tactical drone's live video feed to a system that allows all responding officers to see it on their mobile devices.

There are fewer requirements for the use of tactical drones than those of the DFR program, in large part because they fly closer to the ground. A small number of CVPD officers are trained to pilot (i.e., remote control) the tactical drones, but nearly every officer is trained to be a "visual observer." Visual observers monitor the airspace through which the drones fly and alert the pilot of any potential obstacles. Training for visual observers is reinforced at roll calls approximately every six months. CVPD personnel said tactical drones are used less frequently than the DFRs—about once every two weeks.

Example use of tactical drones during site visit ride-along

During the CNA team's ride-along with a CVPD UAS tactical pilot, a call for service was received requesting a wellness check for an individual experiencing a mental health crisis. This individual owned several registered firearms. To obtain more information before carrying out the wellness check, responding officers requested a drone. The team arrived about 20 minutes after the initial call, and the drone pilot set up a medium-sized drone (pictured in figure 3) at a park about a mile away from the individual's residence. The CVPD drone pilot flew the drone over the house to provide tactical information, such as the location of exits and whether windows were ajar. Simultaneously, the other responding CVPD patrol officers were obtaining cell phone GPS data and supplemental

Photo by CNA Team

Figure 3. Tactical drone (weight: 2 pounds; speed 45 mph; flight time: 28 minutes; dimensions: 322mm x 242mm x 84mm)

information from those close to the individual in crisis. Once they had a better picture of the situation, patrol officers approached the house while the UAS pilot continued to fly the drone above it. The person who had placed the call for the wellness check had a key to the residence. After checking the garage to see that the car was present, despite receiving no answer from knocks and doorbell rings, CVPD officers were more worried and decided to enter. However, with little information about the floor plan and what to expect inside, they requested that the drone pilot fly inside the house. The UAS pilot drove to the residence from the park and set up a smaller drone, which connected directly to his cell phone (pictured in figure 4). The pilot was able to clear two of the three levels and provide supplemental information to the responding officers before they entered the home.

Photo by CNA Team

Figure 4. CVPD drone pilot operating a tactical drone

Key features of tactical drones

Like the DFR, tactical drones have **livestreaming** capability so that all responding officers can see the video feed. Tactical drones are more often used in situations where there is not a known imminent danger and officers want to secure the scene in the safest way possible. In instances where the drone operator is first on scene and there is an immediate threat, the drone is not typically used; the two to three minutes that it takes to set up the drone may be better used for other tasks. There are situations where drone use is suboptimal—for example, situations that occur inside a building without police access. Currently, there are many cases where a drone cannot enter a building; however, in the future the department may use drones that can breach buildings by breaking windows or the glass panes in doors. These drones would be used only in situations where officers themselves would be allowed to enter or in exigent circumstances.

Traffic mapping drone program

In 2019, the CVPD traffic unit began using drone mapping for accident investigations. Previously, the department used a total station (a surveying tool) to complete this task, which could take three hours or longer. The drone cuts that time at least in half and is less onerous on officers. The drone video is uploaded to a computer with software department members can use to complete their investigations by measuring skid marks, speed, distance from impact, and other data. The most important feature of the traffic mapping drone program is the actual software used to transform the drone data into a 4-D replica of the scene. Many software options are available to agencies interested in implementing traffic mapping with drones.

Key takeaways

- **Drones are an important tool for promoting officer safety and de-escalation.**

- **There is value in having law enforcement personnel operating the drones; however, rooftop pilots can be contracted out to save department resources.**

- **The CVPD uses drones only in response to calls for service; it never uses drones for routine surveillance or patrols.**

- **It is important, especially for DFRs, to have high-quality cameras and zoom capabilities.**

- **The DFR program would likely not have received FAA approval for the entire city without the use of geofencing. Geofencing involves mapping out and programming the boundaries within which drones may and may not fly.**

Evolution of the CVPD's UAS Program

After a 2016 officer-involved shooting in a neighboring department, the CVPD decided to implement a new unit based on the scanning, analysis, response, and assessment (SARA) model. While the SARA acronym was taken from the well-known problem-oriented policing model,[7] the CVPD's implementation of it was unique. The CVPD SARA unit sent plainclothes officers in unmarked cars to respond to emergency calls ahead of the uniformed response team. These undercover officers arrived at high priority calls early to gather intelligence and report it back to the other responding officers. This actionable intelligence allowed the responding officers to strategize before arriving on the scene.

The CVPD based its DFR program on the success and positive community reception of the SARA unit. The department realized that using technology could be an effective way to continue the model without the need for plainclothes officers; instead, a drone could conduct the early response. CVPD personnel said their biggest concern about implementation of the DFR program was a lack of community support. They noted that in their research into other jurisdictions that tried to implement a drone program, the primary reason programs failed was because they failed to get community support.

"CVPD had a drone program two years before we ever purchased a drone."

— Roxana Kennedy, Chief of Police, CVPD

To ensure it had community support before buying any drones, the CVPD solicited feedback from key stakeholders: the community, department members, external criminal justice partners, and elected officials. The department consulted with the local chapter of the American Civil Liberties Union (ACLU), held multiple community forums, and responded to written comments. The CVPD stressed that the development of a drone program must be a collaborative process for it to succeed.

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7.   Herman Goldstein, "Improving Policing: A Problem-Oriented Approach," *Crime & Delinquency* 25, no. 2 (1979), https://doi.org/10.1177/001112877902500207; John E. Eck et al., *Problem-Oriented Policing in Newport News*, Problem-Solving (Washington, DC: Police Executive Research Forum, 1987), https://www.ojp.gov/ncjrs/virtual-library/abstracts/problem-solving-problem-oriented-policing-newport-news.

Figure 5 provides a timeline summarizing the phases of implementation for the CVPD's UAS program.

Figure 5. Timeline of the CVPD's UAS program

2016	2017	2018	2019	2020	2021
Nearby officer-involved shooting demonstrates need for an innovative approach for responding to calls for service. — CVPD implements SARA unit with plainclothes officers. — CVPD holds community forums and meetings with key stakeholders to discuss potential drone program.	FAA launches UAS Integration Pilot Program (IPP). — CVPD partners with a drone software company to become a member of the San Diego IPP. — CVPD develops departmental UAS policy.	CVPD applies for beyond visual line of sight (BVLOS) waiver. — CVPD begins DFR program with one launch location and approval to fly one nautical mile. — DFR flies three days per week. — CVPD officers act as rooftop pilots.	FAA grants BVLOS waiver. DFRs can fly up to three miles from launch site. — CVPD establishes a second launch location, bringing coverage to 33 percent of the city. — CVPD contracts with rooftop pilots. — CVPD expands DFR program to seven days of coverage. — CVPD obtains a 1:2 waiver allowing a second drone to replace a drone in air when battery is low.	CVPD applies for approval to launch DFRs city-wide.	FAA grants CVPD city-wide approval. — CVPD establishes four rooftop launch locations.

Key takeaway

- **Solicit community input about the design, implementation, and policies relating to a UAS program before purchasing any equipment.**

Policies, Procedures, and Training Related to the UAS Program

Once the CVPD better understood how the program would be perceived, the department began developing policies, procedures, and training that could address stakeholder concerns. For example, some community members were uneasy about how, and with whom, information from the drones would be shared. Community members were also concerned about transparency; they wanted to know that they would be consistently updated about how the drones were being used. The CVPD dedicated a page on its website to the UAS program and developed a dashboard housed there that provides information about drone activity (see figures 6 and 7).

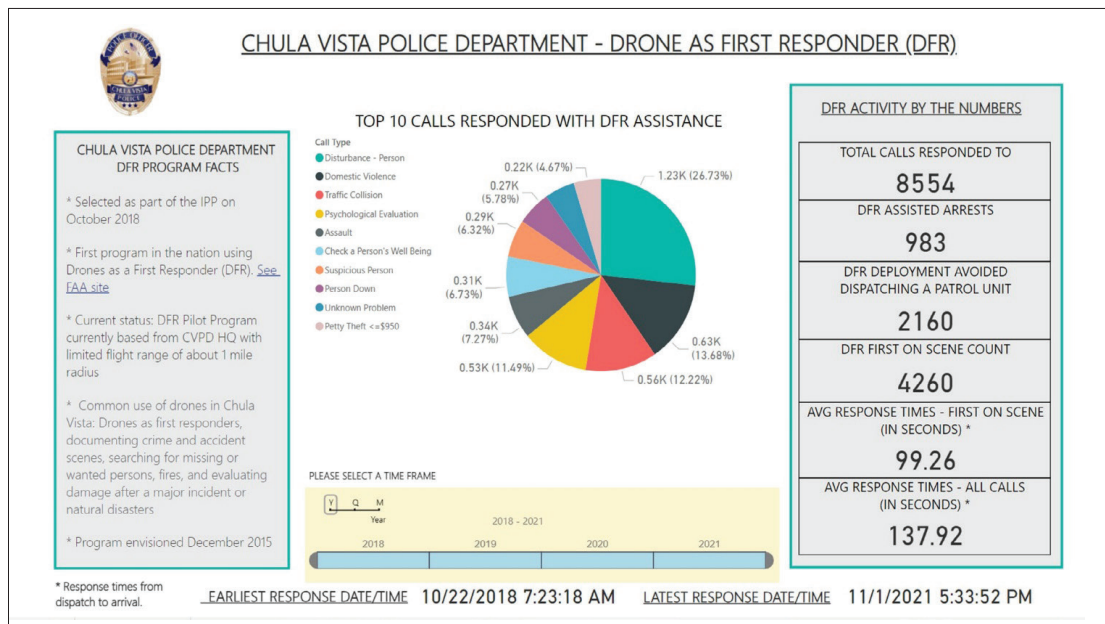**Figure 6. Drone information dashboard on CVPD website**

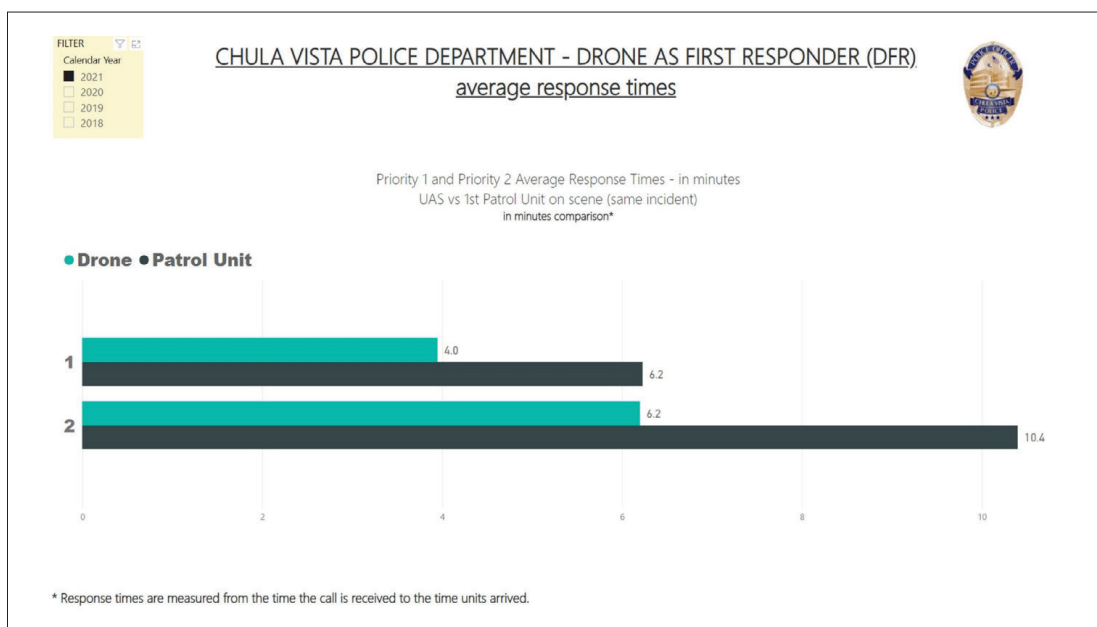**Figure 7. Second drone information dashboard on CVPD website**

Figure 7 shows that in 2021, DFRs arrived at the scene about two minutes faster than officers in priority one (life threatening) calls and about four minutes faster in priority two (potential threat to life) calls.

The CVPD used community feedback to develop a department-wide UAS policy, which it posted on its website. CVPD personnel said they did not have many example policies to pull from because drone programs are still rare among law enforcement agencies. This rarity meant that the department had to develop the policy based on its best judgement and its goals and expectations for the UAS program. The policy includes guidance concerning the proper usage of UAV, data retention, internal and external roles, and privacy concerns. In addition, CVPD uploads air data on flight paths every day for public transparency.

Given that the UAS program is relatively new, the CVPD's UAS policy needs to be updated in some areas. For example, the position of program coordinator, which is effectively filled by the supervising sergeant, is no longer called *program coordinator.* The sergeant has some duties that are not included in the policy, such as personally responding to any community concerns, mentoring other agencies interested in the UAS program, and keeping the website and dashboard up to date. Further, the CVPD should add information about the UAS program to other policies—for example, policies pertaining to civil unrest, crowd management, and body-worn cameras.

UAS program training

Once the CVPD addressed stakeholder concerns and was prepared to implement the UAS program, it also had to decide how to choose and train pilots. The department developed job descriptions for the drone pilots. The CVPD paid for its personnel to obtain remote pilot certificates to ensure accordance with the Small Unmanned Aircraft Systems rule.[8]

Pilots must recertify every two years to remain in the UAS program. Because of the novelty of drone use by law enforcement, the CVPD knew that it would need to train department members often, as requirements and priorities would consistently be shifting. UAS pilots receive an initial 24 hours of training at the Los Angeles County Regional Center, which is certified by the California Commission on Peace Officer Standards and Training (POST). The CVPD also conducts seven hours of in-house training per month. This training covers hand-eye coordination and other perishable skills, technical operation of drones, and scenario-based training. For example, the CVPD said officers practice using drones to respond to active shooters in schools. Further, the department engages in roll-call training for all department members so pilots can use patrol officers as visual observers when flying the tactical drones. These roll-call trainings also serve as an opportunity to share program updates and success stories.

Maintenance

The agency contracted rooftop pilots to perform daily maintenance of first responder drones. Other routine maintenance not performed by the pilots is done by the sergeant who oversees the CVPD's UAS program. This sergeant also performs maintenance on the tactical drones and traffic drones. More serious issues with the DFR drones are contracted out to the vendor; in some cases, these issues are covered under warranty.

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8.   14 CFR part 107 Small Unmanned Aircraft Systems (2016),
https://www.ecfr.gov/current/title-14/chapter-I/subchapter-F/part-107.

Storage

The CVPD uses the same cloud-based storage provider for drone data that it uses for its body-worn camera program. This consistency allows all digital evidence to be stored in the same way and facilitates access for prosecutors when needed. As with body-worn cameras, drone video data must be uploaded and tagged, which can be time intensive. CVPD personnel said that although the DFR responded to 300 to 500 calls for service per month in 2021, they do not expect cloud storage capacity to be a challenge.

Key takeaways

- **Invest in thorough, high-quality training for drone operators to ensure operators are up to date on perishable skills.**

- **Regularly communicate the benefits of the UAS program to gain buy-in from the community and within the agency.**

- **Create a separate complaint channel for community concerns specific to the UAS program. Ensure that someone is responsible for responding to each complaint.**

- **Plan for the lengthy process of uploading, redacting, and tagging videos.**

- **Because drones are relatively new technology, departments with a UAS program must regularly monitor changes in local and federal laws related to what drones are allowed to do without a warrant and keep policies updated based on any changes to those laws.**

Impact

The CVPD does not formally evaluate its drone program. However, statistics from the program's dashboard point to various successes. The CVPD's DFR drones have responded to nearly 9,000 calls for service since 2018 (see figure 6 on page 13) and have assisted in almost 1,000 arrests. The DFR drones also allow the CVPD to deploy staff more efficiently. For example, the initial information collected as a result of DFR deployment has negated the need to dispatch a patrol unit altogether for 2,160 calls for service. In addition, the CVPD shared anecdotes that shed light on other potential impacts of the UAS program. Potential impacts included improved de-escalation, increased officer safety, and better situational awareness.

Although the CVPD has not conducted a cost-benefit evaluation, CVPD personnel said that this type of analysis would be beneficial. When the team asked why the department had not carried out a cost-benefit evaluation, CVPD personnel shared several challenges. The primary barrier to conducting a cost-benefit analysis relates to accurately quantifying the financial benefit of saving a life, reduced use of force, reduced injury or hospitaliza-tions of officers, faster response times, and better intelligence gathering. As one officer put it, "How do you put a price on human life?" At this stage, the impacts of the drone program are demonstrated through narratives of drone use and supported by video gathered by the drones themselves.

Personnel also described some downstream benefits of the UAS program. First, CVPD personnel reported that the implementation of Live911 has improved their relationship with dispatch and increased officers' empathy for community members. A second bene-fit, according to CVPD personnel, is that the drone program can accelerate the on-scene investigation process. One sergeant noted that many arrests are made solely because the drone was able to arrive on scene quickly and follow the suspect. The CVPD hopes to expand its use of drones to improve investigations.

CVPD personnel mentioned that the district attorney's office is enthusiastic about the drone program. One sergeant recalled a domestic violence case in which the judge specifically noted that the drone video made all the difference in securing a convic-tion. The CVPD has also been able to mentor other agencies interested in implement-ing UAS programs. The CVPD is active on a website, droneresponders.org, where law enforcement agencies can share questions and best practices about UAS programs and attends national policing conferences. The CVPD works closely with a sister agency in Brookhaven, Georgia, to help it launch and maintain its UAS program. Finally, CVPD per-sonnel also mentioned benefits like faster response times, freeing up personnel, and pro-viding supervisors additional information to aid their decision-making when responding to calls for service.

CVPD personnel also discussed what contributed to the success of the CVPD's UAS program. Overwhelmingly, interview respondents mentioned that support from different stakeholders was essential to their success. Specifically, respondents said that willingness and support from the chief, mayor, city council, community, and CVPD officers was essential to the program's success. The two-year planning period that the CVPD underwent before purchasing equipment was, ultimately, what allowed it to garner this support and ultimately implement a successful UAS program.

When asked what would make the UAS program even more successful, interview respondents identified four key areas. First, they would like to increase DFR operation to 20 hours per day. Second, they want to train more staff to operate drones during the extra hours that the DFR would be operational. Third, the CVPD hopes to work with the FAA in the future to remove the requirements for a rooftop pilot during DFR operations. This would free up resources that could be used to maintain equipment and train CVPD personnel on the drone program. Finally, they would support legislation that explicitly acknowledges potential benefits of UAS to the community and public safety.

Key takeaways

- **Primary benefits of the UAS program include improved de-escalation, increased officer safety, and better situational awareness.**

- **Secondary benefits of the UAS program include increased empathy among officers, better working relationships with local prosecutors, and opportunities to mentor other agencies interested in implementing their own UAS programs.**

- **Buy-in and support from executive staff, the community, local policymakers, and CVPD officers have been critical to the success of the UAS program.**

Summary of key takeaways

The following table (table 1) organizes the key takeaways from this publication for reference.

Table 1. Summary of key takeaways by subject

Section	Key Takeaways
IMPLEMENTATION	• Drones are an important tool for promoting officer safety and de-escalation. • There is value in having law enforcement personnel operating the drones; however, rooftop pilots can be contracted out to save department resources. • The CVPD uses drones only in response to calls for service; it never uses drones for routine surveillance or patrols. • It is important, especially for DFRs, to have high-quality cameras and zoom capabilities. • The DFR program would likely not have received FAA approval for the entire city without the use of geofencing, which involves mapping out and programming the boundaries within which drones may and may not fly.
PROGRAM EVOLUTION	• Solicit community input about the design, implementation, and policies relating to a UAS program before purchasing any equipment.
POLICIES, PROCEDURES, AND TRAINING	• Invest in thorough, high-quality training for drone operators to ensure operators are up to date on perishable skills. • Regularly communicate the benefits of the UAS program to gain buy-in from the community and within the agency. • Create a separate complaint channel for community concerns specific to the UAS program. Ensure that someone is responsible for responding to each complaint. • Plan for the lengthy process of uploading, redacting, and tagging videos. • Because drones are relatively new technology, departments with a UAS program must regularly monitor changes in local and federal laws related to what drones are allowed to do without a warrant and keep policies updated based on any changes to those laws.
IMPACT	• Primary benefits of the UAS program include improved de-escalation, increased officer safety, and better situational awareness. • Secondary benefits of the UAS program include increased empathy among officers, better working relationships with local prosecutors, and opportunities to mentor other agencies interested in implementing their own UAS programs. • Buy-in and support from executive staff, the community, local policy makers, and CVPD officers have been critical to the success of the UAS program.

About CNA

CNA is a not-for-profit organization based in Arlington, Virginia. The organization pioneered the field of operations research and analysis 70 years ago and today applies its efforts to a broad range of national security, defense, and public interest issues, including education, homeland security, public health, and criminal justice. CNA applies a multidisciplinary, field-based approach to helping decision-makers develop sound policies, make better-informed decisions, and lead more effectively. CNA is one of the technical assistance providers for the U.S. Department of Justice's Office of Community Oriented Policing Services' Collaborative Reform Initiative for Technical Assistance.

For more information, visit CNA online at https://www.cna.org.

About the COPS Office

The **Office of Community Oriented Policing Services (COPS Office)** is the component of the U.S. Department of Justice responsible for advancing the practice of community policing by the nation's state, local, territorial, and tribal law enforcement agencies through information and grant resources.

Community policing begins with a commitment to building trust and mutual respect between police and communities. It supports public safety by encouraging all stakeholders to work together to address our nation's crime challenges. When law enforcement and communities collaborate, they more effectively address underlying issues, change negative behavioral patterns, and allocate resources.

Rather than simply responding to crime, community policing focuses on preventing it through strategic problem-solving approaches based on collaboration. The COPS Office awards grants to hire community policing officers and support the development and testing of innovative policing strategies. COPS Office funding also provides training and technical assistance to community members and local government leaders, as well as all levels of law enforcement.

Since 1994, the COPS Office has been appropriated more than $20 billion to add community policing officers to the nation's streets, enhance crime fighting technology, support crime prevention initiatives, and provide training and technical assistance to help advance community policing. Other achievements include the following:

- To date, the COPS Office has funded the hiring of approximately 138,000 additional officers by more than 13,000 of the nation's 18,000 law enforcement agencies in both small and large jurisdictions.

- More than 800,000 law enforcement personnel, community members, and government leaders have been trained through COPS Office–funded training organizations and the COPS Training Portal.

- More than 1,000 agencies have received customized advice and peer-led technical assistance through the COPS Office Collaborative Reform Initiative Technical Assistance Center.

- To date, the COPS Office has distributed more than nine million topic-specific publications, training curricula, white papers, and resource CDs and flash drives.

The COPS Office also sponsors conferences, roundtables, and other forums focused on issues critical to law enforcement. COPS Office information resources, covering a wide range of community policing topics such as school and campus safety, violent crime, and officer safety and wellness, can be downloaded via the COPS Office's home page, https://cops.usdoj.gov.

In this series, CNA studies the use of emerging technologies by law enforcement agencies. The Chula Vista (California) Police Department (CVPD) has deployed unmanned aerial vehicles (UAV), otherwise known as drones, for first responder assistance, tactical needs, and mapping capabilities. This case study delves into structure of the CVPD's unmanned aircraft system (UAS). Drones as first responders can be deployed quickly to scenes and can deliver intelligence for rapid decision-making by responding officers. Tactical drones can be flown indoors to help field officers clear buildings prior to entry and make approaches safer. The CVPD traffic unit uses UAVs to map traffic patterns and investigate crashes in less time than previously. This case study discusses the policies and procedures used for the UAS and the impacts this technology has had on the CVPD.