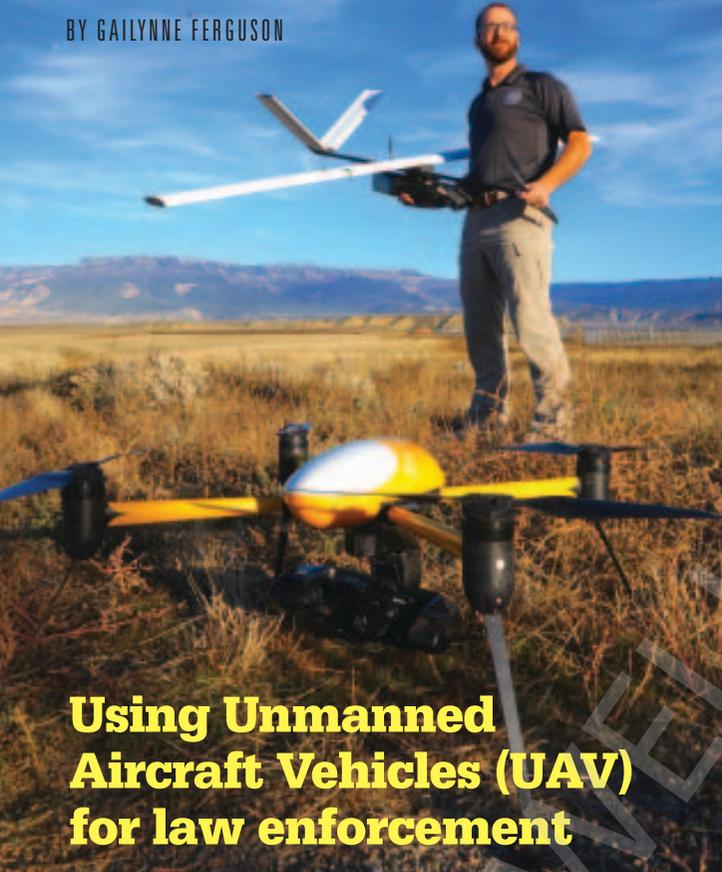


EYE in the SKY

BY GAILLYNNE FERGUSON



Using Unmanned Aircraft Vehicles (UAV) for law enforcement

Unmanned Aircraft Vehicles (UAVs)—or “drones,” as many people have come to know them—are catching the attention of law enforcement’s accident reconstruction and criminal investigation units worldwide. In the United States, however, the technology is fairly new. This may very well be due to public perception and ignorance of Fourth Amendment violations, but one particular agency—the Mesa County (Colo.) Sheriff’s Office—is leading the way to quell the fears of such violations. Their hard work and dedication is proving the value of UAVs for law enforcement and other public safety organizations by making the program transparent through education.

In 2009, the Mesa County Sheriff’s Office (MCSO) teamed up with Draganfly Innovations, Inc. (Saskatoon, SK, Canada) to test potential law enforcement capabilities for free through a mutual agreement. Since then, MCSO Unmanned Aircraft Program Manager Ben Miller has been instrumental in not only working along with the Federal Aviation Administration (FAA) and the Department of Justice (DOJ) to ensure adherence to regulations regarding the

use of UAVs by public safety organizations, but he is considered a thought leader on the application of small UAVs. From tactical operations and crime scene reconstruction to search and rescue and fire operations, Miller’s experience and expertise in operating a variety of UAVs has enabled him to develop defendable crime reconstruction within less than three millimeters.

“MCSO has learned a tremendous amount over the years but it has not been without obstacles, especially when it came to the public’s assimilation with what we do with the missile-bearing predator drones from the military,” Miller said.

When talk of UAV use by law enforcement began in the U.S., pressures by the media and privacy groups started raising suspicions and fear among the public by publishing conspiracy theories revolving around government spying and demanding the FAA protect people’s privacy under the Fourth Amendment.¹ Miller says the Sheriff’s Office was aware of the public’s privacy concerns and since the FAA still had an ill-formed regulatory structure, MCSO decided to study their own uses for years before writing policy.

“We then drafted a policy and sent it through a significant review process in which the policy review committee critiqued it,” he said. “We found that many of the issues we felt we needed to address were covered in other department policy. Things like personal use, attention to sensitive images, etc.—at the end of the day, the UAV is a camera. We have used cameras in our agency for years and our policies have developed over time into a robust guide as to what is appropriate and what is not.”

Those who believed the media somehow overlooked the FAA’s primary responsibility. It is not to protect individual’s rights against unreasonable search and seizures under the Fourth Amendment but rather “to provide the safest, most efficient aerospace system in the world.” This was reiterated by Justice Sandra Day O’Connor in the Supreme Court of the United States’ *Florida v. Riley* (1989), when she offered a concurring opinion: “...FAA regulations whose purpose is to promote air safety, not to protect the right of the people to be secure in their persons, houses, papers and effects, against unreasonable searches and seizures.”³

Additionally, the use of aircraft in law enforcement is nothing new. Manned aircraft such as Cessna’s—fully equipped with high powered cameras—have been used for decades. Even though they are more effective for surveillance and are more intrusive than current UAVs, violations of Fourth Amendment rights against unreasonable search and seizure or invasion of privacy issues have been addressed and protected by the Constitution and the justice system throughout the years. Any incident involving UAV that may arise would receive the same protection.

The benefits of utilizing UAVs by police departments are extensive. Agencies in both the United States and Canada have used UAVs for everything from accident reconstruction and crime scene documentation to assisting search and rescue personnel, SWAT teams and fire departments.

MCSO currently uses the Draganflyer X4-ES model, a product of Draganfly Innovation, Inc. It is a five-pound, four-rotor helicopter measuring 34.24 inches wide and 34.25 inches long, with a height of 11.5 inches and a top diameter of 42 inches. With the capability of adjusting itself, the X4-ES “tilts” forward during windy conditions or when flying to another location, the same as a real helicopter, but the camera remains in position automatically. The most recent camera used for the X4-ES is the Sony RX100II camera, which is capable of live digital broadcasting from the aircraft directly to the screen of the GCS Transmitter or Android-based tablet/smartphone. The X4-ES is able to stay in the air for up to 30 minutes. Though they are capable of going much higher, the FAA limits legal operation during daylight hours up to an altitude of 400 feet above ground level (AGL) and within line of sight to the operator.^{2,4}

Besides using UAVs for accident and crime scene reconstruction, MCSO has also found the technology beneficial for search and rescue operations, where they have been able to cover a vast area with fewer human resources. In other emergency responses, MCSO has found UAVs useful in aiding firefighters by detecting hot spots in a major structure fire by using the camera’s “Forward Looking Infrared” (FLIR) capability. Recently, the Royal Canadian Mounted Police (RCMP) “F” Division was successful in locating and saving a man after he wandered off into the vast Canadian wilderness following an auto accident with the help of a UAV. With such a large geographical area to cover, the RCMP have found this tool to be well worth the investment.

According to Miller, at the time MCSO started experimenting with law enforcement capabilities of the Draganflyer X6 “the FAA had little experience with small UAV and the process at the time.” The first year was a learning curve as Miller and his

staff learned the capabilities of the UAV as it pertained to law enforcement as well as what it could not do. Though the Draganflyer X6 was mainly used to collect data for 3D crime scenes, MCSO replaced the X6 with the improved Draganflyer X4-ES and also added a larger fixed winged UAV called a Falcon UAV for search and rescue operations.²

Miller cited the biggest advantage to the system as “the price and being able to see the world even at 50 feet in the air because it changes perspective.” It costs MCSO approximately \$25 per hour to operate the UAV on a mission as opposed to the previous expense of manned aviation, which



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runs between \$500 and \$1,200 per hour. In Mesa, Colo., alone, the county used to spend upwards of \$10,000 for manned aircraft missions.²

Years ago, in order to obtain an aerial photograph, departments had to call in fire departments or baskets from a city works department to get elevated shots. That is no longer the case with UAVs. Since they are compact and can be stored in the trunk of a cruiser or in a reconstruction unit, they can be assembled and in the air within five minutes. The UAV can easily be piloted to the exact location and with a GPS hold option, can maintain that exact position while the camera angle, zoom and shutter are adjusted.

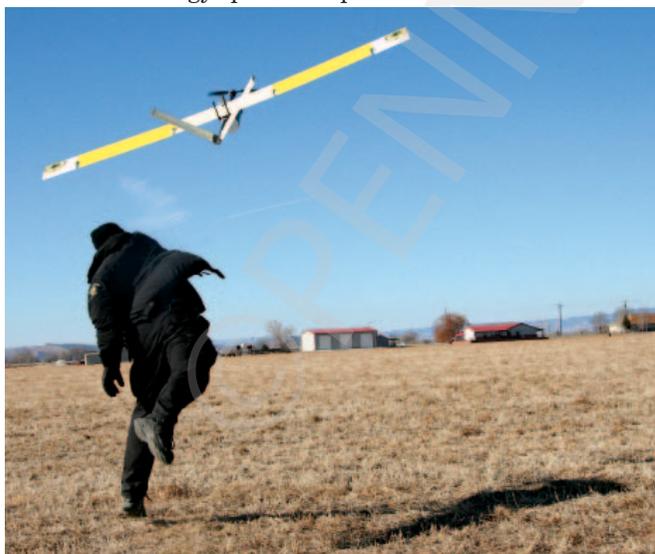
Real work is definitely being accomplished with UAV worldwide from tactical operations, search and 

rescue, HAZMAT operations, bomb squad and detailed aerial mapping to crime scene and traffic collision documentation. The images and video tell a story either in real time or later during the investigation and ultimate prosecution. Live video feed either provides live tactical or search/rescue information or allows the operator to frame shots needed. Incredible video precision allows departments to create highly detailed and accurate information to less than one centimeter accuracy. The sequence of images can be used to create a photo realistic 3D visual model of a crime or collision scene and can be viewed from any angle, measure points and see things that might have been overlooked while walking the incident. A 3D crime scene model generated by the aircraft can be sent to a 3D printer, creating a physical model that everyone can touch and see.

Miller explained how the UAVs accomplish their department's goals. "We fly grid patterns over an area in question and take photos every few seconds as we fly. The photos are then 'aligned' using software and consolidated into one large photo that is accurate to the real world within millimeters. From a large photo, we can locate each pixel in three dimensions, pulling flat photos into a 3D object or model. We can animate or print on a 3D printer. We just have one shot at capturing all the images before things start to change, so we want to get it right. The first step in documenting or recreating a crime scene is measurement. We must be able to accurately place all items in a crime scene and understand their relationship with one another."

The interactive 3D models perform complex measurements within the scene, between objects, vehicle, skid marks or even calculate complex areas to determine volume. Processing a crime or accident is also much faster through the use of UAVs.

"This technology speeds the process and reduces our time



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on scene, the time a road is closed, the time a business is closed or the amount of time before a family can be let back into their home after a crime," Miller said. "This new technology helps us considerably and the people we serve."

Today, there are six UAV test sites in the U.S., including one at the Grand Forks (Colo.) Air Force Base, which hosts an annual unmanned aircraft conference. Demonstrations featuring the Draganflyer X4-ES recording evidence, such as skid marks and debris, from a two car accident were held recently.⁵

Though Mesa's FAA certificate of authorization limits the UAVs to their jurisdiction, they have been granted special permission from the FAA to assist neighboring departments in other communities. The FAA requires pilots to have a Private Pilot's license to fly unmanned aircraft systems at night, so Miller said that night flights will not be an option.

When asked if he felt UAVs were something every department in the United States could possibly have in the future, Miller said, "as much as the democratization of aviation is occurring in small UAV for everyone else, it will occur for law enforcement as well."

For more information on how UAVs can benefit your department, please visit Draganfly Innovations, Inc. at draganfly.com or the Mesa County Sheriff's Office at Mesaus.com. **LOM**

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