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DRONE COPS:

Establishing an Unmanned Aircraft Systems Unit

By Alan Frazier, Deputy Sheriff, Grand Forks (ND) County Sheriff's Office, Associate Professor, University of North Dakota's John D. Odegard School of Aerospace Sciences

Yes, I fully realize I used the dreaded "D" word in the headline. Does it really matter? The media has dubbed unmanned aircraft systems "drones," the public knows these aircraft as drones, and drones is easier to say than "unmanned aircraft systems." So let's move on to more important topics.

Approximately 12 U.S. law enforcement agencies are currently utilizing small unmanned aircraft systems (sUAS). sUAS have proven to be effective in a variety of situations, including documenting crime and traffic collision scenes, searching for lost persons and criminal suspects, maintaining perimeters on warrant services and assessing disaster scenes. For a variety of reasons, sUAS are not appropriate for use in vehicle pursuits and have limited usefulness in covert surveillance. Research conducted at the University of North Dakota indicates sUAS can perform approximately 30 percent of the missions that a manned helicopter can perform for less than 1 percent of the cost of the helicopter and crew.

More than 17,000 state and local law enforcement agencies currently operate in the U.S. Less than 225 of those agencies have manned air support units. The majority of agencies that lack air support do not have sufficient funding to establish such a unit. But with initial purchase costs of sUAS starting as low as \$750, many agencies can support an sUAS-oriented air support unit.

How do you start a UAS unit? The most important step is to begin with the end in mind. Ask yourself the important question: "What do I want the sUAS to do?" By defining the potential missions, you will be well on your way to formulating your unit. Next, look at your environment. What are the most common wind velocities in your jurisdiction? Do you anticipate operating at night? Will you be operating over water? Will you be operating within FAA air traffic control tower controlled airspace (Class C or D)?

Once you have a handle on the environment, return to your anticipated missions. Do you plan to transport any payloads (cell phones, notes, medication)? Do you need visual (electro-optical) and infrared cameras? How long do you anticipate needing to stay airborne? Now bring into play your potential UAS pilots. Are they currently FAA certified manned aircraft pilots? Do they have previous UAS experience (military or RC model flying)? Consideration of these variables will help you define what type of airframe and sensor package you will need.

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Generally, fixed-wing sUAS are capable of longer mission times, can carry heavier payloads and have the ability to operate in higher winds than rotor-wing sUAS. The downside is the need for larger takeoff and landing areas. Rotor-wing sUAS are, of course, capable of vertical takeoffs and landings that allow them greater flexibility, especially desirable in an urban environment. They have the added advantage of being able to hover, land and "perch" on a rooftop. Perching allows the pilot to shut down the rotors to conserve battery power while continuing to stream video from the aircraft's camera to a ground control station.

Most sUAS currently on the market are equipped with autopilots, which vary in sophistication. At a minimum, the autopilot will allow you to "hands-off" hover the aircraft at a set position and altitude. The most sophisticated autopilots allow users to program the entire mission prior to launching the aircraft. Given the multi-tasking nature of law enforcement sUAS flight operations, an autopilot is highly desirable. sUAS manufacturers usually provide payloads for their airframes, most commonly electro-optical (EO) and infrared (IR) cameras. Both cameras should have the ability to stream real time video to a ground control station and capture high-resolution still photographs. It is important that your sUAS be able to carry both EO and IR cameras in a single payload.

Once you have identified what you want the sUAS to do, it is time to begin your research on airframes. Several

hundred sUAS manufacturers operate worldwide, and the number is growing every day. There are a number of problems with many of those manufacturers. Ask yourself the following questions: How much flight and component testing have they done? How reliable is their sUAS? Will they be around in two years to support their sUAS? Currently, there are neither government nor industry standards for the manufacture of sUAS. Consequently, anyone can open an "sUAS factory" and begin selling airframes. Government agencies considering purchasing an sUAS would be well advised to confine their search to well-established companies that specialize in the manufacturer of sUAS. How long has the company been in existence? How many airframes have they sold? Do they have a factory administered or authorized operator training program? Can they provide referrals to agencies that are using their sUAS? The answers to these questions should give you valuable information on the legitimacy and future viability of the manufacturer.

After selecting an airframe, you should begin the process of obtaining a Federal Aviation Administration certificate of authorization (COA). COAs are the FAA mechanism for permitting sUAS access to the National Airspace System (NAS). Although pursuant to FAA Advisory Circular 91-57 hobbyists may fly sUAS with few restrictions, government agencies must have a COA or "333 exemption" to operate in the NAS. Of the two mechanisms available, the COA is the more desirable as it has the potential of providing a law enforcement agency more operational flexibility.

Prior to beginning the COA application process, agencies should obtain a letter from an outside legal authority (state attorney general or city/county counsel) verifying the agency is a component of "a political subdivision of the state." This is necessary to prove the agency's eligibility to operate a "public aircraft." In addition, the agency must register the sUAS with FAA. The registration process for sUAS is the same as that used for manned aircraft. Registration applications may be obtained from any FAA Flight Standards District Office. A final preparatory step is the drafting of an sUAS operations manual. The manual should minimally include the following:

- Types of authorized missions.
- Approval process for missions.
- Minimum pilot qualifications and training requirements (initial and recurrent).

- Medical certificate requirements.
- Weather minimums.
- Crew rest limitations.
- Accident/incident reporting.
- Retention of evidence procedures.

The process of obtaining a COA begins with gaining access to the FAA online COA application site. Access to the site is granted by FAA contractor Steven Pansky, who can be reached via email at steven.ctr.pansky@faa.gov. In your email, include contact details for the requesting


agency, including name of the agency head and point person; the types of missions anticipated; your geographic location (initially a fairly small area within Class-G airspace for training); maximum altitude (below 400 feet AGL is best); make/model of sUAS to be utilized; and qualifications of potential pilots. Current FAA guidance documents state sUAS pilots must have passed the FAA Private Pilot Knowledge Examination at a minimum. A minimum of an FAA Private Pilot Certificate is required in the following situations: operating at night, operating above 400 feet AGL and operating within

Class C or D airspace. Class B airspace operations are not permitted. A visual observer is required in addition to the pilot. Both the visual observer and the pilot must hold valid FAA 2nd Class medical certificates.

Upon being granted access to the online COA application site, complete the lengthy application. The program provides multiple opportunities to upload attachments; creation of a single, well-organized COA attachment document containing all required information will make the application process much easier. Simply attaching the document multiple times with instructions to refer to specific pages will work. Once the application is submitted (FAA calls that step "committing"), it will take approximately 60 days for the administration to review and approve.

FAA will initially issue a "training COA" permitting agency personnel to fly in the small area requested. Agency personnel should receive initial training from factory-authorized instructors. The training should focus on aircraft systems and actual flight training. The agency should then begin an organized series of scenario-based training missions—the more realistic the better. Once all personnel are comfortable in operating the sUAS during simulated missions, contact Pansky and schedule an FAA operational inspection. It is likely that two FAA inspectors, assigned to the FAA's UAS Integration Office, will travel to your location to review your documents and observe a simulated sUAS law enforcement mission. Upon successful completion of the inspection, the FAA will issue an "operational COA," usually allowing the agency to operate the UAS throughout their jurisdiction.

After becoming operational, it is important that personnel continue to conduct flight training with the sUAS. sUAS pilot skills are perishable and must be exercised to remain adequate. At a minimum, the pilot must conduct three takeoffs and landings with the sUAS every 90 days to remain current.

Just prior to press time, FAA issued the long awaited Notice of Proposed Rule-making (NPRM) for sUAS operations. Information on this NPRM can be found beginning on page 30 of this issue of *Air Beat*. It is imperative that law enforcement agencies thoroughly review and comment in writing to FAA on this important rule-making. If we remain silent, we forfeit our right to play a part in the formulation of subsequent sUAS regulations. 



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