

# A Diamond in the Rough:

## Surveillance, Safety & Speed

By Al Fraser, Mohawk Technologies

It's the midnight shift and it has been fairly quiet. You are catching up on paperwork during the lull and the dispatcher broadcasts a burglary in progress call at the other end of the district, and the closest units are on the way. Being the supervisor, you start heading that way but before you can even get the cruiser in gear, a live image comes to life on the TV monitor in your vehicle displaying a bird's eye view of the incident location and the surrounding area just seconds after receiving the call. The building's pertinent details are displayed right on the screen including owner name, phone number and criminal history. You watch the scene develop and provide guidance via radio from miles away as a suspect flees upon hearing sirens, and the camera follows him into a vehicle and out of the neighborhood. You direct the intercepting officers who stop the suspect and make the arrest several blocks away. The entire event is digitally recorded for prosecution. That's because an aircraft loitering quietly thousands of feet above monitored the call.

The crew, having entered the address into the computer that immediately slewed the camera directly to the scene and automatically queried the municipal database, sent the live picture via downlink to the remote receiver in your patrol car. After clearing that scene, the aircraft went quietly back on station having not been seen or heard from the ground. It can do so for the entire shift burning about the same amount of fuel that a helicopter burns in an hour, while the crew sits safely and comfortably with twin-engine redundancy, and the citizens you protect sleep undisturbed by a circling helicopter.

For significantly less than the cost of a new, equally-equipped, single-engine turbine rotorcraft, you can dash to the scene at 170 knots with solid IFR capability, fly surveillance missions for up to 10 hours in relative comfort and with the safety of two engines, downlink day or night video in a brand new quiet, fuel efficient airplane.

Mohawk Technologies, LLC was created in 2004 as a testing and evaluation company working with the U. S. Department of Defense. Company owner, Paul Pefley, was a 7,000-hour pilot and self-proclaimed aviation nut when his interest in aircraft caused him to buy a surplus OV-1 airframe and restore it to flying condition. It wasn't long before the military sought to use the unique and now retired Army platform for testing new ideas, and the company was off the ground.

The idea for a civilian version was born from the company's ongoing desire to fill a gap between the ubiquitous single-engine, high-wing airplanes or helicopters used by most law enforcers, and the high-dollar military hardware that are out of reach for most

civilian agencies. Pefley recognized the need for an economical twin-engine aircraft especially suited for use over hostile terrain, open water or densely populated areas that could support local, state and federal law enforcement, as well as the budget conscious militaries of the world (if there is such a thing) with the latest in surveillance technology.

As the company researched available airframes, only one choice met their design criteria that was reasonably priced, operated economically, offered good performance and was currently in production. An Austrian company, Diamond Aircraft, offered the DA-42 Twin Star. This recently certified aircraft (2004) breaks the traditional light aircraft mold by offering two Jet-A burning 135-hp FADEC controlled diesel engines, a state-of-the-art Garmin G1000 glass cockpit, and unusually comfy interior.

The engines are made by Thielert AG with a design based on the same engines powering the Mercedes-Benz. There are increases in horsepower in the works, as well as increases in TBO up to 2,400 hours. For the uninitiated to FADEC operations, you can forget dealing with finicky prop and mixture controls since software does it for you. There is only one lever per side. Push the levers to go fast, pull back to slow down. FADEC has been around for years, and it's now making life simpler for the small aircraft pilot by significantly decreasing the workload. The airframe is designed for safety and comfort using a variety of ideas transferred from the automotive industry including those for impact protection, failsafe structural components and redundancy.

The DA-42 can cruise at 172 knots at 80 percent power while using only 12.5 GPH and operating from runways shorter than 2,000 feet. With a clean stalling speed of 62 knots and a VMC speed of 68 knots, setting up for a long surveillance orbit should make the 50 gallons of usable (76 gallons optional) fuel stretch for many hours longer than even the highest capacity bladder of the crew. There are about 20 domestic U.S. service centers for aircraft maintenance needs.

Mohawk takes the capabilities of the airframe and matches it with the latest camera systems from your preferred manufacturer, including FLIR Systems, Wescam, Gyrocam or Aerial Films. Day, night, zoom and hi-def are at the discretion of the customer. The camera is mounted far out on the nose of the aircraft and provides the best field of view around the airframe. Features include laser designated auto tracking, IR, color video, downlinking and recording. Satcoms, UHF, VHF and HF are all available for communications per customer requirements.

The picture feeds into components that mix the information with Avalex Technologies AMS7102 Digital Mapping System. The rugged mil-spec (DO-160 vibration standards) tested gear is already in operation with many agencies around the country. This equipment is customizable to include just about any type of mapping software you can think of, including but not limited to nautical, street, satellite or police districts using NGA or FalconView chart software. The system automatically takes the address and searches the database for any pertinent data that your organization wants. Vehicle registrations, property records or criminal history are some examples. It even

provides some redundancy to the aircraft GPS as it uses its own satellite receiver. Avalex keeps loaner spares on the shelf in case of AOG.

The system includes LCD flat panel monitors (optional touch screens) in sizes from 5 to 20 inches, is totally upgradeable and only weighs about 16 pounds in total including digital recording in a choice of formats. The signal is also fed to the right side Garmin G1000 multi-function-display and the to the data link transmitter. The data link communications gear is made by MRC, a Boston area company with decades of wireless experience. The briefcase-sized receiver multiplies the capability of the system for every remote unit deployed. The easily portable units see the same information as the aircraft crew displayed right on their screens. Supervisors, dispatchers or tactical units could benefit significantly with this real-time information.

If your aviation agency covers a large area where speed matters or time on station is important, or both, you get a lot of bang for the buck in the DA-42. It has the combination of performance, surveillance capability, low operating cost, twin-engine safety, solid IFR ability and fast cruise speeds. You won't hover or fly medevacs with it, but you will save significantly on your fuel budget while providing airborne support for many more hours on station and be a whole lot safer with two power plants.