Tactical Pursuits: Then and Now

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In the mid to late 1980s, most aircrews were flying around with little more than a searchlight, some binoculars and a radio or two. We considered ourselves lucky if our binoculars were stabilized. At night, the altitudes from which we could conduct effective searches were limited not only by the brightness of our searchlight and ambient lighting conditions, but by how stable the TFO could hold the binoculars while controlling the searchlight and how well the pilot could position the helicopter. To see any real detail, pilots usually had to fly relatively low and slow. The fact that a suspect could see exactly where we were searching was oftentimes unavoidable.

If we had to search for something between two narrowly spaced buildings and the only way to do so was to hover downwind, we really had our hands full. The pilot usually couldn't see what the TFO could see, and the inevitable shaking of the aircraft during the downwind hover made it very difficult for the TFO to keep the searchlight and binoculars pointed at the scene simultaneously. Some of our pilots simply could not tell when the aircraft was drifting – even though the TFOs neck was twisting like a barber pole to keep the scene in sight. As a TFO, I actually considered writing "Left Pedal" on the back of my helmet to help the pilot dial into the problem.

Our tactics were limited, because our technology was limited. These limitations also increased our exposure to risk, because we often had to operate inside or very close to the aircraft's height-velocity curve to conduct an effective search.

When the first FLIRs arrived in the industry, the learning curve was high from an aircrew perspective, and substantial maintenance was required just to keep them working. The true FLIR pioneers had to charge their systems with argon gas every six to eight hours. Most of those systems ended up on a shelf in relatively short order, but those who persevered in using them deserve to be in the FLIR Hall of Fame. Mechanics shook their heads as they tried to find some real estate in, on or near the instrument panel to mount the bulky CRT – flat screens were more than a decade away. And then we handed the TFO a remote control and said, "Go catch bad guys." There was absolutely no tactical training available, there was little understanding of how to use the device or interpret the image, and crew coordination was non-existent. After all, the FLIR was for the TFO, not the pilot – right?

When searching for suspects, pilots usually just flew around in the general area of a call while the TFO glanced back and forth between the display and the outside world while attempting to stay oriented. Some right-seat pilots orbited to the left, others orbited to the right, and the same for left-seat pilots. Some even hovered during a FLIR search to avoid becoming disoriented.

When we found someone, our workload went through the roof. We had to figure out where the suspect was, and then we had to direct ground units to him or her. If the suspect was moving, or worse yet running, our workload increased exponentially.

Pilots usually had no idea where the suspect was in relation to the aircraft, because they didn't know where the TFO was searching. Oftentimes, even the TFO didn't know where they were searching. Interpreting the azimuth and elevation symbology was an undeveloped skill, and search patterns (if you could call them that) were nonsensical. We were just as likely to find someone on the right side of the aircraft as on the left, or in front of us.

Many TFOs were willing to experiment with FLIR units, but some of the pilots I initially worked with would give me about 30 seconds to find someone with the FLIR, and then they'd say something vulgar about it and demand that I switch to the searchlight. It was just as well, because they had no idea where I was searching anyway, and the aircraft was almost never positioned effectively. It amazes me that we ever caught anyone in those days.

The tactical benefits of FLIR were present, but few understood them. It took years of practice and a lot of experimentation, but over time, some tactics were developed that maximized the FLIR's capabilities and reduced the aircrew's workload. Many pilots learned that the orbit profiles flown during FLIR searches needed to be somewhat different than when a searchlight was being used. Aircrews discovered that FLIR searches required a higher degree of technical proficiency and crew coordination, but there was a corresponding increase in effectiveness.

Even though we were more effective, we really didn't see much in terms of increased safety, because most FLIR searches had to be flown at or near the same altitudes as when a searchlight was being used. The

early generation FLIRs had far less zooming capabilities than they do today, and their gimbals weren't stabilized well. Indeed, some weren't stabilized at all. The early FLIRs simply could not zoom in close enough to see any real detail from higher altitudes.

The technology was available to increase the imager's optical zoom, but not to cost-effectively stabilize the gimbal. The manufacturers took a stab at it with add-on circuitry, including the famous LCRS (low cost rate stabilization – yes, that's actually what it stood for). It was selectable stabilization, and while it was better than nothing, it required the FLIR operator to be constantly switching it on or off depending on the FLIR's field of view and the aircraft's speed. You actually got into a rhythm when using it, and that rhythm became second nature.

The real breakthrough in safety came when manufacturers figured out how to increase their imager's resolution and stabilize their gimbals better. Now they could increase the optical zoom, and the gimbal would still be controllable. This enabled us to fly much higher when conducting FLIR searches, which increased our margin of safety (especially at night). And higher altitudes mean less noise to people on the ground.

We also learned that we could fly faster when conducting FLIR searches at higher altitudes while still enabling the TFO to conduct an effective search, even between narrow spaces. The relative motion and size of objects on the display is the same at higher altitudes and airspeeds as it is at proportionately lower altitudes and airspeeds, as long as the imager has the ability to zoom in.

This is significant from both a tactical and safety perspective. For example, Figures A and B are still-images captured from a FLIR video while orbiting some apartments. The aircraft in Figure A is operating at 500 feet AGL, and in Figure B, it's at 1,000 feet AGL. The images are almost identical, and the FLIR wasn't even zoomed in all the way, nor was its optical doubler being used. When we orbit at higher altitudes with the same angle of declination, we can increase our airspeed to compensate for the additional time it takes to complete an orbit. Increased airspeed is another factor that increases our safety.

In Figures C and D, a suspect is standing between two apartments. One aircraft is orbiting at 1,000 feet AGL, and the other is at 500 feet AGL. We almost never search with our imagers pointed straight down, but the aircraft at 1,000 feet clearly has more room to maneuver than the aircraft at 500 feet, as depicted by the white-shaded area. Both helicopters are headed toward us, and the TFOs view of the suspect between the two buildings is limited by obstructions. In Figure D, however, the perspective of the aircraft in relation to the buildings is much more desirable. Pilots should pay attention to this while orbiting to maximize the aircraft's time in this region. That's easier to do when the aircraft is being flown higher versus lower.

If we're operating at 1,000 feet, and we need to slow down so the TFO has time to evaluate a heat source between two narrowly spaced buildings, the aircraft will still be well outside of its height-velocity curve. If we slow down proportionally, while flying at 500 feet, however, we'll be much closer to the curve, or even inside it. And the pilot will have a much narrower window to operate in as depicted by the white-shaded areas in Figures C and D. Flying lower in these scenarios increases the aircrew's workload, it reduces the time they have to evaluate heat sources, and it exposes them to additional risk. It also increases the noise to people on the ground.

It's usually not necessary to hover in these situations, but if we need to, risk-management must play an important role in our decision-making process. The risks we're exposed to when we hover at 500 feet AGL are substantially greater than the risks we're exposed to when we hover at 1,000 feet AGL (aircraft emergencies, gunfire, etc). If we're hovering because the tactical benefits outweigh the potential risks – so be it. That's why we get the big bucks – to make those decisions after objectively evaluating the risks.

But if we're hovering, or flying low and slow because we're not proficient with our tactics or technology, that's another matter. Leadership, training and accountability are the keys to success:

- **Leadership** – To cause an objective evaluation of our operational procedures.

- **Training** – To train unit members to new standards.

- **Accountability** – To ensure that all crewmembers are proficient, and operating as safely and effectively as they could be.

Searching between two narrowly spaced buildings is just one example of a tactical scenario that airborne law enforcement encounters on a regular basis. There are many more. A lot of words were used to

describe some simple concepts, but those concepts often get overlooked in the heat of battle. These tactics can (and should) be applied to other scenarios, and it's something we need to think about and practice before we encounter them.

The keyword is practice. If we wait for a dynamic high-pressure scenario to unfold before we implement these tactics, it's very likely that we'll lose sight of the suspect or stumble through the call with a lot of unnecessary grief. Crew coordination is important, and practice breeds proficiency.