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Growing Getting Army UAV



In a remote corner of Taji Airfield, Iraq, last summer, the temperature was 114 degrees and climbing—uncomfortable in the non-air-conditioned shelters where soldiers sweated to maintain a small fleet of Shadow tactical unmanned aerial vehicles (TUAVs)—but that wasn't the critical problem. Inside the ground control station shelter, which was

Pains:

Aviation Off the Ground



**Text and Photographs
By Dennis Steele**
Senior Staff Writer

supposed to stay cool for the equipment's sake, the temperature was rising, too. The shelter's environmental control unit (ECU) was failing fast; the shelter's thermometer hit 77 degrees and headed toward 80.

The trouble was that nobody actually knew if the electronic systems would start

failing or arcing at 81 degrees, or 82, or keep going well beyond that, and nobody wanted to find out that day. UAVs were in the air to maintain coverage over Baghdad, and the equipment had to keep functioning, so 1st Sgt. Andrew Gibson climbed on top of the shelter with a case of bottled water and be-

Below, Spc. Eric Petrowski, the Tactical Unmanned Aerial Vehicle (TUAV) Company's standardization instructor pilot, charts a mission. Right, PFC Jason Walker, an air vehicle operator, flies a TUAV from the launch site to a handover point where brigade-level operators from the company will take over the mission flight.



gan wetting down the ECU while an air-conditioner mechanic was located.

The situation might be minor in the overall scale of operations, but it is indicative of how new UAV technology is in the Army. There isn't any institutional knowledge—there isn't a chief warrant officer with 30 years in the business, for example, to say that regardless of what the manual states, the equipment won't fry until it hits 100 degrees inside the shelter for three or four hours. In contrast to an Army rotary-wing unit in which senior pilots and technicians have decades of individual experience and a cumulative total counted in centuries, the standardization instructor pilot in the TUAV Company of the Aviation Brigade, 3rd Infantry Division (Mechanized), is a specialist (E-4) with a few months' experience in UAV field operations.

UAV technology itself isn't new, but its wartime application relative to piloted aircraft is short: a century for airplanes in general and a little over a half century for helicopters, while Operation Enduring Freedom and Operation Iraqi Freedom represent the Army's first widespread use of UAVs in battle; and the more that commanders, staffs and soldiers see of what UAV technology can do, the more they want. It's moved way beyond being a novelty and a nice-to-have capability. If the weather is flyable and a UAV-fed plasma screen goes black in a tactical operations center, people get cranky.

The 3rd Division's TUAV Company was struggling to keep up with the growing demand for its services while fending off equipment failures and feeling the shortcomings of its organizational concept. Meanwhile, it was making the transition from being a Military Intelligence asset, under which UAV units were originally set up and equipped, to an Aviation branch element. With Army UAV

Spc. Joshua Eldridge works on the Shadow UAV "Doc's Girl"—one of the TUAV Company's original aircraft and his admitted favorite, so named because Spc. Eldridge is a doctor of chiropractics.

proponency shifting from MI to Aviation, UAV units and traditional helicopter organizations are learning the ropes of each other's operations and requirements. In Iraq, they happen to be doing it in the middle of a war.

Basic knowledge about a TUAV company starts with three things.

First, just about everything hinges on single points of failure. There is no excess and no redundancy. Each UAV has one engine and one spark plug driving it. If the \$1 spark plug fails, the UAV falls out of the sky—that's the way it goes. However, the lack of redundancy continues with just about every component—equipment or people. If





Left, a tactical automated landing system tracking antenna locks onto a TUAV to autonomously bring it in for a landing. Below, fuel samples are taken before every flight as a safety record.



the ground control station goes down, a unit usually won't have a second at the location to take over. Usually, there's only one launcher, too, and so on down the line. If one truck breaks, the unit can't move itself. But even if it has all its trucks, it actually can't move itself because the company has more soldiers than the total number of seats in all its vehicles; a few people would be hitching a ride. And the unit needs each soldier because staffing is trimmed to the bare minimum. It's a strain for a TUAV company to make up for the loss or absence of even a single UAV pilot.

Much of the lack of organizational and equipment redundancy can be pinned on the second major thing one

needs to know about TUAV companies: they were built to fit inside an Air Force C-130.

The original table of organization and equipment (TO&E) of the TUAV company was established in the era a few years ago when force-projection mobility was the driving factor. A division was allocated a set number of C-130-equivalent sorties to move, and it divided that number among its various elements. In the case of an infantry company, the approach was to take the company's already es-



Sgt. Evan Tailford (left) and Spc. Alex Ho move a Shadow TUAV onto the launcher rail to complete preflight preparations.

Sgt. Tailford checks a TUAV's structural stability before a flight.



established TO&E, allocate airframes to roughly match it and painfully trim the TO&E a little to make it fit inside the allocated number of aircraft, but the unit still kept its core capabilities. Because TUAV companies were just being established, the TO&E was reverse engineered to an extent. A TUAV company was allocated three C-130s to carry it. Nothing went on the TO&E—not a soldier, vehicle or tool—that could not cumulatively fit inside the space of those aircraft. So, for all practical purposes, today's Army TUAV capabilities were molded to meet the limitations of a now 50-year-old aircraft, the C-130 Hercules.

The margin was cut so thin that a TUAV company does not even have tents in which to maintain its aircraft, for example, and the space-constrained TO&E goes on to affect everything else a TUAV company has or can do, which is a problem now because the TUAV mission in Iraq is not exactly the one it was designed for, and that is the third thing to know.

A TUAV company was designed as a surge capability to deploy fast and provide limited, targeted support for high-mobility maneuver warfare. By doctrine, the company was designed to divide its platoons among brigades, each having a set of four aircraft, a launcher and a ground control shelter set. Each platoon was supposed to move with a brigade, set up operations with the headquarters and conduct specific short-duration intelligence-gathering missions ordered by the commander, such as a route reconnaissance, then recover its aircraft, pack and move. It was also expected that the UAVs would operate over relatively open ground where they could see a long distance and cover a lot of territory. That's not the situation in Iraq today.

Maintainers paint mission records on veteran TUAVs. Here, each rhino stands for five missions.



Expectations, driven to a great extent by UAV successes, are now exponentially higher; the environment is relatively static, mostly urban; and the overall mission is no longer short-duration or launched to provide limited specifics. Instead of sending UAVs to look at something and come back, the 3rd Division TUAV Company's mission is to keep at least one aircraft in the air around the clock over Baghdad, meeting a primary mission set during the sortie, such as overwatching a raid or checking a road to spot insurgents emplacing IEDs, but also to be on call to break mission and move its cameras to cover other situations that occur, such as a convoy ambush, downed helicopter or IED detonation. If something happens, commanders and staff, generally speaking, want to get a look at the situation via UAV, and they want to get a look at it quickly. In the case of a major incident or operation, dozens—perhaps hundreds and perhaps even the entire U.S. chain of command in Iraq above the commander directly at the scene—will be fixed on the live UAV video feed coming into the plasma screens in their tactical operations centers.

The mission has shifted from collecting bits of tactical information to providing uninterrupted flexible coverage, which isn't what a TUAV company was originally designed or equipped to do.

Because of experience in Iraq and Afghanistan, UAV units certainly will need to be expanded to meet larger mission expectations, and more and better UAV platforms and related equipment are on the drawing boards under Future Combat Systems development to provide layered tactical and strategic UAV support from the squad level to theater commands. But that is in the future.

While Army battalions now have small hand-launched UAVs and the Air Force can launch jet-powered

UAVs, the brunt of the UAV mission load in Iraq currently is being carried by middleweight Shadow TUAV companies that are pushing the envelope beyond their design limits and punching above their weight class.

To provide continuous coverage over Baghdad, the 3rd Division's TUAV Company consolidated its launch and recovery site, maintenance facility, command and control section and its aircraft at Taji Airfield, pushing three ground control stations to the brigade headquarters, which take direct control of aircraft inside their sectors, and one ground control station to the division headquarters to relay the video and data downlink.

The system was designed for a platoon (four aircraft) to fly 600 hours in a year. Four months into its deployment, the company had already racked up more than 2,700 hours, losing a few aircraft to failures along the way.

The 3rd Division TUAV Company uses the name Shadow Company for its aircraft because it sounds cooler than TUAV Company, and its logo is a phantom amid fiery clouds that pretty much looks apocalyptic. Capt. John Di Dio is the commander.

"The standard from division is to have one aircraft in the air at all times," he said, explaining that six functioning aircraft was the optimum number to support an around-the-clock mission schedule. The company had 13 aircraft at the beginning of its deployment, but some aircraft are always in some stage of maintenance. Losses had cut down the fleet, but replacements have arrived. Capt. Di Dio is an MI branch officer, but he had quickly learned the three most important things to an aviation commander: maintenance, maintenance and maintenance.

"As long as we've got six aircraft, our operation is transparent to division. If we only have five birds, it starts to suck. With four, trouble begins, and priorities really have to be managed," Capt. Di Dio said. "Today, we have five fully mission capable, so we're on the bubble."

UAV mission requests come from the battalions and are collected by a manager at each of the brigades who passes missions approved at that level to a division-level coordinator for final approval and prioritization. The Shadow Company averages 35-50 flight hours a day with a high surge of 62 hours in one day.

The UAV proponency shift to Aviation brought with it adherence to the same safety, maintenance and training requirements as any unit flying manned aircraft, which also means a lot of reporting, testing and inspections.

"Aviation rules also stipulate a maximum of 12 hours on

duty followed by 12 hours off," 1st Sgt. Gibson said. "From a first sergeant's perspective, that throws a big monkey wrench into the mix. If we didn't have three platoons worth of mechanics working together, we couldn't do it."

The captain and first sergeant stood the unit up from scratch, and most of the flyers and maintainers came straight from advanced individual training. Most of the unit's soldiers fall into three military occupational specialties—two in maintenance (avionics and engine) and the other, air vehicle operators.

UAV flyers consider themselves pilots—although they know that most everybody else in Aviation doesn't. They fly aircraft; they just don't happen to be riding in them, and they hope to have their own UAV pilot wings authorized someday. Each UAV requires two operators, one to fly the aircraft and another

to control the camera, and they say it's more difficult to control the camera than the aircraft.

Spc. Eric Petrowski, acknowledged as the unit's best flyer, is Shadow Company's standardization instructor pilot.

"It really just means that I do a lot of paperwork and keep everybody current," he said.

Spc. Petrowski is also the mission controller when he's on shift, which essentially means he has the hands-on operational lead in getting aircraft to the

launcher, off the ground, handed off, and back safely—an E-4 who's pretty much running the UAV show for the 3rd Division 12 hours a day.

He had never really thought about flying—manned or otherwise—before he considered coming into the Army.

"I did an online aptitude test, and this is what came up," he explained.

SFC Kevin Bearden, one of the company's NCOs and air vehicle operators, was an ammunition specialist who applied to transfer into UAVs, and he considers himself lucky to get selected. He said the younger soldiers in the unit have two things in common: they are "Star Trek" fans, and they're heavily into computer gaming.

"I don't play most games with them. They'd kill me," SFC Bearden said. "But when you talk about the so-called Nintendo Generation, this is one of the great things they are doing for our country, and they are doing a job that almost no commander today can live without. We're in the infancy of UAVs. It's really going to be a large organization before long, and being an enlisted soldier who flies an aircraft is really as it was in the infancy of Army Aviation." ★

A Shadow TUAV springs off the launcher on another mission over Baghdad.

