Arizona Dept of Public Safety Aviation Section

Bell helos air rescue operation is major part of public safety in Arizona.

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By Alan Staats Contributing Writer

rizona could be described as 113,635 square miles of astounding contradictions. Its 5.6 million residents live in at least 3 different climates, ranging from near-alpine in the northern half of the state to the Sonoran Desert in the south, where wags list the seasons as Warm, Hot, Good Lord can-it-get-any-hotter? and Yes. Topography ranges from 12,633-ft Mount Humphreys to the Grand Canyon, with miles of flat open desert. Meanwhile the population living within these extreme conditions grows at nearly 2.5 times the national average and is supplemented each fall by an enormous transient population of vacationing "snowbirds" and their Winnebagos.

In 1963, the Arizona Department of Public Safety (DPS, then known as the Arizona Highway Patrol) began providing air support services to its citizens with a single Cessna 205. In the years since, the DPS Aviation Section has changed, DPS Bell 407 *Ranger 52*, seen here enroute to the Superstition Mountains east of Phoenix, is one of 3 on unit strength. DPS also has a Bell 206L3 LongRanger III and a 206L1 maintenance backup.

grown and evolved, as has the state it serves.

Six years after the department began operating the Cessna 205, it was asked to participate in a feasibility study funded by the US Department of Transportation (DOT) and conducted jointly with Arizona State University. Using 2 Bell 206 JetRanger helicopters leased and crewed under contract with a private operator, the Air Medical Evacuation System (AMES) study proved that critically ill and injured patients could benefit significantly from rapid transport to medical facilities. By 1972, those benefits were quantifiably evident to the Arizona state legislature, which in turn approved funding for DPS to buy its first dedicated EMS helicopters-2 Fairchild Hiller FH1100s that were based at a newly constructed facility at FFZ (Mesa AZ). DPS thus became the first helicopter EMS provider in Arizona.

Concurrently, the DPS training curriculum began evolving to include paramedic training for selected officers. Arizona DPS is credited with being the first law enforcement agency in the country to fully certify and assign sworn officers as paramedics on board its EMS aircraft. The program has since served as a prototype for state and local agencies aiming to develop similar programs.

While the Arizona DPS Aviation Section in its earliest iteration may have provided the blueprint for an industry, it has not rested on its laurels and remained primarily an EMS-based operation. In fact, after demonstrating both the need for, and efficiency of, helicopter EMS operations to both public and private-sector operators, DPS air ops actually evolved away from the almost sole-mission mandate of the 1970s and early 80s, as private sector operators moved in and began their own EMS operations.

Changes in the insurance industry and the economy allowed a virtual explosion of airborne EMS providers in Arizona, as well as the rest of the US. Dedicated organizations

such as ASHBEAMS (the American Society of Hospital Based Emergency Air Medical Services, later to become the Association of Air Medical Services) came into being with the mission of providing standards and practices as well as an information clearinghouse for the industry. Hospitals began to embrace a huband-spoke matrix of large trauma centers affiliated with smaller outlying hospitals and clinics, with a dedicated air ambulance network to provide transport between the entities. By the mid-1980s Arizona's major population centers were well served by health care organizations and the Arizona DPS aviation section began to evolve from a primary to a supplemental source of airborne EMS.

Shifting from a primarily EMS role to its current multimission capabilities has been a study in application, precise adaptation and carefully measured growth. Where the DPS Aviation Section was once based at a single point-FFZ-there are now 4 dispersed substations—Kingman, Flagstaff, Phoenix and Tucson—and the section headquarters located in a nondescript hangar at PHX (Sky Harbor, Phoenix AZ). Each of the 4 substations is unique both in mission requirements and in staffing protocols, and the makeup of each unit is adapted to the needs of the surrounding communities.

Central Air Rescue

The Phoenix Air Rescue Unit, for example, is located at Engine 41, a fairly new Phoenix fire department facility in the northern part of the city. Engine 41 provides DPS with quarters and office space, a lighted helipad and a fuel farm. Because the unit is most often called on to respond to traffic accidents and other medical emergencies, the flightcrew consists of a pilot, a DPS paramedic officer and a Fire Dept paramedic. The Phoenix unit is also used as a "force multiplier" during rush hours to augment the ground units and determine which of the seemingly inevitable accidents will require the immediate application of assets to clear the roads and get injured victims to trauma centers in the least amount of time.

In addition, because the Phoenix metro area has a well-developed



(L–R) Phoenix Fire Dept Paramedic Dan Daley, DPS Paramedic Eric Tarr, Helicopter Maintenance Supervisor Joe Annett, Fixed-Wing Maintenance Supervisor Brad Power, Fixed-Wing Pilot Supervisor Benjamin Loreto, Admin Services Officer Dru Bottoms, Aviation Administrator Rich Thacher and Central Air Rescue Senior Pilot Cliff Brunsting. Also on the ramp at PHX are the unit's Raytheon King Air B200, its latest Bell 407 and its King Air E90.

system of parks and lakes, and mountainous terrain within easy driving distance, the unit is often called on to perform short-haul rescue operations that would not fall within the mandate of an average metropolitan unit.

For municipalities in the surrounding areas without their own flight departments, the Phoenix DPS unit provides rotary and fixed-wing coverage for both search and rescue and law enforcement missions, including high-speed pursuit coverage and overhead cover during high-risk entries, as well as EMS.

Tucson—border zone ops

The Tucson Air Rescue Unit is collocated with a federal drug enforcement facility at TUS (Intl, Tucson AZ), where it shares quarters and hangar space. Being so close to the Mexican border, a major part of its operations relates to drug smuggling and border crossing issues but it does not operate in the search or interdiction role for the Border Patrol, ICE or DEA.

Rather than patrolling the border area, the Tucson unit will provide search, rescue and medical assistance to undocumented aliens who become disoriented in the desert and run out of water, for example. On other occasions, crews will spot caches of drugs left in remote areas by smugglers using horses and mules and will assist in hauling them out if federal air assets are unable to do so. It was the Tucson unit that assisted in the evacuation of civilians during the recent Mount Lemon forest fire, which destroyed whole communities. In many cases, the DPS helicopters were among the only means of extracting potential victims and of moving critically needed personnel into and out of harm's way.

Kingman—canyons and cars

The Kingman Air Rescue Unit is located at Kingman Regional Medical Center, in the northwest corner of the state. As with the Phoenix unit, the majority of the calls answered by Kingman relate to motor vehicle accidents and medical emergencies on nearby Interstates 40 and 93.

Crewing for these missions includes a pilot, a DPS paramedic and a flight nurse assigned to the program from Kingman Regional. Due to its proximity to the North Rim of the Grand Canyon, the Kingman unit also serves as a principal backup to the Park Service helicopters that assist climbers, river rafters and tourists who get into trouble in the canyon.

Northern Air Rescue

The Flagstaff Air Rescue Unit, also referred to as Northern Air Rescue, has arguably the most diverse and dangerous mission packages of all the Arizona DPS units. Located at FLG (Flagstaff AZ), this unit's aircraft are crewed by a pilot and paramedic. The reasons have as much to do with weight, balance and aircraft performance as anything else. Field elevation at FLG is 7011 ft MSL on a typical 85° summer's day this can equate to a density altitude of over 11,000 ft. Nearby are a host of 12,000-ft-plus mountain peaks (including the highest point in Arizona, Mount Humphreys at 12,633 ft) and 2 population centers—Sedona and Northern Arizona University (NAU).

Sedona, known for its parks and scenery, caters to a resort trade with an active lifestyle that enjoys hiking through the miles of trails cut through the buttes and canyons surrounding the city. Many of those trails lead into primitive areas and sheer 2000 to 3000-ft cliffs. The lucky hikers discover that they've gone too far before it costs them their lives, and rescuing them is often a difficult and dangerous exercise in precision flying and experience born of practice. The unlucky ones are usually extracted on a rope from the bottom of a box canyon.

NAU places tens of thousands of barely post-pubescent humans in close proximity to skiing, snowboarding, mountain climbing, camping, alcohol and 2 major interstates that lead to places where many 20-somethings want to go-Los Angeles and Las Vegas. Therefore they break bones, manage to get buried in avalanches, get lost in the woods and canyons or "fall asleep" behind the wheel. While there is a civilian air ambulance network in place, the high-risk rescues are the domain of the DPS crews, and during Pro Pilot's visit to the facility, DPS Pilot Pete Sadler and Paramedic Donald Olfers gave me an introduction to some of the terrain they operate in regularly.

Sadler, who has been with the department for 28 years, serving 12 years flying in Tucson before transferring to Flagstaff, describes the surrounding wilderness as "beautiful but terrifying."

"In Tucson," he notes, "you have Mount Lemon at 9000 ft, and you think you've done some mountain flying. Then you get up here and realize you've barely been introduced to it. This place is definitely an eye-opener."

Olfers, a 35-year veteran with the department, was one of the first

graduates of the EMT program in 1972. Now based at FLG, Olfers spent his first 10 years with DPS on the road as a patrolman. Until 1979 he taught the EMT course he had graduated from. During the same period, he attended, and in 1977 received certification from, a paramedic program at the University of Arizona in Tucson.

"I started with DPS well before there was an EMS system up and running," Olfers explains, "and was in the first EMT class in 1972 at the DPS compound in Phoenix. That got me interested in emergency medicine. After teaching for a while, I worked the highway in Globe for a year as a paramedic before transferring up here to Flagstaff in 1979 as one of the first paramedic crew members."



(L–R) Arizona Governor Janet Napolitano and DPS Fixed-Wing Senior Pilot Ben Loreto with the state's Raytheon King Air B200. The Governor is a steadfast supporter of the department's operation and one who, with her staff, makes regular use of the aircraft.

Box canyons, heat and snow

During our visit, Sadler flew up through Sedona as we repositioned the Bell 407, call sign Ranger 52, from PHX to FLG. Cruising over Sedona proper, with the Red Rocks as a backdrop, was beautiful and serene. A few miles northwest of town, though, we were into box canyons, among them Sterling Canyon, where aviation pioneer Gerald Vultee and his wife Sylvia died in 1938 after flying up the canyon at night, in weather, and slamming into the wall. The canyon ends abruptly in a sheer cliff 1/2 mile from the crash site.

Sadler took the 407 up to the top of the cliff wall, as Olfers provided a running historical commentary on rescues—and recoveries—they had made over the years in Sterling and other nearby canyons.

Reaching the top at the end of Sterling was, as Sadler promised, both beautiful and terrifying—on the other side of the canyon wall was a vertical drop of more than 1000 feet. The entire formation resembles a vertical knife blade made of rock.

Moving along northward toward FLG, Olfers continued his sometimes grim recitation—a stranded hiker rescued from this fissure, the body of a climber pulled from that rock pile at the bottom of a canyon, a lost family with small children finally spotted wandering around in shorts and T-shirts 20 feet from a sheer drop, one hour before it started to snow.

Olfers recalls some of these operations being performed in pleasant weather, some in 100° humid weather with gusting winds, rain, little or no pedal left to push, no torque margins and temperatures in the 2-minute range and climbing.

Leaving the canyons, we flew over the pine forests immediately south of Flagstaff while Sadler and Olfers described another all too common mission profile—searching for lost hunters.

"Every year during the hunting season," says Sadler, "we spend hours looking for lost hunters. In some cases they'll get caught by snow, or their truck will break down or they'll get hurt—and we'll get a call from one of the local agencies to go out and start a search."

"Other times, dispatch will get a call from a frantic wife in Phoenix with little more information than 'My husband went hunting and he hasn't come home yet.' A lot of times those calls come in because the husband was tracking a buck and didn't want to break off the hunt just to go to work next day, and he'll show up a day late. Sometimes, though, the call is legitimate and we'll spend days looking for them. Sometimes we find them, sometimes we don't-and a lot of times we'll max out on our daily flight hour limit [8 hours] looking for them.

"The further into winter it gets, the more dangerous it can be-we can get 2 feet of snow in a single night up here. And sometimes," he adds, "we have to go get someone because, when some guys go out hunting, half the time they bring their guns and leave their brains."

Like the Kingman unit, Flagstaff will also occasionally be called to provide backup for Forest Service and Park Service helicopters to assist in rescues and extractions in the Grand Canyon as well—but statistically that's the exception rather than the rule.

DPS also provides aerial coverage for Utah and New Mexico, with a mutual aid agreement to cover the costs. Operations up to 100 nm into either state are done at the request of dispatchers, while coverage further into either state requires permission from State Governor Janet Napolitano.

Rapid transport ops

Fixed-wing operations are based at the Aviation Section headquarters in Phoenix and have evolved into a mix of executive transport for Governor Napolitano and her staff, traffic and crime surveillance, and moving specialized teams such as SWAT, hazmat, crime scene investigators and, when necessary, backup aircrews for remote, relatively long-term helicopter operations.

DPS's current fixed-wing inventory includes a Raytheon King Air E90 and a B200,

Cessna T210s and 182s. The biggest problem facing fixed-wing operations has been pilot availability. In the past this has limited the number of hours flown by the Cessnas, but adding 2 new-hires in the past year has increased the projected number of hours to be flown by each aircraft to approximately 500 per year.

Meeting mission requirements

Given the varied nature of DPS's mission requirements and operating environments faced by each of the various rotary-winged units, it might seem logical for each unit to have its own dedicated aircraft with "tailored" mission and avionics packages. In fact, the opposite is true.

The DPS Aviation Section current-

ly operates 3 nearly identical Bell 407s, with a 4th on order, along with a Bell 206L3 soon to replace the Bell 206L1-C30P currently used as a maintenance backup. (The C30P is a 206L1 whose original powerplant was replaced by STC holder Air Services International.)

None of the 407s is assigned to a particular unit and each is equipped to carry out any of the missions to which it may be assigned. Each air-craft is equipped with a basic King avionics package, Garmin 430/530 GPS/nav/comm units and a Wulfsberg 800-MHz tactical radio with cross-patching capabilities. All have Spectrolab SX5 spotlights, cabling and hardpoints for external loads, and internal hardpoints for rappelling and short-haul rescues.

The installed EMS kit includes oxygen, suction and monitoring



Aircraft Mechanic Gary Keeto performs scheduled maintenance on a DPS Cessna T210 while fellow technicians work on a Bell 206L3. Each of the unit's helicopters is scheduled for 2 days' maintenance at PHX at the end of an 8-day period and is then rotated back into service.

equipment, overhead lighting and provisions for twin litters which, when they're not in use, are folded and stored in either the aircraft baggage compartment or kept at the unit's base. All the medical and rappelling equipment carried by either the paramedics and/or flight nurses is contained in backpack-style cases and, again, either stored in the baggage compartment or the station itself and loaded on an as-needed basis into the aircraft.

To satisfy the most basic forest fire suppression needs, each unit maintains and trains with SEI Bambi Buckets. However, the aircraft are not seen as anything beyond the most basic method of providing a holding action until more appropriate firefighting assets reach the scene. This capability has only been used twice this year.

While the earlier Bell 206 Jet-Rangers operated by DPS units had dual controls, and flight paramedics were trained in the basics of helicopter flight techniques to the point of being able to hover and land, the 407 is equipped with a single set of flight controls. Prevailing reason maintained that throttle response on the FADEC-equipped 407 is quite robust and that the engine could be inadvertently (and rapidly) oversped if, for example, the paramedic were to accidentally roll the throttle up as he brushed the collective while getting into the aircraft.

Crew helmets in each aircraft are equipped with ITT Night Vision P4949 ANVIS 9 Pinnacle night vision goggles (NVGs), which greatly enhance night flying safety as

well as DPS's search capabilities.

According to Aviation Section Commander Rich Thacher, "DPS has been flying with NVGs for 20 years, through several generations of technology. The [ANVIS 9] units that we're using now are so sensitive that we've located lost hikers at night because the NVGs picked up the light from their cell phones. On the other side of the coin, we had a pursuit where we found the guy because he lit up a cigarette, under a tree in the woods, when he thought he'd gotten away from us."

All DPS helicopters are equipped for FLIR 2000 pods, with LCD screens in the cockpit, but the newest 407, as well as a "greenie" in completion at HAS, are equipped with the IAI plug-in optronic payload POP 200 sensor package. Developed by IAI's TAMAM division, the device incorporates both FLIR and a daylight color CCD television camera.



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