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THE PULSE OF THE HELICOPTER INDUSTRY

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POWER MANAGERS

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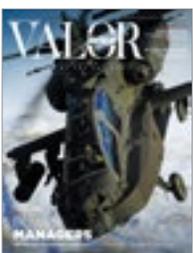
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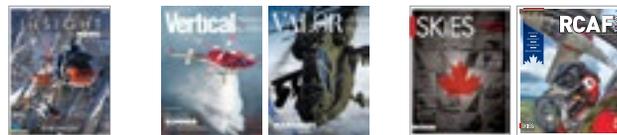
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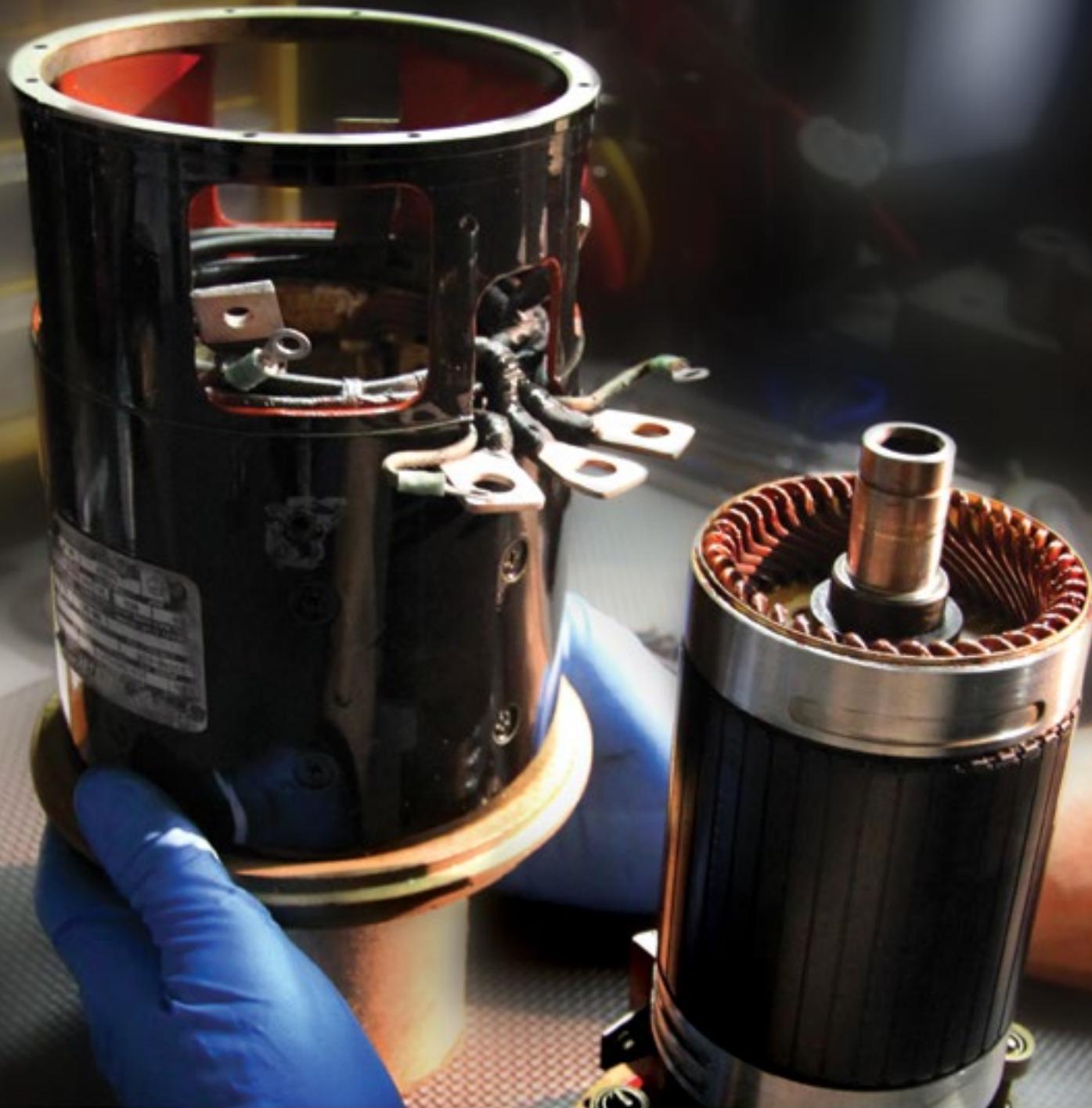
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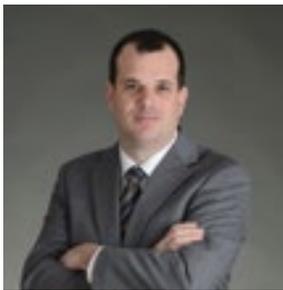
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FROM POST-FLIGHT BRIEF, TO LEGAL BRIEF

On Feb. 24, as the family, friends and fans of the late Kobe Bryant attended his memorial service at the Staples Center in Los Angeles, the news of the lawsuit filed on behalf of his estate was broadcast across the media. Lawsuits are nothing new to aviation. Six years after taking their first flight the Wright Brothers pursued legal action against Glenn Curtiss over patent infringement of their flight control system. Lawsuits on subjects of intellectual property, property damage, and wrongful death have continued since.

Lawsuits have a valuable place in society. They provide people who have suffered the opportunity to be made whole, and oftentimes these costs force companies to invest in safety. When discussing the safety record of the air medical transport industry, I often shared the concern that, compared to their airline counterparts, the cost of crashing a medical helicopter alone wasn't large enough to produce rapid and substantive change; however, when these crashes were litigated, the cost skyrocketed and change happened.

The Flight For Life Colorado medical helicopter crash in 2015 is a perfect example of how litigation creates change. What by all accounts was a survivable helicopter crash left the pilot with fatal injuries and two flight nurses with severe injuries, one having burns to over 90 percent of his body. The helicopter, the most popular airframe in the air medical transport industry at the time, had two well-known problems. First was the lack of an alerting system notifying the pilot of insufficient hydraulic pressure for yaw control, and the second was the fuel tank's propensity to rupture upon impact. The subsequent spilling of fuel over the engine caused the cabin to erupt into flames. In the largest pre-trial settlement for single injury helicopter crashes, the flight nurse received \$100 million from the maker and operator of the helicopter. Though crash-resistant fuel tanks had been required in new models of helicopters for over 20 years, the operator

and manufacturer used a loophole allowing a two-year-old helicopter to not meet this requirement.

This issue with fuel tanks rupturing after crashes has been known since the 1970s. In 1980 and '85 the chairman of the NTSB had written to the FAA regarding this issue. However, just months after this record settlement in 2018, the FAA required that all new helicopters have crash-resistant fuel tanks. The operator had started taking action to upgrade the fuel tanks in its fleet prior to the announcement of the settlement. Nevertheless, such decisive action in the industry was overdue considering the many pilots, medical crewmembers, and others who have lost their lives in post-impact fires in what were survivable crashes.

The largest settlement for a helicopter crash that I was able to locate was \$350 million for the family of a pilot who was killed in a Life Flight helicopter crash in 1993. The engine manufacturer Turbomeca (now Safran) had known the TU-76 standard nozzle, which was installed on the Life Flight helicopter, was defective. In 1992, they manufactured two replacement parts, but instead of spending \$48 million to recall the defective part, Turbomeca reportedly suggested the defective part be replaced during the 2,500-hour inspection. After 2,482 hours of operation, just 18 hours from the scheduled maintenance, the Life Flight helicopter's engine lost power, and the aircraft crashed. According to Turbomeca's records, there were seven other known previous incidents/accidents due to engine failures of a similar nature. However, in many countries other than the U.S., there is no opportunity to pursue damages that would rival the cost of the recall; according to the attorney who litigated this trial, Turbomeca "took a chance that if it crashed, it wouldn't crash in this country where we have a legal system to punish them." The hope of the attorney litigating this case was that the verdict was so substantial that Turbomeca's insurance

companies would not renew their insurance until the defective part had been replaced in all helicopters.

The lawsuit filed on behalf of Kobe Bryant's family is worth watching. While the final NTSB report is yet to be released, many experts are suggesting that the chain of errors started with the pilot, Ara Zobayan, flying in poor weather conditions. While it is widely believed pilot error is partly to blame, families of other victims, friends of Kobe and late-night TV hosts regularly included the pilot as they reflected on the loss resulting from this accident. There is little doubt Ara did not intend to perish that morning, and made decisions he believed would get him home safely to his loved ones. However, amid grieving their loss, Ara's heirs were listed as defendants on the lawsuit.

The practice of listing all possible defendants on initial filings is a well-documented legal strategy. It is said to be easier to shorten lists as information is obtained, than to add people. Good estate planning is a must for anyone who works in a high-risk profession, such as flying helicopters. However, if pilot heirs are going to be named in lawsuits, and possibly have judgments levied against them, there is a new dimension to account for when ensuring your family's well-being in the event tragedy strikes.

Kobe's death and the lawsuits associated with it are going to spark change. Already, Congressman Brad Sherman has introduced legislation requiring all helicopters to have terrain awareness and warning systems, and to set up a commission for helicopter safety that will make recommendations to Congress regarding low-visibility flights. Hopefully with time, as all the details are released, Kobe's untimely death can aid in promoting helicopter safety. However, right now it appears there are as many unanswered questions about the impact this accident will have on the industry and pilots' liability, as there are about the accident itself. ✦



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THREE VOICES IN THE ROOM

High-risk industries such as ours are full of demands to make ethical decisions about compliance. Go/no-go? How far do we push to save lives, but not put those on our own team at risk? Can we, or should we push a crew duty day or a weather minimum to finish a mission? Each of these scenarios, and dozens more, require us to sometimes view full compliance as a variable in a bigger equation.

So how *do* we go about making these calls?

In every ethical situation that involves compliance, there are always three voices in the room: *ME*, *US*, and *THEM*. Each is unique and has its own agenda. This is true even if we are alone with our compliance dilemma.

“ ‘THEM’ ARE THOSE WHO WROTE THE RULES — NAMELESS, FACELESS PEOPLE FROM ANOTHER PLACE AND TIME WHO COMMUNICATE THE STANDARDS FROM TWO-DIMENSIONAL BACKLIT SCREENS . . . ”

“ME” is *you* — all your positive experience, insights, and judgment. Of course, on the flip side, we all have our personal error patterns, biases, and bad habits — some developed by the very same experience we think is working for us. We love to hear ourselves be

right — and are more than willing to fool ourselves or pass the blame even when we are not. We all listen to ME.

“US” is the culture — supervisors, peers, and subordinates — who collectively, and very powerfully, create and continuously shape our decision making and norms of performance. Some cultures sustain us in our efforts towards making good decisions. However, most cultures tend to decay over time when it comes to compliance unless they are very intentional about it — and few are. We may not always realize it, but US is constantly whispering in our ear... “Do it, everybody else does.”

“THEM” are those who wrote the rules — nameless, faceless people from another place and time who communicate the standards from two-dimensional backlit screens and pages with the cold authority of the *Old Testament*. “Do this. Don’t do that,” they preach dispassionately from some unseen pulpit. THEY are annoying party busters, sucking the joy out of our creative spirits. No one likes to listen to THEM, mostly because we are told we have to.

Is it any wonder why “ME” and “US” tend to win out in these three-way debates? Let’s look a bit deeper into this unseen group — THEM — to see what, if anything, we can do about this state of affairs.

The third voice, THEM, is the arbiter — the regulator, OEM, the writer of organizational standard operating procedures (SOPs). We likely don’t know THEM, but we need to know *about* them. They are all well-educated and highly

experienced professionals, with resources at hand that dwarf anything our meager experience or cultures have to offer; reams of engineering data, test results, incident and accident investigation findings, best practices, and countless legal reviews. They are professionals and humans just like us, with families and hobbies. They don’t lie awake at night thinking of new ways to spoil our fun. THEY care about us and those we serve.

THEY are the authorities whose opinions on the matter at hand are above dispute, if not always above questioning. Not just because of the positions they hold, but because of what they know that we do not. When you step outside the guidance provided by THEM, recognize that you are out there *alone* — your momentary judgment or cultural norms trumping their years of modeling, engineering, testing, mishap investigations, and legal review. If something bad happens when you are out there alone without THEM to back your decision, you had better be able to explain it to your boss, a jury, and in some cases, a next of kin.

Intentional or culturally accepted rule busting is not the act of an experienced practitioner who has grown beyond the need for rules. It is the act of a child who does not understand how and why the rules were written, and who fails to respect those who wrote them.

So listen to all the voices, recognize the strengths and flaws in each, and give reverence and priority to THEM. When you bump into THEM, remember to thank them for what they do. ✦

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THE TROUBLE WITH TURBULENCE

Real-live, no-kidding, fear-while-flying is something that you never forget. Whether it's because of a major mechanical malfunction, the terrible end result of a bad decision, or because someone is shooting at you matters not. When ice-cold blood runs through your veins, it's an experience that forever changes you. Luckily, for most of us the truly scary moments pass and turn into unforgettable flying lessons. The less fortunate get written about on the NTSB's website.

As I sit here and consider fearful moments in *my* flying career, the night my pilot-in-command (PIC) and I inadvertently flew a D-model Chinook into a thunderstorm while returning to Fort Bragg, North Carolina, comes back stark and clear. You may think you know what it feels like to get tossed, twisted, and slammed, but hopefully you never feel what I felt that night 33 years ago. Thank God Boeing builds a mighty strong helicopter. My PIC was sitting in the other seat with a grim look on his face. He was slowly shaking his head and his lips were moving as he talked to himself. I was flying the aircraft, sort-of. He told me, "Set your power and take your hand off the thrust control. Don't try to maintain altitude, just let it ride the waves and try to maintain heading." He called air traffic control and told them of our situation. The controller sounded sympathetic, with an undertone of "you guys are idiots." Blasts of lightning illuminated us like fate's flashbulbs, freezing our stupidity in stop-motion for all time and all to see.

I was so scared that I began to fly away from the course line on the horizontal situation indicator. Then I began to giggle. Later, in the U.S. Army's IP course, I would learn that this was an abnormal reaction to stress. There was nothing to giggle about. But we got through the line of weather and made it home. That scenario is exactly how Scott Crossfield — pioneering aviation test pilot and one of the fastest fliers ever — died in northwest Georgia. Google it.

So, fast forward a few decades and I am by myself ferrying a medical BK117 from Fort Benning, Georgia, to Rostraver, Pennsylvania, for maintenance. I got fuel at Blacksburg, Virginia, looked at the latest forecast and the radar — which was clear — and took off. The sky turned dark and ominous in front of me and to the west, so I started easing off to the east. The clouds got darker and darker, and I began to see my odds of reaching the day's destination diminish. There was absolutely no way I was going to mess with a thunderstorm in an aircraft that weighed less than 10,000 pounds after getting the snot knocked out of me in one that weighed over 30,000 lbs. That lesson was for life. So I chickened out and landed at a little airport just over the line from Maryland — the Greater Cumberland Regional Airport in West Virginia. The Virginia State Police medevac pilot based there helped me tie my ship down and gave me a ride to a local hotel for the night. That storm blew the airport up and killed 12 or 13 people in the D.C. area. My little BK rode it out on the ground. Discretion being the better part of valor and all...

While working as a relief EMS pilot in Danville, Alabama, I overheard the Meridianville pilot turning down flights for weather with fine ceiling and visibility. So I called him and said, "Hey, I am new here, educate me. What is it that is making you turn those flights down?" He answered, "Well, we are in AStars, and those scenes are up in the hills. The wind is blowing. I don't feel safe flying at low level in the mountains when the wind is blowing like it is." Point taken.

Sparky Imeson wrote the books on mountain flying. I remember the tone. Mountain flying in a light aircraft should be done with extra care after much thought. You should be aware of the invisible turbulence that surrounds you when the winds blow in the mountains — air currents, cross-currents, and rotors that can snatch control from you in an instant.

With all his knowledge and experience, Sparky was killed while flying in the mountains in turbulence. That's a lesson for the rest of us.

Here's a recent anecdote from a medevac team member: "I am on shift tonight and I just experienced the second-most terrifying moment I've ever had in a helicopter. We accepted the flight, explaining to our communications center that the forecast showed strong wind gusts. Upon entering mountainous terrain with a strong headwind and significant gusts we started having violent turbulence. It was as if we were hovering and being tossed around. We experienced a few drops and recoveries. We aborted, but the worst was yet to come. Upon turning around we were thrust downward and to the right. The aircraft was righted and controlled appropriately by our pilot. We returned to our base, debriefed and continued to breathe the very air that God blew into our lungs at the outset."

When you bring God into it, it's real. I'll bet this team member and his partners learned a lesson that night they will never forget — like me in my thunderstorm. Flying in turbulence, or not, is pretty much left up to the pilot and team in HEMS. None of my general operations manuals had anything about turbulence, ever, in 17 years and four companies. *They left it up to me.* When I asked a check-airman about this once, he answered that the company left it up to "tribal knowledge." I suspect it was that lack of concrete guidance on what to do when faced with turbulence that led to the death of a HEMS pilot and nurse in Cleveland, Ohio, in January 2002 and a solo HEMS pilot in St. Louis, Missouri, in March 2015. Pilots will try to do what we *think* is expected of us by the company and our peers, so maybe those expectations should be spelled out with regards to flying in turbulence around mountains or tall buildings.

In any case — if it scares you, don't do it. ✦

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CORONAVIRUS FORCES HELICOPTER EMS SAFETY STRICTURES



**BY DAN PARSONS
AND DAYNA FEDY**

Helicopter air ambulance operators are enacting rigorous safety measures to protect pilots and medical crews from the novel coronavirus as it continues to spread worldwide.

Because the virus is so contagious, most emergency medical services are transporting patients by ground in specially outfitted ambulances with contained, filtered air circulation and physical separation between drivers and paramedics in the back.

In most helicopters, there is no physical separation between the cabin and cockpit, making it more difficult to contain contagions, according to Tom Judge, executive director of LifeFlight of Maine.

“For all of us that have specialized ground ambulances . . . we’re preferably moving these patients on the ground,” Judge said. “It is very difficult to effectively have personal protective equipment like an N95 mask, a face shield, goggles, protective gown or operating suit for splash protection and have that over a

flight suit, under a helmet, using night vision goggles.”

Some operators have decided the risk to crews is too great and declared they will not transport any patient that has tested positive for coronavirus or the disease it causes, called COVID-19, according to Michael Benton, a HEMS pilot and aviation safety consultant. Among operators that have decided to transport high-risk patients, many have agreed on a set of precautions for pilots and crew.

To decrease the risk of transmission



Among operators that have decided to transport high-risk patients during the COVID-19 pandemic, many have agreed on a set of precautions for pilots and crew. **Mike Reyno Photo**

split about half and half between operators who would not carry suspected or confirmed COVID-19 patients and those who would, as long as the patient was on a closed-circuit ventilator.

Those operators that had decided to take the risk enacted similar policies, including requiring employees to check their temperatures before even coming to work and avoiding coming in with a temperature higher than 100 F (38 C).

All are requiring pilots to wear an N95 respirator mask on any call where a patient could potentially be infected with the virus and male pilots must trim facial hair to ensure a proper fit. Some are requiring the removal of all facial hair because the virus is known to transmit inside water droplets and other particles that can stick to facial hair, Benton said.

Generally, hospitals that carry their own certificates and have authority over HEMS operations are “ahead of the curve” on safely responding to coronavirus patients, Benton said.

LifeFlight of Maine has set up standard operating procedures where ground transportation is the primary response if there is any way possible, even over long distances, for patients at high risk of COVID-19. Every call that comes in is screened for severe respiratory distress, a major symptom of the viral disease, Judge said.

Hospital-based doctors gather as much information on the patient as possible to determine if the patient is at high risk of COVID-19 and whether the underlying illness could be something less virulent, like asthma.

LifeFlight of Maine operates Leonardo AW109s and a KingAir B200 fixed-wing ambulance in an area with many populated islands and long distances between patients and hospitals. They have put in place screening procedures to determine the optimal and safest form of transportation for each patient, based on symptoms and the likelihood they have been exposed to or infected with the virus,

Judge said.

“For most of these patients, there is no way that we can know for certain that they are positive for COVID-19,” Judge said.

Aside from the very real risk of infection, flying a patient at high risk of exposure to the coronavirus carries the risk of flight crews transmitting the virus to other crew members, hospital staff, their families and others. To mitigate the possibility of spreading the virus, if crews were to transport a COVID-19 patient, they would have to be quarantined and taken out of service, Judge said.

“Due to geography, we need every crew to be able to manage every patient. We do not have the luxury of setting up a dedicated [infectious disease] team and dedicating a single aircraft for potential [COVID-19] patients,” Judge said. “If we transported a high-risk patient by aircraft because that is what we really need to do for the patient, we of course will do that, but very likely we would then lose that crew to quarantine.”

Metro Aviation, one of the largest HEMS operators in the U.S., has sent detailed guidance to its flight crews, who work with hospital-provided paramedics and physicians. The company has formed a team of advisors, which includes medical and program directors and chief flight nurses, to evaluate the need and precautionary steps required should they come in contact with COVID-19 patients, Metro spokeswoman Kristen Holmes told *Valor* in an email.

Metro has directed pilots to practice diligent hygiene by washing their hands often and wearing an N95 mask, nitrile or latex gloves and eye protection whenever transporting a known or suspected COVID-19 patient, Holmes said.

Because Metro does not employ medical crews, it is only giving guidance to pilots and then sharing that guidance with its customers.

between cabin and cockpit, many operators are limiting coronavirus patient transport to helicopters equipped with night-vision goggle curtains that shut out non-modified lights in the cabin from flooding the cockpit. That would include models with a bulkhead between the two compartments like the Airbus H135 and H145, Leonardo AW109 and Bell 407, among others.

Benton had surveyed five HEMS operators with a total of 33 rotorcraft and five fixed-wing air medical aircraft when he spoke to *Valor*. Those

“We’ve asked that our pilots refrain from entering health care facilities, and if it’s necessary, they should wear gowns,” she said. “They are not to assist in the loading or unloading of any confirmed positive COVID-19 patients and will adhere to the [personal protective equipment] requirements when assisting in the loading/unloading of other patients.”

“Pilots are not to participate in the decontamination of the aircraft’s

patient carrying areas and we’ve asked for doors to remain open for as long as possible to allow fresh air to flow through the aircraft post-decontamination,” Holmes added.

North of the U.S.-Canada border, HALO Air Ambulance, which is the only dedicated medevac program to serve the entire region of southern Alberta, is still actively responding to calls, but has implemented “enhanced infection control

precautions,” according to chief executive Paul Carolan.

In the event HALO responds to a scene where a patient has risk factors associated with coronavirus, the operator has put protocols in place to protect its flight and EMS crews, Carolan said.

HALO flight crews and aircraft have been isolated, public relations events have been postponed or canceled, and HALO has begun a public-service announcement campaign asking emergency service partners at accident scenes to stay at least five meters from aircraft and flight crews.

Operating an Airbus BK117, as well as a Bell 206 as a back-up aircraft, HALO works closely with Alberta Health Services, which operates ground ambulances and provides flight paramedics to HALO.

That partnership, and a relationship with an international air ambulance service, “allows us to implement precautions at an extremely high level,” said Steve Harmer, chief pilot/operations manager at HALO. “HALO Air Ambulance has always had a protocol for infectious type disease in the event we are required to transport a symptomatic patient, but these circumstances are extreme.”

Though COVID-19 is a unique pandemic, HEMS operators have not altered the basic “go/no-go” rules of flight safety and the virus ranks equally with weather and other factors when deciding whether or not to make a flight, said Judge of LifeFlight of Maine. His insistence that safety is paramount, now as ever, was echoed by all the operators and officials *Valor* contacted.

“If people don’t believe they can accomplish the job safely, then we would expect that they would say ‘No’ and we would support that decision and find another way to transport the patient,” Judge said. “We still need to take care of patients, but we don’t want anyone to put themselves or their families [at risk].”

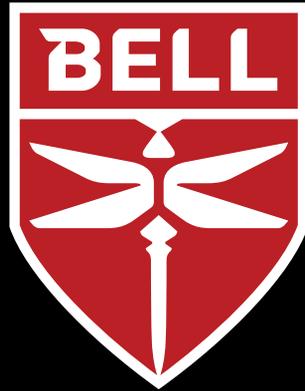
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U.S. Navy Photo: Patrick Menah Jr.



**GO ABOVE AND
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U.S. ARMY TAPS SIKORSKY RAIDER X, BELL INVICTUS FOR FARA FLY-OFF



Sikorsky Raider X. Sikorsky Image



Bell 360 Invictus. Bell Image

✦ BY DAN PARSONS

A field of five industry teams vying to build the U.S. Army's Future Attack Reconnaissance Aircraft (FARA) has been whittled to two, with Sikorsky and Bell coming out on top and headed for a face-to-face flyoff.

The Army chose Sikorsky's Raider X compound coaxial helicopter and Bell's 360 Invictus single-main-rotor design to continue into the competitive prototyping phase of FARA.

"The Future Attack Reconnaissance Aircraft is the Army's number one aviation modernization priority and is integral to effectively penetrate and dis-integrate adversaries' Integrated Air Defense Systems," said Dr. Bruce D. Jette, assistant secretary of the Army for acquisition, logistics and technology. "It will enable combatant commanders with greater tactical, operational and strategic capabilities through significantly increased speed, range, endurance, survivability and lethality."

FARA is split into three phases: preliminary design; detailed design, build, and test; and prototype completion assessment and evaluation for

entrance into a final production phase.

Five teams were awarded design, build and test contracts in April 2019. They were AVX Aircraft Co. partnered with L3Harris, Bell, Boeing, Karem Aircraft and Sikorsky. Bell and Sikorsky are now cleared for phase two, in which they will complete detailed design, build and test of their air vehicle solutions.

Bell's current contract is worth more than \$700 million while Sikorsky's total contract value is \$940 million, which includes significant internal research and development funding. The Army will cut funding to the other three teams.

Sikorsky's Raider X is a direct descendent of the S-97 Raider that has been in test for several years. The new concept retains the basic coaxial, rigid-main-rotor configuration with an aft pusher propulsor, but is 20 percent larger than the S-97.

Where the S-97 has a 34-foot (10.4-meter) main rotor diameter and is built around a GE YT706 engine, its evolutionary descendant will have a 39-foot (11.9-meter) main rotor diameter and be built to accept the GE T901 engine the Army has prescribed for FARA, according to Tim Malia, Sikorsky's

FARA program director.

Bell's offering is the 360 Invictus, a prototype design that on the surface is a conventional helicopter with single main rotor and canted, ducted tail rotor, but includes a supplemental power unit to boost it beyond 180 knots.

Invictus's design borrows the rotor system from the Bell 525, which the company notes has been flown at speeds above 200 knots in test flights. Invictus also will use a version of the 525's fly-by-wire flight control system.

The aircraft should have a combat radius of 135 nautical miles with more than 90 minutes of time on station and achieve 4k/95F hover out of ground effect (HOGE). At cruising speed, two "lift-sharing" wings, which are 24 feet tip-to-tip, will offload half the burden from the fully-articulated main rotors.

A government-sponsored fly-off between the two is scheduled for no later than the fall of 2023. The Army is aiming to fill the operational gap left by retiring the OH-58D Kiowa Warrior armed scout helicopter. The successful FARA should fit in a 40-foot by 40-foot box and achieve cruise speeds of 180 knots in forward flight.



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UT HEALTH EAST TEXAS WELCOMES FINAL EC135

Metro Aviation has delivered a new Airbus EC135 aircraft for the UT Health East Texas Air 1 air medical program. This aircraft, added to the existing fleet of three recently rebranded aircraft, has also been upgraded with single-pilot IFR (SPIFR) certifications. Headquartered in Tyler, Texas, the program will soon boast six precision GPS procedures at various hospitals and bases.

“We are excited we have the opportunity to replace our first VFR EC135 P1 and put it into a backup role,” said Michael Lawyer, director/ chief flight nurse at UT Health East Texas Air 1. “This will give us three EC135s with IFR capabilities.”

The GPS procedures, slated to be certified by the end of August 2020, will complement the latest aircraft

features, which include a medical configuration tailored to the needs of the Air 1 service area. Metro also outfitted the helicopter with mission-critical systems like Outerlink’s IRIS platform, providing satellite tracking, push-to-talk radio, flight data monitoring and voice and video recording.

“This new aircraft will have WAAS [Wide Area Augmentation System] and allow us to reach some of our patients during certain weather days that we would not have been able to reach before,” said Lawyer. “This brings added important safety features to our operations and provides a much-needed advantage to help us provide the best service and outcomes to our patients that we serve in the northeast Texas area.”



UT Health East Texas Air 1 now has three EC135s with IFR capabilities. **Metro Photo**

ROTORBITS ✈️

JAPAN COAST GUARD ORDERS 2 MORE H225s

Japan’s largest Super Puma operator, the Japan Coast Guard (JCG), has placed a new order for two Airbus H225 helicopters. This follow-on order brings JCG’s Super Puma fleet to 15, comprising two AS332s and 13 H225s. The new helicopters will be utilized for territorial coastal activities, security enforcement, as well as disaster relief missions in Japan.

“We thank the Japan Coast Guard for its continued confidence in the H225,” said Guillaume Leprince, managing director of Airbus Helicopters in Japan. “The H225 is well regarded as a reference in search-and-rescue operations and security enforcement, and we are certainly happy to see these helicopters effectively deployed in Japan through the years.”

“We have delivered three new H225s to JCG in the recent months, within schedule, and are committed to fully supporting its existing fleet as well as its upcoming deliveries, ensuring high availability for its operations.”

The JCG’s H225s are covered by Airbus’s HCare Smart full-by-the-hour material support. This customized fleet availability program allows the JCG to focus on its flight operations while Airbus manages its assets.



The follow-on order brings the Japan Coast Guard’s Super Puma fleet to 15, comprising two AS332s and 13 H225s. **Anthony Pecchi Photo**

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Bell V-280 Valor. **Bell Photo**



BELL'S VALOR, SIKORSKY/ BOEING DEFIANT ADVANCE IN U.S. ARMY FUTURE ASSAULT AIRCRAFT PROGRAM

✖ BY DAN PARSONS

Sikorsky/Boeing SB>1 Defiant.
Lockheed Martin Photo



Bell's V-280 advanced tiltrotor and the Sikorsky-Boeing SB>1 coaxial compound helicopter are now the two official contenders for the U.S. Army's Future Long Range Assault Aircraft, or FLRAA.

The Army announced the competitive demonstration and risk reduction (CD&RR) contracts March 16, after a protracted industry-led demonstration program that launched both aircraft and gathered reams of data on their flight characteristics.

The Army's Aviation program office, working with Army Contracting Command at Redstone Arsenal, Alabama, awarded the project agreements under the Aviation and Missile Technology Consortium Other Transaction Authority (OTA). Using OTAs allows the Army more flexibility than the Defense Department's traditional contracting process, but also does not require the service to publish contract amounts.

The new CD&RR agreements extend

for two years, informing the final Army requirements and the program of record planned for competition in 2022.

"These agreements are an important milestone for FLRAA," said Patrick Mason, program executive officer for Army Aviation. "We will be conducting analysis to refine the requirements, conceptual designs, and acquisition approach. Ultimately, this information and industry feedback are vital to understanding the performance, cost, affordability, schedule risks and trades needed to successfully execute the FLRAA program."

FLRAA is the program of record that resulted from years of investment into the Joint Multi-role Technology Demonstrator (JMR-TD) program that sought to study what leap-ahead vertical lift capabilities industry could deliver on relatively short notice.

Both the SB>1 Defiant and V-280 Valor were financed partially by the

U.S. government through the JMR-TD program and partially through each company's internal research and development funding, to the tune of more than half a billion dollars each. Funding for the new CD&RR phase is flipped, with government covering two thirds of the funding and industry pitching in one third.

That public-private teamwork played a major role in the decision process, according to Brig. Gen. Wally Rugen, director of the Army's Future Vertical Lift (FVL) Cross-Functional Team.

"I'm very proud of the collaborative work done by this team of teams and excited about the award of the OTA agreements for the CD&RR efforts to continue burning down risk and setting conditions for the FLRAA program four-year acceleration," Rugen said. "We appreciate the support from Congress and Army senior leaders that postures FLRAA for a stable and executable program of record."

Informed by the development and operational experience of the Bell-Boeing V-22 Osprey, the V-280 has tilting nacelles and large side doors. Bell got out to an early lead and has been flying aggressively since December 2017. Since then it has achieved speeds of 300 knots in forward flight. In late 2019, Valor demonstrated an end-to-end autonomous flight.

For JMR, Boeing teamed with Sikorsky, now owned by Lockheed Martin, on its coaxial X2-inspired Defiant. The 30,000-pound coaxial rigid-rotor design includes a pusher propeller like its smaller cousin the S-97 Raider.

Defiant first flew in March 2019, lifted off twice more in April 2019 and then was earthbound for several months while engineers sorted out a bearing creep issue found on the ground-based propulsion system test bed.

Defiant returned to flight in late September 2019 and ramped up the pace of flying in 2020. It has achieved speeds of at least 100 knots and plans are to reach at least 250 knots.

SCAA LAUNCHES SECOND AIR AMBULANCE HELICOPTER



SCAA has doubled its capability, with a second helicopter service (callsign Helimed 79) launched from an additional base at Aberdeen International Airport. **SCAA Photo**

A new air ambulance recently took to the skies as Scotland's Charity Air Ambulance (SCAA) launched its second life-saving emergency response helicopter, an Airbus EC135.

The only charity of its type in Scotland, SCAA has operated a single-aircraft, nationwide helicopter emergency medical service (HEMS) since 2013 from its base at Perth Airport, saving and impacting on thousands of lives. Now the charity has doubled its capability with a second helicopter service (callsign Helimed 79) launched from an additional base at Aberdeen International Airport.

Together, the charity's two air ambulances will cover the whole of Scotland, working alongside two government-funded helicopters and two fixed-wing aircraft — all tasked through the country's 999 emergency response service.

John Bullough, founding chairman of SCAA, described the launch as a "major milestone" for the charity.

"There's never been a more crucial time for additional emergency pre-hospital care resources in Scotland, and SCAA is proud to be able to strengthen the country's air ambulance fleet. Within seven years,

this relatively young charity has been able to sustain one helicopter and then fund a second, which is a remarkable achievement for everyone involved — not least the public, whose generous support funds our entire life-saving service.

"During these difficult times, the demands on frontline emergency services has never been greater, and we hope the public will continue to support us — ensuring that, with the launch of Helimed 79, we can fly more care, more quickly, to more people wherever the need arises in Scotland. We wish Helimed 79, her long-serving stablemate Helimed 76 and their experienced and professional crews safe flying in the years to come."

SCAA chief executive David Craig said the charity's new air ambulance asset was launching in "unprecedented and challenging times."

"The need for air ambulance resources in Scotland is proven," he said, "and we stand ready to deploy Helimed 79 and 76 as and when they are required by the Scottish Ambulance Service. Our new air response asset in Aberdeen will serve not only the north east but the whole of Scotland as and when required during these difficult times and into the future."



Samantha Poirier went from flying air tours to becoming a HEMS pilot with UHealth LifeLine, where she is the organization's first and only female pilot. Photo courtesy of e.Moon Photography

LIFE-SAVING AIR MEDICAL TRANSPORT INSPIRES CAREER SHIFT FOR COLORADO PILOT

✦ BY DAYNA FEDY

What was supposed to be a typical day of flying in Wenatchee, Washington, for Samantha Poirier turned into a day she'd never forget. It was June 2016, and Samantha was spending her days flying air tours, doing wildlife surveys, wine tours, and drying cherry trees by helicopter. That morning she got a phone call at around 2 a.m. informing her that her sister, Savanna, was involved in an ATV accident while camping in the mountains in Colorado, and had sustained life-threatening injuries. From there, everything changed.

"It was pretty traumatic for my family," said Samantha. "You go from living happy, healthy lives, to all of a sudden everything has been turned upside down."

Prior to working in Wenatchee — and while she was going through flight school to obtain her rotorcraft add-on in addition to her fixed-wing pilot's license — Samantha worked at the front desk at Northern Colorado Regional Airport, and also assisted with aircraft refueling. There she met a UHealth LifeLine flight crew based out of Medical Center of the Rockies in Loveland, Colorado. (UHealth LifeLine, formerly known as Air Link, is an air and ground critical transport system, which utilizes helicopters operated by REACH Air Medical Services.) After getting on the first flight to Denver to see her sister, who was in a coma in an intensive care unit (ICU), Samantha learned that the Air Link (now LifeLine) crew she became friends with years ago was the same flight crew that transferred Savanna to the ICU.

"The pilot I knew well, and both the nurse and paramedic who worked on my sister and saved her life that night, I knew very well," said Samantha.

"My last memories [from that day] were that it was still daylight . . . we were setting up camp and gathering firewood," recalled Savanna. "And then I woke up in the hospital being told that I sustained very serious injuries. My first visuals were seeing my sister and my family standing around a bed. . . . It's still a very scary thing to process that I went through."

After Savanna was discharged from the hospital and worked through her recovery, the Poirier sisters went to Loveland to visit and say thank you to the crew that saved Savanna's life.

"I remember feeling like I couldn't quite thank them enough," said Samantha. "And it just clicked in my head that I



Samantha Poirier (left) and her sister Savanna Poirier sit in the AS350 that transferred Savanna to an ICU, saving her life, after she was involved in an ATV accident. **Photo courtesy of Samantha and Savanna Poirier**

had to repay this. Being a pilot, I know I was always interested in [air medical], but it's a far-fetched career because it has specifications and certifications. And at the time I didn't have my instrument rating, so that was a huge thing that I had to go back to school for — which was time and money. As well as getting the needed flight hours."

After spending time building her flight hours by flying her familiar air tour and cherry-tree drying jobs, Samantha got her instrument rating and applied for jobs with three different air medical operators, eventually ending up at REACH — a service close to her heart, which she said had a great management team.

"I told them my goals and said I would eventually want to be back in Colorado — it's a pretty highly desired state to work in," said Samantha, "and they understood that and took that into consideration."

While on her way to REACH's main headquarters in California, another phone call changed things for Samantha in a positive way. She got re-based to Loveland — the base that was home to the crew who saved her sister's life, and also a base that Samantha described as a "far fetch."

"There are only four pilots who work at this base, it's a really low-turnover base

. . . so it was just one of those meant-to-be sort of [deals]," she said.

The Loveland base, located at UHealth Medical Center of the Rockies, is known as LifeLine 1, and utilizes a REACH Airbus H125 to respond to critical care calls. It's a hybrid base with UHealth LifeLine, meaning "the med crew works for UHealth, and the pilot, the mechanic, and the helicopter is owned by REACH; it's a little bit different than most bases," explained Samantha.

A second base, LifeLine 2, is located at UHealth Memorial Central Hospital in Colorado Springs, and also utilizes a REACH H125.

Samantha's base transfer brought her into the UHealth family where, unbeknownst to her, she made history — becoming the service's first female pilot.

"If you were to say, 'Describe it in one word'... it's honorable," said Samantha. "I'm just very proud to be able to be that first person. As well, I grew up here . . . in a hometown that's just five miles south of this base, as well as the hospital that saved my sister's life. There are just so many little things that make me extremely proud to be able to pave the way and be the first female here."

Working with REACH in Loveland, Samantha was required to complete various courses, including mountain flying and night vision goggle training, before she was able to start working the line. Her first three months at the base, Samantha was flying the same aircraft that transferred her sister — an AS350 B3+. While she works with different flight nurses and paramedics every day, her very first flight coincidentally was with her sister's life-saving crew, flying that same AS350 B3+.

"It was pretty ironic that the first time I transferred a patient, it was with my sister's same crew and the same helicopter," Samantha added.

She also had the honor of ferrying that aircraft to California to retire it out of the company, landing the helicopter on the anniversary of her sister's accident.

Now, Samantha flies the H125, which was an update to REACH's fleet.

Every flight takes off with a crew of three — ideally a flight nurse, flight paramedic, and, of course, a pilot. Samantha said UHealth/REACH allow flights with two flight nurses if the service is unable to get a flight paramedic, however, they will not fly with two paramedics.

There are two types of flights that the LifeLine 1 base carries out: inter-facility transfers, which means transferring a patient from a lower-level hospital to a higher level of care; and on-scene calls, which see the REACH aircraft land right at, or near the site of an accident — in an area that is safe for the crew and helicopter.

The LifeLine 1 base is situated at 5,000 feet, with 14,000-foot mountains just a 15-minute flight away. "You have to respect the mountains at all times," said Samantha. "Even on a perfect, blue-sky day, you're probably going to get rocked by turbulence."

The H125 at the LifeLine 1 base has a complete glass cockpit with the Genesys HeliSAS autopilot system, which Samantha said "helps take some pressure off of us when we're in an intense situation." Working with a great medical crew helps, too.

"The med crew here is phenomenal, they're second family to me," said Samantha. "The facilities and the program manager, they're all second to none. And flying one of the nicest helicopters in the industry is also amazing.

"Being able to give back is truly what it's about for me, though," she added. "I took this job because a crew like the crew I'm a part of changed my family's life forever. When a patient's family comes back in, and then shakes my hand and says thank you for saving their life . . . that's truly my payday."

For Samantha, she couldn't have asked for anything more. "I love working for REACH and working with UHealth," she said. "Do I want to transfer bases? Absolutely not. I'm 100 percent where I hope to finish out my career."

CORNWALL AIR AMBULANCE EXPECTS NEW AW169 WILL SAVE TIME & LIVES



The next-generation AW169 helicopter will replace Cornwall Air Ambulance's MD 902 Explorer. **Greg Caygill Photo**

✦ BY GREG CAYGILL

Cornwall Air Ambulance is celebrating the arrival of a new Leonardo AW169 helicopter, which will replace the service's MD 902 Explorer. The next-generation air ambulance helicopter will ensure the charity's critical care paramedics can reach even more people in their hour of need.

Taking to the skies in 1987, Cornwall Air Ambulance was the first air ambulance service in the U.K. It has now completed more than 28,000 missions, saving countless lives. The helicopter flies more than 800 missions every year and is on scene in an average of 12 minutes on mainland Cornwall, and less than 30 minutes on the Isles of Scilly. As a charity, it does not receive any government support but relies on the generosity of public donations, which have helped raise more than US\$2.8 million towards the new helicopter as well as to fund the service each year.

After in-depth research, the charity identified the AW169 as the helicopter to help save more time and more lives. The helicopter was built in Italy by manufacturer Leonardo, and was then brought to the U.K. to be fitted with a special medical interior. The aircraft was delivered on Feb. 25 to Cornwall Air Ambulance Trust, based at Cornwall Airport Newquay, and was deemed mission-ready on April 1 to respond to emergencies across Cornwall and the Isles of Scilly.

Air operations officer Steve Garvey leads the dedicated crew of Cornwall Air Ambulance critical care paramedics. Garvey joined the aircrew in 2009 and now has over 2,200 missions under his belt. Explaining why the charity chose the AW169, he said: "It is faster — travelling at 145 knots instead of the previous 120 knots — more powerful, and has double the fuel range of our current aircraft, which crucially means the crew will be available to fly more missions back-to-back without having to

refuel. The quicker we get to a patient, the sooner we can start their treatment and improve that patient's outcome."

Garvey's main priority in choosing the AW169 was that it would help the team improve the care they give their patients. He said: "Part of this was about having the ability to carry more medical equipment, so we can make more lifesaving interventions on scene. The extra power of the AW169 will allow us to do this. It gives our team 360-degree access to the patient with a stretcher down the middle, whereas in our current aircraft, the MD 902, we can only treat them from one side. It may sound simple, but having the extra space to allow two crew members to work on a patient will greatly improve the care we can give."

In 2019, the critical care team were tasked to 1,144 missions across Cornwall and the Isles of Scilly. On average, nearly 60 percent of missions are in response to medical emergencies and the remainder are

due to severe trauma injuries, such as falls and road traffic collisions (RTCs). One in four missions are for patients suffering cardiac arrest, while one in 10 are to help children.

Chief pilot captain Adam Smith, who has flown both the current MD 902 and the new AW169 aircraft, enthused: “There are many upgrades in the aircraft that will make a real difference to operations here. The AW169 is more ergonomic and has some of the most advanced navigation capabilities to offer in the industry. It has an auxiliary power unit that allows us to shut down an engine and stop the rotors while maintaining electrical power. This will help to reduce disruption at scene — for instance, if we land on a busy beach in the summer.”

He added: “There are increased safety features such as a rear camera to check the engines, and the clinical crew will also have TCAS warnings in their headsets in the back, so they are alerted to other nearby aircraft. It is great to fly, and from the training flights we have conducted so far we are already seeing the difference in timing to locations across the county — which will make a huge difference when we are on an emergency mission.”

When asked about the percentages of landing at a scene without support already there, Smith replied: “It’s about 50/50 of landing on our own. It obviously moves away from the beaches in the winter when we have more RTCs and incidents in the more inaccessible areas of moors, etc.”

Given the county’s isolated beaches, rural settlements, and challenging road networks, Cornwall Air Ambulance is considered a lifeline. The charity believes the AW169 will improve the quality of care patients receive, giving them an even better chance of survival. The extra space, technologically advanced features, and ability to carry more medical equipment will enable an emergency department to be created in the back of the helicopter. Garvey added: “We will in effect be taking the hospital to the patient, whether they are on a cliff top, roadside, living room or beach.”

BOEING DELIVERS FIRST CH-47F TO RNLAF

Boeing recently delivered the first CH-47F Chinook to the Royal Netherlands Air Force (RNLAF). The RNLAF will operate a fleet of 20 CH-47F Chinooks, the newest configuration in use by countries around the world.

“The RNLAF made it clear to us that they need the advanced, proven capability of the CH-47F now,” said Andy Buita, vice president of cargo and utility helicopters and H-47 program manager. “I want to thank our phenomenal team for working hard during a difficult situation to safely deliver these aircraft. This is a reminder to all of us of how important Chinooks are to our customers.”

The fleet of 20 CH-47F Chinooks will be equipped with the same technol-

ogy used by the U.S. Army, including digital automatic flight controls, a fully-integrated Common Avionics Architecture System (CAAS) glass cockpit, and advanced cargo handling capabilities. The common configuration leads to lower overall life cycle costs.

The RNLAF currently flies a mix of F-model Chinooks with the Advanced Cockpit Management System (ACMS) and CH-47D Chinooks.

Deliveries to the RNLAF are expected to continue into 2021. Chinooks are currently in service or under contract with 20 international defense forces, including the U.S. Army, U.S. Special Operations Forces and eight NATO member nations.



The RNLAF will operate a fleet of 20 CH-47F Chinooks, which will be equipped with the same technology used by the U.S. Army. **Fred Troilo/Boeing Photo**

JOLLY GREEN II HELICOPTER COMPLETES EXTREME TESTING



An HH-60W Jolly Green II sits under bright lights used to create heat in the McKinley Climatic Lab on March 19 at Eglin Air Force Base, Florida. The aircraft was tested in temperatures as high as 120 F. **USAF/Samuel King Jr. Photo**

An HH-60W Jolly Green II, the U.S. Air Force's new combat search-and-rescue helicopter, has completed a month-long trial of extremes inside the McKinley Climatic Lab.

The Sikorsky test aircraft endured real temperatures ranging from -60 to 120 F (-51 to 49 C) as well as 45-mph (72-km/h) winds coupled with heavy rainfall. All of those scenarios were created within the lab's 55,000-square-foot test chamber.

The goal of these punishing tests was to prove the new aircraft's sustainability in any operational environment.

"Operating the HH-60W in the

extreme conditions was a truly unique experience as a pilot and a tester," said LCol Ryan Coates, an 88th Test and Evaluation Squadron (TES) pilot, who performed most of the testing.

"Checking system performance under the stress of heat, cold, heavy wind and rain will give us real-world data regarding the helicopter's capability to perform the rescue mission worldwide in various environments, which is exactly what the operator needs to make solid employment decisions."

Once the lab technicians created the extreme environments, aircrew would enter the aircraft and perform various

test procedures. The crew would execute their preflight checklists and perform tasks to see if the extreme conditions affected any of the avionics, electronics, engine and other systems.

The aircrew performing the procedures were also test subjects themselves. Their own reactions and movements were evaluated in the harsh environment. For example, the cold-weather gear worn by the aircrew is much bulkier than a standard flight suit. One of the evaluations was to ensure the pilots could easily reach all of the aircraft controls in the thicker cold-weather gear.

A significant amount of the test schedule was dedicated to preparing the chamber for the extreme conditions. McKinley's lab professionals create, break-down, and recreate again for each new test environment. Technicians worked continuously to go from a superheated 100-degree desert condition to a below freezing icebox in only three days.

The Jolly Green II created some unique challenges for McKinley Lab personnel. The lab technicians created a system specifically for the HH-60W to remove the aircraft's exhaust. Thorough exhaust removal is a critical part of maintaining the controlled temperature conditions needed for chamber testing, according to lab technicians working on the test.

The design of the ventilation system meant the aircraft's blades were removed for the duration of the testing. The lab's in-house fabrication shop also specially designed brackets for the aircraft's weapons, among other items.

"Successful completion of this test is absolutely shared with the Sikorsky and McKinley teams," said Ben Walker, the lead 413th Flight Test Squadron (FLTS) test engineer for the effort and Air Force PALACE Acquire journeyman. "Everyone worked together extremely well and we completed on time and on budget. I am very thankful for this opportunity to perform exciting engineering work, while also supporting the warfighter."

After testing in the climatic lab, the HH-60W will return to Sikorsky's test facility in West Palm Beach, Florida, for further evaluation. The HH-60W developmental test program is a joint effort between Sikorsky, the 413th FLTS, the 88th TES and Air Force Operational Test and Evaluation Center.

"Testing on the Combat Rescue Helicopter continued amidst the chaos of COVID-19," said Lt. Col. Wayne Dirkes, the 413th FLTS operations officer. "While the situation could change at any moment, we have not lost any test schedule thus far. That is a testament to the entire team's attitude and willingness to work through challenges."

Three British Army AW159 Wildcats are among the Leonardo helicopters providing support during the COVID-19 crisis. **Leonardo Photo**



LEONARDO SUPPORTS CIVILIAN AUTHORITIES, U.K. MOD DURING COVID-19 CRISIS

During an unprecedented health emergency in Italy, Leonardo has continued to provide resources and people in support of national institutions' management and containment of the COVID-19 pandemic.

Leonardo has undertaken a series of solidarity initiatives to support the efforts made by people who are working to guarantee the containment of COVID-19 on a daily basis, as well as assistance to those affected by coronavirus.

The company's Helicopters Division has made its pilots and three helicopters (two AW139s and one AW189) available in different configurations, providing technical support to the Armed Forces' helicopter fleet, organizations, institutions, police forces and to all Leonardo helicopters engaged in the emergency.

Three British Army AW159 Wildcat helicopters have also been deployed to support the U.K. Ministry of Defense's (MoD's) efforts in tackling the COVID-19 pandemic.

The Army Air Corps helicopters are operating out of RNAS Yeovilton and cover the South of England as required by the U.K. government's response to COVID-19, alongside Royal Air Force helicopters from RAF Odiham and RAF Benson.

"Leonardo is proud to support the U.K. Ministry of Defense's COVID-19 operations with its AW159 Wildcat helicopters as the country comes together to tackle this pandemic," said Norman Bone, chairman and managing director of Leonardo UK.

At the Leonardo-Grottaglie site, the aerostructures division has launched the first production batch of valves through additive manufacturing technology (3D printing). These will support Brescian company Isinnova's plastic valve project that modifies a particular model of snorkeling mask and transforms it into respirators for sub-intensive therapies. The same initiative will be carried out at Leonardo's Electronics Division at the La Spezia site.

A Maryland State Police Aviation Command AW139. MSP Photo



MARYLAND STATE POLICE MARKS HALF-CENTURY OF HELICOPTER EMS

✦ BY DAN PARSONS

Fifty years ago, on March 19, 1970, Maryland State Police flew its first helicopter medevac mission, marking the beginning of half a century of life-saving air ambulance service in the state.

That mission was flown by Maryland State Police “Helicopter 108,” a Bell 206 JetRanger crewed by pilot Cpl Gary Moore and medic Trooper First Class Paul Benson. The aircraft and crew were called to the scene of a motor vehicle accident with injuries at the intersection of Baltimore Beltway and Falls Road.

The two troopers flew the injured motorist to the Center for the Study of Trauma, known today as the University of Maryland R. Adams Cowley Shock Trauma Center in Baltimore.

“It took about three weeks before we got our first call because it was all new all over the state,” said retired lieutenant colonel Gary Moore in a

Maryland State Police video published online March 19. “That particular morning in 1970, Paul [Benson] and I were the duty crew and landed on the highway, picked that patient up and took him down to the trauma center. That patient did live.”

The successful air ambulance mission marks the formal expansion of the Maryland State Police into emergency medical services and the first time a non-military agency transported a critically-injured trauma patient from a scene by medevac helicopter.

“We are a proud partner in an amazing system of emergency medical services personnel and resources that includes the dedicated fire and EMS personnel on the scene and the incredible nurses, doctors and support personnel at trauma centers and hospitals throughout Maryland,” Maryland State Police Superintendent Col Woodrow Jones III said during a recent ceremony marking the anniversary.

In the half-century since that first mission, the Maryland State Police Aviation Command has completed at least 180,000 missions and transported more than 150,000 patients. The Aviation Command currently has a fleet of 10 Leonardo AW139 helicopters that are assigned to seven sections located in Allegany, Frederick, Baltimore, Prince George’s, St. Mary’s, Talbot and Wicomico counties.

The department in recent years has rescued hikers in Maryland’s mountains and kayakers from the Potomac River and most places in between.

The aviation program has not been immune to loss during its long run. In 50 years, one airplane and four helicopter crashes claimed the lives of nine state troopers and one emergency medical technician.

The Maryland State Police Aviation Division medical mission profile began in November 1960 with a Hiller UH-12E helicopter used primarily for police missions but also performing “medical support.” That entailed transporting patients such as heart attack victims and expectant mothers during snowstorms, or other emergencies. Medical rescues were performed with the Hiller as early as 1966, but without comprehensive en route care.

The Department then flew a fleet of JetRangers until the late 1980s, when it upgraded to the Eurocopter (now Airbus) AS365 Dolphin helicopter, which added a second engine, increased speed and provided enough space for two patients. In 2013, the program again upgraded to the AgustaWestland (now Leonardo) AW139.

Additional safety equipment and measures were incorporated, along with the addition of a second pilot and a second medical provider to the standard flight crew. The round-the-clock mission of the Aviation Command has grown to include aerial rescue, homeland security support, search-and-rescue and disaster assessment.



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USAF LAUNCHES EVTOL SOLICITATION, WITH AN EYE TOWARD PROCUREMENT IN THE NEXT 3 YEARS

✦ BY GERRARD COWAN



The U.S. Air Force's new Agility Prime project aims to encourage the development of the U.S. eVTOL market, assisting companies with testing, certification, and other key focus areas and accelerating the fielding of promising technologies for the government.

The Agility Prime initiative is being driven by an integrated product team spearheaded by the Program Executive Office for Air Force Mobility, which is based at Wright-Patterson Air Force Base in Dayton, Ohio. An Innovative Capabilities Opening (ICO) was published on Feb. 25, outlining the core goal of establishing "a collaborative strategy with industry and investors that accelerates fielding of the most promising technologies for savings and utility to the government, as well as potential commercial market success."

The ICO noted that as the systems mature towards certified commercial operations, "the government will identify opportunities for early adoption, with the potential for procurement and fielding in the next three years."

The Air Force outlines interest in a broad swathe of technologies, with core focuses including emerging eVTOL and urban/advanced air mobility (UAM/AAM) aircraft, though it notes that alternatives will be considered. The ICO states that the aircraft may incorporate non-traditional electric or hybrid propulsion for manned or optionally manned missions, with onboard pilot, remote pilot, or autonomous control.

The opening outlines an array of goals, though fundamentally it aims to test the hypothesis that eVTOLs could

revolutionize mobility based on five key factors: lower maintenance cost and time due to mechanical simplicity; improved safety and declining personnel demands through the use of autonomy; affordable quantity due to potential mass production; improved acoustics, employing distributed propulsion; and greater flexibility and reduced infrastructure needs, with runway independence.

"To mitigate risk, this hypothesis will initially be tested outside of the urban environment in scenarios that could potentially open a broad public-use market for early government adoption prior to civil certification in a way that accelerates UAM," it states.

The ICO refers to the vehicles as "ORBs," which can be interpreted in various ways. They "are not drones,



Joby Aviation's S4 eVTOL prototype, which is backed by more than \$720 million in funding from investors including Toyota. **Joby Photo**

cars, helicopters, trucks, airplanes, motorcycles, or SUVs, but might support similar missions," the ICO states. "Given their flexibility, an ORB could act as an organic resupply bus for disaster relief teams, an operational readiness bus for improved aircraft availability, and an open requirements bus for a growing diversity of missions. ORBs could enable distributed logistics, sustainment, and maneuver, with particular utility in medical evacuation, firefighting, civil and military disaster relief, installation and border security, search-and-rescue, and humanitarian operations."

In a media briefing following the publication of the ICO, Agility Prime team lead Colonel Nathan Diller, assistant director of aeronautics at the White House Office of Science and Technology Policy, outlined two core

goals of the project. First, he noted the development of new flying platforms, with the Air Force keen "to make sure that we are potentially a part of that, if that provides additional capability for our operators and the potential of savings for the taxpayer."

Second, this would be done in a way that boosts the industrial base, creating new options for companies so that "we can accelerate the potential value that comes from that market and do it in a way that creates value to the DoD [Department of Defense] as well as the industrial base," he said.

At a media roundtable ahead of the publication of the ICO, Dr. Will Roper, assistant secretary of the Air Force for acquisition, technology and logistics, said the aim is to catalyze the commercial market by bringing the military market to bear. It is important that this commercial market first catalyzes in the U.S., he said, pointing to the example of the small drone market as a warning.

"It was a commercial technology, the Pentagon didn't take a proactive stance on it, and now most of that supply chain has moved to China," he said. "If we had realized that commercial trend and had shown that the Pentagon is willing to pay a higher price point for a trusted supply chain drone, we probably could have kept part of the market here and not have to go through the security issues we do now when someone wants to use a foreign-made drone at some kind of Air Force or service event."

The ICO will be continuously open until the end of February 2025, and will be broken into a series of future Areas of Interest (AOIs) that will request briefs and proposals for new solutions or capabilities. The first of these — AOI 1 — was published alongside the ICO, focusing on platforms with a payload of three to eight personnel, a range of more than 100 miles (160 kilometers), a speed of more than 100 miles per hour, endurance of over 60 minutes, and a first full-scale flight set to take place before Dec. 17, 2020.

Diller referred to this AOI as an "air race to certification." AOI 1 will take place across a number of stages, Diller said. First, it will request details about planned commercial technologies and the market that different companies are looking to access, before identifying which technologies are likely to result in successful prototypes. He stressed that the aim is not to write explicit requirements and pay for R&D to achieve these requirements; rather, it will take feedback from industry, identify technologies, and create opportunities for collaborative test planning, potentially using DoD or other government test assets and expertise.

The aim is to eventually develop a test report that will help "test the hypothesis that has been posed by the urban air mobility or advanced aerial mobility markets — that this is a revolutionary approach to mobility." There would then be an opportunity to leverage the test campaign for near-term airworthiness authorizations that would allow for very near-term government use cases "in a way that ideally . . . is accelerating civil certification, potentially providing revenue and data that accelerates the broader adoption of this technology and potential further development of the technology."

The U.S. Marine Corps will also partner with the Air Force on its Agility Prime initiative, said Carmine Borrelli, deputy of the Logistics Innovation Office supporting the Marine Corps Warfighting Lab.

The partnership with the Air Force dovetails with the Marines' broader efforts to develop "unmanned logistics systems — air" (ULS-A) in small, medium, and large sizes, including models with conventional, electric, and hybrid-electric propulsion systems. The expanded use of drones for cargo transportation promises to reduce risks associated with moving cargo by ground, as well as free up conventional aircraft for other missions.

**DRF LUFTRETTUNG USES
“EPISHUTTLES” TO PROTECT
PATIENTS, CREWS**

DRF Luftrettung is investing in the protection of patients and its crews to ensure that people in medical emergencies can still be rescued as fast as possible during the COVID-19 crisis. Two of DRF’s helicopter emergency medical services (HEMS) bases have been equipped with isolation stretchers known as “EpiShuttles.”

A further eight HEMS bases will soon follow suit. These stretchers will not only help crews save valuable time, but will

also afford them optimum protection. The newly equipped HEMS bases will be ready for action after each operation more quickly, as the very time-consuming disinfection of helicopters after missions with corona-infected patients will no longer be necessary.

“The innovative ‘EpiShuttles’ enable patients to be transported as if in an intensive care unit. The person lies under a transparent cover and can be connected to an intensive respiratory device via air-tight access points while being monitored and treated at the same time,” explained DRF Luftrettung medical director, Dr. Jörg Braun. An “EpiShuttle” currently costs about US\$44,400.



The innovative “EpiShuttles” enable patients to be transported as if in an intensive care unit. **EpiGuard Photo**

**AUK PROTECTION SECURES
MAJOR FLIGHT SUIT CONTRACT**

AUK Protection has signed a contract with the Swedish Maritime Administration (SMA) regarding the supply of high-performance AUK flight suits and pants for search-and-rescue (SAR) helicopter crews.

The SMA operates out of five strategic bases along the Swedish coastline.

Its crew will now have access to AUK flight suits and pants that have been specifically designed with safety and comfort in mind.

“We are happy to have secured the order,” said Michael Elmeskog, CEO of AUK Protection. “The premium quality of our products was well known among most private operators, but with this order, we have gained the trust of a large public actor, which we are very proud of.”

ROTORBITS ✦

**AIR METHODS ANNOUNCES
2 IN-NETWORK
AGREEMENTS**

Air Methods has reached an agreement with Avera Health Plans and DAKOTACARE to provide in-network coverage for its consumers. The agreement will protect both Avera Health Plans and DAKOTACARE members from unplanned financial liability for Air Methods’ services.

Air Methods operates Black Hills Life Flight, based out of Rapid City, South Dakota, which serves the state’s greater Black Hills region. Under this agreement, Rocky Mountain Holdings (Black Hills Life Flight) has agreed to accept the amount allowed by Avera Health Plans and DAKOTACARE as full settlement of their charges in South Dakota, Nebraska and Iowa.

This agreement includes all the air ambulance services operated by Rocky Mountain Holdings. With this agreement, Air Methods is now in-network with 54 commercial health plans.

Chris Myers, executive vice president of reimbursement for Air Methods, said the agreement “will protect our patients from thousands of dollars in unplanned financial liability when an episode of medical care involves the need for air ambulance transportation.”

As Air Methods continues to work towards additional in-network agreements, its patient advocacy program also supports patients with insurance bills when their air medical care and transportation is an out-of-network benefit. ✦

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 SIKORSKY UH-60 MEDEVAC BLACK HAWK RETURNS TO BASE IN POWIDZ, POLAND, AFTER COMPLETING A TRAINING EXERCISE. **BRYCE POTTER PHOTO**





✦ NEW YORK CITY POLICE DEPARTMENT AVIATION UNIT CREWS PATROL THE SKIES IN A BELL 412EP. PHOTO COURTESY OF INSTAGRAM USER [@TANKS_AND_HELICOPTERS](https://instagram.com/tanks_and_helicopters)





BABCOCK MCS ITALIA AIRBUS H145 HEMS HELICOPTER DURING AN AVALANCHE TRAINING MISSION IN NORTHERN ITALY. **ALBERTO BETTO PHOTO**





✦ THE FIRST U.S. NAVY CMV-22 CARRIER ONBOARD DELIVERY VARIANT OF THE V-22 OSPREY FLIES A FAREWELL FORMATION WITH THE LAST VX-20 C-2 GREYHOUND ON MARCH 9, 2020, NEAR NAVAL AIR STATION PATUXENT RIVER IN MARYLAND. **USN PHOTO BY ERIK HILDEBRANDT / RELEASED**



U.S. COAST GUARD MH-60 JAYHAWK DURING A SEARCH-AND-RESCUE DEMONSTRATION AT AIR STATION KODIAK IN ALASKA. **BRADLEY PIGAGE PHOTO**



NEW TO THE

Frontlines

WE CHECKED IN WITH A VARIETY OF COMPANIES THAT WERE EXHIBITING NEW PRODUCTS GEARED TOWARD THE PARAPUBLIC AND MILITARY HELICOPTER SECTORS AT THIS YEAR'S HAI HELI-EXPO IN ANAHEIM, CALIFORNIA. HERE'S WHAT WE SAW ON THE SHOW FLOOR.

BY DAYNA FEDY



TYLER TECHNOLOGIES

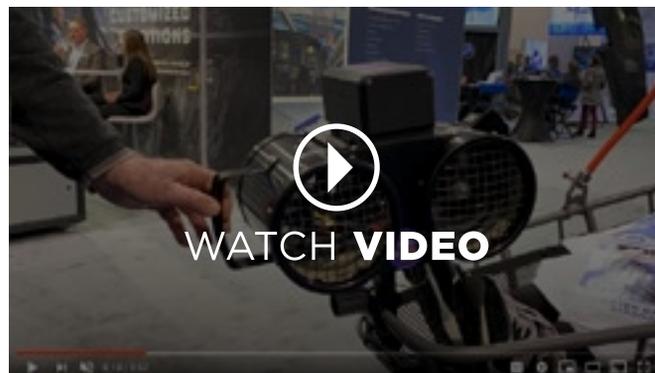
NO•SPIN litter basket stabilizer

Tyler Technologies, manufacturer and developer of Tyler Special Operations Platform (TSOP), is introducing a new litter basket stabilizer to the rotorcraft market that will help make rescue hoist operations safer.

The module, called the Tyler NO•SPIN litter basket stabilizer, uses two powerful gyro-controlled thrusters to counter the rotation of a litter basket, preventing it from spinning during flight. When switched on, the Tyler NO•SPIN module analyzes where the basket is sitting, and is then able to detect and correct even the smallest movements away from its forward-facing position.

The stabilizer “stops the basket from spinning in any weather condition, in any kind of wind; it will counter the wind and the rotor wash,” explained Nelson Tyler, company CEO and creator of the Tyler NO•SPIN. “And when the helicopter is flying along, the GPS in the stabilizer turns the basket so it follows the ship, instead of dragging the patient along sideways.”

Weighing only 12 lb. (5.5 kg), the Tyler NO•SPIN stabilizer



can be installed on any litter basket in less than a minute, without the need for tools. The module uses a specially designed clip that can be adjusted to fit any type of basket, and is then secured by a pip pin.

The Tyler NO•SPIN stabilizer is powered by one snap-on rechargeable 96Wh lithium iron phosphate battery.

At press time, Tyler said the company was in the beginning stages of production, with a goal to start selling units in early May.

BUCHER H135 AC67 flex cabin

Bucher Leichtbau AG is providing flexibility to Airbus H135 operators with multi-mission roles, including helicopter emergency medical services (HEMS). The H135 HEMS AC67 flex cabin, which Bucher demonstrated at Heli-Expo 2020, is a modular cabin interior that can be assembled/disassembled with Bucher's quick release system in roughly 30 minutes to change the mission configuration of the helicopter.

"If the customer is not already a dedicated HEMS operator, they can install the [AC67 flex cabin] equipment within 30 minutes for a HEMS mission, and then maybe they have a cargo mission after," said Rolf Kraus, director of sales and programs at Bucher. "That's the advantage — that you don't [assign] the helicopter to HEMS missions only."

The AC67 flex cabin has numerous possible configurations — all approved under one supplemental type certificate. The HEMS configuration features two medical crew seats and a stretcher system. Also available are the helicopter intensive care medical system (HICAMS) configuration (three medical crew seats, a stretcher system, and multiple stowages) and the disaster management configuration (two medical crew seats and a dual stretcher system).



The AC67 flex kit also includes a detachable equipment wall, oxygen bottle rack, rear stowage unit, modular center cabinet, and Bucher's integral flex floor. The latter allows customers to truly customize the configuration of seats and equipment. As the AC67 HEMS equipment is modular, Kraus said various elements could be used in the H145.

When customers purchase the kit, Bucher provides comprehensive on-site training on how to install the interior and how to use the equipment.

The HEMS AC67 flex cabin has received certification from the European Union Aviation Safety Agency and has been purchased by a launch customer in China.



THALES

FlytX avionics suite

Thales had its latest FlytX avionics suite for helicopters on display at this year's Heli-Expo, which has been chosen to equip the Airbus H160M Guépard helicopter. The FlytX was developed to enhance efficiency in the cockpit and reduce pilot workload, while also reducing the weight and amount of equipment on board.

The entire FlytX suite is touchscreen, and features controls similar to a tablet or smart device (two-finger zoom, scrolling, search, etc.). While pilots in many sectors today are wearing gloves, Thales experimental helicopter test pilot Nicolas Couder said the FlytX touchscreen displays are usable with many glove models.

In order to enhance situational awareness, FlytX offers synthetic vision system and digital map features. Pilots even have the ability to choose any application they have on their personal tablet and share it directly onto the avionics display. FlytX can also be connected to any mission computer for parapublic or military operations.

Additionally, current avionics functions such as traffic collision avoidance system, ADS-B, weather radar, and Identification Friend or Foe transponders are integrated into the FlytX avionics suite. Localization and radio communications are also embedded.

The features on FlytX can be customized to meet the specific requirements of operators, and the suite itself can be adapted to fit any cockpit size — ranging from one display screen to up to four displays.

Couder said Thales is working toward certification of FlytX with the European Union Aviation Safety Agency, with other global aviation authorities to follow.

SIERRA NEVADA CORPORATION

Tactical Medevac Carry-on Aero Kit



Sierra Nevada Corporation (SNC) brought its military-tested e-health and remote monitoring system, the Tactical Medevac Carry-on Aero Kit, to this year's Heli-Expo. Known for providing injured soldier status and medic treatment information to medical facilities before the patient arrives, SNC's e-health kit enables a more seamless critical care process.

Duston Thompson, e-health and remote monitoring program manager at Sierra Nevada Corporation, said: "The intent of this system is to give actionable information to receiving clinicians, so they can prepare for an injured soldier prior to arrival." SNC developed the technology in partnership with the Warfighter Health, Performance & Evacuation Program Management Office, U.S. Army Medical Materiel Development Activity.

Sierra Nevada Corporation is exploring how to best certify the kit for use in the commercial air and ground first responder sector.

With SNC's Tactical Medevac Carry-on Aero Kit, aeromedical crews are able to focus on providing care to patients while non-invasive monitors capture vital signs and forward the information through wireless connectivity to receiving hospitals. That information is then stored, and allows hospital trauma teams to prepare accordingly to receive a patient.

The Tactical Medevac Carry-on Aero Kit also provides aeromedical crews with proper drug dosages, if needed, based on the patient's weight and standard medical operating guidelines.

All the information from the Tactical Medevac Carry-on Aero Kit is displayed on a web portal at a receiving medical facility, and notifies care teams of an inbound patient, their estimated time of arrival, their last set of vital signs, any drug treatment they have received, and whether they are litter or ambulatory.



"Litter or ambulatory matters because . . . without a litter team ready, the helicopter has to land and call for a litter team, and that can take five to 10 minutes," said Thompson. "So now that litter team can be ready as soon as that injured patient lands, and [clinicians] can get them right into the OR [operating room]."

The Tactical Medevac Carry-on Aero Kit supports up to six patients at a time; each patient is color-coded in the system, making it easier for crews to identify what vital signs are coming from what patient.

AVSPEEDBOARDS

Strapless aviation kneeboards

A first-time exhibitor at Heli-Expo, AVSpeedboards brought its new line of strapless knee boards to this year's show. The speedboards are designed to zip into a pilot or crewmember's left or right leg flight suit pocket, allowing them to write directly onto the green transparent board to quickly take notes.

"A lot of flight paramedics are using [AV Speedboards] to write down patient vitals," said Michael Ajalat, owner and CEO. "You can also put something behind the board to reference it, like a drug card or a frequency sheet. . . . The boards come with clips, and they illuminate so you can read them at night."

AV Speedboards come in three different models: first is the Hasty Board, which is the most secure board, designed for rescue hoist crew. "When they get down to the patient, they write down



the vitals of the patient, then they get hoisted back up and they have that info right on them," said Ajalat.

The second model is the Flight Suit Pro, which is slightly larger than the Hasty Board, and is the appropriate size to hold an instrument approach plate. Customers can also choose to add a clip, an additional light or both to the board.

The third model is the Tablet Hi-Vis Green, which comes in two sizes and features a layered design that allows users to slide a sheet into it for viewing.

Ajalat said the company is working on further advancing its product, and will be introducing a night vision goggle-friendly board, as well as a board with a patient vital sensor. The latter board will include "a thumb print sensor that will allow you to place your patient's thumb right on the board and pick up their vitals."

AV Speedboards are currently patent pending.

IMS NEW ZEALAND LTD. Cloudburst Fire Bucket

IMS New Zealand Ltd. has introduced design enhancements to its Cloudburst Fire Bucket, which was on display at Heli-Expo 2020.

The Cloudburst bucket now features a folding plastic ring around the inside rim — a change from the initial stainless-steel ring — which offers more flexibility if the bucket comes into contact with anything, and allows the bucket to retain its shape and filling operation. The switch to plastic also offers additional weight savings.

The Cloudburst is operated by compressed air, which can come from either turbine bleed air if approved and available, or from an underslung inline compact air compressor. Compressed air ensures the valve is charged and operational at any stage of flight and is compatible with water — meaning no electrical power in the Cloudburst bucket itself.

When aircraft bleed air is available to power the bucket, "it's a closed-loop system, so it doesn't take horsepower

from the helicopter when it's needed," said Richard Lane, managing director.

Another advantage of the air supply system is if an object gets stuck in the valve, it will remain there until removed without breaking any components of the bucket, said Lane.

Additionally, "we always say fly with the valve open when [the bucket] is empty," he added.

"That allows air to flow through the bucket, keeping it stable when empty."

When it's not in use, the Cloudburst can be folded up into a compact carrier bag, making it easily transportable.

The buckets range in size from 53 US gallons (200 liters) to 2,641 US gallons (10,000 liters). Lane said today there are more than 300 Cloudburst buckets flying in various parts of the world, including North and South America, China, Australia, and New Zealand.





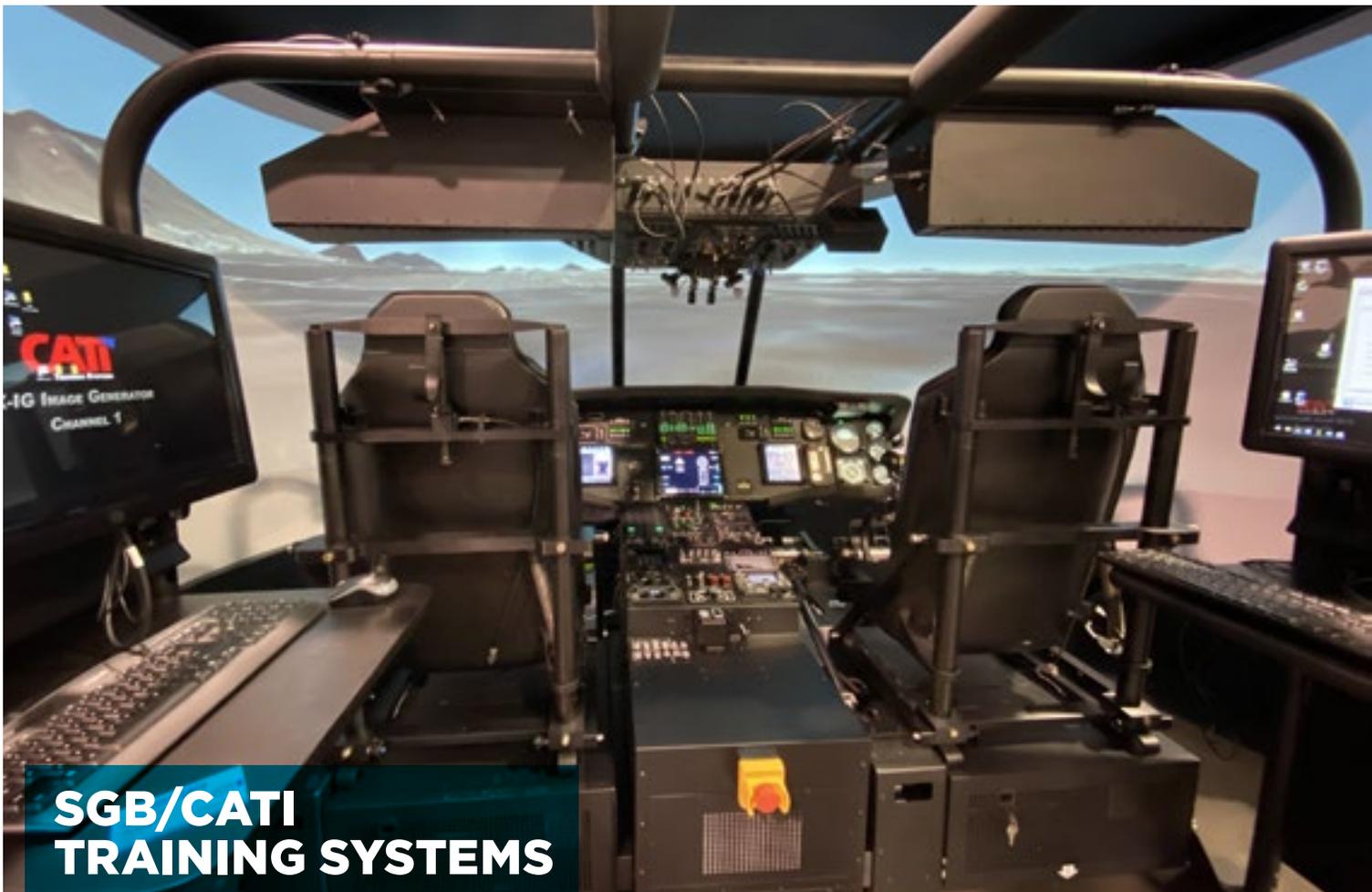
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SGB/CATI TRAINING SYSTEMS

CAPTE-VCS simulator

SGB Simulation & Training Products brought its latest simulator, the Cockpit Academics Procedural Tool-Enhanced with visual and flight control systems (CAPTE-VCS), to this year's Heli-Expo. While the system can be custom configured by SGB, the show-floor model was configured with gun, rocket, and missile simulation for the weaponized Sikorsky UH-60L Black Hawk, with a complete cockpit.

The visualization software for the simulator was developed by CATI Training Systems, which is known for its X-IG image generator system.

“Right now, the [UH-60L] aircraft is being tested for those weapons, and we have the matching simulator,” said Michael Larkin, manager, software engineer at CATI. “So when the helicopter is ready, the simulation will also be ready.”

The simulator's database, built by CATI, covers the entire country of Afghanistan. “It's all geo-specific imagery,” said Larkin. Trainees will fly over known areas such as Kandahar Airport, and CATI also “built up some villages where we can practice the [simulated] weapons engagements.”

Since Afghanistan has areas with mountainous terrain, that particular database allows students to practice high-



altitude training.

SGB also brought to the show the Cockpit Avionics Procedural Tool (CAPT) simulator for the UH-60M helicopter with a single-seat configuration. The simulator has a “much smaller footprint and a much lower cost, but almost all the capabilities of the VCS [model],” said Larkin.

The CAPT UH-60M simulator features a 180-degree display screen in 4K resolution. CATI built a San Francisco database for the UH-60M simulator that was featured on the show floor, with geo-specific imagery for all 85,000 buildings in the city.

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RECOIL SUPPRESSION SYSTEMS

R60-E Tsunami Tank

Recoil Suppression Systems, a division of Recoil Aerospace, brought its newest fire suppression tank, the R60-E Tsunami Tank, to this year's Heli-Expo. Derived from its predecessor, the R60-I (internal) tank, the E-model is a retractable tank built with lightweight carbon-fiber composite material, weighing only 425 lb. (192 kg).

The R60-E has a 1,000 US-gallon capacity and can be integrated into standard commercial aircraft without making any structural modifications to the airframe.

The target airframes for the tank are currently heavy helicopters like the Airbus H225 and AS332L1 Super

Pumas, Sikorsky UH-60 Black Hawk, and Kamov models. Recoil uses the cargo hook load path to integrate its tanks onto helicopters.

Recoil offers options on the R60-E tank to meet customer needs, including a snorkel system that can be attached on either the right or left side of the tank — depending on what seat the pilot flies in. Another custom option is a hand-controller for the tank, which allows the pilot to activate the snorkel or dump the tank using a thumb switch.

As a first-time Heli-Expo exhibitor, "it was a very successful show," said Joseph Rice, Recoil's managing director and owner. "We were very impressed with the orders that came out of the show. . . . We had 15 tank orders total — eight on the external and seven on the internal."

COBHAM AEROSPACE CONNECTIVITY

Titan audio management system



BY DAN PARSONS

Law enforcement and other public safety aviation operations are increasingly using smaller aircraft for tactical missions, but those aircraft can be weighed down by as many as nine different radios needed to stay in touch with relevant ground authorities.

Cobham Aerospace Connectivity at Heli-Expo 2020 introduced its line of Titan aircraft audio management products to streamline the communication equipment carried by law enforcement helicopters and fixed-wing aircraft.

Titan provides all of the functionality that a tactical mission requires, with a compact profile, and over 50 percent weight reduction compared to existing systems, according to Cobham. The system builds on the established capability of Cobham's Digital Audio Communications System, and will be aimed at aircraft such as the Airbus H125 and Cessna Caravan.

Titan is designed for configurability, including restricted transmission capability, configurable front panel, warning access and talk groups, and reduced need for multiple part certifications.

The system will include Bluetooth capability, enabling the crew to take telephone calls, while the system's spatially separated audio will increase their ability to distinguish conversations on different radios.

"Titan brings helicopter and turboprop connectivity into the 21st century, providing their crews with the modern functionality that they are used to outside aviation and reflecting the requirements for multichannel audio management systems to cope with tactical missions," said Mickeal Daw, Cobham's audio and information management product manager. "We have had early expressions of interest from leading OEMs, who have responded positively to the functionality and profile of the system."

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SPECTROLAB SLL 46-200 landing light

BY DAN PARSONS

Spectrolab is bringing military-grade lighting technologies to the law enforcement market with ever brighter, lighter landing and search lamps.

Unveiled at Heli-Expo 2020 was the new SLL 46-200 fold-flat landing light currently deployed on the Bell-Boeing V-22 Osprey. The light is currently still only available for government customers, the company said.

Built to strict military specifications for vibration, temperature, shock, humidity, rain, salt, fog, icing, and acceleration, the SLL 46-200 is an aimable LED search and landing light that can cast a powerful beam in both visible and infrared light for use with night vision goggles. The relatively small package packs a punch, with 250,000 candle power using 30 high-powered LEDs. Control capabilities are a departure from the standard

norm with an innovative dual digital servo and gear design for quick and smooth slewing in azimuth and elevation, with position feedback capability. The innovative gear design also enables the lamp to be deployed and operated within full range of motion at an unmatched air speed of 200 knots. The base design lends itself as a drop-in replacement and alternative to most Par 46 deployable landing light cavities.

In larger lights, Spectrolab is working to extend availability of its Nightsun XP line. Its new flagship commercial model, the XPM IR LED, is a 1,600-watt searchlight that shines in both visible and infrared spectrums. The system has launched aboard the Boeing CH-47 Chinook.

The system takes the aerodynamic and rigid design of the company's legacy XP model a step further by employing additive-manufactured structures for improved performance and stability.

The XPM uses ultra-high-speed motors for precise maneuverability and position feedback with increased control functionality and integration with popular mission systems and camera sensors. A military-grade console control panel configuration also is available for cockpit integration.

All major system components have undergone rigorous testing to U.S. military standards for vibration, temperature, shock, fluid contamination, explosive atmosphere, adverse weather conditions, and aircraft speed.



EAA TOOLS

Black Hawk tooling solution

BY OLIVER JOHNSON

EAA Tools has created a specialized two-piece tool kit for the Sikorsky H-60/S-70 Black Hawk that allows operators to perform all maintenance required on the type, except that which requires the use of a hoist.

While originally established to develop tooling for the U.S. military, the company has found a flourishing market in the civilian sector, with the availability of hundreds of former military Black Hawks to commercial operators through the military's Black

Hawk Exchange and Sales Team (BEST) program.

"A lot of these operators are buying their first Black Hawk," said Andrew Goettl from EAA Tools. "We started off by asking ourselves, 'If I was starting with nothing, what do I need to maintain this machine?'"

The customized heavy tooling includes spindle and pitch beam pullers, a tail rotor assembly inspection tool, chip detector removal tool, spindle and main washer alignment tool, and spindle bearing press, among many others.

The veteran-owned company, based in Phoenix, Arizona, released its first product in 2012, and built up its inventory over the years to be able to offer a complete maintenance tooling solution, known as the Expeditionary Maintenance Kit. The kit is contained in two large carry cases, with the tools secured with custom-fit foam.

"You could throw these two kits in the back of a Black Hawk, go anywhere in the world, and you'd have about a 90-percent solution to do all your required maintenance on the aircraft to keep it in the air," said Goettl.

The kit costs about \$70,000.

Operators can also purchase individual tools. One of items in highest demand is the spindle puller — a special tool to remove the 90-pound spindle attached to the rotor blade on the main rotor head. Without the tool, the spindle is incredibly difficult to remove, said Goettl. With it, the spindle can be taken out in just two minutes, he added, while carrying handles on the tool make it much easier — and safer — to move the heavyweight spindle off the aircraft. 🚀



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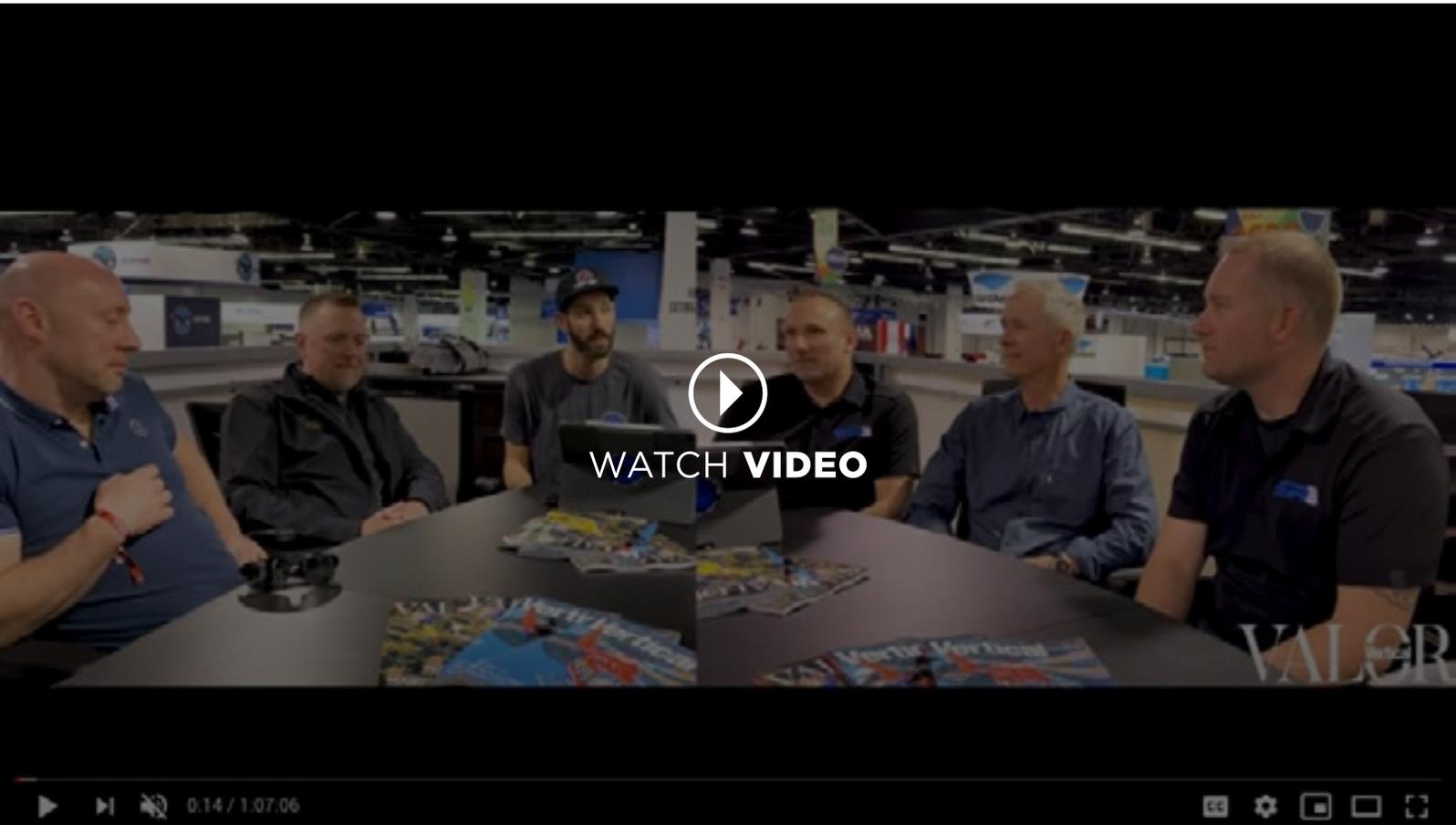
A Blackcomb Helicopters EC135 conducts a hoist operation in British Columbia. Blackcomb helicopter hoist operator and instructor Rob Munday moderated the roundtable discussion at the *Vertical* booth during HAI Heli-Expo 2020. **Barry Smith Photo**



LIFE on the WIRE

A HIGHLIGHT OF OUR HELI-EXPO THIS YEAR WAS A ROUNDTABLE DISCUSSION ORGANIZED BY SR3 RESCUE CONCEPTS. IF YOU MISSED THE LIVESTREAM, IT'S NOT TOO LATE TO CATCH UP.

BY ELAN HEAD



Get a group of seasoned rescue professionals around a table together, and you're sure to hear some great stories.

That was the idea behind "Life on the Wire," a roundtable discussion held Jan. 28 at HAI Heli-Expo 2020 in Anaheim. The event was organized by SR3 Rescue Concepts and held upstairs in the *Vertical* booth, and although we livestreamed the discussion on the @verticalmag Instagram, it was too good not to share with the rest of our audience, too. So we've posted a video of the entire hour-long discussion on our YouTube channel, and collected some of the highlights here.

The professionals who took part in the discussion have decades of combined experience in helicopter search-and-rescue (SAR) operations. They include Derek Everitt, a paramedic-rated winchman for CHC Ireland, which flies Sikorsky S-92s for the Irish Coast Guard in all-weather SAR operations. Wil Milam, chief rescue specialist for Two Bear Air Rescue in Montana, who previously served as a U.S. Coast Guard helicopter rescue swimmer out of Kodiak, Alaska, and Astoria, Oregon. Tony Webber, a long-serving pilot with the San Diego Sheriff's aviation division, currently assigned to its fire rescue program.

Joining in from SR3 Rescue Concepts were Rob Munday, a rescue specialist with Blackcomb Helicopters in British

Columbia, who has been involved with firefighting and SAR programs in Canada and Australia; SR3 primary flight instructor Dave Callen, who has spent nearly two decades with the Las Vegas Metropolitan Police Department (LVMPD) conducting hoist, one-skid, and long line rescues; and hoist operator, rescuer, and paramedic Jason Connell, who recently retired from the LVMPD.

The wide-ranging conversation touched on a variety of subjects: from the participants' most memorable rescues to their biggest mistakes and, closely related, their best pieces of advice. Here's a sample.

WHEN YOU HAVE TO 'REEL YOURSELF IN'

Callen's most memorable rescue occurred on a recent New Year's Eve, always a big night in Las Vegas. He was staffing an MD 500 and, just after midnight, received a call that a teenager had fallen from the edge of a steep cliff where he and a friend had gone to watch fireworks. Callen and a rescuer took off in strong winds and flew to the site of the accident, where the location of the victim was pinpointed by people on the ground using a thermal imager.

"We spot this kid, and he's laying there," Callen recalled. "You can tell by the position of his body that he has more



SR3 Rescue Concepts co-founder Dave Callen has flown Bell HH-1H, MD 530F, and Airbus H145 helicopters for the Las Vegas Metro Police Department in rescue and law enforcement operations. **Photos courtesy of Dave Callen**



For Dave Callen, search-and-rescue operations are the most rewarding missions he performs. "The element of teamwork/CRM [crew resource management] is amazing to be a part of," he said. **Photo courtesy of Dave Callen**

than likely not survived. So we get in as close as we can — we're probably 10, 15 yards away — and we're like, this sucks, man; this is going to be a body recovery. So as we're trying to figure out . . . how we're going to get him out, he starts moving, and then he starts to sit up!"

Not only was the teenager still alive, his friend who reported the fall also managed to tumble off the cliff before rescuers arrived and was lying nearby. Callen and his partner were able to retrieve both patients, but only through a very difficult toe-in landing in a tight space and gusty winds.

"I can see the thing you're trying to fight," Milam said. "Your mindset [is]: 'It's a body, let's relax.' And all of a sudden the kid moves. Now's when you've got to be careful."

Callen agreed: "We talk about the human factors part of it. You'd like to say and think that we all would not allow that to change your actions or what you would do," but learning that a victim is still alive invariably ramps up the sense of urgency. "We had to really reel ourselves in," he said.

As Everitt observed, "You've already drawn a picture in your head: 'This is a deceased person.' The plan has already fallen in your head, then he sits up. And then you go, OK, chuck that plan, time for a new plan, but it has to be as safe as the other plan."



The dictum that “there is no rank in the helicopter” hasn’t always been respected, as this reminder placard suggests. **Keith Campbell Photo**



Derek Everitt started his career in the Irish Army Air Corps, but now spends his time with CHC Ireland conducting rescue operations for the Irish Coast Guard using the Sikorsky S-92. **Photo courtesy of Derek Everitt**

THERE’S NO RANK IN THE HELICOPTER

When the time came for the participants to discuss their “biggest screw-ups,” it became apparent that most of these were also their biggest learning experiences. That was true for Everitt, who related his experience as a young crewman in the Irish Army Air Corps flying in an Aérospatiale Alouette. His pilot had a high-ranking friend on board, whom he was taking up to observe an exercise in the mountains.

“We were going to put him into a field beside [where] we were doing a live-fire exercise,” Everitt recalled. But when they arrived on location, the pilot and his friend — who were chatting away the whole time — decided to make a flashier entrance by landing at a small crossroads closely surrounded by stone walls.

“So we get down there, and we’re knocking around in a low hover, and [the friend] is going to jump out for all the boys in the field . . . a total glamour shot,” as Everitt put it. Everitt was looking outside directing the pilot at this point — warning him that the tail rotor was very tight to the wall in the back — but “this guy’s chatting away over what I’m telling him.”

When the time came for the friend to disembark, Everitt tapped him on the shoulder and he jumped out. As he did so, the pilot touched back on the cyclic, resulting in a tail rotor blade strike on the wall aft. The blades had to be

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Tony Webber has spent 35 years with the San Diego Sheriff's Department, conducting law enforcement, rescue, and firefighting missions. His biggest advice for new crewmembers? "Pay attention to detail, and checklist discipline," he said. "If you pay attention to detail, and notice stuff, and don't skip anything on the checklist, you're going to be OK. . . . The moment you start taking shortcuts, especially on a checklist, is where it's going to bite you on the butt." **Photos courtesy of Tony Webber**





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changed in the field and the humiliated pilot had to submit a report on the accident.

Later, Everitt recollected, "His boss, which is my boss, brought me upstairs and said, 'Do you know what you've learned today?' And I said, 'No, I'm not sure.' And he said, 'I'll tell you what you learned. As a crewman, it doesn't matter who's in that aircraft. When you're telling him to do something and he isn't doing it, you call it — 'Up up up.'"

That advice 23 years ago has stuck with him to this day, he said. "When I'm in the aircraft, and we're doing something, and I'm not happy, you're going to know about it."



Now chief rescue specialist for Two Bear Air in Montana, Wil Milam spent a decade working as a U.S. Coast Guard helicopter rescue swimmer. **Photo courtesy of Wil Milam**

DON'T COUNT ON BEING RECOGNIZED FOR YOUR EFFORTS

Recognition is nice when it comes, but it's not why any of these professionals go to work every day. Many of the people they rescue may be quickly overwhelmed by medical or personal issues related to their incidents and neglect to follow up with a "thank you." (Others might just be embarrassed.)

And the media can be fickle. Munday recounted a swiftwater rescue he performed in Queensland, Australia, very early in his career. The next day, another team made a similar rescue in the same location, in this case using a dive bag as an improvised carrier to hoist up a small child. That rescue was captured on video, and naturally got all of the attention, Munday laughed.

However, sometimes rescues can lead to very meaningful connections. Webber recalled one extraordinary mission that occurred during a firestorm fanned by Southern California's Santa Ana winds. Webber, in a Bell 205, had been dropping water on a fire for three or four hours when a fire crew came on the radio to say the fire was overtaking them.

"They're starting to yell over the air that they're getting burned over, deploying fire shelters, and you're hearing that in the helicopter and it's gut-wrenching," he said. "Because there's nothing you can do."

As the radios fell silent and the fire burned past the crew's location, air attack asked who would be willing to fly to the scene. Webber and the pilot of a call-when-needed aircraft volunteered.

"They could only send in one helicopter at a time because the visibility was less than a quarter mile, power lines everywhere," Webber explained, recounting that the call-when-needed helicopter went in first and loaded several victims who were badly burned.

"He departs, I start following the power line in — I had to follow it and it is just thick smoke — I now spot the crew bus and we land next to it," Webber said. "And the reason it sticks out for me, it was like something out of the *Twilight Zone*. Because I saw the crew bus earlier in the day, and it was a new one. We landed next to it, windows are blown out, it's melted, there's melted metal on the ground, and when we land, the fire shelters are blowing."

Webber and his crew member were unable to find the one person who was still missing — a homeowner who, it later turned out, had gone back into his house and perished in the flames.

"Fast forward about five years later, one of the kids that was on the crew that got burned over, is now coming into our helitack team at Gillespie," Webber said. "He comes up to me and says, 'I hear you're one of the guys who came in to get us.' . . . And he was thanking me for being one of the pilots who came in to help him." ❖



Elan Head | An award-winning journalist, Elan is also an FAA Gold Seal flight instructor with helicopter and instrument helicopter ratings, and has held commercial helicopter licenses in Canada and Australia as well as the U.S. She is on Twitter @elanhead and can be reached at elan@mhmpub.com.

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POWER

An aerial photograph of two Apache helicopters flying over a rugged, snow-covered mountain range. The helicopters are in formation, with one in the foreground and another slightly behind and to the right. The terrain is a mix of white snow and dark, rocky outcrops. The sky is a clear, pale blue. The helicopters are olive green with various sensors and equipment mounted on their exteriors. The main rotor blades are blurred due to motion.

IN THE RUGGED TERRAIN SURROUNDING SALT LAKE, THE UTAH ARMY NATIONAL GUARD'S 97TH AVIATION TROOP COMMAND TRAINS ITS APACHE PILOTS TO MASTER THE MOUNTAINS.

STORY & PHOTOS BY SKIP ROBINSON

ANNAGERS



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Working and training above 10,000 feet is routine for the 1-211th Utah Army Guard Apache units. The Apaches work well for the missions, but the aircraft need to be finessed.

For new pilots, flying in the mountains can be more than a little intimidating. Now add to that taking off, landing, and potentially engaging the enemy, at night, in the mountains — that can be downright daunting. In the military, when flying in austere, mountainous locations like Afghanistan, pilots are often operating on the edge of their power margins. But instead of letting these conditions own them, the Army is training its pilots to own the edge.

The 97th Aviation Troop Command of the Utah Army National Guard is one of the premier power-management and high-altitude training units in the Army. Operating Boeing AH-64D Longbow Apaches, the 1-211th Attack/Reconnaissance Battalion (ARB) of the 97th Aviation Troop Command are located at South Valley Regional Airport, in the Salt Lake Valley.

While the airfield itself is just over 4,600 feet mean sea level (MSL), numerous landing zones up to 12,000 feet MSL are just a 10- to 15-minute flight away. The extremely rugged Wasatch Mountain Range provides a close approximation of Afghanistan's mountains during both the winter and summer months, allowing 1-211th Apache crews to gain daily experience in the type of environment to which they may soon deploy.

The 1-211th ARB's power-management and high-altitude training program rivals that of any other Apache unit out there. According to a senior Utah Guard pilot, Chief Warrant Officer 5 (CW5) Upton, the program is modeled after the High



Two Apaches work together to destroy a target during a training mission.



A group of 1-211th members during training with U.S. Marines at the Marine Corps Mountain Warfare Training Center near Bridgeport, California.



A Utah Army Guard Apache flight crew poses in front of the aircraft.





The Apache's destructive side. The aircraft is equipped with a 30-mm chain gun and targeting system.



The Apache's two-man cockpit gives the crew excellent visibility in most flight regimes.

Altitude Army National Guard Aviation Training Site (HAATS). Located in the mountainous region of Eagle, Colorado, HAATS trains not only U.S. Army pilots but also Navy, Marine Corps, Air Force, and Coast Guard crews. The schoolhouse is a National Guard-led initiative, and the Utah National Guard sends many of its instructor pilots to HAATS to ensure that its own program meets the same high standards, Upton said.

Every new pilot in the 1-211th goes through a rigorous power management and high-altitude training curriculum before being signed off as combat-ready, setting up the aviator and ultimately the unit for success in austere environments downrange. The program of instruction begins with robust academics, followed by simulator and flight training to reinforce the academics. New pilots, known as co-pilot gunners, initially receive around 10 hours of focused training in this area, then additional training before being designated as pilot-in-command (PIC).

The AH-64D Longbow Apache has been in service for over a quarter century and is still a formidable machine. It is an upgrade from the initial version of the Apache, the AH-64A, which entered the service in the 1980s. The AH-64A was a simpler helicopter with less powerful engines but considered a more "sporty" machine because of its lighter weight and handling characteristics. It was capable for its time, but significant advances in forward-looking infrared (FLIR) and other sensor technology make the AH-64D a much more capable system.

The AH-64D Longbows are powered by a pair of uprated General Electric T700-701D engines rated at 2,000 shaft horsepower, giving the airframe approximately five percent more torque than the preceding engine model, the 701C, and substantially more than the original T700-701 engine of the AH-64A. Nevertheless, it is not uncommon for the Apache to be significantly power-limited during combat overseas and gunnery operations, with limited in-ground-effect power during high-and-hot operations.

Helping pilots manage power is the Apache performance (PERF) page, which takes data from the operators manual and presents a dynamic model replicating the Army's performance planning card (PPC). One of the key

"THE AH-64D LONGBOW APACHE HAS BEEN IN SERVICE FOR OVER A QUARTER CENTURY AND IS STILL A FORMIDABLE MACHINE."



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Flying with two aircraft during combat gives flight crews the ability to cover and support each other if one aircraft needs to land during a mission.

values provided is what is known as velocity safe dual engine (VSDE) — what effectively becomes a “stall speed” indicating that the aircraft does not have sufficient power to hover out of ground effect. Crews need this information to safely fly and perform combat operations in these challenging environments, and interpreting the PERF page under dynamic conditions is part of the 1-211th ARB's training program.

Part of becoming a highly proficient pilot is looking for ways to capitalize on additional power, when and where available — such as when exiting transverse flow, or through something known as ram air effect. Ram air effect is the additional power produced by the engines at higher airspeeds, and is something the 1-211th trains all of its pilots to watch for and capitalize on.



OWNING THE NIGHT

Because a substantial portion of Apache missions are at night, crews are required to demonstrate competence flying with FLIR and night vision goggles (NVGs). For the Utah 1-211th crews, flying combat missions at night in the mountains — in both hot and cold conditions — adds to the challenge.

“Flying in the mountains at night is even more of a strain than during the day,” the 1-211th ARB’s standardization instructor pilot (SP) told *Valor*. “The FLIR — while providing a great picture — is a monocle, meaning video is only provided to one eye. This eliminates depth perception available during the day or under NVGs, so Apache pilots must learn to understand depth based on experience.”



Nighttime flying is a big part of what Apache crews do. Here is the front “office” of the Apache before a night flight.



An AH-64D starts up for an evening flight to the mountains.



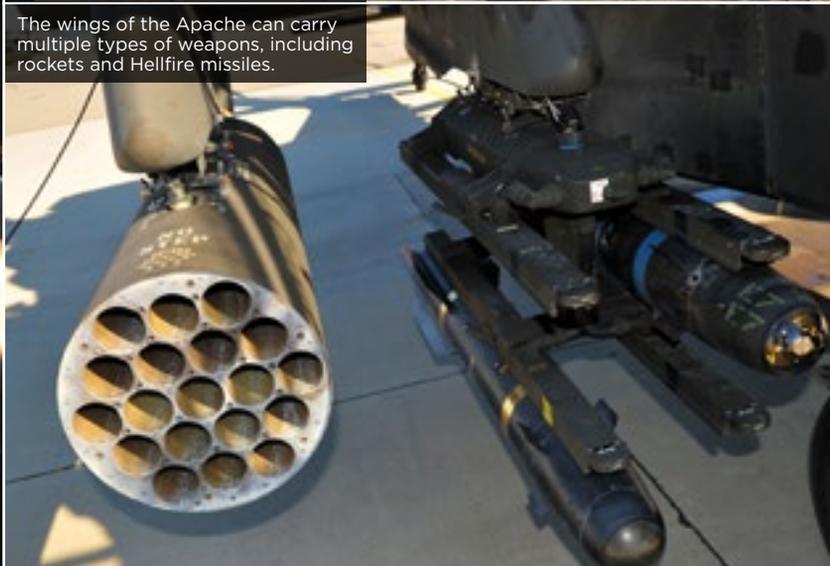
A Utah Army Guard pilot performs a preflight check of the rotor system.



Flying high over parts of Utah, an AH-64D transits to a training area.



The wings of the Apache can carry multiple types of weapons, including rockets and Hellfire missiles.



Nighttime schedules can disrupt pilots' circadian rhythms, posing challenges to staying active and alert, the battalion SP added. This is exacerbated by the effect of lower oxygen levels at altitude. Night vision is also known to deteriorate at altitudes above 5,000 feet MSL, although the use of FLIR and NVGs compensates for the effects of this phenomenon.

It takes a new pilot a fair amount of time to become comfortable operating at night in the mountains using their night vision devices and sensors to gain the skills necessary to accurately deploy weapons. First the pilot needs to fly an aircraft that becomes more and more power limited as it goes higher, while at the same time searching for points of interest and maintaining situational awareness.

Maintaining situational awareness is critical and the most difficult part of every mission, the battalion instructor pilot emphasized. Doing all of this at night — with the

mountainous terrain, weather considerations, and ground threat — can put a huge strain on a new pilot's mind. Add to this the coordination and communication with other military helicopters and ground forces, and task saturation can take a toll on newer Apache crews. Fortunately, Apaches are flown by two rated aviators, giving the aircraft double the ability to process what is going on during the flight.

“MAINTAINING SITUATIONAL AWARENESS IS CRITICAL AND THE MOST DIFFICULT PART OF EVERY MISSION.”



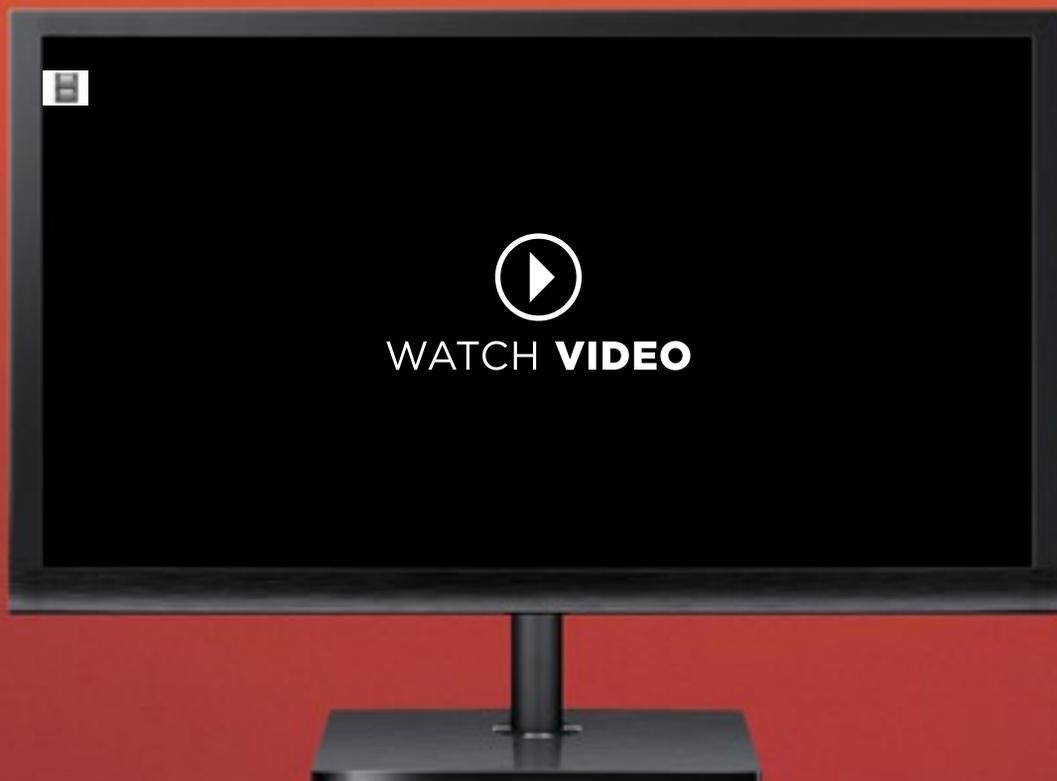
Escorting UH-60 Black Hawks is a big part of the Apache's mission. Here, two 1-211th AH-64Ds fly with a California Guard HH-60L air medical bird.

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Whether seen from the front or the back, the AH-64D is an aggressive, powerful looking machine.

THE CURRICULUM

The 1-211th ARB's power management and high-altitude training program includes academics, simulator and flight training in the following subjects:



FOB (Forward Operating Base) Operations:

Aviators are trained to land in tightly confined areas, often at higher than normal density altitudes.



Enroute Mountain Techniques:

Aviators learn the fundamentals of flying safely through mountainous regions, while always having an escape plan.



Landing Zone Sequence:

Aviators are trained how to assess winds, terrain, and calculate power so that they can land in any spot large enough to put at least one wheel down.



Snow/Desert Operations:

Aviators learn how to take off and land safely in significantly snowy or dusty environments.



PHODS (Portable Helicopter Oxygen Delivery System) Training:

This system gives aviators the ability to safely fly above 14,000 feet MSL.



High, Hot, Heavy (H3) Operations:

High = high altitude / Hot = high temperatures / Heavy = high gross weight. One "H" factor by itself presents challenges; Army aviators are trained to be effective when dealing with all three components.



Combat Maneuvering Flight (CMF):

Aviators are trained to maneuver the aircraft defensively, offensively, and when necessary, aggressively, to employ weapons against the enemy.



High Mountain Attack Training:

In challenging terrain, day and night, to bring together the fundamentals of flying at altitude, coupled with weapons employment to ensure accurate and timely fire. This training includes close combat attack and close air support, working with Ground Force Commanders (GFCs) / Joint Terminal Attack Controllers (JTACs).

“THE 1-211TH HAS BEEN DEPLOYED TO AFGHANISTAN TWICE BEFORE, WITH ANOTHER DEPLOYMENT ANTICIPATED LATER THIS YEAR.”

The AH-64D is slowly being replaced by the E-model Apache, but is still a very capable airframe.



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TRAIN LIKE YOU FIGHT

Utah is also home to the Utah Test & Training Range (UTTR), the largest combined military operations area/restricted airspace in the contiguous United States. The UTTR is used for air-to-air-combat, air-to-ground inert and live practice bombing and gunnery training by DoD aircrews, providing a vast area of realistic terrain for world-class test and training scenarios.

The 1-211th ARB frequently trains with other units in the UTTR and other austere locations to reinforce and further improve crew competency. This allows the unit to validate not just individual aviators, but also crews and multi-ship missions in their mission essential tasks: movement to contact, attack, reconnaissance, and security. The 1-211th routinely trains with the Air Force Weapons School at Nellis Air Force Base in Las Vegas, Nevada; the Naval Aviation Warfighting Development Center at Naval Air Station Fallon, Nevada; and the Marine Corps Mountain Warfare Training Center in Bridgeport, California.

The 1-211th has been deployed to Afghanistan twice before, with another deployment anticipated later this year. The Hindu Kush region of Afghanistan has mountains over 20,000 feet MSL, and several forward operating bases at altitudes near 8,000 feet, with density altitudes approaching 10,000 feet on a hot Afghan day.

After many years of operating at the extremes of its capabilities in the very challenging Afghanistan environment, the AH-64 Apache has proven itself time and again. The 1-211th ARB will be the latest unit put to the test as they deploy overseas — but their training should once again serve them well. 🚁



Skip Robinson | Skip has covered helicopter operations through photography for 25 years and has worked with *Vertical Magazine* for over a decade. His main interests are rescue, parapublic and military operations. Skip is based in Los Angeles, California.





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Working in the lower mountain ranges of Utah, the 1-211th has some of the best mountain training areas in the U.S.

ARA Flugrettung is the first HEMS provider in Austria to introduce winch operations, as well as the Airbus H145 aircraft, to the air rescue sector.



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Alpine Guardians

IN THE MOUNTAINS THAT SPAN THE AUSTRO-GERMAN BORDER, AIR RESCUE AUSTRIA DOES SOME HEAVY HOISTING WITH ITS AIRBUS H145, SERVING AS A MOUNTAIN-RESCUE MEDICAL UNIT IN HIGH-ALPINE TERRAIN. **STORY & PHOTOS BY TOMAS KIKA**





Technical winch rescues using the TYROMONT bag or evacuation triangle represent two of every 10 missions flown by ARA's RK2 helicopter.

Not only is A the first letter in the alphabet, it also marks the beginning of a new era in modern helicopter emergency medical services (HEMS) in Austria. It was back in April 2001 when the first of two helicopter rescue bases under the name ARA Flugrettung opened its hangar gate in Fresach, in southeastern Austria with the call sign RK1.

About a year later, a second base called RK2 opened in the north-Tirolean town of Reutte, and Air Rescue Austria (ARA), a sister company of German HEMS giant DRF Luftrettung, started redrafting the way helicopter rescue was done in high-alpine terrain. Flying the legendary MBB (now Airbus) BK117 (versions B2, C1), ARA was the first, and for 13 years the only operator using a hoist for technical rescue missions. In 2018, it became the first air rescue company to introduce the Airbus H145 to Austrian skies. *Valor* spent a rather busy August weekend with the crews of RK2 aboard an H145, the operator's current workhorse and leading HEMS machine.

ALWAYS HARNESSSED

ARA typically flies with a crew of four, explains chief flight paramedic Elmar Flatz while showing us around the RK2 base. The pilot and technical crew member/hoist operator are in the cockpit, with a flight paramedic and a doctor in the cabin. The hoist operator is also a fully qualified paramedic but does not leave the helicopter for technical rescues during flight missions. If there are missions not indicated for a helicopter, or it can't take off because of bad weather, that crew member hits the road as an ambulance driver, together with a doctor, to reach the patient by ground.

The concept is simple and serves the region of northern Tyrol close to the German border. The RK2 helicopter is based at the doorstep of Reutte hospital and the base serves as the emergency rescue launchpad for both air and ground response. It is not a permanent job for any of the crew members except



pilots, who usually take weekly shifts, while the doctors come from surrounding hospitals. Flight paramedics typically take two to three days of duty a month.

"It may sound like a cliché, but what I value the most is that we're an excellent group of people, strong team," Flatz says as Capt. Christian Brunnelechner serves eggs sunny side up during mutual breakfast on a warm August Saturday. It looks like a calm, sunny morning, so the red-white-black H145 goes out from the hangar, patiently expecting its first scramble message. Crew members always wear harnesses on duty because every fifth mission, of about 900 per year, requires a hoist. The first incoming call, shortly before noon, turns out to be one such mission.

BORN FOR THE ALPS

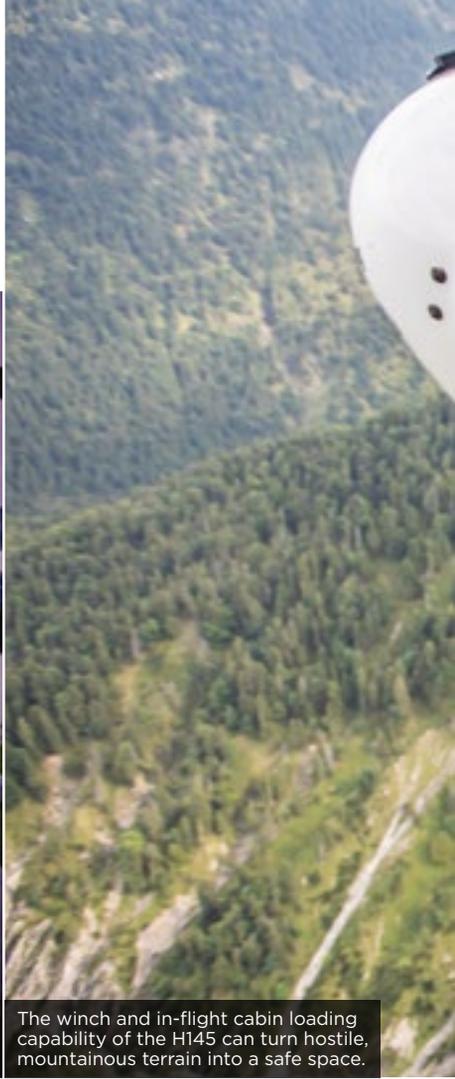
The Tirolean region close to the German border is filled with treacherous mountain terrain that reaches 3,000 meters (9,842 feet) above sea level, requiring ARA crews to feel at home at high altitude. Flight paramedics must be skilled mountain rescuers as the front-line responder for year-round alpine evacuations. For flight physicians as well, solid mountaineering skills in both summer and winter conditions are an absolutely vital part of the job.

The helicopter and crew serve as a self-contained, mountain-rescue medical unit for most alpine missions in Austria, but technical rescues on the German side of the border require a mountain rescuer on board, according to an agreement with Bavarian Mountain Rescue in Bad Tölz.

The town of Reutte where ARA's RK2 helicopter is based not only offers a strategic location but also stunning mountain views.



Excellent team spirit is one of the biggest assets of the rather small, but highly skilled ARA team.



The winch and in-flight cabin loading capability of the H145 can turn hostile, mountainous terrain into a safe space.



Base captain Christian Brunnlechner enjoys taking full advantage of the Helionix-equipped H145 — Airbus's flagship aircraft for the HEMS sector.



With pagers still beeping, everybody gets seated, rotors spin, Flatz completes a standard operating procedure checklist and announces, “Cabin OK.”

After a gentle lift-off, we’re heading to the mountains near Ehrwald, Austria, to help a female patient with head and leg injuries. After receiving the coordinates and details of the mission it is clear we have to use the hoist, as landing would be impossible due to the rather steep slope and trees.

“It’s a hoist one!” doctor Florian Muckenthaler says excitedly. The H145 is certified for hoist operations on both sides of the fuselage, but to standardize operating procedures with DRF — the German mother company — ARA operates the hoist from the right side. From his seat on the right, the pilot can better see hoist operations in progress, especially among steep mountain walls.

The hoist operator has to make his way from the cockpit to the right-side sliding door through the cabin, but the procedure is smooth, and despite being attached to the fixed anchoring points, nobody gets in the way of each other.

It takes a 40-m (130-ft) winch to reach the elderly female patient on a narrow mountain trail, who is in the care of ground-based mountain rescuers. Based on their assessment, Muckenthaler decides evacuation by air is warranted. After safe transport of the tourist to the hospital in Garmisch, Germany, the skids are back on the platform in Reutte — about 43 kilometers (27 miles) away — exactly 45 minutes after take-off.

ON THE ROAD AGAIN

After only a seven-minute pitstop, our H145’s engine spools back up. No hoist this time. We’re called to a grassy area in Mittenwald, Germany, near a bike trail where a female on an electric bicycle lost control and crashed.

The patient is prepared for pick up in an on-scene ambulance and loaded into the helicopter. In short order we’re landing in Murnau, Germany — a hospital about 40 km (25 miles) away by car — and the home base of another H145 called Christoph 74. This particular aircraft is operated by German ADAC, the largest automobile club in Europe that also operates a fleet of rescue helicopters.

There is no time for lunch — just a quick coffee, replenishing medical equipment, and we are skids up for a motorbike accident in Biberwier, Austria, where a local road forms more than a generous landing pad for our helicopter.

While loading the young concussed biker into the cabin, a background panorama of the Alps is a reminder the next mission could be there. As it turns out, that reminder was prescient.

Just 40 minutes after dropping that patient off at the RK2 base in Reutte, the pager beeps again, and everyone on the team, and the helicopter, are ready for whatever and wherever the call may lead them.

This time, the mountains are calling. Specifically, the Wank mountain in Germany, where a hiker suffered a knee injury



on a mountain trail. The rescue is routine, with a German mountain rescuer hoisted 25 m (82 ft) down to a ridge trail. Using a rescue triangle, the patient is hoisted and we're soon on the way to the clinic in Garmisch. What started as a calm day had turned into a series of back-to-back rescue flights. It turns out the climax was to come.

We receive another call before returning to Reutte directing us to the scene of a car accident with multiple traumas in Klaus, Austria. When we arrive, the road is blocked and the flashing lights of fire trucks and ambulances light up the sky, quickly darkening because of an incoming storm.

Right after touchdown on a small field near the road, our medical team is running to the crash site, receiving direction from a Red Cross officer to where help is most needed. It's reminiscent of a movie scene, except it's real. A car has collided head-on with a van causing several casualties that lie about on the ground. Our team focuses on a patient stuck in the front seat of one of the vehicles with suspected severe leg and spine injuries.

Firefighters and medical personnel scurry amidst the flashing colored lights, equipment, and debris from the crash. The sound of helicopter blades cuts the air as rain suddenly pours from the sky. It's the Christoph 74 H145 we met in Murnau earlier today, now landing at the scene, as is a yellow ÖAMTC EC135 T2+, callsign Christophorus 1, from Innsbruck, Austria, that was offloading a patient nearby before being called here.

After rendering urgent medical treatment, the patient is successfully freed from the car and transported on a

backboard through the road barriers and up a wet, slippery slope to the helicopter.

The rain intensifies, and we leave the flashing blue lights and busy crash scene behind on the way back to Murnau. Shortly before 7 p.m., the helicopter lands at home base and goes into the hangar in a heavy downpour.

"There's another storm coming from the northeast," says pilot Christian Brunnlechner while parking the towing tractor. Sitting in front of a TV to watch the evening news in a break room that resembles a cozy living room, the team is interrupted by another page. We take off into an orange, hazy sky toward the towering walls of the 2,962-m (9,717-ft) Zugspitze — Germany's highest peak.

This time a hiker has missed the descent path and is stuck at the end of his too-short abseiling rope. Upon reaching the GPS coordinates, Brunnlechner maneuvers the H145 along the mountain wall while the crew scan the rocks for the hiker in distress. In less than five minutes Flatz spots a blue jacket on a small plateau beneath an almost vertical waterfall of glacial runoff.

The hiker is at the end of a very narrow canyon, requiring cautious, precise aircraft handling and rescue operations. It's also already dark. Flatz dons a rain jacket and rides the hoist 37 m (121 ft) to reach the exhausted, hypothermic man.

Brunnlechner uses the mounted TrakkaBeam searchlight to illuminate a reference point on the mountain wall. Hoist operator Hubert Dreer keeps the lit rock in peripheral sight to better steady the hoist. There's no room for error, as the patient



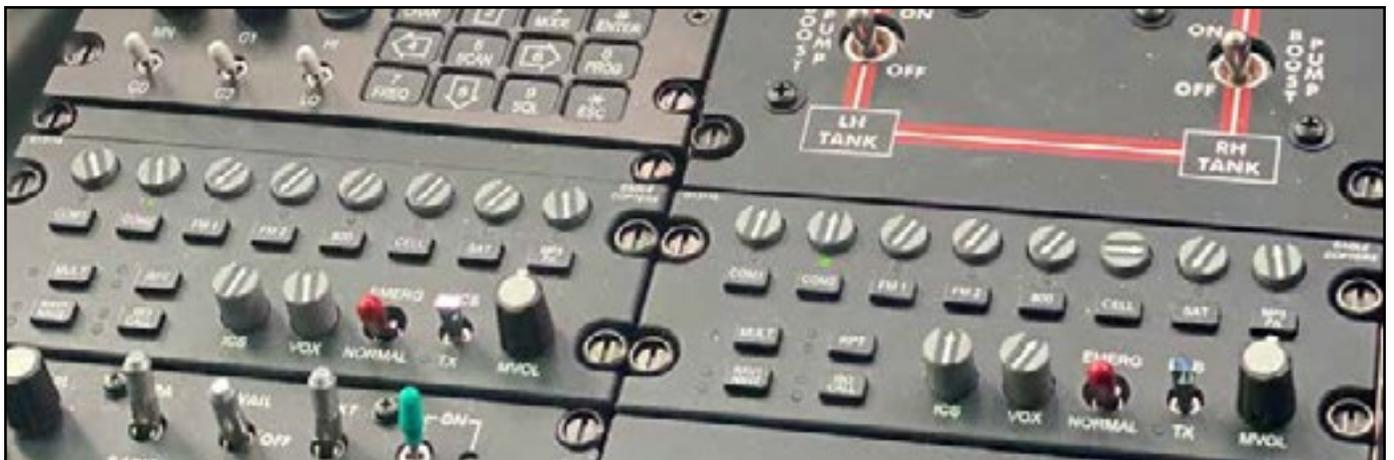
The high main rotor position and variable on- and off-loading capabilities make the H145 a universal HEMS soldier for all conditions.



Landing on the rooftop helipad of Innsbruck AKH hospital, just a few miles from the centerline of the Innsbruck International Airport runway, never gets old.



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The RK2 helicopter is the backbone of emergency medical response in the Reutte area, with numerous missions taking place at night.



is perched on a very small outcropping. A static hoisting succeeds without rotating the patient and Brunnlechner reverses the machine out of the narrow canyon into the dark.

"The helicopter's four-axis autopilot is a huge asset in such situations," Brunnlechner explains after landing back at home base, just 30 minutes after take-off from the canyon. "The GTC and GTC hover modes are hands-on automated modes, yet still remove a lot of workload in the moments where absolute situational awareness is required and a lot is going on in and under the helicopter."

The stranded hiker is in the good hands of the doctors at our home base hospital in Reutte, and the helicopter undergoes a thorough clean up after what turns out to be the day's final mission.

STRONG SUNDAYS

"Well, of course it is hard to predict, but this summer, Sundays are not mission-free days at all," Flatz says first thing the next morning. "The duty time is 7:30 a.m. until 10:30 p.m. year-round; there is only time for a brief nap between two shifts."

Today, the team remains the same, except for the young and energetic Henrike Hommel, suited perfectly to the job as a flight physician. She is fond of sports and passionate about both mountains and medicine and will be our doctor onboard for the day.

The first call comes at 10:47 a.m. and it's another hoist mission to help a patient who has fallen unconscious during a hike to a mountain cabin. The coordinates do not correspond exactly to where the patient is located, but other tourists





Cooperation with the mountain rescue service on the German side of the border often allows for more versatile and efficient solutions at the accident scene.

on the ridge are able to point us in right direction and we're quickly above the correct steep mountain trail. Hommel treats the unconscious female patient on the ground before they are both hoisted up 54 m (177 ft) using the TYROMONT rescue bag. A brief flight to a small hospital in Füssen, Germany, concludes the first mission of the day.

We try to scarf down a lunch, but after just 40 minutes, we are back on board and headed into the mountains to help a hiker who has fallen and sustained a head injury. Because the hiker is in Germany, we pick up a mountain rescuer and rush towards Imberger Horn to proceed with another hoist evacuation.

"[The] hoist is absolutely an essential piece of equipment," says Flatz. "Together with the category and configuration of the helicopter it allows for very prompt and foremost safe evacuation, even in very demanding conditions."

On our way from Immenstaad hospital to home base we receive another call; this time a mountain biker has fallen off a ridge trail and is seriously injured. Flatz and a fellow mountain rescuer are first hoisted down on a fixed rope to secure the position. Hommel follows with medical equipment. The steep, exposed, grassy terrain makes for a demanding rescue, but all goes smoothly and we head back to Murnau hospital once the patient and our own personnel are on board. The mountain rescuer proves essential in preparing the position

for safe hoisting. When we lift off, he remains with the rest of the bike crew and, riding the casualty's bike, guides them safely down to the valley.

Another mission safely and successfully complete, but no time for dessert or coffee. Just six minutes after arrival to Reutte, we're lifting off to a heart attack patient at a mountain pass gas station in Nassereith, Austria. The elderly woman is treated and transported to the rooftop heliport at AKH Innsbruck, one of the top hospitals in Austria.

"See, I told you, Sundays are not free days here," Flatz says, loading the stretchers back into the helicopter and wiping sweat from his forehead.

A spectacular sunset over Innsbruck concludes a busy, but rather typical weekend for the RK2 helicopter. The team now must navigate its way back to home base in Reutte through valleys as storm clouds crowd the mountain tops. After a debrief, equipment and hoist check, material replenishment, and some compulsory paperwork, the helicopter is back in its hangar and ready to help those in need.



Tomas Kika | A helicopter pilot and rescuer, Tomas draws on his hundreds of hours spent rescuing and training at the end of a line to provide instruction in helicopter rescue techniques. This unique insight into the world of helicopter rescue is reflected in his writing and photography, but his rescuer's helping hands and paramedic skills are always his first priority.



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A Volusia County Sheriff's Office Bell 407 flies past the Daytona International Speedway in March. The race track is a major tourist draw for the central Florida county and a venue for the annual Bike Week.

DAYTONA INTERNATIONAL



SAV

NATIONAL SPEEDWAY



CIVIL
VIORS

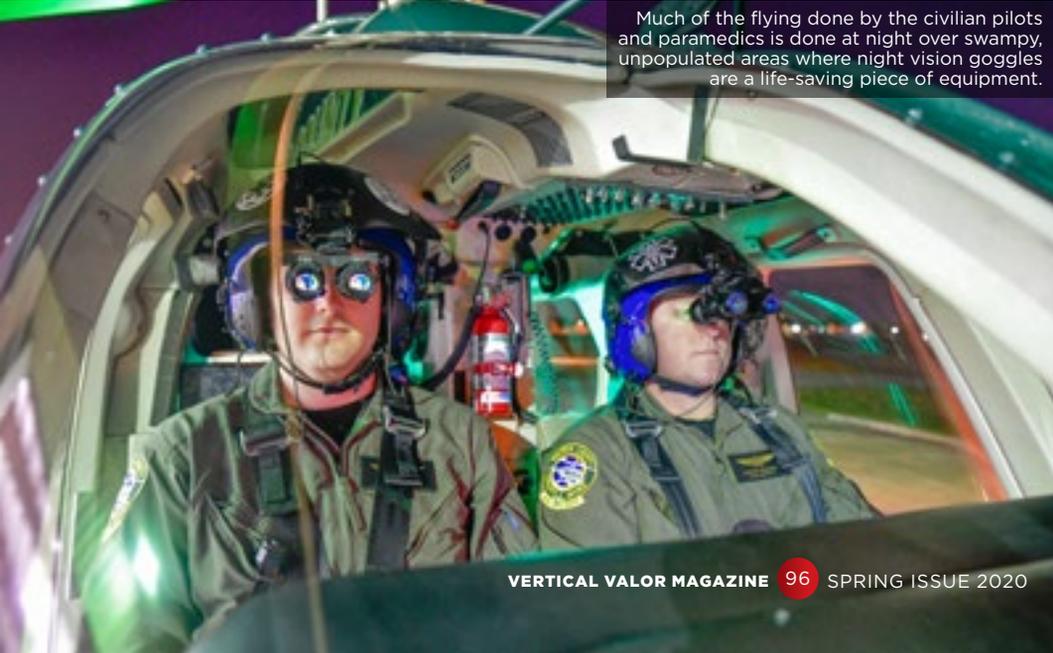
IN ONE OF CENTRAL FLORIDA'S LARGEST COUNTIES, VOLUSIA CIVILIAN SHERIFF'S PILOTS AND PARAMEDICS WATCH OVER BEACHES, SWAMPS AND CITIES YEAR-ROUND IN THEIR FLEET OF BELL 407s.

BY DAN PARSONS | PHOTOS BY MIKE REYNO



Much of the flying done by the civilian pilots and paramedics is done at night over swampy, unpopulated areas where night vision goggles are a life-saving piece of equipment.

A "patient" is transferred from the helicopter atop Halifax Health Medical Center. The Sheriff's Office and the hospital have partnered in the past to purchase equipment for the fleet of Bell 407s.





Maintaining the fleet of three 407s is complicated by the proximity to saltwater, but chief pilot Greg Brooks says they only ever fly as far from shore as one would want to swim in, should anything happen.



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Each year, Daytona Beach Bike Week draws 100,000 bikers to the Fun Coast of Florida, where a handful of riders inevitably wipe out and suffer sometimes horrific injuries.

So began the festivities for one biker who took a turn too wide on March 11 and cut a scar into a grassy Volusia County roadside. The man was thrown from the bike, slashed open his left thigh and ate a face full of dirt. Not wearing a helmet, he was knocked unconscious.

Fortunately for the injured biker, a Volusia County Sheriff's Office Bell 407 was airborne and directed to the scene. Police on the ground had stopped traffic along the two-lane road, which provided just enough room and clearance from roadside wires for pilot Dean Balmforth to land.

Flight paramedic John Oldham hopped from the left cockpit seat, and jogged up the road to where a ground-ambulance crew had stabilized the injured biker. Because he was unresponsive when paramedics arrived in the ambulance, the man was flagged as a trauma patient and the aviation unit was called in.

He was awake but not quite sensical when Oldham arrived and began gathering information from his earthbound colleagues. Together they load him onto a backboard and then a stretcher that is wheeled toward the helicopter, rotors still spinning.

The front left seat is removed from the cockpit and placed in an aft storage locker so the patient, strapped to an immobilizing backboard, can be loaded in. His feet rest nearly against the dash with his head in the cabin, where Oldham gets busy providing emergency medical care.

"The patient's lower right leg is 'crunchy' with multiple fractures," Oldham says. The patient does not appear to have been drinking. He'll spend his bike week in the hospital.

Within 15 minutes, Balmforth has the helicopter and the injured biker at Halifax Health Medical Center. He is wheeled from the rooftop helipad into an elevator and down to the emergency department, where doctors and nurses swarm to triage his wounds.

The successful medevac mission is a shining example of the service the Volusia Sheriff's Office provides its residents 24 hours a day, year-round, with a staff of 10 and three Bell 407s.

It isn't only the public that benefits from having an air ambulance service in Volusia County. In 2001, the aviation unit possibly saved the life of Lt. Tom Tatum, after a drunken motorcyclist hit Tatum while performing a traffic stop.

He pulled the vehicle over on the side of U.S. 1 near the Iron Horse Saloon, a popular Bike Week roadhouse. One biker in a passing pack of motorcycles edged too close to Tatum and clipped his leg, breaking it in four places.

"It was pretty painful," he said. "They called for trauma alert and the aircraft came in, landed on U.S. 1, loaded me up and flew me to the hospital. It was a huge benefit for me, personally. For one, it's a faster response to the hospital and you don't have to ride in the ambulance, which is more bumps on the road."

The three Bell 407s owned by the Volusia County Sheriff's Office share the sky near the Ponce de Leon Inlet Lighthouse. Chief pilot Greg Brooks said the outing was the only time in his more than 20 years with the program that all three were in the air together.



A CRITICAL NEED

Daytona is a shining band of development along the shore of this county of roughly 550,000 people. The 10-minute flight between the city and the DeLand Municipal Airport traverses a gulf of lightless, marshy wetland that spans the 1,300-square-mile county north to south.

"You have a population on the east side of the county and a population on the west side of the county, and in the middle is just a big swamp from the north end to the south end," chief pilot Greg Brooks said. "We have a lot of remote areas that we have to search sometimes."

A while back, Brooks brought his 407 down to about four feet to offload flight paramedic Matt Brunelle into waist-high water in that swamp. A woman and two children had kayaked into the mangrove maze and became lost when the sun set. A rescue boat could not reach them in what is called Mosquito Lagoon, but the helicopter could. Using night vision goggles, Brooks located the lost trio and deposited Brunelle. Brooks orbited in the helicopter and kept them lit with his spotlight during the daring rescue. The only casualty was Brunelle's

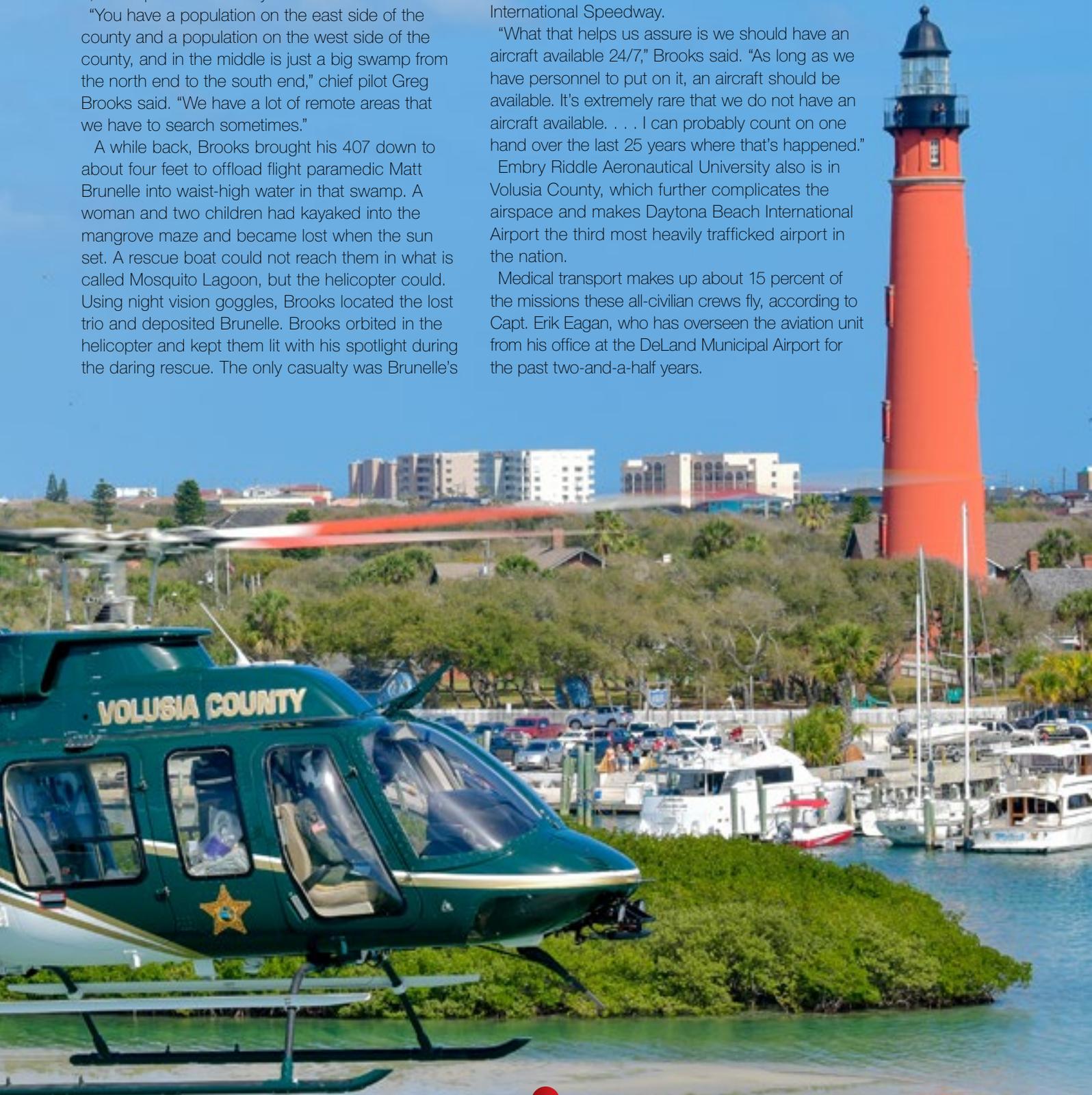
radio, dropped and still lost in the swamp.

With three Bell 407s, the sheriff's office manages to keep one aircraft on duty at all times and typically flies about 150 medical transports a year, about one every two or three days. The frequency ramps up during big events like Bike Week or the Daytona 500, held annually at Daytona International Speedway.

"What that helps us assure is we should have an aircraft available 24/7," Brooks said. "As long as we have personnel to put on it, an aircraft should be available. It's extremely rare that we do not have an aircraft available. . . . I can probably count on one hand over the last 25 years where that's happened."

Embry Riddle Aeronautical University also is in Volusia County, which further complicates the airspace and makes Daytona Beach International Airport the third most heavily trafficked airport in the nation.

Medical transport makes up about 15 percent of the missions these all-civilian crews fly, according to Capt. Erik Eagan, who has overseen the aviation unit from his office at the DeLand Municipal Airport for the past two-and-a-half years.



One of the Volusia Sheriff's Office Bell 407s cruising along past Daytona Beach apartment highrises.



The civilian pilots and paramedics and their uniformed counterparts, from left to right: Lt. Tom Tatum, flight paramedic John Oldham, pilot Dean Balmforth, pilot Kodey McKnight, chief pilot Greg Brooks, deputy Jordan McDaniel, maintenance supervisor Neil Ridout and Capt. Erik Eagan.

Much of Volusia County between the county seat of DeLand and Daytona Beach along the Atlantic coast is mangrove swamp.





Most of the patients transported by the Sheriff's Office helicopters are taken to Halifax Health Center, which has room for two helicopters on its rooftop helipads.



The underside of one of the Bell 407s shows the Spectrolab NightSun spotlight and L3Harris Wescam MX-10 forward-looking infrared (FLIR) sensor.

"There's a critical need because we are such a large county," Eagan said. "In order to get to that golden hour and get you to the hospital for emergency treatment, we really need this resource. There's a huge benefit to having this resource also for law enforcement, being able to follow fleeing vehicles. . . . It's just an awesome tool that we use."

Eagan manages a staff of four full-time and one part-time pilot and four flight paramedics, which he prefers to call tactical flight officers because most of their time is spent operating the searchlight and FLIR sensor, as well as navigating and communicating with officers and emergency medical personnel on the ground.

Within a huge department of 900 employees — 465 of them sworn law enforcement officers — Volusia County Sheriff Michael Chitwood has been a tireless advocate of the aviation unit, Eagan said. Although the aviation staff currently are all civilians, most have trained to fly law enforcement missions and the flight paramedics actually



Chief pilot Greg Brooks at the stick of a Bell 407.



Maintenance supervisor Neil Ridout cares for the fleet by himself, usually working on one aircraft so the other two are ready for missions.



Flight paramedic John Oldham cares for an injured motorcyclist whose Bike Week was spent in the hospital.

attend tactical flight officer training in Palm Beach County, Eagan said.

"Airborne law enforcement is a different animal, or different mission compared to regular aviation," he said. "I think it's a benefit to have sworn law enforcement; that's the direction the sheriff wants to go because then we can actually transfer probable cause from the sky to the ground. They could see a reckless driver. Having civilian pilots and civilian staff, they can relay that information, but we cannot act upon it. . . . You can't transfer that crime that you are witnessing to the ground."

That would entail flight crew members attending a law enforcement training academy and obtaining either certification as an officer or auxiliary officer. Florida Highway Patrol has such a program that the Volusia aviation unit is considering sending pilots and paramedics through, he said.

The Sheriff's Office holds its own FAA part 135 certificate and is the only air medical service in the county. As such, its primary mission, though not the one it spends most time on, is medical transport and supersedes any other type of call, Brooks said.

"We don't really have any air medical assets in this county right now," Brooks said. "The closest is Orlando and Flagler, which is part time. They operate during the day and at nighttime they're shut down. So we'll do a lot of mutual aid with Flagler County."

Though it is a second priority, about 90 percent of incoming calls are to support law enforcement operations on the ground, Brooks said. They also have a bucket for firefighting, but have not put it to use yet. Plans are to train for firefighting missions with Flagler County FireFlight.

Sometimes the Coast Guard calls on Volusia's 407s to search inland bodies of water like Lake George, the second largest lake in Florida.

"Their closest air asset comes out of Clearwater, so it takes them a while to get over here," Brooks said. "We don't go far offshore because we don't have floats. . . . We're a single-engine aircraft and we don't have floats, so the running joke is we only go as far offshore as we're willing to swim back to the land."

One of the 407s is equipped with a mount for SWAT team members to rappel from the aircraft. The aviation unit also trains to drop officers in and pluck them from water and for aerial shooting, Brooks said.

"We're trying to be a little more proactive with the SWAT Team and a little more specialized with what we do, just to be a little bit more useful for whatever they need us for," Brooks said.



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AN 'EXCELLENT AIRCRAFT'

The Sheriff's Office has maintained aviation assets since the late 1970s beginning with Bell 206B JetRangers with law enforcement pilots only on duty. When a medical call came in, they would have ambulance-based medical personnel hop onboard, chief pilot Brooks told *Valor*.

It eventually upgraded to L-model 206s and then to the four-bladed, single-engine 407. The current fleet of three 407s is the department's second batch of that model aircraft, and they have served well for the past 25 years, Brooks said.

"The 407 is an excellent aircraft," he said, admitting a bias toward Bell because most of his experience has been in the company's aircraft. "They're very forgiving aircraft. They're very durable."

A March 10 photo flight with Brooks, Balmforth and pilot Kodey McKnight each flying an aircraft was the first time any of them could remember all three helicopters in the air at the same time.

McKnight flew in the Army as a UH-60 medevac pilot, and notched a combat tour in Iraq, in 2006-2007. She was in the Army for 12 years and flew for the final five after having

corrective eye surgery. Also along for the ride was Jordan McDaniel, a sworn Volusia Sheriff's Office deputy training to fly with the unit.

Configured to fly at about 5,250 pounds (2,381 kilograms), the Bell 407 gives Volusia crews about 2.5 hours of flight time. The aviation unit is budgeted for about 2,000 to 2,200 hours per year but has been averaging less — around 1,200 hours — in recent years while their aircraft were being upgraded, Brooks said.

Two people typically sit in the front of the aircraft, with the flight paramedic in the left-hand position. The paramedic/tactical flight officer is in charge of navigation and operating the Spectrolab NightSun spotlight and L3Harris WesCam MX-10 forward-looking infrared (FLIR) sensor.

"We want the pilots to just pay attention and fly," flight paramedic Oldham said. "So I do most of the spotting and communication with the ground and towers."

A ONE-MAN BAND

Perhaps the most remarkable aspect of Volusia County's aviation unit is that the whole fleet is maintained by a single



mechanic. Neil Ridout, a mountainous, jolly Brit and former U.S. Army AH-1 Cobra crew chief, has been director of maintenance for the aviation unit for eight years. He still is the single line of defense for these aircraft against the rigors of flying in a coastal Florida county.

"What he does compared to some of the other agencies in Central Florida, as a one-man band, is phenomenal," Eagan said.

"I shy away from anything structural," Ridout said. "We don't have the tools. I don't really have the experience or do it enough to get into it. . . . Anything else we'll do. If we don't have the tooling, Bell will assist us with the tooling."

The county has just finished upgrading its steam-gauge 407s with new Garmin digital avionics systems, a process that took about three years, Ridout said. Having decided to upgrade its existing aircraft instead of buying new, the sheriff decided to invest several million dollars into the program.

"We were in a position to either trade the aircraft or modify the aircraft or live with them the way they are," Ridout said. "We spent a couple million dollars putting law enforcement equipment in."

That included installation of Garmin 500H dual-screen electronic flight displays, the L3 Wescam MX-10 camera on two of the aircraft, a Churchill Navigation augmented reality system, Kestrel Systems target acquisition capability and multi-band 800 MHz police radios.

"We've managed to do all this while keeping our role up as an air ambulance when called upon," Ridout said. "It's been quite a challenge squeezing all that stuff into a helicopter that also has to be able to accept [patients]."

Having a fleet of three 407s allows Ridout to focus on one at a time and stagger the major maintenance groundings so at least two are operational for emergencies.

"The fact that we have three helicopters takes a lot of the challenge out," he said. "We need 24/7 support, so by having a third helicopter, it allows me to focus on maintenance while I have two other aircraft out in the field operating."

Ridout also leans heavily on Bell maintenance services based in Fort Lauderdale to keep the fleet flying every day of the year. Under an existing agreement with the manufacturer, Bell provides all spare parts on demand. All general maintenance and overhaul is done in-house, but Bell also



will dispatch skilled mechanics to perform maintenance that Ridout can't do. Volusia County's pilots also help with some of the heavy lifting.

"We're more of a team," Ridout said. "I can call on pilots to help me get blades off. If I'm pulling an engine, the pilots will come down and help me. I have all the support I need, so it's not as big of a job as it looks."

Volusia County also has a working agreement with Keystone Turbine Services in Pennsylvania to care for its Rolls-Royce 250-C47B turboshaft engines.

The unit has just finished the 5,000-hour inspection on one of its 407s. A second aircraft is nearing the same inspection, which entails an overhaul of the drivetrain from the rotor head down to the tail rotor gearbox. This will be done in-house but takes the aircraft out of service for about 90 days. The aircraft also undergo interim 60-month inspections between major overhauls, Ridout said.

"We'll have both of those going on at the same time," he said. "It's going to be a challenge because that will leave us with one helicopter for probably a couple of weeks."

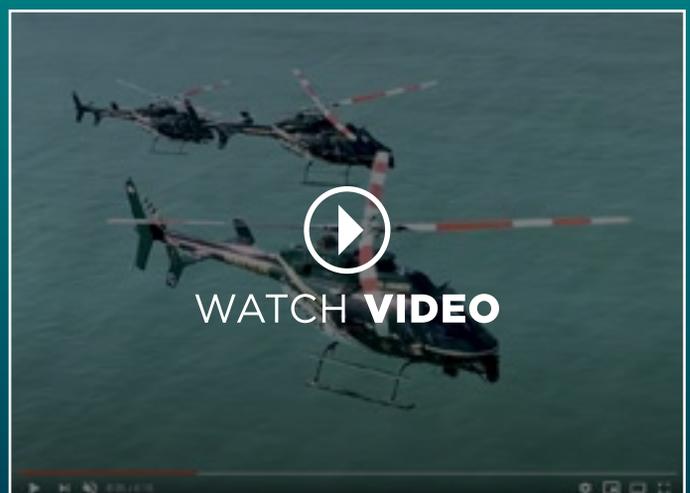
Even with that one helicopter, the Volusia Sheriff's Office crews will be on call, ready to respond at a moment's notice.

"Our paramedics are top-notch and they've saved [many lives] because they do emergency procedures . . . in flight," Eagan said. "We've got the best of the best that fly with us, and they are literally saving lives. That's the mission." 🚁

The Volusia Sheriff's Office fleet of three Bell 407s show off their colors over the turquoise water off Daytona Beach, Florida.



Dan Parsons | Dan is the incoming editor of *Vertical Valor*. He was previously the executive editor of *Rotor & Wing International* magazine and has covered aviation and military matters at several other industry publications. Before moving to Washington, D.C., in 2011, he covered local government and legal issues at newspapers in Virginia and North Carolina. He can be reached at dan.parsons@mhmpub.com and on Twitter at @sharkparsons.



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An Irish Air Corps EC135 during a press demonstration session at Casement Aerodrome in Dublin, Ireland.

WATCHFUL & LOYAL

STARTING OUT AS A DEDICATED SEARCH-AND-RESCUE UNIT, THE IRISH AIR CORPS HELICOPTER WING HAS GROWN INTO AIR MEDICAL AND AIR SUPPORT ROLES TO PROTECT AND SERVE SURROUNDING COMMUNITIES — ALL WHILE FACING IRELAND'S EVER-CHANGING WEATHER.

STORY & PHOTOS BY LUKASZ GANCARZ

Ireland is well known for its mild climate and evergreen fields, but the weather can change in an instant. It is so common to experience all four seasons within a single day that an oft-repeated refrain goes, "If you can fly in Ireland, you can fly anywhere."

It was the gnarly winter of 1963-64, remembered woefully as the "Big Freeze," that proved the saying correct and





An AW139 hovers while the crewman searches for a safe landing spot on a soft soil.



For now Irish HEMS operates only during the daytime; however, the helicopter used for this role remains in an operational readiness 24/7.



All crews are undergoing NVG training sessions to remain current for all night time operations.

demonstrated both the need for and utility of rotorcraft in the Irish Air Corps. It hadn't gotten as cold in the last 200 years with ponds, lakes and rivers freezing solid. Towns and villages were cut off and supplies ran low. People in need of urgent medical care were put in a life-threatening situation with no means of transportation. Families were stranded in their own homes with local emergency services battling through the snow to gain any access to those in need. Ireland's Defense Forces deployed troops to provide rations and evacuate those worst affected countrywide.

Irish Air Corps crews did their best to drop food where possible, but it was rarely enough. High winds and low visibility were jeopardizing all relief efforts. It became painfully obvious that the state needed its own, dedicated rotary division. The decision was made to form the Helicopter Wing of the Air Corps, which would focus mainly on search-and-rescue (SAR) operations. After long consideration, the Irish government placed an order for three Aérospatiale Alouette III helicopters. The first two were delivered in 1963 and the third in 1964.

The Alouette III is a light, multirole, single-engine helicopter developed by the French Sud Aviation, which had seen service across the globe. A total of eight Alouette IIIs saw service in Ireland between 1963 and 2007, initially with the Irish Air Ambulance Service. Irish Air Corps helicopters were regularly deployed on SAR missions, troop transport and explosive ordnance disposal operations.

The rising number of tasks and an outstanding success rate of helicopter SAR operations was an indication that a new type of aircraft was needed to meet public demand. The Aérospatiale SA 330 Puma was leased from its manufacturer to fill in the role of a heavy-duty workhorse. It was only in 1982 when the Aérospatiale SA 365 Dauphin II (now the Airbus AS365 Dauphin) was chosen to fill the SAR role. The Aérospatiale SA342L Gazelle was purchased to work as a training aircraft for the pilots who wanted to move on to the Dauphin. It was the first aircraft with a full glass cockpit introduced to Ireland's fleet; however, it soon became clear that the Dauphin was not well suited for SAR operations, especially in bad weather.

Another leap forward was marked by introduction of the crew resource management (CRM) system, known well in civil aviation. It was designed to include all staff working both on the ground and in the air. This project was, and still is managed by Lt. Col. Phillip Bonner, who until recently was the commanding officer of No. 3 Operations Wing. The main idea was to give everyone in and working with the Air Corps, from flight attendants, engineers and flight crews all the way to janitorial staff, responsibility for the safety and performance of its operations.

With new training standards in place, CRM was introduced to the Garda Air Support Unit (GASU). The Air Corps provided pilots and a Eurocopter (now Airbus) AS355N Twin Squirrel for Ireland's National Police Service (An Garda Síochána) beginning in September 1997.

In January 2008, a Eurocopter EC135 T2 was purchased.

During Irish EAS operations, every crew member is responsible for safety, including paramedics.



“THE WINTER OF 1963-64, REMEMBERED WOEFULLY AS THE ‘BIG FREEZE,’ DEMONSTRATED BOTH THE NEED FOR AND UTILITY OF ROTORCRAFT IN THE IRISH AIR CORPS.”

“AFTER NEARLY 20 YEARS OF COOPERATION, BOTH THE AIR CORPS AND AN GARDA SÍOCHÁNA HAVE DEVELOPED A PERFECTLY BALANCED SERVICE TO THE PUBLIC, OPERATING ON A 24-HOUR BASIS.”



Confined area operations are a vital part of the Air Corps training syllabus.



From 2005 to 2008, both aircraft contributed to over 1,300 arrests and located 14 missing persons during SAR details. The Irish Air Corps was providing pilots, while the national police provided two more crew positions: the mission commander seated in the back of the aircraft and a second crew member sitting beside the pilot. (Again, all crew members are fully CRM trained and they can assist the single pilot in a variety of tasks, such as verifying checklist items or assistance during an emergency operation.)

The AS355N was replaced in 2007 by a second EC135 T2+. After nearly 20 years of cooperation, both the Air Corps and An Garda Síochána have developed a perfectly balanced service to the public, operating on a 24-hour basis. While being attached to the No. 3 Wing, each pilot is working under orders from their commanding officer. In GASU, the pilot in command (PIC) makes the final call on whether the mission tasked by the dispatcher is flyable or not. And CRM shines when there could be significant pressure involved in the decision-making process — especially with high-risk arrests, or the pursuit of armed criminals.

The EC135 had proven itself to be such an effective tool for all-weather operations that two more aircraft were fielded by the Irish Air Corps in 2004. Soon after, a search commenced for a complete SAR and helicopter emergency medical services (HEMS) capable platform, which can also fill some traditionally military roles. The AgustaWestland (now

Leonardo) AW139 was chosen to replace a veteran fleet of Dauphins. The AW139 was meant to be a true Swiss army knife, capable of undertaking a full spectrum of missions including HEMS, firefighting, troop insertion and patient transport. Floor sections of the aircraft can be modified for carriage of not only a specialized stretcher base but an advanced neonatal unit.

Additionally, all of the AW139 pilots had extensive EC135 experience. With a very intense training regime, the Air Corps prepares each pilot for their future roles. The training program is tailored to prepare the cadets to operate on multiple aircraft types in all weather conditions.

The first step in becoming a fully qualified pilot with the Irish Air Corps is passing a seven-month period of basic military training. Next comes fixed-wing ground school, during which CRM is imprinted into the recruits' minds after which crews are familiarized with the Pilatus PC-9M. There the Cadets accrue 130-150 flight hours and approximately 20-50 simulator hours. Upon completion of flight training they then proceed to their advanced flight training on the Pilatus PC-12, CASA CN235 or EC135.

After passing the yearlong Helicopter Conversion Course, pilots are trained on the EC135 to perform air ambulance missions. Pilots then proceed to the AW139 and complete a period as co-pilots on the aircraft, which includes time on EAS. They are then dispatched to GASU. After three to



Advanced paramedic David Irvin receives information electronically about a casualty while Corporal Dermot Corcoran checks the route for obstacles and alternative approaches.

five years spent with GASU, pilots are sent back to No. 3 Helicopter Wing where they continue to operate and train on the AW139 as needed.

Probably the most vital task of the No. 3 Helicopter Wing is the provision of emergency medical services. In 2011, a 12-month pilot project was launched to test possible advantages of having a helicopter with a full crew on standby to provide daytime HEMS flying under visual flight rules. CRM was a defining element of the program, which Bonner helped launch. One of the unique challenges at the beginning of joint operations was integrating two very different operational cultures.

Pilots and aircrew were using jargon unfamiliar to medical personnel, while paramedics were using medical terminology previously unheard by the aviators. Again, CRM training was modified to educate military staff on medical phraseology, including having one of the Air Corps crew members trained as a medical technician able to assist with casualty care. The same approach went toward the medical staff, who were introduced to the Air Corps procedures and operations, making them permanent members of the HEMS team. EAS flights were initially performed with an EC135 before the larger, more capable AW139 was brought online.

The service significantly reduced transit times for the patients and in 2013 became permanent. Another big step forward was to include the dispatcher's offices, which are located over 100 miles (160 kilometers) away from Athlone,

by installing a set of cameras in the HEMS briefing room. This allowed the dispatcher to see and hear the pre- and post-action briefings, fully incorporating them into the advanced CRM system in place.

A standard day for a HEMS crew starts with an operations briefing carried out by the commanding officer (CO). This includes a weather summary prepared by the first officer and a technical report by the engineers. While the first officer reviews the pre-designated landing sites and reports from previous duties, the CO carries out a thorough pre-flight inspection of the aircraft, after which the helicopter is set up for a quick start-up. Training flights are planned as required for the day, depending on weather conditions. Once a call comes in from the dispatch center, it is considered by the advanced paramedic. If it qualifies for a HEMS response, a mission is initiated, and the commander starts up the helicopter. At the same time, the first officer checks the location of an incident and assigns a pre-designated landing site or creates a new one if needed.

With location and route planned, the remainder of the crew boards the helicopter for an immediate departure. When airborne, the paramedic receives constant operational updates from the dispatch center. In many cases an ambulance team will be on the scene first and can confirm if HEMS response is needed. Upon arrival, the crew surveys the landing site, looking for any obstacles which could put

“SINCE ITS FOUNDING, NO LESS THAN 14 DISTINGUISHED SERVICE MEDALS HAVE BEEN AWARDED TO THE MEMBERS OF THE HELICOPTER WING.”

In preparation for landing the crewmembers become the eyes and ears of the flight deck, especially when flying over populated areas.

the aircraft in danger. Several tight turns are made while every crew member checks the landing zone.

With transition into hover and imminent landing, the Air Corps crewman becomes eyes and ears for the pilots. They will verbally confirm the aircraft's distance from the ground, possible debris and finally, contact with the ground. Immediately upon touchdown both a paramedic and an Air Corps medical technician will meet up with the ambulance team on the ground to assess the casualty. Within minutes of landing, usually with the aircraft awaiting with engines idling, the medical crew returns to the helicopter, which then takes off and heads for the nearest, most appropriate hospital.

Sometimes, when more specialized assistance is needed — such as for neonatal care — the Air Corps' fixed-wing aircraft will fuel up to help. With the component's CASA CN-235 ready at Casement Aerodrome, a young patient can be immediately transferred and transported to an advanced care unit in the United Kingdom. And with full cooperation from all emergency services involved, the Athlone-based HEMS unit has proven itself to be a major addition to the Irish public. Today, No. 3 Helicopter Wing provides three major services: Garda Air Support, emergency medical services and air mobility.

Ireland's Óglaigh na hÉireann (Irish Defense Forces) have actively taken part in global peacekeeping efforts since 1958 — from Central America to Africa and Asia and when called upon by partner nations and allies.

Apart from its local aid to the general public, No. 3 Wing in 2018 was deployed to Northern Ireland to assist with putting out brush fires. Two AW139s, each equipped with a 1,200-liter (317-US gallon) Bambi Bucket, worked directly over the affected areas while an EC135 was used as an observation platform. While the Irish Air Corps has been used in cross-border operations before, this was the first time the helicopters were used to directly tackle fires.

The Irish Air Corps' Helicopter Wing continues to develop and adjust its innovative training and staff retention programs, which makes this small force one of the most modern institutions of its kind in the world. While a pilot and staff shortage continues to be a global issue, in Ireland training is being adapted to attract not only new recruits and engineers, but most importantly to ensure that staff remain in service until retirement. As new training programs and technologies are continuously modernizing helicopter operations, the Irish Air Corps constantly adapts to remain one step ahead of global aviation trends. Since its founding, no less than 14 Distinguished Service Medals have been awarded to the members of the Helicopter Wing, who proudly adopted the international SAR motto: “That Others Might Live”; which in Irish translates to: “Go Mairidis Beo.” 🚁



Lukasz Gancarz | Private pilot, photographer, soldier. Full time Flight Lead Officer with Ireland's own airline - Aer Lingus. Lukasz focuses on military helicopter photography while serving with the Irish Army Reserves and working for “An Cosantoir” Military Magazine.

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DR. JARET RIDDICK

DR. JARET RIDDICK is director of the U.S. Army Research Laboratory's (ARL's) Vehicle Technology Directorate. In an interview with *Vertical Valor*, he discussed ARL's efforts to learn from pioneers in the electric vertical take-off and landing (eVTOL) space, notably through its collaboration with Uber. In May 2018, the two organizations announced a Cooperative Research and Development Agreement (CRADA) to work together on technologies supporting Future Vertical Lift, one of the modernization priorities. This has a particular focus on the creation of stacked, co-rotating rotors, which would be significantly quieter than traditional paired rotor approaches, an advantage with benefits to both the military and Uber, as Riddick explained.

✦ INTERVIEWED BY GERRARD COWAN

VERTICAL VALOR: WHAT LED TO ARL'S COLLABORATION WITH UBER?

JARET RIDDICK: ARL has a long history of collaborating with academia and industry to advance science. Over the past decade, we focused more concertedly on tearing down traditional barriers that prevent commercial and academic partners from working alongside military researchers, and through this more open collaboration business model that ARL has adopted, we've widened the pathway to partnership with non-traditional companies.

In standing up the Army Futures Command, it's very clear from senior military leadership that there is a desire to collaborate with the best people in the world to achieve the objectives that we have for the modernization enterprise of the Army. We recognize that we can't get there alone. So there's a big interest in engaging with non-traditional partners, industry partners in particular who are leading in areas that can be beneficial to the Army.

Uber is one of those companies, particularly in the air taxi domain through their Uber Air

model. They are leading a dialogue in the UAM [urban air mobility] community on a future where it will be normal to see commercial, commuter eVTOL transportation flying above urban centers to move people around.

VV: ARE THERE ANY SPECIFIC AREAS OF TECHNOLOGY WHERE YOU SEE POTENTIAL IN THE COLLABORATION?

JR: The key area of collaboration with Uber is what we call quiet rotor technology. Vertical take-off and landing vehicles all have a rotor system of some sort, whether that converts to forward flight when they're in the air in the case of tilt rotors, or other things that some other configurations can do. Quiet rotor technology is mutually beneficial. Uber wants to fly hundreds of these flights over urban areas, so there will be noise issues for them.

For ARL, when you think about an army on the battlefield of the future, unmanned systems that provide the capability for silent overwatch would enhance the lethality and survivability of soldiers on the ground. This quiet rotor technology is one where there are mutual benefits, so it was a perfect area for us to strike collaboration. Both sides in the relationship are deriving benefit from the research advances that would come out of the partnership.

VV: COULD YOU TELL ME MORE ABOUT THE ROTOR TECHNOLOGY YOU'RE WORKING ON?

JR: The particular configuration that we're looking at with Uber Air for quiet rotor is a stacked, co-rotating set of rotors. So instead of one rotor spinning, there are two rotors that are stacked on top of one another. And traditionally when you have these stacks — or coaxial rotors — they spin in opposite directions to create lift. But in this quiet rotor approach, those stacked rotors are actually spinning in the same direction: we refer to that as co-rotating.

All of this is enabled by the fact that the vehicle is driven electrically, setting the separation distance between the rotors and maintaining that very precisely as those rotors spin around. It's very hard to do this with mechanical transmission. With electrical transmission, the spacing and the pacing of the rotors is made more feasible. And so the idea of this co-rotating rotor, which will reduce the noise without affecting performance — in fact even improving performance in certain cases — is a very important thing.

VV: WHAT DOES ARL OFFER FOR NON-TRADITIONAL PARTNERS FROM DOMAINS LIKE EVTOL?

JR: ARL has a unique offer to make to an industry partner. We systematically built up an approach to this type of engagement almost a decade ago when we adopted a new business model we call "Open Campus." We have great researchers, we've got world-class facilities, but a lot of people were not really familiar with what

we do because we existed behind a fence. And so Open Campus was a way to open up the fence and say to potential collaborators, "come in, work alongside our research scientists and engineers, let's share specialized research facilities and let's create a broader network of collaboration" by bringing to bear knowledge and other teaming relationships to answer scientific questions of mutual interest.

The key thing, though, is our Open Campus model is not a funding model; it's not transactional. It's an "in kind" cooperative agreement, like the work we're doing with Uber.

VV: ARE THERE ANY OTHER FOCUSES OF THE WORK WITH UBER IN PARTICULAR THAT YOU WOULD HIGHLIGHT?

JR: We are developing analytical tools for acoustics analysis. In collaboration with Uber, we are doing some very specific and sophisticated analysis to improve and upgrade the design tools that are available to the community to look at acoustics for these particular rotor configurations. The tools that will come out of this collaboration really will have impact for the entire community of folks who are designing platforms for UAM, but will also impact the wider vertical lift community.

VV: DO YOU WORK WITH ANY OTHER COMPANIES IN THE EVTOL SPACE, OR DO YOU HOPE TO GROW THIS WORK IN FUTURE?

JR: Interestingly, I am going to California this week [Feb. 29] to attend the GoFly Prize fly-off. At this event, I'll engage with some of the brightest, most adventurous minds in aerospace; those who are innovators, engineers, designers, pilots, and revolutionary thinkers and planners with an eye toward the future.

While I'm in California, I'll have a packed agenda visiting a number of UAM companies seeking collaborations within the UAM horizontal across various business lines, such as military, commercial eVTOL transportation, and first responders, looking at how each UAM company addresses durability, capacity, payload, and affordability, and the S&T implications that enable the right balance of each of these.

When we talk about the Army engaging with non-traditional industry partners that are leading in a wide variety of technical fields, we want to do that aggressively because these industry partners can prototype proofs of concept very rapidly, including for some of the discovery that's coming out of ARL. It's a way to move the technology faster from discovery into the hands of the warfighter, so we want to engage as many industry partners as we can, particularly those non-traditional ones who can partner with us while we're early in the discovery phase. So while I'm in California, I'll be visiting a whole variety of these UAM companies, and I'm very excited to see the different configurations that these folks are coming out with. ✦



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