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AN MHM PUBLISHING MAGAZINE // WINTER ISSUE 2020

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THE TEAM

GROUP PUBLISHER MIKE REYNO, MIKE@MHMPUB.COM

GROUP PUBLISHER

LINDA REYNO, LINDA@MHMPUB.COM

ASSOCIATE PUBLISHER DEREK KAST, DEREK@MHMPUB.COM

SPECIAL PROJECTS EDITOR ELAN HEAD, ELAN@MHMPUB.COM

ASSOCIATE EDITOR DAYNA FEDY DAYNA@MHMPUB.COM

EDITOR DAN PARSONS, DAN.PARSONS@MHMPUB.COM

> SALES & MARKETING DIRECTOR TIM MUISE, TIM@MHMPUB.COM

MARKETPLACE SALES MANAGER CARLA MCKAY, CARLA@MHMPUB.COM

JUNIOR SALES REPRESENTATIVE MITCHELL REYNO, MITCH@MHMPUB.COM

CIRCULATION MANAGER LEANNE WILLIS, LEANNE@MHMPUB.COM

> PRODUCTION MANAGER JEN COLVEN, JEN@MHMPUB.COM

GRAPHIC DESIGNER KAYTLYN WISMAYER, KAYTLYN@MHMPUB.COM

WEBMASTER

SHAWN PIETERS, SHAWNP@MHMPUB.COM

CONTRIBUTING **WRITERS**

DANIEL FOULDS IAIN HOLMES TONY KERN DAN MEGNA SKIP ROBINSON MICHAEL TOSI

CONTRIBUTING PHOTOGRAPHERS

SHELDON COHEN SAMUEL KING DAN MEGNA BARBIE MOORHOUSE TIM PRUITT MIKE REYNO SKIP ROBINSON JENNIFER L. SAPIENZA MICHAEL TOSI

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INTRODUCING VERTICAL VALOR

Welcome to the first issue of Vertical Valor! When we launched Vertical 911 magazine in 2009, the name was a perfect fit for our target audience of air medical, law enforcement, searchand-rescue (SAR), and fire helicopter professionals in North America. After all, these people are in the business of helping others, and 911 is usually the best way to reach them.

Over the past decade, however, the magazine has evolved. First, we moved into coverage of the military helicopter sector, including through multiple combat embeds in Afghanistan. Then, we greatly expanded our international reach encompassing many countries where 911 is not the emergency phone number.

Clearly, a name change was in order. After much internal discussion, we settled on Valor - a name that speaks to the common trait in all of our readers who spend their lives in service to their countries or their communities. Our core mission hasn't changed; we're still dedicated to in-depth reporting and spectacular photography from the field. But as we move forward with Valor, we plan to bring you more: more stories, more breaking news, more videos, and more ways to interact with the magazine and shape our coverage.

As a first step, we're launching a new weekly email newsletter focused exclusively on the air medical, law enforcement, SAR, fire, and military helicopter sectors. Intended to complement our popular Vertical Daily email, it will provide a convenient roundup of the stories that are specifically relevant to your operations. To sign up, visit verticalmag.com/subscribe-daily-news.

We've also created a new Vertical Valor Facebook group and @verticalvalor Instagram account where we'll be sharing exclusive photos and videos for our Valor audience. Like our Vertical Facebook and Instagram accounts, we hope to grow these into vibrant online communities where you can share your own photos

and experiences with like-minded professionals and the next generation of Valor readers. We've made some of our most valuable connections on social media, and look forward to hearing from more of you in the future.

Meanwhile, I'm pleased to announce that I'm handing over the reins of Valor to our new editor Dan Parsons and associate editor Davna Fedy. Dan previously served as the executive editor of Rotor & Wing International magazine and has covered aviation and military stories for

in 2017, including the Mercy Flight cover story in our Fall issue. Dan and Dayna will be working as a team to produce each outstanding issue of Valor going forward. Fortunately for me, I'm not going anywhere. With the print magazine in Dan and Dayna's capable hands, I'll be heading up our digital and social media efforts, plus some special projects to be announced in due course. Stepping away from day-to-day editing duties will also give me more time to get out into the field, which is what I enjoy most.

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several other industry publications since moving to the Washington, D.C. area in 2011. He's a talented journalist with particular expertise in defense matters, which will help us grow our military coverage without losing focus on our other key sectors.

If you've been a regular reader of Vertical 911, you may already recognize Dayna's name. She has written some great features since joining MHM Publishing





Reporting for the magazine has provided me with some truly unforgettable experiences - from flying night patrol with the Los Angeles Police Department, to landing in the deserts of Mali with the Royal Canadian Air Force. Along the way, I've been greatly impressed with the knowledge, skill, and - yes - valor of the men and women I've flown with, and will be honored to continue sharing their stories in issues to come. 泽





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YEAR IN REVIEW: AIR AMBULANCE ACCIDENTS AND INCIDENTS

As 2019 came to an end, a new year and new beginnings arrived. In 2019, as in many previous years, some of our fellow air medical crewmembers arrived at work but never had the opportunity to clock out. This year seemed worse in many ways; for example, on Jan. 29, 2019, we lost two aircraft on the same day.

In my previous article, "When should we talk about accidents?" (see p.10, Vertical 911, Summer 2019), I briefly touched on some learning points from the fatal Survival Fight crash in Ohio. Recently the National Transportation Safety Board (NTSB) released further information on this accident, including a detailed operational factors report (see p.30). It was shocking, and many people who do not regularly read NTSB reports went through this one in its entirety.

However, every NTSB and Aviation Safety Reporting System (ASRS) report is an opportunity to learn. Here is a roundup of some notable accidents and incidents in the U.S. air medical transport industry (both fixed- and rotary-wing) over the past 12 months.

There were four fatal accidents in the sector last year which are still under investigation. There were also a number of nonfatal accidents and incidents. These include an Airbus H135 in New York that contacted trees on departure, an Airbus AS350 that experienced a dynamic rollover in Oklahoma, and a Bell 206 in Georgia that suffered an engine failure on departure.

On a frigid winter's night in Union Center, South Dakota, a Bell 407 responded to a scene call. Upon landing, the flight medic exited the aircraft, while the nurse and pilot remained onboard for shutdown. A ground ambulance drove into the helicopter's blades, injuring one person and causing substantial damage to both the helicopter and ground ambulance.

A Sikorsky S-76 made an emergency landing in Morrilton, Arkansas, in May. Forty minutes into the flight, the pilot smelled fumes in the cockpit, followed by a warning of smoke in the aft baggage compartment. The NTSB hasn't published the final report for this incident yet, so not all of the details are available.

Perhaps the scariest incident involved a Cessna 550 flying from Savannah/Hilton Head International Airport to Niagara Falls, New York. Twenty minutes into the flight, at flight level 350, the left engine began to spool down. The pilot chose to return to the airport, and as he did, the situation worsened. The engine instrument soon showed no oil pressure, so he had to shut down the engine, and at approximately 6,000 feet, his right engine began to spool down and had to be shut down, too. Fortunately, he was able to glide in for a safe landing. It appears that a lineman mixed half a bottle of fuel system icing inhibitor with diesel exhaust fluid, contaminating the fuel aboard the medical flight.

Looking at ASRS reports, there were some additional noteworthy events for the sector. An air traffic controller in Orlando, Florida, reported difficulty with a helicopter departing a local medical center, as its departure route conflicted with traffic at a local airport. He recommended procedures or a special route for helicopters entering the medical center. A pilot reported that as he pulled in to start his shift, the tones went off. In the confusion over who should take the flight, the pilot omitted to file a risk analysis.

A pilot flying a Pilatus PC-12 wasn't feeling well but thought he was safe to operate the aircraft. After departure, he started to vomit. The flight nurse who brought him an emesis bag reported the pilot lost consciousness temporarily. After regaining consciousness, he was able to land the aircraft.

While working at an airport that was clearing snow, a controller reported he rushed to clear the plows from the runway to allow an air ambulance to land. He stated that he should have sent the aircraft around, and it was unclear if the fact the plane was an air ambulance was a factor in his decision. Another report worthy of review involved a fixed-wing single-pilot operation. The pilot learned the winds were outside his allowable range at his destination, so he elected to divert to his alternate. He reportedly had issues contacting dispatch and ended up cancelling his instrument flight rules clearance to ease his workload. He inadvertently landed at the wrong airport, citing task saturation, night flying, and difficulty contacting dispatch as factors.

Upon discovering he had landed at the wrong airport, the pilot opted to take off and fly to the correct airport. The pilot admitted in his report that taking off was a poor choice. This decision is understandable, as once you make a mistake, your first impulse is often to correct it immediately. However, it is essential to remember that when we make mistakes we need to stop and regroup before proceeding.

In another event, a mechanic replaced the pitot tube on an unspecified helicopter model and signed it back into service. The pilot reported he was unsure if the mechanic had completed the 24-month recertification test required for the helicopter to be airworthy. He questioned the mechanic but was satisfied with his answer, so carried on with his day and flew the aircraft.

The next morning at shift change, he mentioned his concern to the oncoming pilot who was more familiar with maintenance schedules. The oncoming pilot thought the original pilot was right, so together they asked the mechanic to look into it further and grounded the helicopter in the meantime. The mechanic returned and acknowledged he had missed a section in the manual. The aircraft remained grounded until the additional testing was complete.

Reviewing the events of the last year shows the challenges we have in the air medical transport industry — there is no doubt that risks are all around us. As we proceed into 2020, we must remember that to get everyone home safely, we all need to be vigilant every second of every day.

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PREFLECTIVE THINKING

Over the past decade or two, I've bucked the trends of human factors research by ignoring the analysis of mishaps and accident data and spending most of my time looking at the highest end of the performance spectrum. As many of my readers are aware, this began with the study

"OVER MY FIRST CUP OF COFFEE, I ASK MYSELF TWO QUESTIONS EVERY MORNING. WHERE AM I LIKELY TO SCREW SOMETHING UP? AND, WHERE ARE MY OPPORTUNITIES TO LEARN AND EXCEL?"

> of how smart operators learn to recognize and avoid errors through (1) a thorough understanding of human error in general, but more critically, (2) an honest assessment of their own personal error patterns and how they can use these insights to avoid traps that others fall into. This error control twostep was published in *Blue Threat: Why to Err is Inhuman* back in 2010.

> Building on this new self-awareness model, I discovered that many high-end professionals are different from their peers in that they are able to grow where they are. with the resources at hand, no matter where they are or what level of resources they are provided. These men and women are unique in that they don't log hours as much as they log lessons. They use everyday opportunities to discover new ways to do things better. Not surprisingly, these folks tend to rise quickly in their careers and use their new positions to assist others to do so as well. These insights led to the publication of Going Pro: The Deliberate Practice of Professionalism in 2011.

For the last few years, I've been following these high achievers and their protégés to see what else might be different about them that we as lesser mortals might learn and apply. A few months ago, I spoke to a few of these people from the first responder community - specifically firefighters and law enforcement types - and discovered something subtle but unique in the way they prepare for a given task, be that task a critical response or simply a routing act in their day-to-day activities. I would categorize it somewhere inside the risk management realm and have coined the term preflective thinking to try and capture what this is.

First of all, preflective thinking is not a formal process; it is a discipline of thought that weighs known factors of personal performance (e.g. error patterns, physiological readiness, team composition, etc.) against the known and unknown obstacles and challenges of the task. This mindset is activated by an uncommon drive to improve. One quote from a senior leader in the law enforcement community best describes this frame of thought. "Over my first cup of coffee, I ask myself two questions every morning. Where am I likely to screw something up? And, Where are my opportunities to learn and excel?" In my human performance geek brain,

I immediately recognized this as a cognitive forcing strategy, a way to force our minds to think in a way we might not normally think. I was reminded of a quote I highlighted decades ago in a Carlos Castaneda book. If my memory serves me, it came from an Indian sorcerer named Don Juan Matus who told his protégé that "Every morning, a true warrior wakes up and asks himself, Who is my enemy today?" There are two keys here. The first is contained in the words "every morning" or "over my first cup of coffee." This habit of preflective thinking becomes a part of the high achiever's daily routine, priming their minds for controlling errors and seizing opportunities. The second is more subtle. It looks inward and establishes a code of personal accountability for success, failure, and growth.

There is much more to learn about how these high achievers use this mindset in real time, and I am on the task to discover and share these insights with you like a bloodhound on a hot track. In the meantime, try an early morning routine of forward thinking — preflective thinking — to see if it has any benefit in your life. If you discover anything, drop me a note at tony@convergentperformance.com and I will be sure to share these lessons in a future column. Work smart, work safe, and have a great 2020!

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WHEN BUSINESS AS USUAL IS BAD FOR BUSINESS

In the post mortem that occurs after any helicopter air ambulance crash, factors that might have prevented or promoted the tragedy are examined, discussed, and given lots of ink. In 2004, I was the base manager of a program in Columbia, South Carolina, when one such crash made headlines. One of my pilots was the first to launch on a request with sufficiently good weather indicated by current and forecast conditions. While flying to the scene, he observed halos forming around surface lights, and taking this to be a sign that fog was forming, he aborted and returned to base.

A competing service less than five miles away from our base monitored this abort and subsequently refused a request for transport. A pilot at the accident aircraft's sister base upstate was then requested, and he refused. Finally, the accident pilot was contacted and after checking the weather which was above his approved minimums — he accepted and flew to the scene. I can only surmise that the weather was "on the bubble" but just good enough as he and his crew flew to their patient. While they were loading, the bubble popped.

Shortly after takeoff, the accident aircraft was observed to enter low clouds and/ or fog. They crashed into trees a few seconds later. The pilot, nurse, paramedic, and patient were killed.

This crash put "chopper shopping" on everyone's radar. Ensuring that all programs are aware of any program's refusal for weather became an industry imperative with varying levels of success. The weatherturndown.com website was created, and sharing information about flight refusals was encouraged by all of the "alphabet groups."

On Jan. 29, 2019, a Survival Flight helicopter crashed while performing a transport that two other programs had declined due to weather, and the issue of chopper shopping again became an urgent concern. On social media, many industry observers suggested that accepting a flight request after another service has refused it is tantamount to gross negligence. But like many things in life, this issue is not as simple as it first appears. In the U.S., the rise of the for-profit model, and the sale of subscriptions that cover the unreimbursed portion of transport bills, has created a different imperative for some air ambulance providers. They must always be open for business.

They sell subscriptions to the public and they promise to provide a service in return. Occasionally, these same providers find it difficult to provide a functioning helicopter and a full team. The constant focus on cutting costs to maximize revenue often results in a missing crewmember or a broken helicopter with no backup. This puts the operator in an embarrassing situation, unable to live up to their promise.

The easiest way of covering up this failure is to withhold information about the crew or helicopter and simply refuse flight requests for the weather. Bad weather is beyond the control of the operator.

Ask almost any industry participant and they can tell you stories of competitors refusing flights under clear skies with unlimited visibility. More than one requestor has asked me while the patient was being loaded, "Why did that other service refuse the flight for weather?" A common response is to shrug one's shoulders and say, "I'm not sure, but the weather is fine." After all, it's unprofessional to disparage another service, right?

The dangerous downside to this development is that flight teams get it into their heads that their competitor's weather refusals have nothing to do with the weather. In a dog-eat-dog competitive environment where people's jobs depend on transporting patients, it's easy for things to get out of hand, and for teams to refuse to speak honestly with each other.

In business, misdirection and counterintelligence schemes are common and accepted. If I can get you to quit on the way to the contest, I have won. If I am not able to accept a request for my services, the last thing I want is for you to get the business. You might develop a relationship with "my" customer, and this might adversely impact me downstream. The words "cutthroat" and "business" are often written in the same sentence. The thing is, in most businesses you aren't actually cutting anyone's throat.

The helicopter air ambulance business is different. Here, misdirection might actually result in human suffering or death. Let's say that you can't complete a flight, and you don't want me to, either. If you say that the weather is too bad for you to do the flight, maybe I will become aware of your weather refusal and do the same thing myself. No one wins. Sadly, in this case, there might be another loser: the patient.

The patient isn't party to our struggle, and we do a fellow human being a disservice when we allow competitive instincts to color our actions. As flight nurse Kevin High wrote many years ago, competition is inevitable and a good thing. The way to be competitive in this business is to provide superior service; to offer capabilities that your competition can't or won't — such as the ability to fly under instrument flight rules.

Flights absolutely *do* get refused for weather when weather is not the reason. This is a problem for all of us. One way to fix this would be for state authorities to require air ambulance bases to update crew status and aircraft availability on a state-wide database/website. Malfeasance and deliberate misdirection should be punished.

Most importantly, *you* should resolve never to provide misleading information concerning a flight refusal. If you refuse a flight because you are tired or it's near the end of your shift, or it will take you over your duty time limit, please tell the truth. When you or your team refuse a flight, you should include an honest and accurate "why." Duty time limits and crew incapacitation are valid reasons for not going and don't mislead others or delay patient care unnecessarily.

If you hold a management position within an air ambulance company, please do not ask your people to deliberately mislead and confuse others. Doing so increases the chances that someone will get hurt. You are a good person, and you don't want that to happen.

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THE HOURS DILEMMA

In an effort to understand the current pilot shortage, I was given a unique opportunity by *Valor* to preview the military-to-civilian pilot transition with Metro Aviation and the Dartmouth Hitchcock Aerial Response Team (DHART). While the article (starting on p.56) was written in large part to remind U.S. military aviators like myself of the many challenging, rewarding career opportunities that exist in the commercial helicopter industry, it is also intended to highlight significant issues with recruitment and retention of military aviators.

While I touch on a multitude of factors including salary, benefits, and culture in the article, there's one significant issue I

"PILOTS INCUR A TREMENDOUS AMOUNT OF RISK AND ARE THE FRONTLINE OF ANY HELICOPTER OPERATION. WITH YEARS OF RIGOROUS TRAINING AND EXPERIENCE, THEY'LL GO ELSEWHERE IF THEY FEEL UNDERVALUED."

> didn't cover — the massive barrier created by civilian hiring standards that revolve almost entirely around minimum flight hour requirements.

Unfortunately, desire alone is no longer enough for military aviators looking to take their experience into the civilian helicopter industry. Gone is the Vietnam era, Cold War, and even Iraq and Afghanistan counterinsurgency operations, when military helicopter pilots could potentially log up to 1,000 hours in a year or single deployment. Depending on the branch of service, some pilots will be lucky to leave their initial six, eight, or 10-year commitments with 1,000 hours. Worse yet, that's very often total and not pilot-in-command (PIC) time, which for years has been the U.S. industry's standard for just an entry-level turbine job.

Does that lack of 1,000 hours PIC time make them eminently less qualified than pilots who have gone up through the traditional civilian route of instruction and tours? Does anyone "need" that much? Many major operators outside the U.S. start pilots in light turbine helicopters with nothing more than a commercial helicopter pilot license and proper training in type, first evaluating the person and not just their hours.

While this debate is contentious, I would argue what many military aviators lack in total time, they make up for in quality of training, flight experience, and a multitude of other factors. Under pressure from airlines seeking to fill their pilot seats, the Federal Aviation Administration (FAA) has considered this argument, and largely concurred. The FAA now allows pilots who have completed military flight training, whether fixed- or rotary-wing, to attain a restricted fixed-wing airline transport pilot (ATP) certificate in as little as 750 hours of total flight time, rather than the 1,500 hours typically required.

I hope the irony of this situation isn't lost here. The FAA and airlines are giving deference to military helicopter pilots for a discipline in which they're not even trained, while the civilian helicopter industry — for which these pilots' skills would arguably be better suited — continues to thumb their nose at them, largely based off of arbitrary insurance minimums.

With first-year salaries at regional airlines now equivalent to many in our industry, with an exponentially greater upside, it's simply no longer realistic to suggest that a military aviator looking to separate should "pay their dues" by time building at minimum wage. With my fair share of Robinson time — having founded, co-owned and eventually sold a small helicopter business, while also having deployed multiple times with the Air Guard — I feel uniquely qualified to comment on the notion of paying dues from both perspectives.

Having done both, I understand why those currently separating with or without the requisite hours are transitioning to the airlines in droves. The helicopter industry isn't even a consideration for many of these individuals, many of whom are taking a tremendous amount of training and experience with them.

What are the solutions? Like the airlines, the helicopter industry could significantly rethink its approach to hiring, developing more thoughtful screening and training programs rather than relying on arbitrary hour minimums. Many helicopter air ambulance operators are already implementing second-in-command programs to help military and lower-time civilian pilots transition into their organizations; coincidentally increasing safety with the addition of an extra pilot.

While the industry will need to offer more competitive salary and benefits packages to keep from hemorrhaging more talent, that alone won't solve the problem, either. An introspective look is needed at the organizational culture of many operators, with a recognition that human capital is the most important sort.

Pilots incur a tremendous amount of risk and are the frontline of any helicopter operation. With years of rigorous training and experience, they'll go elsewhere if they feel undervalued. This goes for experienced pilots of any background, civilian or military. After decades of continually being treated like disposable, unskilled workers who just fill seats, the perfect storm has finally struck. This mass exodus of talent and experience simply won't stop until drastic changes are made.



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VENTURA COUNTY PREPARING FOR ARRIVAL OF FIREHAWKS

SAR

The Ventura County Aviation Unit consists of two firefighter/paramedic crew chiefs, one fire captain/fire manager, and a second fire captain/ fire manager during the fire season provided by the Ventura County Fire Department; and four full-time pilots, a fifth reserve pilot, two sheriff's crew chiefs, and a sheriff's sergeant provided by the Ventura County Sheriff's Office. Each agency also provides five collateral crew chiefs. The unit is managed by a sheriff's captain. **Skip Robinson Photo**

VENTURA COUNT

> BY SKIP ROBINSON

In December 2017, the Thomas Fire burned over 281,000 acres (around 114,000 hectares) in Ventura and Santa Barbara counties, north of Los Angeles. More than 1,000 structures were destroyed in the blaze, which at the time was the largest wildfire in modern California history. Then, in November 2018, more than 1,500 structures were destroyed as the Woolsey Fire ripped through almost 97,000 acres (39,000 hectares) in Ventura and Los Angeles counties. The combined damages amounted to billions of dollars.

In the wake of these destructive blazes, Ventura County's leaders began to explore an upgrade to their aerial firefighting capabilities. The county was already operating Bell Super Huey helicopters for firefighting through the Ventura County Air Unit, a unique partnership between the county's fire and sheriff's departments. However, the success of the L.A. County Fire Department (LACoFD) in operating larger, more capable Sikorsky S-70 Firehawks - plus recent orders for new Firehawks from Cal Fire and San Diego County - prompted Ventura County to consider Firehawks, too.

Unfortunately, with new Firehawks selling for around \$20 million, it seemed unlikely that Ventura County, with its smaller tax base, would be able to afford any. Then county leaders looked into purchasing surplus H-60 Black Hawks through the U.S. Army's Black Hawk Exchange and Sales Team (BEST) program. Here, they hit the jackpot, acquiring not one but three HH-60L Black Hawks for the Ventura County Fire Department at a reasonable price. The county decided to convert two of these into mission-ready Firehawks, while retaining the third aircraft in its baseline configuration for use as a training and parts platform.

At press time, the two Firehawks were with United Rotorcraft in Colorado for a substantial conversion process including the addition of extended landing gear and a fixed 1,000-gallon (3,785-liter) belly tank. That will allow each HH-60L Firehawk to carry three times as much water as the Hueys in the current fleet (and, with the Firehawk's larger cabin, twice as many firefighting personnel).

The Firehawks will also be outfitted with hoists and medical interiors for searchand-rescue (SAR) operations. With the Firehawks taking over primary firefighting duties, the Hueys will remain the primary helicopters for SAR and medical responses. However, both models will be able to cover for each other when needed. With their strong twin-engine performance, the Firehawks will provide a greater margin of safety for high-altitude rescue missions and overwater flights to the offshore islands in Ventura County's area of responsibility.

In the meantime, Ventura County crews have been busy training on their unmodified HH-60L, dubbed "Copter 2," which is still in its Army colors, with the addition of Ventura County markings. According to pilot James McGuire, the pilots obtained their initial S-70/H-60 type ratings through a two-week transition course at Flight Safety's West Palm Beach Learning Center in Florida. Following this transition course, they went through advanced Black Hawk training with former Sikorsky test pilot Kevin Bredenbeck, who provided further insights on aircraft systems and performance, operating at high altitudes, engine-out and other emergency procedures, advanced maneuvers, and real-world interpretation of the performance charts.

Now, McGuire said, the pilots have started training with crew members using a "crawl, walk, run" mentality. "The first goal was to

train the rear crew chief to become familiar with the operating characteristics of the different and larger airframe," he explained. "As the eyes and ears of the pilot, it is imperative that they are comfortable calling in or 'conning' the pilot into the tight areas that we normally operate in. They had to get used to the sight picture of how the Hawk hovers, the tail touching down first [and] the stabilator being a potential hazard with rocks and terrain."

Once the rear crew chiefs were comfortable with the new platform, they moved into practicing "hoverload" operations - hovering to load and unload crew and passengers. "We wanted to see what worked the best and what didn't work so well - doing one main wheel on the ground versus both mains on the ground," McGuire continued. "We want to have all the variations figured out before we put the Firehawk into operation."

According to Ventura Fire crew chief Jonathan Tolle, face-to-face discussions with LACoFD crews have provided valuable insights on how to operate with the Firehawk. "What we learned is the Firehawk is much larger and heavier than our Bell mediums, so we expect to do more hoisting when flying the Firehawk," he told Valor. "With the Huey, we can use the skids to get into places that might prove to be more difficult with the Firehawk."

Tolle added, "We are still learning the ropes of the wheels on the Hawk and how to deploy personnel from the aircraft. Hoisting operations will be different than our Huey because of the size and weight of the Firehawk. We will have to hover higher and be much more aware of the downwash the H-60 generates."

Ventura County has long provided basic flight instruction to its crew chiefs to enable them



to perform a survivable emergency landing in the event of pilot incapacitation. With the arrival of the new aircraft, this training has been formalized and expanded to encompass procedures specific to the HH-60L.

"We plan on flying the Firehawk single-pilot much like L.A. County does," explained pilot Alex Keller, noting that the retrofit of the Firehawks will include some upgrades to cockpit ergonomics to make it easier for the pilot to perform procedures safely. "In addition to this, we have trained all of our crew chiefs to be qualified front left seat operators. This includes monitoring gauges, and assisting the pilot with emergency procedures [EPs] by being able to identify any caution warning panel lights that illuminate and read the corresponding emergency procedure in the aircraft EP checklist."

As crews have become more familiar with the aircraft, they have also begun flying it throughout their entire operating area, with altitudes extending from sea level to over 9,000 feet in the mountains, according to pilot Rolla Boggs (see p.96). "We have started taking the HH-60L training in our higher-altitude operating areas at max gross weights to see how the aircraft performs with our mission set," he noted. "This is to ensure the pilots can become comfortable with the machine, and is helping us to get an idea of the performance difference between our current fleet of helicopters compared to the HH-60L."

The unit has also started with simulated hoist training in order to learn the idiosyncrasies of the Breeze Eastern hoist - which is slightly different from the Goodrich hoists in the current fleet - before progressing to live hoisting scenarios. At press time, crews were preparing to begin firefighting Bambi Bucket training at a local lake, and were identifying suitable dip sites throughout their operational area. They had also started flying nighttime familiarization flights using night vision goggles (NVGs). "As the training moves forward, detailed decisions will be made about how the crews operate during night NVG firefighting operations utilizing the HH-60L," Boggs said.

According to Ventura Fire Captain Mel Lovo, this progressive training has been designed to give crews all of the tools they need to make the best use of their new Firehawks. "We are using the third HH-60L 'Copter 2' to give our flight crews the smoothest, safest transition to the new airframe we possibly can have," he said. "We want to be ready to go for the 2020 fire season with fully trained crews and aircraft we understand." 泽

THE AIR MEDICAL MEMBERSHIP DEBATE

🏞 BY DAYNA FEDY

The issue of balance billing in the air medical industry continues to be a pressing issue. Patients who receive air transport in the event of a serious accident are subsequently left with thousands of dollars in surprise bills — paying the difference between the medical charges and what an insurance provider covers.

Some air medical operators believe strongly in membership programs to eradicate surprise bills, and others are opposed to that method, looking to other programs that help patients through the post-air medical care process. We spoke to operators on both sides to learn why they chose their particular program, and how those programs could help mitigate the issue of balance billing.

Air Evac Lifeteam, headquartered in O'Fallon, Missouri, has been on board with the membership program model since its inception in 1985. In fact, what initially began as the Air Evac Lifeteam membership program came before the start of the air medical organization itself. The air medical membership concept was first brought up in the West Plains, Missouri, area in 1982 by a group with the local hospital board, following a tragic car accident where a couple died during a more than 100-mile transport to the nearest trauma center.

"The group thought it was really a shame, and there had to be a better way," said Seth Myers, group president, Global Medical Response East. "They literally spent about two-and-a-half years on different business plans, but they could never figure out . . . how they could afford to buy a helicopter, operate it, and pay the staff at the earnings [without] any in-patient revenue."

A gentleman named Ken Harper learned about foundations in Europe that were using memberships to help fund the organizations. "He said, 'Maybe the folks out here would want to help fund something that would save their neighbors', friends' and families' lives.' And they set out to open up the membership program," said Myers.

In the first three months of implementing the program, they sold 5,000 memberships in the West Plains area alone. Of those original 5,000 members, 800 are still members today after 34 years, said Keith Hovey, vice president of membership at AirMedCare Network.

Now, Air Evac is part of the AirMedCare Network umbrella — which consists of more than 60 helicopter, fixed-wing and ground operators — and participates in the AirMedCare Network membership program. Any person who is signed up to the AirMedCare membership program will be covered for emergency transport in 38 U.S. states, should they ever need/receive it, by any AirMedCare operator.

At \$85 per year, per household, there are now more than 3 million people covered by the AirMedCare Network. The membership is prepaid protection against copays, deductibles and any uncovered charges that are denied by payers. "If you're a member, you have no out-of-pocket expense related to your transport by one of our network providers, and whatever your benefits provider pays will be considered payment in full for the service," said Hovey.

Air Evac said the major benefit of offering memberships comes down to helping the people. When the program first started in the 1980s, the membership fees were the only way the company could survive financially, Myers told *Valor.* "But all of that has changed. . . . Today it really is more



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about the individual, and the peace of mind for those people," he said.

The membership program is intended to be prepaid protection against copays and deductibles, Hovey said. "In the climate that is today, it is affected by balance billing, and membership does write off any balance bill as well."

He added: *"Fox News* had an article here a while back that said a \$1,000 unexpected bill is pretty harmful to about 85 to 90 percent of the population in the United States, simply because it's unexpected and it's a fair amount of money. So, to not have to do that when we transport someone who has the membership is why we're so proud of the membership program."

Combined, AirMedCare Network providers operate from roughly 350 bases across 38 states, including Alaska and Hawaii. (Those providers comprise what was previously known as Air Medical Group Holding, which as of Jan. 1 has transitioned to Global Medical Response.) Air Evac in particular operates more than 140 helicopter air ambulance bases across 15 states. The organization is very focused on serving rural America in sparsely populated areas, because "that's where the people need you the most," said Myers, recalling the tragic small-town car accident from the early '80s.

In 2019, Air Evac performed over 40,000 patient transports; on average about 12 percent of the organization's total flights are members.

In the event of an accident, if someone with a casualty tells emergency response the patient is an AirMedCare member, it is "highly likely" that an AirMedCare provider responds to the call, said Myers. But at the end of the day, the EMS agencies are "going to do the right thing and call the closest [air medical] provider," he added.

Air Evac operates a large fleet of aircraft: 120 Bell 206 LongRangers, 25 Bell 407s, and three Airbus EC130s. The company recently decommissioned its four Airbus AS350 B2s from its fleet, and is planning to expand its EC130 fleet to eight aircraft by the end of the year.

THE CONTRASTING PERSPECTIVE

Air Methods Corporation, headquartered in Greenwood Village, Colorado, recently announced its "No Membership Required" initiative, and officially discontinued selling its Air Methods Advantage membership in April 2019. The company has instead chosen to focus on its patient advocacy program and



in-network strategy to help patients navigate the often-confusing insurance process.

Air Methods said it will honor the remaining terms of any memberships that have been paid for, but those memberships will not be renewed once they expire. The company also said it is refunding any membership fees paid by Medicare beneficiaries who were members when the program ended in April.

The air medical provider launched its patient advocacy program in 2016, "in an effort to work with our patients better through the billing and insurance process as we help them after a flight with us," said Dallan Huff, senior vice president of marketing and communications.

With the patient advocacy program, each patient has an assigned patient advocate to help them through the insurance and claims appeals process, and help them to be able to pay what they can afford after receiving air medical care. Air Methods' in-network strategy with insurance companies — which typically sees insurance cover a negotiated amount of an air medical bill and the patient pay the co-pay or deductible, rather than receiving a balance bill — combined with the success of its patient advocacy program "made memberships, in our opinion, unnecessary," said Huff.

"The other thing, too, is that historically the way memberships have been sold is through fear, and essentially making people afraid of the large bill that they potentially are going to get," he added. "There are times where memberships are sold to people who don't necessarily need them, like people on Medicaid. So, we felt like there was a better way to do this."

Moreover, the company's decision to move away from memberships stems from the belief that a membership should not factor into a decision in an emergency situation. Huff said EMS agencies "shouldn't have to take into account whether the patient has a membership when they're making those calls; they should just call the closest, most appropriate air medical provider. . . . People shouldn't have to pay a fee and have a membership to be covered. We'd rather cover all the people in the communities that we serve." Following its "No Membership Required" announcement, Air Methods promoted the initiative on Twitter, raising concerns about the fine print of memberships. The company linked to an article from *National Public Radio*, which outlined concerns that private insurance often doesn't cover the full cost of an air medical trip, and memberships typically don't include every air ambulance company in an area, so the choice of which service answers a call is beyond the consumer's control.

Air Methods said after a patient flies with the company, they are assigned a patient advocate. Rather than immediately receiving a bill, the patent receives communication from the patient advocate that walks them through the process of what happens next. If the patent has insurance, their insurance company is then billed. And if the patient is uninsured, the patient advocate helps them fill out Air Methods' financial assistance form for its financial assistance program.

"We're trying to take the patient out of the middle as much as possible through either patient advocacy or the in-network process," said Huff.

The average out-of-pocket cost for Air Methods patients who are covered for air medical services without a membership is a few hundred dollars, including co-pays and deductibles, said Huff.

The company is focusing heavily on increasing its in-network agreements with insurance companies; at the beginning of 2019, roughly 25 percent of Air Methods' privately insured patients were in-network, and by the end of 2019, that number grew to 40 percent.

"We believe going in-network with insurance companies, along with our patient advocacy program is, in a lot of ways, the solution to patients being left with balance bills," Huff told *Valor.* "We're really focusing in on those two things. We will go in-network with any insurance company that is willing to talk with us."

With over 4,500 team members, more than 300 bases and a fleet of 400 aircraft, Air Methods serves 48 U.S. states, averaging about 70,000 flights per year.

MH-139 GREY WOLVES BEGIN TESTING, WILL GUARD U.S. MISSILE FIELDS



> BY DAN PARSONS

U.S. nuclear missile fields and the Washington, D.C., area will soon be guarded by a fleet of Grey Wolves, the name given to the U.S. Air Force's new MH-139 helicopter.

Air Force Global Strike Command, which will operate the aircraft, unveiled the name during a ceremony at Eglin Air Force Base on Dec. 19.

The MH-139 Grey Wolf is an off-the-shelf aircraft modified by Boeing to military specifications. It will replace the Bell UH-1N fleet that entered service with the Air Force in 1970 and represents a significant boost in speed, range, endurance, payload capacity and survivability over the legacy aircraft.

The aircraft's primary mission will be to guard intercontinental ballistic missile silos in Wyoming, Montana, North Dakota, Colorado and Nebraska. The helicopters also will provide VIP transportation of government and military officials around Washington, D.C., particularly in the event of an incoming nuclear strike. The first MH-139 arrived at Eglin Air Force Base in Florida on Dec. 19 to begin testing. Flight testing is scheduled to continue through late 2022 with a decision on whether to enter low-rate initial production, called Milestone C, by the end of 2021.

The Air Force plans to buy 84 MH-139s, based on the Leonardo Helicopters commercial AW139 multi-mission helicopter built in Philadelphia. The aircraft are shipped across town to Boeing, where they are militarized and outfitted with nuclearmission specific equipment, sensors and communications gear. Boeing is acting as the prime contractor on the \$2.38 billion deal to replace the UH-1N fleet.

The current \$375 million contract awarded in September 2018 covers the first four aircraft that will be used for operational test and evaluation. The first operational MH-139 is scheduled for delivery in 2021.

Bell did not submit an offering to replace the UH-1, leaving the ultimately successful Boeing-Leonardo team to compete with Sikorsky and Sierra Nevada in a program that emphasized best value. Sikorsky offered a version of the UH-60 Black Hawk, while Sierra Nevada was going to buy up old Army Black Hawks and refurbish them for the Air Force.

Initial Air Force estimates put the total program cost at more than \$4 billion, but service officials said fierce competition drove the price down nearly \$2 billion.

With the Air Force planning to replace much of its nuclear arsenal from the B-2 nuclear-capable bomber to the Minuteman ICBM, Gen Timothy Ray, chief of Global Strike Command, hopes the Grey Wolf is a harbinger of successful acquisitions to come.

"When I think about the issue in front of us, about moving forward in nuclear deterrence, when I stare down a wave of acquisition for essentially everything we do, I hope this particular program is a harbinger of very successful stories to follow," Ray said. "Not just for our command, but for the good of the nation, and for the good of our allies and partners."

lt's not just

science fiction.

Yes, there's a lot of hype around electric VTOL aircraft and urban air mobility. But eVTOL aircraft are already flying. How will this emerging market affect you?

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ROTORBITS 🏞

CAE TO PROVIDE GERMAN NAVY WITH NH90 SEA LION TRAINER

CAE Elektronik GmbH has signed a contract with the NATO Support and Procurement Agency (NSPA) to provide the German Navy with a comprehensive training solution for the NH90 Sea Lion helicopter.

The German Navy is procuring a fleet of 18 NH90 Sea Lion helicopters to support search-and-rescue operations and replace the venerable Sea King MK41 helicopter, which has been in operation for over 40 years with the German Navy. The German Navy NH90 Sea Lion training solution will be based near German Naval Airbase Nordholz, which is the home of the German Naval Air Command.

In addition, CAE will construct an interim training facility just outside the main entrance to German Naval Airbase Nordholz and will provide on-site training support and maintenance services upon delivery. The new NH90 Sea Lion training system is expected to be operational by the second half of 2022.

"CAE has a long history supporting German naval aviation training at Nordholz on platforms such as the Sea King and Lynx helicopters as well as P-3C Orion maritime patrol aircraft," said Niels Kröning, general manager, CAE Elektronik GmbH.

The NH90 full-mission simulator for the German Navy will feature a range of CAE's core simulation technologies: six degreeof-freedom electric motion system; highperformance vibration platform to replicate vibration cues critical to helicopter pilots; and a high-fidelity CAE Medallion-6000 image generator.

The NH90 training devices will also feature the Open Geospatial Consortium Common Database architecture, an international standard for the creation of synthetic environment databases that has been adopted on a range of German Armed Forces training systems.



CAE Elektronik GmbH will develop a comprehensive NH90 Sea Lion training solution for the German Navy at Nordholz. **CAE Image**

LEONARDO DELIVERS 100TH AW169 TO U.K. HEMS OPERATOR



Leonardo's 100th AW169 delivery is the first Leonardo helicopter to enter Cornwall Air Ambulance's fleet. **Leonardo Photo**

Leonardo has delivered its 100th AW169 helicopter, setting a major milestone since its summer 2015 European Union Aviation Safety Agency (EASA) certification for the first all new helicopter in the light intermediate category in decades. The aircraft was handed over to Specialist Aviation Services/ Cornwall Air Ambulance during an official ceremony at Leonardo's plant in Vergiate, Italy, in early December 2019.

The delivery marked the first Leonardo helicopter to enter Cornwall Air Ambulance's fleet; the twin-engine multirole AW169 will be operated by Specialist Aviation Services and will be used to conduct helicopter emergency medical services (HEMS) operations throughout southwest England.

The team at Specialist Aviation Services in Gloucestershire will install an aeromedical interior in the AW169 in early 2020.

The helicopter's numerous safety characteristics make it well-suited for HEMS missions, the OEM said. Its main and tail rotors have high clearance, which enables safe passenger and crew transportation. The AW169 also has large sliding doors which allow easy patient entry and egress. In addition, the AW169's auxiliary power unit mode ensures the continued operation of the environmental control systems, radios and medical devices when the rotors are stopped. The large cabin can accommodate two stretchers as well as a full suite of advanced life support equipment.

Paula Martin, CEO of Cornwall Air Ambulance Trust, said: "It is clear to us that our careful deliberations concluded in the right choice of aircraft to provide EMS to our largely rural and coastal communities, both now and in the future. The helicopter itself looks outstanding, and I have no doubt that our charity supporters will be completely wowed by what they have made possible when it arrives in Cornwall in spring 2020."

Luke Farajallah, CEO of Specialist Aviation Services, added: "We are absolutely delighted and proud to be the partner of choice of the team at Cornwall as we bring the 100th AW169 into operation in early 2020 on their behalf. Our team of pilots and engineers can't wait to be maintaining and flying this fantastic helicopter in and around the county and to demonstrate its advanced features when and where it's needed most. Exciting times."

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JUMP AERO AIMS TO PUT EVTOL AIRCRAFT IN THE HANDS OF FIRST RESPONDERS

Price Price

A new startup called Jump Aero aims to create a fast, agile electric vertical take-off and landing (eVTOL) aircraft specifically for use by first responders traveling to the scenes of emergencies.

Based in Petaluma, California, the new venture is headed by Carl Dietrich, an MIT-trained aerospace engineer who led the flying car company Terrafugia from its founding in 2006 through its acquisition by China's Zhejiang Geely Holding Group — the automotive group that also owns Volvo Cars and Lotus.

Joining him as co-founders are fellow MIT alumni Jeff Myjak, president of the composite boat manufacturing company Still Water Design; and Anna Dietrich, previously Terrafugia's chief operating officer and now co-executive director of the Community Air Mobility Initiative.

According to Carl Dietrich, Jump Aero will leverage its founders' considerable expertise in eVTOL aircraft technology to serve a critical market that has been largely overlooked by companies racing to develop air taxis for urban air mobility.

"I spent a number of years looking at various business concepts for eVTOL, and this summer after having left Terrafugia I decided to take another look at the market and where a startup could add some unique value to this emerging ecosystem," Dietrich told *Valor*.

While he sees "a lot of potential" in the urban air mobility space, there are "also a lot of challenges that need to be overcome, and I think you need the deep pockets of a major enterprise to tackle a lot of the uncertainty that's associated with that marketplace," he said.

Instead, Dietrich continued, Jump Aero's founders sought "an application of this technology that may be very readily accepted by society, that may not get as much hype right now as air taxis . . . but might actually wind up being a faster path to a real market." A vehicle intended to shorten emergency response times emerged as a natural fit.

According to Dietrich, the concept of operations associated with eVTOL use

by first responders "lines up really nicely with the capabilities and, frankly, the shortcomings of eVTOL technology."

One such capability is the potential for an eVTOL aircraft to deploy in a fraction of the time required for a conventional helicopter.

"With an all-electric aircraft, you're not doing an engine run-up, you're not waiting for the oil to heat up, you can start it up and shut it down incredibly rapidly," Dietrich said. "Electric motors have basically instant 'on' capability without a warm-up period, and similarly without a cool-down period. You can just shut it down and get right out of the aircraft. You don't have to wait for a hot section to cool down or anything like that."

Eliminating costly engines and transmission systems should make eVTOL aircraft more economical to operate, especially over many short cycles. They can also incorporate wings for high-speed cruise flight, and Jump Aero thinks it can design an aircraft with a top speed in excess of 200 miles per hour (320 kilometers per hour).

The most obvious shortcomings of fully electric aircraft are the limits placed on range and payload by today's battery technology. But these should be less critical in first responder applications where no additional passengers are carried, and where many missions will take less than 10 minutes, Dietrich said.

Jump Aero envisions elite cadres of first responders — perhaps paramedics or law enforcement officers — using its eVTOL aircraft to reach emergency scenes faster than they could otherwise. The founders aim to cut average emergency response times in half, which could make a life-or-death difference in situations such as cardiac arrest.

A conventional ground ambulance or medical helicopter would follow to the scene as required. "This is not replacing a medevac helicopter; in fact, medevac helicopters I think are really well suited for that particular mission," Dietrich said. "The mission that we are [targeting], aircraft are not used for today. So it's something that's truly enabled by electric VTOL aircraft."

The company expects to deploy its aircraft in rural areas first, where the potential value to the end user is especially high due to large coverage areas and limited numbers of emergency response personnel. It also sees promise for the concept in suburban areas.

Jump Aero has "done enough conceptual design work to have confidence we can make a vehicle that will provide the value that we're talking about," said Dietrich. However, the design has not been finalized — and the company made a deliberate decision to reveal its plans at an early stage in order to solicit feedback from potential customers.

"The purpose of us coming out at this time is to try to engage with first responder organizations that are interested in the potential of this type of technology to save lives," Dietrich explained, encouraging prospective end users to contact the company through the Jump Aero website. "It is kind of a risk for a startup to come out and say, 'Hey, we're doing this, and we're at an early stage'... but it's much, much more important to us that we're getting the requirements right."

Dietrich said that while Jump Aero's eventual vehicles will incorporate a high degree of automation, they won't be autonomous. The human operator will still be responsible for decisions such as whether and where the aircraft will land, "based on the various factors that a human has to weigh in an emergency situation," he said.

For that reason, he continued, the first responders at the controls "will require training, they will require experience in flight situations, and simulator time, and things of that nature where you put them through various scenarios, and you give them practice making decisions. The nice thing we can do with automation is make those decisions focused on more highlevel things, and get rid of the lower-level stick-and-rudder [demands]."

Dietrich declined to specify a timeline for vehicle development and certification, as his experience with Terrafugia has made him cautious about such predictions. With all of the regulatory unknowns surrounding certification, "it's not just a question of technology; it's not just a question of funding," he told *Valor.* "What I can say with confidence is that we're going to move forward as quickly and responsibly as we can."



The reach of St. David's HealthCare, an eight-hospital healthcare system in Austin, Texas, goes well beyond its community. Through the St. David's Specialty Transport Team, which uses multiple modes of transport - from ground to fixed-wing and rotor - the Central Texas-based healthcare system serves patients from all over the state who are in need of a higher level of care than is currently available in their region.

Like most neonatal teams who utilize multiple modes of transport, the St. David's Specialty Transport Team has separate transport incubators for fixed- and rotary-wing missions. When missions require the use of a helicopter, the St. David's Specialty Transport Team partners with Travis County STAR Flight to provide neonatal and high-risk obstetric transport services throughout Central Texas and beyond. When Travis County STAR Flight recently purchased three Leonardo AW169s - configured for medical transport, search-andrescue, and fire suppression - the St. David's HealthCare team discovered an opportunity to standardize their transport incubator configurations across all modes of neonatal transport, thereby creating a universal transport incubator.

became the first in the Central Texas region to offer a hospital-affiliated fixedwing ambulance aircraft service for timely transfer of emergent and acute care patients. This service laid the foundation for the later development of the universal transport incubator. While the mode of transport can vary across missions, ground transport is a part of every fixed-wing mission. Historically, the ground leg of a fixed-wing air transport was challenging, and included managing multiple variables: varying ambulance cots, different ambulance locking systems and third-party EMS crews. Neonatal specialty transport teams dependent on their transport incubator systems would often struggle with securing their transport system to an unfamiliar, non-compatible ambulance cot. With this challenge, it wasn't uncommon for transport teams to be forced to use straps to secure their transport incubator while traveling to and from the hospital, which could potentially shift during transport, creating a risk to both the patient and members of the transport team.

Recognizing this potential hazard, St. David's HealthCare adopted the use of International Biomedical's Certified Litter Interface Platform (CLIP) Deck to create an airborne transport incubator that could safely incubator allows safe transportation of babies across all modes of transport: ground, fixed-wing and rotor. **St. David's HealthCare Photo**

transport babies across both ground and fixed-wing modes of transport. The CLIP Deck is a unique adaptor for ambulance stretchers that allows the transport incubator configured for fixed-wing transport to be secured safely in the ambulance during the ground portion of the transport.

Working with STAR Flight, the St. David's HealthCare Specialty Transport Team discovered an opportunity to extend the use of the stretcher adaptor to rotary-wing aircraft by using a pre-existing sliding lock within the interior of the aircraft that accommodates the footprint of a transport deck sled. With this accommodation. St. David's HealthCare was able to create a truly universal transport incubator that could safely transport babies across all modes of transport: ground, fixed-wing and rotor.

On Aug. 15, 2019, St. David's HealthCare was dispatched on its first NICU rotor mission in STAR Flight's new aircraft, successfully completing its journey with a universal incubator. This is not only an accomplishment in terms of safety for both the patient and the clinical team, but it also gives St. David's HealthCare the versatility to change modes of transport seamlessly mid-mission, should operational challenges such as weather, mechanical failure or pilot fatigue occur, the organization said. ≯

Several years ago, St. David's HealthCare

UNIVERSITY OF UTAH AIRMED EXPLORES NEW ROLE FOR MASS CASUALTY INCIDENTS



AirMed, in partnership with Metro Aviation, operates eight helicopters and two airplanes from seven bases in Utah and Wyoming. **Dan Megna Photo**

PAN MEGNA

Across the U.S., mass casualty incidents (MCIs) are becoming all too common. Single, horrific events — whether mass shootings, natural disasters, or terrorist attacks — all have the potential for large numbers of victims with wide-ranging injuries.

The sudden onset of such an incident and the resulting surge of victims pose immense challenges for first responders and hospital emergency departments. Even with preparation and planning, emergency medical resources can quickly become overwhelmed.

As with other institutions across the country, MCI protocols at the University of Utah Hospitals and Clinics (UUHC) have

long been a work in progress. Through semi-annual disaster drills and afteraction assessments of other MCIs, such as the 2017 Las Vegas Strip shootings, UUHC is constantly refining and improving processes for dealing with an MCI.

In early 2019, at the conclusion of one such MCI drill and subsequent needs assessment, UUHC identified a pool of highly skilled medical technicians who were perhaps not being utilized to their full potential.

Typically, the flight crews assigned to the hospital's air medical program, AirMed, fulfill a traditional helicopter EMS role: scene response and inter-hospital transports. However, UUHC has begun exploring a slightly unconventional role for the medical crews in the event of an MCI. As an alternative to AirMed crews being dispatched to the scene of a MCI as first responders, they would instead respond to UUHC's large rooftop helipad in Salt Lake City, Utah. The medical teams would then be sent downstairs to the hospital emergency room to augment the medical staffing as patients are received and treated.

Kasey Hart, an AirMed flight paramedic, explained, "If something happens somewhere in the Valley [metro Salt Lake City], we have paramedics and EMTs and EMS providers that can handle the scene. And most of these [MCI] incidents are happening in high population areas. So if something happens in downtown it might be more appropriate to fly directly to [UUHC] and help them get ready for the patients they know are coming."

"We have flight nurses and medics with advanced skills," Hart continued. "And we handle these sorts of trauma patients when we fly out on scene. So why wouldn't we utilize those people in the emergency room setting when the medical staffing begins to thin out during a mass casualty incident?"

In the event of an activation of an MCI "full response" protocol, the AirMed flight center will be notified and a dispatch plan developed. Presently, AirMed has the ability to respond five medical crews from bases throughout the greater Salt Lake City area, each with an approximately 20 minute response time to UUHC. Flight crew members who may be off work are encouraged to make themselves available to also respond and assist.

Upon arrival at the emergency room, AirMed medical teams report to the charge nurse for direction. They may be utilized for triage of incoming patients; care for "Delayed" (yellow) patients; perform interventions on "Immediate" (red) patients; or conduct an eFast (extended focused assessment with sonography for trauma) exam with ultrasound.

In a best case scenario, a UUHC trauma response consists of four clinicians for each patient: a team lead (physician), an airway provider, and two examiners. As more patients are received, however, that staffing can and does flex as resources become strained and thin out. Hart said, "We've really wanted to stay flexible in our job role in order to best mold to the changing environment and increasing demands you see in these types of incidents."

HELI AUSTRIA CHOOSES HELITAK TANK FOR SUPER PUMA

Heli Austria has chosen Australian company Helitak Fire Fighting Equipment to supply an underbelly aerial fire suppression tank suitable for Heli Austria's Super Puma fleet.

Helitak will design and manufacture a tank to complement the Airbus AS332, H215 and H225 Super Puma models. The Super Puma and the Helitak FT4250 fire tank will be packaged as the Super Puma Firecat.

Heli Austria entered the heavy lift market in 2016 with four AS332 Super Pumas, developing the low empty-weight and high-performing Firecats. The company has acquired an additional eight AS332 Super Pumas, which will be offered for wet and dry lease operations overseas.

Heli Austria's Super Puma Firecats will feature night vision goggle-certified glass

cockpits for nighttime firefighting operations.

While being extremely capable in the aerial firefighting space, the Super Puma Firecat lacked the added advantage of a suitable fire tank for the delivery of water to the fire ground. The Helitak tank is designed to generate the highest amount of head pressure or mechanical force available due to the funnel shape of the Helitak retractable water bag. This head pressure provides the operator with controllable water delivery whether it be high canopy penetration or lower level vegetation and grass fire management.

The FT4250 tank offers a maximum capacity of 4,250 liters (just over 1,100 gallons), fills in 40 to 50 seconds, offers a quick and easy installation and removal and has an empty weight of around 300 kg

An illustration of the Super Puma Firecat with the Helitak FT4250 tank. **Helitak Image**

(660 lb.) with a retracted flying profile of only 300 mm (12 inches).

The design team at Helitak has also developed a next generation Programmable Logic Controller that provides all the telemetry and data that Heli Austria requires for reporting and maintenance management.

The first tank has completed final testing and is ready to be shipped to California for FAA flight testing and installation approvals, which will be followed with both EASA and Transport Canada certifications.



NTSB: SURVIVAL FLIGHT PILOTS AND CREW PRESSURED TO TAKE RISKY FLIGHTS



> BY DAN PARSONS

Management at Survival Flight, which operated the January EMS flight that crashed in Ohio killing all three personnel aboard, pressured pilots and crews to fly in inclement weather, often insisting they take risky flights other operators had turned down, according to a National Transportation Safety Board (NTSB) report on the human factors that led to the fatal accident.

The report, dated Sept. 20, is based on interviews with current and former employees of Viking Aviation, which under the name Survival Flight operated the fatal Jan. 29 flight in Ohio. On that night, the Survival Flight pilot accepted a 69-mile (111-kilometer) flight between two hospitals that had previously been turned down by two other helicopter emergency medical services (HEMS) operators.

About 20 minutes after takeoff, the Bell 407 crashed into hilly, forested terrain about four miles northeast of Zaleski, Ohio. The pilot, flight nurse and flight paramedic were killed.

The NTSB's Operational Factors and Human Performance report, published Sept. 20 and released when the NTSB opened its docket on Nov. 19, details interviews with current and former pilots at Survival Flight, operated by Viking Aviation.

The NTSB's docket for the case includes 1,025 pages of interviews. Employees reported incidents of being cussed at by management and chief pilots at various bases for not accepting flights, pressure from non-aviation management to make unrealistic flight guotas and inability to take bases out of service because of wind. weather or maintenance concerns.

Current Survival Flight employees, including pilots and medical staff have texted former employees that they are "scared to fly," according to the report. A flight nurse interviewed for the report said the company's aviation staff were generally risk averse and safety conscious but were pressured by management to make unsafe decisions on whether to accept flights.

Employees describe a culture where pilots and crews were "cussed at," "berated" and threatened with firing for refusing flights because of legitimate safety reasons.

Through a process dubbed "reverse helicopter shopping" managers and operations center employees at Survival Flight would seek flight requests that other operators had turned down as too risky, then passed them onto aviation staff and pressured them to accept, according to the report.

Survival Flight, in written answers provided to Valor, categorically disagreed with many of the statements former employees made

Specifically, the company denies "that crew members were yelled at for declining flights because of safety concerns," Survival Flight spokesman Ryan Stubenrauch told Valor in an email.

"To the contrary, we train, remind, and require each pilot and nurse in the crew that they have both the power and the responsibility to reject any flight if they feel something could go wrong," Stubenrauch wrote. "Every single flight request that we get can only take off if all three crew members and the operations control manager OK it. If any one of those four people have doubts, the flight doesn't take off."

Interviews with NTSB investigators did shed light on some "human resources problems and communication issues between some employees," Stubenrauch said. "We investigated those issues when we became aware of them and required additional training in an effort to streamline and improve communication between staff."

The NTSB's report is preliminary, yet HEMS personnel who spoke to Valor were uniformly shocked at the lax safety culture it details and the FAA's failure to recognize the problem before it cost three people their lives.

"I've heard from many of my colleagues . . . that reading that report is the worst thing they've ever read in terms of the operational culture of the program," Dr. Bill Hinckley, medical director and flight physician at

the University of Cincinnati's Air Care and Mobile Care, told *Valor* in an interview.

"It is extremely frustrating and disheartening. We work so hard to maximize our aviation capability and our clinical capability.... When these sorts of things happen, the majority of the lay public and, in fact, the majority of the medical public, believe that a helicopter is a helicopter and a HEMS program is a HEMS program and they're all the same."

When considering flight requests, HEMS best practices typically include the rule "all to go, one to say no," meaning that the pilot, flight nurse and EMT or physician should all agree that a flight is safe and each has veto power.

"Even if the pilot accepts a flight, I as the flight doc, have the right and responsibility if I'm not comfortable to say, 'No,'" Hinckley said. "So does my partner the flight nurse and so does the communication specialist and so does the person sitting in the control center."

According to the NTSB report, at Survival Flight that system of redundant checks broke down when flight decisions were effectively ceded to non-aviation management.

Dr. Craig Bates, medical director of Metro Life Flight and attending physician at MetroHealth Department of Emergency Medicine in Cleveland, Ohio, was disturbed by aspects of the report such as the reverse helicopter shopping, but is concerned the alarming allegations will detract from opportunities presented by the report for HEMS operators to enhance their own safety. The NTSB and FAA should focus on the allegations while the HEMS community focuses on "extracting lessons" from the tragedy and what led to it.

"This crash happened near our service area and people we care about are involved in the program. It's important to emphasize this release doesn't contain any conclusions, but rather interim information from NTSB's fact-finding process," Bates wrote in an email to *Valor.* "While these documents don't determine blame for the specific crash, they are a great tool to help assess and improve the safety culture and processes in each of our own transport programs. There are always opportunities to improve."

"The quest to optimize quality and safety – whether aviation or medical – is a constant team effort," Bates added. "This includes working even harder to reduce real or perceived pressures to initiate and/or complete transports and further reducing the risks inherent in weather shopping."

'REVERSE HELICOPTER SHOPPING'

Helicopter shopping is a practice in which a medical facility contacts multiple helicopter operators until one is found that will accept a flight request.

Michael Benton, a HEMS pilot and aviation safety consultant, said it is not unusual for hospital staff to call multiple providers because their first priority is patient wellbeing. Air ambulance pilots and HEMS personnel, conversely, are expected to prioritize flight safety and risk assessment — previous flight turndowns included instead of a patient's condition.

"It's normal for them to call multiple providers," Benton said. "It becomes negative when you are not sharing the fact that you called two or three others and what the results were."

On Jan. 29, Holzer Meigs Hospital first contacted MedFlight, its regular HEMS provider, but was refused due to weather concerns. Hospital personnel called at least one other HEMS provider, which also refused the flight, before Survival Flight accepted.

While the hospital was shopping for a helicopter to transport a patient, Survival Flight was sometimes shopping for flights that other operators refused, a process called "reverse helicopter shopping," according to the report. Citing employee concerns, the NTSB indicates that personnel in the Survival Flight operational control center (OCC) were using the weatherturndown.com website to find helicopter air ambulance flight requests refused by rival operators due to weather concerns.

"One pilot noted that anytime he received a flight request for a flight outside of their normal program area he suspected that OCC was using weatherturndown.com to find flights," the report says. "Another pilot expressed similar suspicions but noted that this practice by OCC would not affect how flight crews at his base would approach a flight request."

Survival Flight denies it ever authorized or condoned reverse helicopter shopping, though the company's operations system pulls data from multiple sources, including weatherturndown.com, Stubenrauch said. Data from that website, however, was not used to schedule the Jan. 29 accident flight, he said.

"Only a small handful of flights out of the thousands and thousands of flights in our company's history have ever come from data obtained through that website," Stubenrauch said. "On those rare few occasions, we knew that the other company purportedly turning down the flight for weather was really turning down the flight because of a maintenance issue."

Hinckley said he had never heard of reverse helicopter shopping in his entire career and that the tactic exists at all is a sign that major HEMS regulatory changes are due to incentivize safety over profit.

"There needs to be universal condemnation of both helicopter shopping and, especially, reverse helicopter shopping," he said.

Survival Flight has since prohibited its dispatchers from "anything similar to 'reverse helicopter shopping' even if we have information suggesting the flight was turned down for something other than weather," Stubenrauch said.

PRESSURED TO FLY

One Survival Flight pilot quoted in the NTSB report describes "an awful push to get numbers" in an "environment that felt like competition." The pilot told the NTSB that the company's vice president of EMS set a 150-flight per-month flight volume quota where the pilot's realistic estimate was between 30 and 35 flights per month. In another case, management promised bases a new massage chair if they flew 30 flights in one calendar month.

"There were numerous company personnel who witnessed people in management, including the chief pilot, pressuring pilots to accept flights," the report says.

Benton said the reported pressure Survival Flight management put on pilots to fly was "a big eye opener."

"If it's true what they said about the chief [pilot] and those guys, it's pretty shocking," he said.

One pilot described a situation where another pilot reported to the [operational control manager] that he was concerned he was too tired to take another flight after having flown three, but the chief pilot serving as the OCM at the time convinced the pilot to accept the flight.

The pilot was told to "maybe drink a cup of coffee before you go . . . and try to get it

done," according to the report.

Numerous pilots and medical personnel witnessed management being "reprimanded or challenged for declining a flight," according to the report. When some flights were declined, one medical crew told the NTSB, "the chief pilot of the company would call within about 10 minutes and

would cuss out our pilots and belittle them."

Survival Flight outright denies that any pressure was placed on any of its flight crews to fly in unsafe conditions. Before any flight takes off, the company requires four people to give the go-ahead.

"All three crew members and our operational control manager have the ability to turn down or cancel any flight at any time if they have a concern about fatigue, weather, or any other potential danger," Stubenrauch said.

"Our bases go out of service for weather or maintenance every day," he added. "Each year, Survival Flight turns down thousands of flights for weather, maintenance, or other reasons. In fact, one out of every four flight requests we get are turned down for weather alone."

SURVIVAL FLIGHT'S CEO RESPONDS

On Nov. 25, Survival Flight CEO Chris Millard sent a "Thanksgiving Message" to employees that amounted to a defense

of the company against the NTSB report wrapped in a holiday missive. It created a firestorm when posted to a HEMS Facebook group's message board.

"Please join me in remembering the fallen and keeping their families in our thoughts and prayers through this season," he writes before slamming the NTSB report as "largely opinion that was collected from former employees who, for one reason or another, were disgruntled when they left."

"To show the points that the NSTB were trying to make, they largely used the comments of those who have left us to insert their own agenda and to try and hurt us." Millard wrote.

Millard said the NTSB is reviewing information on the accident aircraft flight data recorder and is "confident that once they get a closer look at this information, the cause of the crash will be nothing related to weather or anything else that they have speculated on to date, and all of this noise that is out there regarding our operations will all be proven to be untrue and unrelated to the cause."

He followed that up with another email to employees meant "to ensure that everyone once again understands our company's rules protecting our safety, including every member of our crew's ability and responsibility to turn down a flight."

"From day one at Survival Flight, it has



been an iron clad rule that everyone has the right to turn down a flight for any reason," Millard wrote. "I also expect and want you to turn down a flight if you feel it's the right thing to do."

Stubenrauch emphasized that the NTSB's report is preliminary and does not make any official findings. He was hired to speak for the company as the investigation unfolds toward a final report. The company recently held a two-day safety stand down at its Ohio bases to emphasize safety. It also has hired an independent aviation expert to perform a "comprehensive evaluation of every policy, procedure and employee at our Ohio bases during that time and will implement any recommendations," Stubenrauch said.

OUTCOMES AND OPPORTUNITIES

The NTSB's investigation is not final and does not assign blame or name a cause for the accident. Neither has the FAA made any determination of what caused the accident, who is to blame or what new rules and regulations should result.

Benton did not think major regulatory changes would result from the investigation, but said the accident has stirred up more passion for safety awareness since the fiery 2015 Flight for Life helicopter crash in Frisco, Colorado, that resulted in requirements that certain helicopters be outfitted with crash-resistant fuel systems.

"I think one positive thing that's going to come from this . . . I've never seen an accident report generate so much discussion," Benton said. "I don't think you're going to see regulation changes that come from just one accident, but it's definitely going to bring it to the forefront."

Bates was more measured in his assessment of the report, but encouraged the NTSB and FAA to extract as many lessons as possible from the incident and subsequent investigation to boost HEMS safety.

"A big reason why the NTSB releases these documents is because they are an invaluable tool in enhancing safety in our own programs," Bates said. "I sincerely hope that the FAA will incorporate any eventual NTSB findings into improved oversight procedures. This would ensure any lessons learned would benefit a broader population so future air medical crews and patients will be safer."


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MDHI ENHANCES WEAPON & MISSION MANAGEMENT SYSTEM FOR MD 530G

MD Helicopters, Inc. (MDHI) has entered a strategic teaming agreement with Elbit Systems Ltd. to deliver next-generation weapons and mission management capabilities to the MD 530G Block II Scout Attack Helicopter. The pilot-centric integrated weapons system is comprised of a helmet display and tracking system (HDTS), weapons management system (WMS) and mission management system (MMS).

"Design and disruption are the cornerstone of all product development efforts," said Lynn Tilton, chief executive officer for MDHI. "This partnership with Elbit Systems, Ltd. will allow us to rapidly expand the capabilities of the MD 530G, resulting in a next-generation, advanced light scout attack helicopter solution

that will set a new standard in this highly competitive class."

The integrated, advanced avionics suite utilizes an intuitive human machine interface, multi-functional smart displays and next-generation applications to deliver a fully compatible multi-mission cockpit that reduces pilot workload, increases efficiency of crew operations, and delivers increased lethality for a range of operational parameters, said MDHI.

The HDTS configuration supports both daytime and nighttime operations, allowing the pilot to intuitively maneuver the aircraft into attack positions and engage targets head-up and eyes out.

The digital WMS will allow the MD 530G





Block II Scout Attack Helicopter to support a comprehensive array of suppressive firepower options as well as unguided and guided munitions. Standard configuration includes support for M260 rocket pods, HMP 400 digital gun pods, RMP digital gun/rocket pods, and the M134D-H miniguns. Critical weapons management functions, such as weapon activation and HDTS operation, will be integrated into the cyclic grip and collective for both pilots.

The main component in the MD 530G Block II Scout Attack Helicopter MMS is the digital mapping application managed by a touchscreen graphical user interface. This moving map display will give pilots greater situational awareness with aircraft positions, known threats, and friendly locations plotted.

"A proven and iconic light scout attack helicopter platform, the addition of this elegant, technically superior solution elevates the MD 530G Block II to best-inclass status," Tilton concluded. "My team has delivered industry-leading rotorcraft solutions for decades. Now partnered with the Elbit Systems team, we are poised to bring a new level of customizable, operator-focused solutions to U.S. and partner nation aviation forces."

MD Helicopters anticipates live fire events with a production-quality test asset this year. 泽

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ALLOW ME TO **CONTRODUCE** MYSELF. Vertical

Vertical is excited to announce the rebranding of its sister publication, Vertical 911 – the only helicopter resource that covers law enforcement, search-and-rescue, air medical, fire and military in one publication.

To better reflect the coverage of all five of these sectors, Vertical 911 will now be known as Vertical Valor.

"Valor speaks to all of the sectors that we now cover," said Vertical publisher and owner Mike Reyno. "The men and women in these sectors of the helicopter industry spend their working lives in service - whether to their communities or their country. So we want to use a name that recognizes them."

The change to Vertical Valor also reflects our increased coverage of the military sector, and identifies better with our readers on a global scale.



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MEMBERS OF THE NORWEGIAN RED CROSS PERFORM A TRAINING EXERCISE WITH AN AIRLIFT AIRBUS AS350 AND "SUMMIT" THE AVALANCHE DOG. MARKUS FOERST PHOTO

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🕨 AN AUSTRIAN POLICE AIR SUPPORT AIRBUS EC135 LIGHTS UP THE NIGHT. ROBERT NIEDERWOLFSGRUBER PHOTO

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A SUPER PUMA POPS FLARES AT THE AXALP AIRSHOW IN THE BERNESE HIGHLANDS, SWITZERLAND. JAREK WEKSEJ PHOTO

VERTICAL VALOR MAGAZINE 44 WINTER ISSUE 2020

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The U.S. Air Force plans to purchase 113 Sikorsky HH-60W aircraft to replace its fleet of HH-60Gs. **Sikorsky Photo**

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The Sikorsky HH-60W is designed to be a technologically advanced combat search-and-rescue (CSAR) helicopter, but U.S. Air Force pilots delivering the first aircraft to its Florida test squadron had to make the ferry flight without any modern flight systems.

Both HH-60W "Whiskey" helicopters now at Eglin Air Force Base in Florida made the five-hour flight from Sikorsky's Developmental Flight Center in West Palm Beach under visual flight rules. That's because the aircraft's current experimental flight clearance does not allow for instrument flight or using a transponder, according to pilot Maj. Evan McNeal, 88th Test and Evaluation Squadron Detachment 2.

"We had to pick our way carefully through densely trafficked airspace while avoiding typical Florida fog and precipitation without the tools that many of the most basic modern aircraft have available," McNeal said at the time of delivery. "We mitigated those risks through careful mission planning and using available equipment."

That ferry flight and the upcoming developmental testing of the aircraft are necessary steps to replacing the Air Force's beat-up HH-60G Pave Hawks, which have seen hurricane devastation, tsunami aftermaths, and years of war in their service lives. In the wake of Hurricane Katrina in 2005, more than 20 Air Force HH-60G Pave Hawks descended on Jackson, Mississippi, from

PROGRAM REVIEW > SIKORSKY HH-60W



THE U.S. AIR FORCE HAS ENTERED PRODUCTION AND TESTING OF ITS NEW COMBAT RESCUE HELICOPTER, THE SIKORSKY HH-60W OR "WHISKEY" MODEL.

BY DAN PARSONS

which they launched 24-hour operations for weeks, ultimately

saving more than 4,300 people.

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That's just one of the non-combat missions the venerable rescue helicopters have conducted since entering service more than 35 years ago. In combat, beginning with the 1991 Operation Desert Storm, they provided search-and-rescue in Iraq, Kuwait, and Saudi Arabia.

In Afghanistan and Iraq, the U.S. Air Force nearly perfected the art of finding wounded troops and delivering them to advanced medical facilities within the "golden hour" when they are most likely to survive. Thousands of lives were saved during medical

evacuations and combat rescues performed by active-duty, reserve, and Air National Guard airmen.

"We send in brave men and women who are going to find a way to get the job done," Air Force chief weapons buyer Will Roper said during an October ceremony at Sikorsky's West Palm Beach plant. "But they'll tell you about flying in and not being certain that they could land safely or putting the broad side of their vehicle between a downed pilot and gunfire. When you hear those stories, you realize that we put heroes on these vehicles. We pick up heroes in these vehicles and they deserve every technology advantage we can give them."

NEW CAPABILITIES

The intense combat flying, humanitarian aid work, and other search-and-rescue operations prematurely aged the force's legacy HH-60G, rode them hard, and parked them dusty and battle-worn. CSAR pilots have described the Pave Hawks they fly as "shredded." Some aircraft have reportedly rolled down mountains, lost their tail booms, made hard landings and have been patched back together and sent back into combat.

The Air Force has about 82 primary mission and backup Pave Hawks, as well as 12 training HH-60Gs and two developmental and testing aircraft. The runway to replacing them has been a long one, beginning way back in 2006, when the Boeing HH-47 Chinook won an initial competition called the CSAR-X. That effort crumbled under successful protests by competitors Sikorsky and Lockheed Martin, which were then separate firms.

Relaunched in 2012, the Air Force sought a Combat Rescue Helicopter (CRH) with a combat range of 450 nautical miles (830 kilometers), 1,500-pound (680-kilogram) payload and cabin space for up to four patient stretchers. By the end of the year, hopefuls AgustaWestland, EADS, Boeing, and Bell all had dropped out, leaving Sikorsky as the sole offeror and resulting in concerns that the Air Force tailored its requirements to favor the H-60.

Enter the new HH-60W, or Whiskey-model CRH, which undoubtedly is an improvement over the battle-battered HH-60G. "The CRH will be capable of employment day or night, in adverse weather, and across the full spectrum of threats to include chemical, biological, radiological, and nuclear," according to the Air Force's official justification for the program.

"Onboard defensive capabilities will permit the CRH system to operate with less risk than legacy systems in an increased threat environment. An in-flight air refueling capability will provide an airborne alert capability and extend its combat mission range."

The aircraft made its maiden flight in May and has made great strides since then, racking up more than 100 flight hours in a matter of months. However, compared to the current HH-60G, which entered service in 1982, the increases in overall capability are limited and the new Whiskey models come at a hefty \$73 million per unit in 2020 dollars. Sikorsky markets the W-model as being 100 percent compatible with the HH-60G, which lessens the logistics burden of integrating a new aircraft but reinforces the fact that the Whiskey is an evolutionary, not revolutionary, increase in capability.

When the aircraft enters service with active-duty units in 2020, rescue pilots will have a 450-nm (833-km) range and a maximum interior gross weight of 22,500 lb. (10,205 kg). The legacy HH-60G — which cost \$40.1 million in 2011 dollars — has a 504-nm (933-km) range and 22,000-lb. (9,900-kg) maximum takeoff weight, according to an Air Force weapon system fact sheet.

The decrease in range reflects the loss of two 185-US gallon (700liter) auxiliary fuel tanks that the HH-60G Pave Hawk typically carries inside the cabin bolted to the aft bulkhead. In addition to 360 gallons (1,360 liters) of internal fuel capacity, these enable the legacy design to haul 730 gallons (2,760 liters) of fuel. By contrast, the HH-60W carries 660 gallons (2,500 liters) of fuel in a larger internal tank.

The legacy General Electric T700-701C engines are each capable of 1,940 shaft horsepower (shp) of thrust, where the new -701Ds can push with 1,994 shp.

As similar as the Golf and Whiskey are, the new aircraft requires specific training for its advanced avionics and other novel systems. Sikorsky and parent company Lockheed Martin plan to train 200 U.S. Air Force and maintenance aircrew students at Sikorsky's academy in Stuart, Florida, using flight simulators, training systems, and three newly built HH-60W aircraft.

Six aircraft are enrolled in the developmental test phase of the program. The first two were delivered to the 413th Flight Test Squadron at Eglin Air Force Base in Florida on Nov. 6.

"Getting an HH-60W is very exciting not only for the 413th Flight Test Squadron, but also for the 96th Test Wing," said Lt. Col. Wayne Dirkes, the squadron's operations officer. "Our entire test strategy has been adapted to include Sikorsky as a fully integrated partner — we have all put a lot of energy into trying to create a seamless execution model for testing here and now it's time to make it happen."

Intense combat flying, humanitarian aid work, and other search-andrescue operations have taken a toll on the Air Force's HH-60Gs. **Michael Tosi Photo**

PROGRAM REVIEW > SIKORSKY HH-60W



Combat Rescue Helicopters perform hover testing at Sikorsky's facilities in West Palm Beach, Florida. Jennifer L. Sapienza Photo



BACK ON TRACK

Not long before the test aircraft arrived at Eglin, the Air Force was given the go-ahead to begin serial, low-rate initial production (LRIP) of the HH-60W. The so-called milestone C decision was a significant one for the program, which had experienced developmental delays and fell about five months behind the Air Force's targeted schedule.

The Pentagon's Director of Test and Evaluation report for 2018 weapon testing dinged the program for several deficiencies relating to tactical mission equipment and aircraft survivability targets. An affirmative milestone C decision allows Sikorsky to begin production of the aircraft, which is based on the venerable Black Hawk helicopter.

The Air Force now is expected to award \$564 million in contracts for 10 aircraft in LRIP lot one for \$660 million, and 12 aircraft in lot two for \$884 million, according to Air Force budget documents. Both contracts have already been negotiated, Sikorsky said. Those production aircraft should begin delivering in February 2021.

The Air Force plans to purchase 113 HH-60W aircraft to replace its fleet of HH-60Gs.

The Sept. 24 decision by the Pentagon signified the program was back on the prescribed schedule. It also squeezed a production decision into fiscal year 2019, taking advantage of funding that could have expired when the new year began Oct. 1.

The helicopter is built around a reinforced crashworthy airframe that also is designed to withstand battle damage. Crew complement is two pilots, two door gunners on .50 caliber or 7.62-mm machine guns, and a pair of paramedics who oversee patients on two litters in the enlarged cabin. Using the same GE T700-701D engines as the UH-60M will cut down on maintenance and logistics costs, according to the Air Force. Exterior weapon mounts free up space in the cabin, which can be reconfigured to suit different missions, including installation of seating specifically designed for pararescue personnel.

Numerous possible missions for the aircraft include the CSAR mission it was designed for, other types of evacuation during noncombat or humanitarian missions, disaster relief, and transporting troops to and from battlefields.

Congress continues to have concerns about when Air Force Reserve and Air National Guard units will begin to field the type. As of now, reserve components are scheduled to receive their first aircraft in 2026.

In the defense policy bill signed into law Dec. 20, the Senate included a call for more legacy Pave Hawks for the Air National Guard to counter delays in the Whiskey development program, and a separate program to replace HH-60Gs lost in combat.

"It is the sense of Congress that, given delays to Operational Loss Replacement program fielding and the on-time fielding of Combat Rescue Helicopter, the Air National Guard should retain additional HH–60G helicopters at Air National Guard locations to meet their recommended primary aircraft authorized," the bill states.

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 HH-60W is shown here suspended in an anechoic chamber at Eglin Air Force Base in Florida for defense systems testing. The chamber is designed to stop internal reflections of electromagnetic waves, as well as insulate from exterior sources of electromagnetic noise. **Samuel King Photo**

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UNIT PROFILE > U.S. CUSTOMS AND BORDER PROTECTION

61

RESPONSIBLE FOR 125 MILES OF INTERNATIONAL BORDER IN ARIZONA AND CALIFORNIA, U.S. CUSTOMS AND BORDER PROTECTION'S YUMA AIR BRANCH PERFORMS DEMANDING MISSIONS IN A CHALLENGING ENVIRONMENT.

STORY & PHOTOS BY DAN MEGNA

VERTICAL VALOR MAGAZINE 52 WINTER ISSUE 2020

AIR AND MARINE OPER.



UNIT PROFILE > U.S. CUSTOMS AND BORDER PROTECTION

Aviation enforcement agents are often deployed from the aircraft to check tracks, assist with rescues, and secure scenes and landing areas, as well as making apprehensions and arrests.

> The sight and sound of CBP helicopters intimidate smugglers and illegal border crossers, making them stop and hide in the sparse vegetation. That allows Border Patrol agents on the ground to catch up and make apprehensions.



In the wake of the terrorist attacks of Sept. 11, 2001, the United States enacted the Homeland Security Act of 2002. This was a broad-reaching governmental reorganization leading to the creation of the Department of Homeland Security (DHS). Its mission: develop, coordinate, and implement a comprehensive strategy for homeland security.

As part of the reorganization, elements of the U.S. Immigration and Naturalization Service and Customs Service merged to create three new federal agencies: Customs and Border Protection (CBP), Immigration and Customs Enforcement (ICE), and

Citizenship and Immigration Services (CIS).

CBP was organized into four operational components, including Air and Marine Operations (AMO), Office of Field Operations (OFO), U.S. Border Patrol (USBP), and Office of Trade Relations (OTR). These four components work together in a closely aligned partnership, each leveraging their own individual enforcement specialties in coordinated efforts to safeguard the U.S.

The AMO adopted the mission to "safeguard our nation by anticipating and confronting security through our aviation and maritime law enforcement expertise, innovative capabilities, and



partnerships at the border and beyond." To accomplish this mission, AMO partitioned the U.S. into three geographic operating regions — northern, southeast, and southwest. Each region presents its own unique environmental and tactical challenges in combating illegal cross-border activity.

The southwest region is home to seven individual AMO branches. Together, they own the responsibility for the entire 1,900-mile (3,050-kilometer) border between the U.S. and Mexico. Their territory also extends north, encompassing over 800,000 square miles (207 million hectares) including portions of Oklahoma and Nevada.

With few exceptions, the terrain all along the southern border is remote and largely inhospitable; expanses of austere desert broken only by small, rugged mountain ranges. There, summer temperatures often exceed 120 F (49 C) and winter overnight lows dip below freezing. Throughout much of the year, this hostile environment can be horribly unforgiving for those who venture into it unprepared.

In spite of the environmental hazards, the southern border has long been notorious as an illicit portal into the U.S.

> for illegal immigration and narcotics smuggling, much of it controlled by powerful drug cartels.

CBP identified two particular regions — the Rio Grande Valley in Texas and Arizona's southern border — as "areas with high cross-border criminal activity and illegal immigration."

Based in Yuma, Arizona, in the southwest corner of the state, Yuma Air Branch (YAB) is one of two AMO branches sharing

During their daily routine patrol flights, YAB crews often spot stashes of illegal contraband that, for any number of reasons, have been left behind by smugglers. Here, an air interdiction agent stands by with bundles of narcotics on a mountaintop in southern Arizona. **Barbie Moorhouse Photo**

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enforcement responsibilities along Arizona's southern border. Their primary mission is to conduct aerial missions in support of and in coordination with federal enforcement partners such as USBP and ICE, as well as state and local agencies throughout the region.

YAB is responsible for roughly 125 miles (200 kilometers) of international border in Arizona and California. Overall, its entire area of responsibility encompasses nearly 60,000 square miles (15 million hectares).

YAB operates a fleet of nine helicopters: six Airbus EC120s and three AS350 B3s (equipped with Safran Arriel 2B1 engines). The branch also oversees a number of small shallow-draft watercraft operated by specially trained USBP agents assigned to the riverine unit responsible for operations along the Colorado River, All-American Canal, and other regional waterways.

'CUTTING SIGN'

AMO operations, often in coordination with USBP, are targeted to interrupt illicit human and narcotics smuggling emanating from south of the border. AMO agents, however, quite often work independently, pursuing clues to smuggling operations, such as vehicle tracks and footprints, discovered during patrol missions. Under the right lighting conditions, experienced agents can "cut sign" (track tire tracks and footsteps) from the air. "It's really a skill that has been passed down, literally from generation to generation," said veteran Air Interdiction Agent (AIA) Barbie Moorhouse. "I remember the first time that I ever flew with some of our former Border Patrol pilots and they were cutting sign — I couldn't understand how they were able to do that from the air." Today, Moorhouse feels that "cutting sign" from the air is easier

The YAB have a small number of specially trained and armed air crew rifle operators (ACROs), capable of neutralizing targets from the air.

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The Yuma AMO riverine units are staffed by specially trained Border Patrol agents. Here, they're working with an air unit along a portion of the Colorado River near Andrade, California.

than on the ground. She prefers the visibility afforded by the EC120, flying about 20 knots and 50 to 80 feet (15 to 25 meters) above ground level to keep from disturbing the sign with rotor wash. "We get the bigger picture from up in the air. Sometimes you can look far ahead and see the trail that they've left in the grass or in the sand."

Smugglers are constantly changing up tactics in an effort to out-maneuver authorities. Knowing that agents rely heavily on shoe sole patterns for tracking individuals, smugglers use various methods to keep from being identified by their shoe. One recent trend is attaching pieces of carpet to the soles so as not to leave an identifiable pattern for trackers.

Smuggling operations are typically organized following a basic blueprint, AMO agents explained. "Guides" are employed to lead the group of illegal immigrants or loads of contraband along an established smuggling route.

Contraband loads are typically 50- to 75-pound (20- to 35-kilogram) rectangular bundles, often wrapped in a camouflage fabric. These loads are often configured as backpacks for human carry or loaded aboard vehicles and/or specially modified all-terrain vehicles.

Along smuggling routes, "scouts" are strategically positioned to conduct counter surveillance against CBP. "The counter surveillance they have against us is amazing," said Aviation Enforcement Agent (AEA) Trevor Prather. "You can drive or fly around out here and you may feel like you're the only person on the planet. But I can guarantee you're not - you're being watched."

The counter surveillance networks can be rather elaborate. Smugglers may position a scout right along the border to "green light" an illegal crossing. Several more may be positioned up among rocky outcroppings in the hills and mountains all along the route, all the way to the destination. Agents tell of discovering "scout" positions well supplied, with food, water, and provisions to last seemingly many weeks at a time, including batteries, solar panels, cookware - even cases of beer.

Prather said, "They are very, very well organized. We have all this fancy technology; radios and sensors and aircraft. But sometimes old technology, like a simple pair of binos [binoculars] and handheld radios or cell phones, can beat us all to hell when it comes to counter surveillance. All it takes is a guy standing out in a field with a shovel and a farmer's hat and a cell phone — they just blend in."

The smuggling operations themselves are also highly organized, carefully controlling the flow of humans and narcotics. AIA Alex Johnson said, "There are certain areas where, when people want



to cross, they have to bring stuff with them - the narcotics, whether they want to or not. Then there are areas where you will not get any groups coming across [human smuggling]. It just doesn't happen. Because that's where they're pushing drugs."

Human smuggling is often responsible for horrific instances of abuse, even death. According to AMO agents, it starts with smugglers giving migrants false information about the actual distance and the many difficulties they may face. Often, what's professed to be a six-hour walk from the border actually requires a difficult many-day journey. The result: immigrants are not at all prepared with adequate food, water, and clothing.

Prather said, "Once they cross that border, money has already been paid to the south side [smuggling organization] so they [the guides] really don't care what happens to those people."

The smuggling routes often follow a network of desert game water tanks serving as supplemental water for the trek. If a member of the group is unable to keep up or falls ill, the guide will kick them out of the group, leaving them behind. If the group is discovered by agents, the guide will often abandon the group entirely in an attempt to avoid capture, leaving individuals/groups to fend for themselves, agents said.

These instances are often responsible for the large number of search-andrescue (SAR) missions flown by YAB. In fiscal year (FY) 2019, YAB handled 70 SAR missions, nearly a quarter of the 377 conducted across the entire AMO southwest region.

"I don't think people really understand how much SAR we do," said Moorhouse. "We can be chasing smugglers one day, and the next, we're searching for them because they've run out of food and water, gotten lost, or have become injured."

YAB officers credit today's cell phone technology and improved coverage



Barbie Moorhouse Photo

"WE CAN BE CHASING SMUGGLERS ONE DAY, AND THE NEXT, WE'RE SEARCHING FOR THEM BECAUSE THEY'VE RUN OUT OF FOOD AND WATER. GOTTEN LOST, OR HAVE BECOME INJURED."

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Day patrol missions in the EC120s are typically crewed by a single pilot.

A Border Patrol agent (left in green) and a Yuma Air Interdiction Agent (in tan) discuss the air and ground efforts that went into apprehending a group of smugglers (seated right) along the southern border. **Barbie Moorhouse Photo**

YAB pilots must constantly be mindful when working in and around the many military restricted areas, military operating areas, and air traffic control assigned airspaces throughout their "beat."

areas in helping them locate individuals needing help. During a 911 call, the GPS location information provided by Enhanced 911 or Phase II technology can nearly pinpoint their location.

Moorhouse said, "The first time they gave me 'Phase II' grid coordinates, I was like, well, I don't really know what that means. But, I put in the GPS coordinates, flew right to the coordinates and found the person, literally right on that spot. It was absolutely amazing."

THE TOOLS FOR THE JOB

YAB uses the EC120 primarily as a daytime, single-pilot aircraft. It may, however, be utilized at night as a night vision goggle (NVG) asset with the addition of a tactical flight officer. The EC120s have been stripped of unnecessary weight — void of sensor packages, search lights, or moving map — to maximize performance.

"The EC120 is really our workhorse," said Moorhouse. "The visibility out the front is amazing. So for what we do, which is looking for people, search-and-rescue, sign cutting, it's fantastic, especially for daytime flight. The Fenestron tail rotor makes it ideal for landing off field. It's quieter. It's smaller, you can fit into tight spots and it's very nimble."

The AS350s are Yuma's nighttime and special mission aircraft. They are equipped with a sensor package including a FLIR Star SAFIRE III, Avalex digital mapping, and audio visual downlink. This technology makes them well suited for night missions, and the aircraft performance provides the capability to tackle heavy payloads, such as with utility missions for repeater maintenance.

Two special mission programs — ground team air coordinator (GTAC) and air crew rifle (ACR) — are relatively new to YAB's playbook and are evolving to provide valuable operational capabilities nationwide.

The GTAC program was originally developed as a dedicated communication link between a supporting AMO aircraft and a tactical team on high-risk missions. Specially trained and equipped AMO officers are embedded with the team and act as direct communication liaisons, controlling the aircraft and providing the team with pertinent intel relayed from the air.

Today, GTAC has evolved, with enhanced capabilities that have been utilized in disaster relief efforts. The program provides for rapid deployment of communication and asset tracking in hurricane-ravaged areas and other places where communication infrastructure has been compromised. Presently, Yuma has two agents qualified to fulfill the GTAC mission.

The ACR program is an offensive airborne rifle platform leveraging specially trained AMO agents, capable of neutralizing targets from the air. They're armed with FN SCAR Heavy .308 rifles equipped with targeting optics and can be utilized for aerial support for tactical teams, VIP protection, and security for large public events as an overhead cover with a lethal option.

"Every time I shoot it's to stop the threat," said Jay White Jr., AEA and ACR operator. "So when it comes to a vehicle, I'm not engaging the engine block. I'm engaging the driver. Now, if I take out the driver, and the vehicle is still rolling, I own that vehicle. Whatever that vehicle does, I'm responsible for. So that's something I need to consider before I pull the trigger."

A VISION TO LEAD

Presently, YAB is staffed by 15 law enforcement agents making up the ranks of administration, pilots, and tactical officers. Two USBP agents are temporarily assigned and trained as supplemental air crew members. An additional 20 employees



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provide administrative support and oversee the maintenance and service of the aircraft.

As AMO modernizes its fleet to meet new threats and incorporate cutting-edge technology, the YAB fleet will also be modernized and change. YAB director Jim Schuetzler said, "AMO is looking to the [Airbus] H125 as the follow-on to our older AS350s and the versatility of that platform is the reason it is AMO's current choice for our light enforcement helicopter [LEH]. The EC120s are no longer being manufactured and as they get older, their rising maintenance operating costs will force them into retirement."

Nationwide, AMO utilizes roughly 250 fixed- and rotor-wing aircraft, unmanned aircraft systems, and a fleet of 300 watercraft in support of law enforcement missions as well as humanitarian relief efforts. Their vision: to be the nation's leading aviation and maritime law enforcement organization.

In FY 2018, a total of 396,579 individuals were apprehended between ports of entry along the CBP southwest region. In FY 2019, the numbers more than doubled to 851,508 individuals. Apprehensions in the Yuma sector alone eclipsed nearly 70,000. Overall, AMO and their enforcement partners are responsible for making a significant impact on cross-border illicit activity. In FY 2019, AMO enforcement actions resulted in the seizure or disruption of 284,825 lb. (129,194 kg) of cocaine, 101,874 lb. (46,209 kg) of marijuana, 51,058 lb. (23,159 kg) of methamphetamine, 935 weapons, and \$34.1 million in cash. The agency also made 1,575 arrests for various crimes and 52,036 apprehensions of illegal aliens. Schuetzler said, "The Yuma Air Branch operates squarely in AMO's core business: providing law enforcement capability in the air and maritime environments. Like many law enforcement agencies, we're called on to patrol a vast area in a harsh environment, but in small numbers, many times as a single pilot or two-person crew. Back-up is usually pretty far away. But we also provide that same back-up for the agents on the ground and YAB crews take that job very seriously."



Dan Megna | Dan served nearly 20 years of a 30-year law enforcement career as a helicopter tactical officer, pilot, and flight instructor with a large Southern Californian sheriff's department. He has been a regular contributor to *Vertical* since 2004.

> Just ahead of the nose of the YAB EC120 is one of the original concrete boundary markers, constructed between 1849 and 1857, delineating the U.S./Mexico border. From the base of the marker extends today's more substantial border fence and patrol road.



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U.S. AIR FORCE HELICOPTER PILOT MICHAEL TOSI GOT A PREVIEW OF THE MILITARY-TO-CIVILIAN TRANSITION WITH AIR MEDICAL OPERATOR DHART. HERE ARE HIS THOUGHTS ON WHAT CIVILIAN HELICOPTER FLYING OFFERS TO MILITARY PILOTS — AND WHAT THE INDUSTRY SHOULD BE DOING TO ATTRACT MORE OF THEM.

BY MICHAEL TOSI PHOTOS BY SHELDON COHEN



Dartmouth-Hitchcock

One of DHART's newest Airbus EC135 P2+ helicopters over the scenic Lakes Region of New Hampshire. The author embedded with DHART for a taste of the military-to-civilian pilot transition.

"If I need another helicopter pilot, I'll just go down to Bourbon Street and pull one out of the gutter." Incredibly enough, this oft-quoted commentary on the perceived disposable nature of helicopter pilots was attributed to a former CEO at one of North America's largest commercial helicopter operators. While I can't speak to the veracity of the quote, it perfectly epitomizes the pervasive attitude about pilots that has left our industry scrambling.

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As is evident from a growing number of unfilled job openings, the pilot shortage is no longer hypothetical, nor is the helicopter industry immune. While the reasons are clear — the retirement of Vietnam-era pilots, airline hiring, a flighthour-constrained military, and stagnant civilian pilot production — the solutions are not.

Even if the civilian pilot training pipeline were to be properly promoted, incentivized, and rapidly spooled up, it would still take the better part of five years until the impact was felt. One of the few options the helicopter industry has now is to attract more military pilots, but here it's losing to the airlines, and losing badly. As a military aviator rapidly approaching the end of my service commitment, I was given a chance by *Valor* to take a firsthand look at the military-to-civilian pilot transition. I would start by going through the various hiring wickets, an interview, then in-house training and qualification on the aircraft of choice, ultimately culminating in a week on the job. My goal was not only to provide a template for pilots looking to make the switch — including those who may still be on the fence — but also to examine what the industry can do better to both attract and retain military pilots.

THE JOB SEARCH

In an effort to keep this undertaking as realistic as possible, I looked at jobs I'd not only be interested in, but also for which I would theoretically be competitive. With a background in U.S. Air Force combat search-and-rescue (CSAR) and a desire to work in a specific location, I found the helicopter air ambulance (HAA) industry to be a natural fit.

My research led me to Metro Aviation, considered by many to be the benchmark when it comes to the HAA industry in the United States. Founded in 1982 by Mike Stanberry, it is known for a culture that embraces safety, innovation, customer service, and — most importantly — taking care of its people. With a focus on traditional hospital-based programs, Metro is well incentivized to provide a quality product when it comes to aircraft and pilots.

As for choosing a base, that was easy (and quite frankly the cart came before the horse on this one). Having grown



(D)

The Operational Control Center (OCC) at Metro Aviation's headquarters in Shreveport, Louisiana. All flights are approved and closely monitored by the OCC as an additional safety measure.

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The author getting familiar with the EC135 P2+ helicopter and air ambulance procedures on Metro's Level D simulator.



ALC: Status

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than done in today's military. (I speak more to this on page 16.) My interview with Metro Aviation took place at the company's

headquarters in Shreveport, Louisiana, in the presence of director of training John McClure, head of human resources (HR) Rebecca Stinson, and chief pilot Brian Bihler. In an effort to pass on any tips, techniques, or mistakes on my part, I told them to pull no punches. The experience was remarkably authentic and at times I found myself sweating a bit, forgetting it wasn't an actual job interview.

While I'm clearly an advocate for the value of military training and experience, I would also strongly caution pilots making the switch to the civilian world: When the time comes, leave your attitude and preconceived notions at the door. At the time of hiring, there's a good possibility your civilian counterparts will be far more qualified for the job. Due to their greater flight experience on the types of helicopters flown outside the military, the likelihood exists they'll also be better on the controls. Stepping into your interview and ultimately a new career, be humble and know that while your airmanship, past experiences, and training can ultimately help set you apart, you're still applying for an entirely different job.

I was surprised to find that the interview process at Metro didn't stop with a verbal interview; there was also a written test and an "interview sim." The written test covered subjects including airspace, instrument flight rules (IFR), and Federal Aviation Regulations part 135. While I "passed," my results were a bit lackluster and could have been a red flag. This leads to another critical piece of advice: Unlike the military, don't show up expecting to be spoon-fed or started from square one (and take the time before your interview to brush up on the regs and other information pertinent to the job).

Fortunately I still had an opportunity to redeem myself in the interview sim. Conducted in one of Metro's phenomenal level D full-motion flight simulators, the emphasis was on general airmanship, rather than on the specific aircraft or HAA operations. I followed along as my instructor and experienced check airman Scott Michaelson helped me with startup, before having me pick up for some hover work and a few laps around the pattern. This was followed by a scene call and rooftop landing, all immaculately modeled with stunning visuals.

While this all sounds rather vanilla, let's just say you'll face various challenges in the sim, from unforecast weather to unpredictable landing zone conditions during the sortie. I'll remain vague in an effort to not give away all of Metro's secrets, but expect these to test your judgment and aeronautical decision making.

up in rural New England, I've long been familiar with the Dartmouth Hitchcock Aerial Response Team — "DHART" for short. Painted in a distinctive green, white, and orange livery, its Airbus EC135 P2+ helicopters offer a stunning contrast to the New England scenery. The program also has a stellar reputation, both on a local and national level.

Having *Valor* pitch my story idea to Metro was admittedly cheating a bit when it came to getting an "interview," but the value of networking still can't be overstated. While the military hiring process is very structured in nature, getting a job in the civilian industry is often more about personality, fit, and commitment to a future employer or base. It's never too early to start this process, and I recommend compiling a list of prospective employers years out from separating. Pay a visit every so often while you're on leave, network on social media, and stay in touch with your contacts as you approach your separation date.

Of course, you also need to be qualified for your next job at the time of separation. Unfortunately, in our industry "being qualified" means meeting minimum hour requirements, which is easier said

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I was told I had done well and presumably would have passed. Although unlike the written test, I felt slightly more confident in my performance - not due to any particular skill in the sim, but rather because I had met my single quantitative metric of success established over years in military simulators: avoiding the proverbial "red screen of death." Either way, I walked away with a notional job offer from chief pilot Bihler.

BASIC INDOC

Upon receiving and accepting my "offer" at Metro, it was time to attend basic indoc (BI). The course is typically two weeks long, although I was on a slightly abbreviated schedule due to other commitments. The first week primarily focuses on learning company procedures and operations specifications (ops specs), while the second week involves ground school and sim training on the respective aircraft (in my case, the EC135 P1/P2+). Having just come from a nearly two-month-long instructor upgrade, this was markedly shorter than the military transition courses I'm accustomed to.

As with any new hire, I was put in touch with pilot training coordinator Rachel Corpier to make travel arrangements. I mention this because the process was seamless and, oddly enough, one of the highlights of the whole process. Anyone familiar with Defense Travel System or government travel can surely appreciate why! Of course, with any good news comes a bit of bad news specifically, about a week's worth of computerized training to be completed prior to the conclusion of BI. (While I had asked for the "full experience," this is one area where I invoked some editorial privilege and skipped a bit of the courseware.)

DHART operates from three bases covering the entirety of New Hampshire and Vermont.

Showing up in the hotel lobby to catch the shuttle to Metro, I met my BI classmates. Our class was large by Metro standards and guite diverse. There were a few newcomers to HAA, most transitioning from flying tours or offshore in the Gulf of Mexico. We also had several members of the class either returning to the HAA industry or transitioning to Metro from other HAA operators. Tellingly, there was no one transitioning directly from the military.

The first day of BI consisted largely of HR paperwork with briefings on pay and benefits. While Metro acknowledges that it doesn't offer the highest salaries in the industry, it does have an industry-leading benefits package. Noteworthy for veterans who already have medical coverage is the \$5,000 credit Metro offers if you elect to keep your existing coverage. Also worth keeping in Conducting a simulated scene call with the Newport, New Hampshire fire department as part of community outreach and familiarization with DHART.

mind is the prospect of overtime - never guaranteed, but usually not lacking given the current shortage of pilots.

After wrapping up with HR, it was time to become acquainted with Metro's general operations manual and Complete Flight, an app that simplifies much of the paperwork associated with part 135 flight operations. Our guide for most of this was field training manager Ann Lowell, who was wonderful and patient with us as we fumbled along on our iPads. Interspersed throughout the week were several talks from Metro's senior leadership, including Mike Stanberry and his son Todd. It was clear how much pride they took in their corporate culture and being a family-run business, especially in an industry now dominated by private equity.

Classroom wrapped on Friday and while everyone else had the weekend to catch up, my week was about to get even busier. Due to my abbreviated timeline, I asked to condense a week of ground school and sims into two days. While this was fairly aggressive, I was able to start preparing earlier in the week with a review of the pilot operating handbook and various study guides. In addition to the EC135 being fairly straightforward, with no defensive systems, weapons, or tactics to memorize, it was markedly easier to get the basics down.

PERSONAL EXPERIENCE > MIL-TO-CIV TRANSITION



The civilian helicopter industry has simply not kept up with the fixed-wing world when it comes to pay and bonuses. Commensurate with the drastic increase in competition for pilots, the military has also upped its incentive pay in an effort to retain its aviators. For example, the Air Force is now offering pilots an additional \$35,000 per year on top of an almost six-figure or greater salary. That means a nearly 50 percent after-tax pay cut for those looking to fly HAA in the civilian world.

Unfortunately the helicopter's inability to compete on salary and benefits is unlikely to change in the near future. This is the economic reality of an industry with too many operators who are willing to cut corners and compromise on safety in order to win a contract. The pilot shortage has led many of them to erode their hiring minimums, with no concurrent increase in screening or training. The onus to prevent a further slide will eventually fall on customers, who will have to accept higher costs in order to keep quality pilots rather than just warm bodies in the cockpit.

Fortunately there are several other ways for civilian helicopter operators to compete in the near term; namely, with workplace culture and job satisfaction. While I certainly can't speak for everyone, many of us want to take pride not only in what we do, but in the organizations we work for - organizations that are committed to doing the job right, take safety seriously, innovate, and aren't just about the bottom line. From my first contact with Metro, it was apparent they take tremendous pride in their culture and consider it their biggest selling point.

For those currently serving who aren't ready to hang up the uniform just yet, it's also possible to enjoy the best of both worlds through the Guard and Reserve. I myself am a member of the Air Guard, which has allowed me to serve as an HH-60G CSAR pilot while also writing this article, starting a business, and pursuing civilian flying opportunities. Many employers including Metro are supportive of service in the Guard and Reserve, and the associated pay can help augment lower salaries. Moreover, the time spent away at drill, annual training, or on deployment often results in training and experiences that enhance pilots' overall skillsets, yielding benefits both for pilots and their civilian employers.

PERSONAL EXPERIENCE > MIL-TO-CIV TRANSITION

-60G Pavehawk conducting nall boat hoist operations with a United States Coast Guard 47-foot motor lifeboat. The Air Guard also trains and conducts civil SAR missions. Michael Tosi Photo

With a fair amount of SAR and night vision goggle (NVG) experience under my belt, I was able to emphasize basic checklist procedures and emergency procedures (EPs) as we moved into the sim. While the transition from a multi-crew cockpit to single-pilot operations was significant, concurrently going from the best technology the late '80s had to offer (our Sikorsky HH-60G Pave Hawk) to a fully coupled autopilot and all-glass cockpit was a game changer. Metro's IFRequipped 135s were remarkably intuitive, and after gradually learning to trust the autopilot, I quickly settled into single-pilot operations.

Because of my abbreviated timeline and not technically being an employee, I wasn't able to complete an "official" part 135 checkride upon completion of BI. I did, however, ask to be put through a simulated one, which like any military check flight started with a robust general knowledge session before moving into the sim. The flight profile was similar to the weekend's previous sims, with a scene call, rooftop hospital pad landing, and copious amounts of EPs in between. Having lived up to my previous metric of success - avoiding the red screen of death - I was "checkride" complete and off to New Hampshire for a week with DHART.

IN THE FIELD

As you can likely tell from the pictures, the timing of my week spent at DHART was no accident - there are few things more spectacular than fall in the Green and White mountains. DHART's main base is nestled between these two mountain ranges near the scenic Dartmouth campus in Hanover, New Hampshire. Started to provide advanced level emergency medical care to rural New England, DHART has grown under its current leadership to include two additional bases in Manchester, New Hampshire, and

Burlington, Vermont, covering the whole of both states.

Prior to handing them the reins solo, Metro requires its pilots to undergo extensive on-the-job training at their respective bases. For my familiarization, I was scheduled with DHART chief pilot Paul Austin and base lead Doug Moore, rotating between the two New Hampshire bases. Coming from significantly different backgrounds, both with an immense amount of experience, they were able to provide two unique perspectives on the militaryto-civilian transition: Moore as a former Air Force CSAR/special operations pilot, and Austin as a civilian-trained pilot who has seen a number of military aviators make the transition at DHART.

Both identified systems knowledge, IFR proficiency, and the ability to manage a crew along with multiple radios as common strengths of military aviators. Those who struggled to make the transition, they said, were unable to adapt from a "mission first," aircraft-focused mentality to serving a customer. While the pilotin-command is still the final authority as to the operation of an aircraft, regularly ordering civilians around, as if they're in the military, is likely to end poorly. Same for aggressively pushing aircraft or weather limits to accomplish a flight.

Although there are numerous differences between the military and civil aviation worlds, there are also remarkable similarities, particularly in HAA. Getting a tone at DHART prompted the same kind of rush associated with a combat rescue or civil SAR mission. A late-night scene call in the White Mountains or IFR hospital approach, with weather at minimums, and prospectively single pilot, demands no less attention or skill. Of course, there was inevitably downtime, too, and the ensuing banter between a close-knit group of people doing a job they love.



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The crew dynamic was actually the biggest surprise of the transition for me and also the most enjoyable. I had heard horror stories about civilian med crews: their disinterest in all aviation matters, reluctance to fly, or just general lack of professionalism. This couldn't have been further from the truth at DHART.

From the start of shift briefing to hour 14 of the duty day, the Dartmouth Hitchcock clinicians were always engaged and an integral part of the crew. The crew resource management was exactly what I had grown accustomed to over years flying crewed aircraft, with the med crew running checklists, clearing the tail, and everything in between. While the transition from a multi-crew cockpit to single-pilot operations is certainly a significant one, having an engaged med crew helps immensely.

CLOSING THOUGHTS

The civil helicopter industry is currently perceived by a majority of U.S. military aviators as being underpaid, risky, and — due to minimum flight hour requirements — often unattainable even if they wanted to make the switch. I take a bit of liberty in saying "a majority" rather than "many," but this is supported by fairly compelling data when it comes to the volume of pilots transitioning to the airlines from the military, not to mention overwhelming anecdotal evidence received through day-to-day interactions and social media.

Even as I sat writing this article on a flight back from Europe, I started speaking with one of my neighbors — who, ironically enough, was a U.S. Navy helicopter pilot nearing his retirement date. When I asked him about his future plans, there was discussion of the airlines, staying in the military past 20, a desk job, and even going back to school, but no mention of continuing in the civilian sector as a helicopter pilot. When queried further as to why, he gave me a perplexed look and a response, bordering on incredulous, as to why he'd even consider it in light of all of the negatives I've previously alluded to.

Like most readers of *Valor*, I'm passionate about helicopters, and so are many of the folks I work with in the military. It's alarming to see that level of enthusiasm, training, and experience draining

Dartmouth-Hitchcock

away from the industry at such a rate. Despite its drawbacks, civilian employment as a helicopter pilot also offers a number of positives, including challenging flying and, in the HAA sector at least, the possibility of being home every night. For those of us who joined the armed services to be part of something bigger than ourselves, the helicopter industry also affords many opportunities to continue serving the community, whether in HAA, firefighting, or even utility work.

All of this begs the question: After an experience this in-depth, would I actually take a job in the industry? Absolutely, especially somewhere with a culture like that of DHART and Metro. But given that I volunteered my personal "vacation" time for this project, I may be an outlier — and even for me, the prospect of a nearly 50 percent pay cut from active military service gives me some pause (see "Culture, Salary and Benefits," p.61).

Solutions to the helicopter industry's pilot shortage are no secret, and attracting more military aviators is one of many. Unfortunately, implementing those solutions will first require the industry to acknowledge several endemic problems. Market forces are finally driving some changes, but irrespective of the current shortage or how long it lasts, these lessons should be taken to heart by an industry that often forgets human capital is the most important kind. If we continue to treat pilots like they can be pulled out of any gutter, we'll continue to see a mass exodus of talent on both the military and the civilian side.

The views expressed in this article are those of the author and do not reflect the official policy or position of the United States Air Force, Air National Guard, Department of Defense, or the U.S. government.



Michael Tosi | Currently serving as an HH-60G CSAR pilot with the Air Guard, Michael has flown combat missions in the Middle East and Africa, as well as civil SAR and humanitarian relief missions all over North America. As a civilian, he also founded, co-owned, and recently sold a small part 135 charter/tour operation. He currently runs the @jolly_pilot Instagram page with more than 35,000 followers.

Despite its drawbacks, civilian employment as a helicopter pilot offers a number of positives for pilots leaving the military, including the ability to continue serving the community.


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Travis County STAR Flight senior flight nurse Jennifer Roberts (left) and flight medic John Hamilton work with first responder partners from Travis County Fire & Rescue to load a simulated trauma patient. The aircraft is in APU mode, allowing for movement in and around the aircraft without Rescue to PU mode, vithout litating a Photo STARFIGNT the rotor blades turning, improving safety and facilitating communication with ground personnel. Dan Megna Photo

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PROGRAM PROFILE > TRAVIS COUNTY STAR FLIGHT

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MULTI-MISSION MASTERS

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BY DAN MEGNA

One of STAR Flight's three AW169s on duty and ready to serve over downtown Austin, Texas. **Dan Megna Photo**



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Landing on one of two rooftop helipads at the newly constructed Dell Seton Medical Center of University of Texas. **Tim Pruitt Photo**



STAR Flight is often called by local fire departments to assist firefighters on the ground with grass and vegetation fires. Dan Megna Photo

In the pre-dawn hours of Oct. 13, 2013, Austin-Travis County (Texas) Emergency Medical Services (EMS) paramedic captain Jim Martin was driving to work in his Jeep Wrangler. The overnight rain had stopped and Martin had no reason to think his 40-mile (64-kilometer) commute would be anything but ordinary.

Several miles down the dark country road, rain began to fall and rapidly increased in intensity. Martin recalled, "It began raining so hard I had to stop and put the Jeep into four-wheel drive and turn the flashers on so nobody would run up on the back of me."

Seemingly out of nowhere, Martin's Jeep was broadsided by what he described as "a wall of water." His Jeep was swept off the narrow roadway and into a churning river of mud and debris. Its nose pitched down into the cascading flow, bobbing and whirling as it was carried downstream.

With water filling the cab up to his chest, Martin had the presence of mind to grab his cell phone and call 911. He relayed his situation but could only provide a general location. He suggested a helicopter rescue might be his only hope.

"I was pretty scared," said Martin. "I figured it was game over for me - pretty much thought I was a dead man. I even told dispatch to tell my son I loved him."

Martin's communication with 911 lasted over 20 minutes before the connection was lost. The last he was told: a helicopter would not be responding. The storm was just too bad.

Travis County and the surrounding Texas Hill Country is the most flash-flood-prone region in the country. It owns the distinction of the most flash and river flooding related deaths annually and is often referred to as "Flash Flood Alley."

In this instance, thunderstorms that rolled in the previous evening dumped over 12 inches (30 centimeters) of rain across the region. Martin was now fighting for his life, trapped in flood waters resulting from rain that fell many miles away.

Meanwhile, 20 miles (32 km) away in Austin, the Travis County STAR (Shock Trauma Air Rescue) Flight crew received the dispatch. It was their second flood-related mission of the morning, and their Airbus EC145 was already configured for rescue. The crew strapped in and prepared to launch.

"After we started up, we had to wait for a strong cell to pass before we could launch," said veteran STAR Flight registered nurse (RN) Brian Hill. "Jim, my pilot, actually followed the major roadways to get to the location. Even though we have radar capabilities in the aircraft, he was in contact with ATC [air traffic control] which was keeping us updated on weather conditions. There was a lot of lightning and so much electrical activity in the air [lightning and rotor-generated] I kept getting static discharge off any exposed metal inside the aircraft."

After flowing downstream for over a mile, the rear of the Jeep impacted the trunk of a large tree, finally coming to a stop. It was still pitch-dark. Martin was facing upstream; the nose of the Jeep was completely submerged and water continued to fill the cab. But for the moment, anyway, Martin felt a sense of hope.

Then, a second flash flood torrent cascaded down the creek. It brought with it another massive debris flow including large tree branches that slammed into the Jeep and threatened to dislodge it. Sensing urgency, Martin escaped through a roof hatch, climbed to the rear bumper and up into the tree.

Despite the weather, the STAR Flight crew persisted. They took advantage of a window between storm cells to launch. Even then, while en route they were forced to land in a parking lot for nearly 15 minutes to wait out a heavy downpour.



Some of the STAR Flight team, including chief medical supervisor Patrick chief/helicopter pilot/instructor Marc Jones, flight nurse/crew chief/helicopter rescue specialist Rita Sears, assistant chief pilot/instructor Taylor Petty, senior flight nurse/crew chief/helicopter rescue specialist Jennifer Roberts, flight nurse/helicopter rescue specialist Michael Brian Hill, and director of operations Craig Hilzendager. Dan Megna Photo



Flight paramedic/crew chief/helicopter rescue specialist Scott White and flight nurse/helicopter rescue specialist Michael Brian Hill conduct hoist operations training from the AW169. Dan Megna Photo



catchment area for hurricane relief missions. Tim Pruitt Photo





"Once we located the scene we started searching downstream," said Hill. "It seemed we searched several miles downstream; we were thinking there is no way his Jeep could have floated this far, before Jim [the pilot], located him in the top of a tree. His Jeep was stuck against the tree and fast-moving water [was] flowing up over the roof."

Martin had endured his harrowing situation for over an hour before being located. "It's hard to put into words the severity of that storm," he said. "But the minute I saw that helicopter and that spotlight locked on me, I knew I was going home. Because I know the kind of men and women who crew those helicopters."

The EC145 established a hover and Hill was deployed via hoist to recover Martin. "It took several tries to get me to Jim [Martin] as the winds were gusting," recalled Hill. "I remember him reaching out to me, and me yelling [to] him not to do that. My fear was he would lose his grip and fall. Once I did make it to him I got the strop [rescue device] on him fairly quickly."

A UNIQUE SERVICE

This year marks STAR Flight's 35th year. What began as a partnership between Travis County, the City of Austin EMS, and the University Medical Center Brackenridge (which was recently rebuilt as the Dell Seton Medical Center at the University of Texas) is today solely administered by Travis County as a regional public safety asset - not only for citizens of Travis County, but 19 neighboring counties throughout south-central Texas.

What sets STAR Flight apart is its multi-mission capabilities. In addition to its traditional air medical and search-and-rescue (SAR)/hoist capabilities, the program also performs firefighting and law enforcement support.

STAR Flight's dispatch protocols differ from most air medical operators. The program has a partnership with the City of Austin EMS for dispatch and aircraft tracking services and it is directly integrated into the greater Austin-Travis County EMS system. In high-priority instances where 911 operators determine whether

In addition to quarterly, semi-annual and annual qualifications, STAR Flight has developed crew-based training (CBT) scenarios that crews can go out and perform at their discretion. Most crews go out to perform at least one of these CBTs weekly every time they are on a "hitch." Tim Pruitt Photo

ground EMS assets are more than 20 minutes away, STAR Flight may be dispatched as a first response advanced life support (ALS) ambulance.

STARFIGHT

Travis County's goal is to have ALS to a patient within 20 minutes of a 911 call. With STAR Flight's lift-off time averaging four to eight minutes, the helicopters are critical in meeting that goal, especially in the outlying rural areas.

STAR Flight program director Chuck Spangler said, "Since Travis County and the surrounding regional counties are mostly remote, the benefit our capabilities provide is simply to reduce out-of-hospital time for those critical patients needing to get to the proper medical care facility quickly.

"There are no other programs in our region that have the capability to do this," he added. "There are other programs in the region that can do scene calls and simple one-patient transfers, but not specialty teams. Additionally, our capability to conduct search-and-rescue, fire suppression, and law assist is the only program in the region capable of supporting this."

Since its inception, STAR Flight has operated a number of different aircraft. The program began service in 1985 with a contract-leased Bell 206B JetRanger, and eventually replaced that aircraft with a larger, more powerful Bell 206L3 LongRanger. In 1990 STAR Flight added a Bell 412 to its fleet, which brought about multi-patient/mission capabilities. This became the primary aircraft, with the 206L3 serving as a backup. In 1998, the program standardized its fleet, transitioning to two EC135s which it operated until 2006 when two EC145s were acquired.

The purchase of a third EC145 in 2010 allowed STAR Flight to increase aircraft availability. It also led to growth for the program, bringing on additional pilots, medical crew, and mechanics. In 2013, a Bell UH-1H+ Huey was purchased to support wildland firefighting.

In the spring of 2015, tragedy struck. During a night hoist mission of an injured hiker, flight nurse Kristin McClain lost her life after falling during the hoist extraction of the victim. After an extensive investigation by the National Transportation Safety



Helicopter senior mechanic Bryan Franklin conducts a portion of a daily inspection of the AW169 avionics suite. Dan Megna Photo



Senior mechanic Robert Pado and Bryan Franklin perform a required tail rotor inspection of the AW169. Dan Megna Photo



Board and STAR Flight leadership, it was concluded that the fall was not an equipment failure. Instead, they determined that McClain was not properly attached to the hoist.

Spangler said, "We brought in an outside safety expert to interview all of our employees and evaluate our safety program as well as the specifics of our hoist rescue processes. We conducted a complete 'scrub' of all our hoist processes with our most senior and experienced personnel to find out what we had overlooked or taken for granted. From all of this we added steps to improve our risk mitigation measures specific to hoisting."

By 2017, in the wake of losing McClain and with operational requirements increasing, the capabilities of the fleet were coming under scrutiny. STAR Flight began exploring options for a more capable aircraft better suited to the needs of the maturing program.

Craig Hilzendager, STAR Flight director of operations, said, "The EC145 and the Huey were great reliable workhorses that served us well for many years. However, as our mission footprint changed so did the performance needs, causing us to try and adapt.

"In recent years our local hospital partners have changed their scope of practice with more specialty team transport needs, going out farther and farther from our base of operation to pick up critical patients," added Hilzendager. "For this type of operation, the need for a larger, more robust aircraft that can carry more people further and faster forced us to explore the ability to provide that service to our partners."

Through 2017/18, the request for proposal process ultimately led to the contract being awarded to Leonardo Helicopters for the purchase of three AW169 helicopters, replacing the EC145s and the UH-1. The acquisition would give STAR Flight the distinction of being the first U.S. helicopter air ambulance service to operate the AW169. In 2018, their last full year of service, the Huey and the three EC145s stacked up impressive statistics. Together they responded to 1.427 calls for service, 931 air ambulance calls, 95 rescue calls, 29 fire calls and nine law enforcement assists, amassing 692 flight hours covering over 51,000 miles (82,076 km).

NEW CAPABILITIES

With delivery of the first AW169 originally slated for May 2019 and a goal of pressing it into service by August, STAR Flight pilots executed a rigorous two-month transition training schedule. Each attended ground school, simulator training, and flight training at the Leonardo Training Facility in Sesto Calende, Italy. Upon returning home, they completed additional in-house Federal Aviation Administration (FAA)-approved ground and flight training.

Today, all three AW169s are in service and earning high praise from pilots and crews. Hilzendager said, "The AW169 is a dream to fly; the synthetic vision system, [the] available power, speed, TCAS [traffic collision avoidance system], four-axis autopilot with hover mode, wings level autopilot function, redundancy in systems, and just overall comfort make the AW169 a great aircraft that our pilots truly enjoy flying.

"Moreover, our medical crews enjoy the increased cabin space while retaining the capabilities of transporting two patients at a time," he added. "The increased speed of the AW169 also decreases the time of out-of-hospital care, helping to create a better outcome for the patients we transport on a daily basis."

The size and performance of the AW169 greatly improves STAR Flight's specialty care capabilities. Spangler said, "We have the room and seats to meet multiple specialty team roles, [including] high risk obstetrics teams, neonatal intensive care unit teams, pediatric intensive care unit teams, and extracorporeal membrane oxygenation patients."

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Like most public safety agencies, STAR Flight is funded by local taxpayers. But it is also a revenue-generating Code of Federal Regulations part 135 air medical operator — so any hospital transport is billed to a patient's insurance provider. In the event of a SAR or public safety mission, where no hospital transport results, the individual(s) or the agency are not billed.

Star Flight's standard crew is comprised of a pilot, one nurse, and one paramedic. While SAR and public safety missions are flown often, medical crewmembers are cross-trained to serve as crew chief/hoist operator (HOP) and helicopter rescue specialist (HRS).

"Medical personnel are continuously qualified as an HRS and required to maintain their qualifications and currency at that position," said chief pilot Mark Parcell. "The HRS will act as the rescuer and will be deployed by way of rescue hoist to the scene. At an appropriate time in the tenure of an HRS, usually within two to three years of initial HRS qualification, selected candidates commence dedicated training to become a crew chief/HOP."

While STAR Flight's multi-mission capabilities are certainly highly regarded throughout southcentral Texas, the program's competence and skill in swift water and flood rescue have earned them international acclaim.

The Higgins & Langley Memorial Awards is an international organization honoring outstanding achievement in the technical rescue discipline of swift water and flood rescue. Over the years, STAR Flight has been recognized many times, including with the rarely awarded Lifetime Achievement Award.

The organization stated, "They are not heroism awards, but rather recognize preparedness, teamwork, and a job well done, sometimes under extreme conditions where training is vital to the success of rescue missions, as well as the safety of rescue personnel."

Martin's case is just one example of STAR Flight's commitment to public safety and its ability to work confidently in high hazard environments and treacherous conditions.

"It's nearly impossible to simulate some of the flight conditions our crews will potentially face," said Spangler. "Many times we

must make the choice to go fly in what most would consider unbelievably horrible weather that only a 'rogue

risk-taker' would attempt. We do not take these situations lightly.

"We know we will have to make some extremely high-risk decisions when there's a human life hanging in the balance. To mitigate these risks, we train continuously to not only build confidence in our abilities but to continually seek improvement in our processes. The bottomline risk mitigation tool we have is constant communication with our crews that we are completely confident in their decisions." Hilzendager said, "The citizens of Travis County along with the Travis County commissioners have

provided STAR Flight with some of the best equipment available, such as the AW169. This equipment allows us the ability to conduct the types of operations we perform.

"However, it's because of our amazing, dedicated, and welltrained team, along with our first responder and EMS partners, that we're successful," he added. "Our team's commitment to serve those in need through selfless public service and professional dedication is what has always made, and will continue to make STAR Flight successful."

In 2019, a Travis County Commissioners Court Proclamation recognized STAR Flight's outstanding accomplishment in transitioning to the AW169 while remaining in service for the community. While many challenges were faced during the transition, no calls were missed. **Dan Megna Photo**

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STORY & PHOTOS BY SKIP ROBINSON

The first dedicated attack helicopter of its type, the Bell AH-1/ Model 209 Huey Cobra is one of the best known and appreciated attack helicopters the world has ever seen, thanks to its wartime service, good looks, and aggressive stance. The history of this aircraft dates back to the early part of the Vietnam War, when the U.S. Army recognized a need for a faster, less vulnerable helicopter than the armed Bell UH-1B and C model Hueys initially used for the escort of troop-carrying helicopters and direct attack. These aircraft, which used multiple variations of forward-firing light machine guns and air-to-ground rockets, proved the concept of armed helicopters providing support for troops in contact with the enemy. In 1963, the Army launched the Advanced Aerial Fire Support System competition, which Bell lost to Lockheed and its futuristic - but eventually cancelled - AH-56A Cheyenne. Despite the loss, Bell pursued its concept for the smaller, lighter Model 209, principally designed by a young engineer named Michael Folse. Sleek and fast, the 209 had a new tandem-seat cockpit with the pilot in the back and the gunner up front. The fuselage was only about 36 inches (91 centimeters) wide and had the drive train, rotors, and engine used in the Bell UH-1. Crucially, because the

aircraft got roughly 80 percent of its parts from the existing UH-1, it could be bought by the Army as a product improvement and not as a new helicopter subject to competition requirements.

The Army liked it and started ordering the AH-1G production version armed with a nose turret containing a 7.62-mm six-barreled minigun and a 40-mm grenade launcher. Bell built 1,116 AH-1G Cobras for the U.S. Army between 1967 and 1973, and a large portion of them flew over one million operational hours over Vietnam. About 300 were lost during combat and operational accidents during the war.

Over their decades of service, AH-1G Cobras were modified to create many different versions, starting with the AH-1Q that brought into service the tube-launched optically-tracked wire-guided (TOW) missile and sighting system. AH-1Gs were further modified to AH-1S, AH-1P (Production), AH-1E ECAS (Enhanced Cobra Armament System) and, finally, AH-1F models.

These aircraft introduced new exhaust suppression systems, from the "toilet bowl" scoop of the P models to the AH-1F's much more advanced suppressed exhausts. Self-protection systems were added, including the ALQ-144 "Disco Ball." Armament was upgraded for the turret to a 20-mm three-barreled cannon that



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Number 15589 is operated by AAHF's Arizona chapter, and by its SoCal detachment during the summer air show season.

LZ MGR



In addition to its Living History Flight Experience program, AAHF presents its historic aircraft on static display at events such as HA<u>I Heli-Expo.</u>

AIRCRAFT PROFILE ⊁ BELL AH-1F COBRA

could be quickly aimed from either seat's helmet sight subsystem simply by looking at the visible target and actioning the weapon. The wing-mounted rockets evolved to 2.75-inch folding fin aerial rockets, and the TOW missiles were upgraded. Meanwhile, the Lycoming (now Honeywell) T53 engine evolved from the AH-1G's 1,400-horsepower T53-13 model to the definitive 1,800-hp -703, which powered all the later versions of the Army Cobra.

For its time, the Cobra represented the pinnacle of attack helicopter development. The U.S. Army flew Cobras in combat through the Cold War, into Operation Desert Storm and Somalia. It started retiring AH-1S/P/F models only during the 1990s, with full retirement occurring in March 1999. The Army Reserves and Army National Guard units continued operating the AH-1 series for a couple more years, retiring the AH-1 series by the end of 2001.

HONORING ARMY AVIATION

In 1997, a group of veterans and interested citizens organized the Army Aviation Heritage Foundation (AAHF) to further the public's awareness of Army Aviation and the people who have been involved with it. As the organization's Mark Metzger explained, AAHF is a non-profit public education and history foundation dedicated to keeping the story of Army Aviation alive through flying and static displays of the actual aircraft and equipment that were operated from Vietnam to the present day.

AAHF is made up of three chapters. These are located in Hampton, Georgia, just south of Atlanta; Creve Coeur Airport outside of Saint Louis, Missouri; and Mesa, Arizona, near Phoenix. The chapter in Georgia flies three UH-1H Hueys and four AH-1 Cobras, with a fifth Cobra — number 15295, the 50th Cobra ever built — coming online in the near future following its complete restoration from an F model to its original G model configuration. The Georgia chapter also operates a Cessna L-19D Bird Dog.

The Gateway chapter in Saint Louis flies a UH-1H and recently completed restoration of a Bell OH-58 Kiowa, which at press time was awaiting certification. The Arizona chapter, in conjunction with its Southern California (SoCal) detachment, operates the AH-1F Cobra with build number 67-15589. It is known as the "Black Pearl" for its distinctive black-and-gold paint scheme, a holdover from its duties with the formation display team the foundation operated for years in conjunction with the Army's recruiting command.

The Arizona chapter also has a fully restored UH-1B gunship on display with the Commemorative Air Force in Mesa, and a UH-1M gunship mounted on a specially built trailer that allows it to be moved to various events for educational purposes. The chapter is also restoring a UH-1H and an OH-6A Cayuse to flyable condition.

Every year in late April, the Arizona chapter's aircraft deploy to Chino, California, where the SoCal detachment supports them for the summer air show season. All of the foundation's flyable aircraft are certified in the experimental category, but have been restored, maintained, and are operated in accordance with Federal Aviation Administration (FAA)-approved procedures that allow them to participate in the Living History Flight Experience program. While federal regulations normally do not allow experimental aircraft to be used for carrying paying passengers, the Living History Flight Experience program provides exemptions to certain approved organizations for the purpose of preserving aviation history by keeping historic aircraft operational.

AAHF is presently the only non-profit organization in the world possessing such an exemption for AH-1 Cobra attack helicopters. The FAA sets an exceptionally high bar for the Living History Flight Experience, and the foundation is very proud to have achieved that privilege, Metzger said. For many people, flying in a Vietnamera AH-1 or UH-1 Huey is a once-in-a-lifetime experience. The Cobra's good looks and history of service make it one of the world's best known and appreciated attack helicopters.

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FLYING THE BLACK PEARL

AAHF's "Black Pearl," number 67-15589, was accepted by the U.S. Army from Bell Helicopter in 1967 and was sent directly to Vietnam, where she flew with several cavalry squadrons. In 1970, the aircraft crashed while returning from a combat mission to refuel. An examination of the engine following recovery of the aircraft revealed that the compressor had a three-inch hole in it, most likely combat damage.

The Cobra was returned to the U.S., where it was repaired at the Corpus Christi Army Depot in Texas. Number 15589 was then sent to the 175th Attack Helicopter Company, which in 1973 was one of the first two attack helicopter companies deployed to Germany to defend against the Warsaw threat. Over the 34 years it spent on active duty, 15589 was modified to its current

AH-1F version and served in Fort Lewis (Washington) and Korea, in addition to Vietnam and Germany. The Cobra also did a stint as a research aircraft at NASA's Langley Research Center in Virginia before being transferred to the Tennessee Army National Guard until its retirement in 2001.

Following retirement, 15589 was put in storage at Fort Drum, New York, and remained there until 2006. She was then transferred to AAHF and restored back to flying condition, performing for years as part of the Sky Soldiers Cobra Demo Team. Today, 15589 is part of the foundation's ride and re-enactment program, available for paid public rides during the airshow season and by special request.

Eric Pacheco is one of the exceptionally well qualified AAHF pilots who provides rides in the Black Pearl. He has a long history with the Cobra, as he recalled in an interview with *Valor.* "My first experience goes back 34 years ago in 1985 at Fort Rucker, Alabama. I transitioned into the Cobra as an elective out of WORWAC [Warrant Officer Rotary-Wing Aviator Course]. My initial impression was it was just a sexy helicopter — sleek, lean, and just looked like she was all business."

Pacheco flew various models of the Cobra for just over four years on active duty. As a fledgling aviator, he was mentored "by some incredibly experienced Vietnam vets — what we called 'top heavy' aviators while at Fort Rucker," he continued. "I was incredibly fortunate [not only] to fly this airframe in general, but [in] learning from these guys on how to fly it to the edge, not to mention employing the weapons. Conducting gunnery in the Cobra was an indescribable thrill. I always enjoyed the tandem cockpit visual of launching rockets and seeing them slip past the cockpit down range."

Pacheco became an instructor pilot in the Cobra before transitioning into the AH-64 Apache. He flew the Cobra again in the Hawaii Army National Guard for another two-and-a-half years, then not for a very long time until linking up with AAHF three years ago.

"Flying the aircraft now with the Heritage Foundation allows me to share and give back to the public, and create a unique experience they would not normally get to [have]," Pacheco said. "The looks on the faces of some of the Vietnam Cobra pilots I have flown — who haven't seen, let alone touched a Cobra since the Vietnam War — have been my most rewarding memories yet. And having lost a roommate to a Cobra crash myself, I also do this to honor those Cobra pilots who never had a chance to come back home."

Another AAHF pilot is John Harris, who trained in the AH-1G on his way to Vietnam, although he flew there as a Huey aircraft commander instead. After the cease-fire in Vietnam, he returned to the U.S.,



AAHF pilot Eric Pacheco prior to an air-to-air photo shoot with number 15589 and Studio Wings' Eagle Single.





Riding in a historic aircraft like number 15589 is a special, often very meaningful experience for AAHF's passengers.

where he flew Cobras out of Fort Lewis. He was later sent to Fort Hunter-Liggett in California, where he conducted extended operational testing with Cobras modified to carry prototype Hellfire missiles. As a result of these tests, the Hellfire was selected over the TOW as the primary weapons system for what became the AH-64 Apache.

Harris went on to fly Cobras along the Korean Demilitarized Zone, and at Fort Carson, Colorado. He also served as an instructor pilot at Fort Rucker and later for the California Army National Guard at Los Alamitos. Then, for five fire seasons, he flew AH-1Fs performing the Air Attack Firewatch mission for the U.S. Forest Service. "[I] heard about the AAHF Cobras in 2016, volunteered, and started performing demonstration flights in the Cobra in 2017," Harris said. "Never thought I'd still be flying Cobras over 47 years after my initial check-out, but it's still as fun as ever!"

Maintaining a warbird is neither easy nor cheap. However, for the men and women involved with AAHF, the rewards of keeping these aircraft flying justify the effort. Riding in an AAHF helicopter is an unforgettable, often very meaningful experience for the foundation's passengers, whether they're re-living experiences in Vietnam or discovering this piece of history for the first time. For more information about how to support the organization — including through a flight in 15589, the Black Pearl — visit armyav.org.



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.

> Through its three chapters in Georgia, Missouri, and Arizona, AAHF keeps the history of Army Aviation alive.



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With ever more U.S. Army surplus Black Hawks and Chinooks making their way into the civilian world, L3Harris is offering operators of these helicopters high-quality training on military flight simulators. **Skip Robinson Photo**

WE PAID A VISIT TO THE L3HARRIS ARLINGTON TRAINING CENTER IN TEXAS, WHICH OFFERS FULL-MOTION SIMULATOR TRAINING FOR THE SIKORSKY UH-60A/L AND BOEING CH-47D. BY ELAN HEAD | PHOTOS COURTESY OF L3HARDIS

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Sikorsky UH-60A and L-model Black Hawks and Boeing CH-47D Chinooks served the U.S. Army well for decades. Now, these combat-proven workhorses - which continue to serve in some foreign militaries - are also finding new life in the civilian world, as surplus models make their way to both commercial operators and government agencies such as the Ventura County (California) Fire Department (see p.18).

Even when operated under the limitations of a restricted category type certificate, surplus Black Hawks and Chinooks offer civilian operators impressive capabilities at an unbeatable price point. But they also come with some additional burdens. These are complex machines, originally intended for operation by massive organizations. Smaller operators, especially those with no previous experience on the models, may find it challenging to spool up maintenance and training programs for the aircraft.

On the latter point, L3Harris can help. The company has deployed one UH-60A/L and one CH-47D full flight simulator (FFS) at its L3Harris Arlington Training Center (LATC) in Arlington, Texas. Initially developed for the U.S. Army, these fullmotion simulators are now seeing use by both foreign military customers and, increasingly, civilian operators of the types. That has allowed civilian customers to benefit not only from the aircraft themselves, but also the many advantages associated with simulator training - advantages the U.S. military has been reaping for years.

"I don't think simulation is used enough [in the civilian helicopter industry]," said Nick Mayhew, LATC general manager. Mayhew

came to the company after nearly a decade with the civilian flight school Bristow Academy and, before that, 28 years in the Royal Navy, where he served as a helicopter instructor pilot and flight training policy executive. "With the advances in [simulator] fidelity and technology, we can create an atmosphere which is safe for a pilot to learn in," he said.

Whether helicopter pilots are flying in combat or fighting fires, "there's still going to be this possibility of flying into cloud, running out of fuel, all of the things that can catch you out," Mayhew continued. "You can do that in the simulator and allow it to go to the point where the engine fails, where you fly into cloud, where you lose control of the aircraft and still walk away having learned from that. To me, that's the most important thing."

AN IMPRESSIVE LEGACY

L3Harris's background in flight simulation dates back fully 90 years, to the first pilot trainer developed by Ed Link, the founder of Link Aviation Devices. Link was marketing a rudimentary flight simulator - powered by an electric pump and organ bellows - as early as 1929. He secured his first order in 1934 from the U.S. Army Air Corps, which ordered six of the devices to train Air Mail pilots how to fly on instruments. By the Second World War, Link had developed the ANT-18 Basic Instrument Trainer, or "Blue Box," which was produced by the thousands for training pilots in the U.S. and allied nations.

Today, following decades of industry consolidation and technological advancement, Link's legacy lives on in L3Harris, a major producer of flight simulators and maintenance training

"WITH THE ADVANCES IN [SIMULATOR] FIDELITY AND TECHNOLOGY, WE CAN CREATE AN ATMOSPHERE WHICH IS SAFE FOR A PILOT TO LEARN IN."

- LATC GENERAL MANAGER NICK MAYHEW

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systems, primarily for military customers. In addition to Black Hawk and Chinook simulators - including versions for the latest UH-60M and CH-47F models - L3Harris makes simulators for General Dynamics F-16 and Boeing F/A-18 fighters; the Northrop Grumman B-2 Stealth Bomber; the Leonardo C-27J turboprop airlifter; and a variety of intelligence, surveillance, and reconnaissance (ISR) platforms including the Boeing E-3 Sentry.

The company is also the prime contractor on the U.S. Air Force's Predator/Reaper Mission Aircrew Training System (PMATS). This elaborate ground station simulator can generate incredibly realistic scenarios, preparing operators of these armed drones for the full spectrum of missions, including ISR and strike operations.

L3Harris currently has a PMATS and four full-motion flight simulators at its recently expanded facility in Arlington, with space for two additional full-motion sims in the future. Besides the UH-60A/L and CH-47D simulators, the current line-up includes a C-27J FFS owned by the U.S. Coast Guard, and a Boeing 737NG-300E FFS owned by L3Harris's Commercial Training Solutions subsidiary and certified to the Federal Aviation Administration's (FAA's) Level D.

The Black Hawk and Chinook simulators were initially delivered to the U.S. Army at Fort Rucker, Alabama. When the Army transitioned to newer versions of both helicopters, L3Harris had the opportunity to pull the simulators out of Fort Rucker for use in third-party training. Both simulators were originally certified by the military, not the FAA, which has somewhat different

standards for certification. L3Harris is currently in the process of obtaining FAA certification for both simulators, which it hopes to obtain in early 2020.

Mayhew said the company is targeting Level B or C certification for these simulators, primarily because their older visual systems fall short of the standards specified for Level D - the highest level of FFS gualification. However, he provided an extensive demonstration of the UH-60A/L simulator during Valor's visit to LATC, illustrating its usefulness for procedures ranging from autorotation to recovery from inadvertent flight into instrument meteorological conditions (IIMC).

As he put it, "It flies like a Level D simulator - it's quite good." And the visuals were more than adequate for recreating the disorienting experience of wandering into the clouds during flight in marginal weather conditions.

MEETING CUSTOMERS' NEEDS

L3Harris offers flexible training solutions for its customers at LATC. For customers seeking a full-service training solution, the company will typically conduct what it calls a "training needs analysis," which starts with identifying the specific knowledge, skills, attitudes, and qualifications to be imparted during the training. "The next step is to select the best combination of training mediums to produce the most efficient learning process," the company said. This could entail anything from selfstudy to classroom lectures and interactive sessions, in addition to time in the sim.



However, the company also dry leases its simulators to operators who prefer to conduct training using their own instructors and check airmen. For these customers, L3Harris will either provide a simulator operator, or training on how to operate the simulator. Mayhew said the training is "very quick — just a couple of hours," since the touchscreen controls in the simulator are relatively easy to learn.

Mayhew noted that flight simulators have historically been used for instrument training, and that "most of the FAA certification has developed around that requirement." However, he continued, "I believe that even the lowest fidelity level of simulator can provide you with more than that." Simulators are ideal for rehearsing procedures and checklists, particularly emergency procedures, he said.

"The emergency training is huge being able to know what to do when an engine fails or a piece of equipment fails in the aircraft — not only for procedure and making sure you stay safe, but also to help you develop knowledge of that system because you talk about it in the simulator. You can stop the simulator and talk about it, whereas you wouldn't be able to do that in the real aircraft," he pointed out.

Then, of course, there's the ability to experience and practice recovery from IIMC — a leading cause of fatal helicopter accidents. Simulators provide visceral reinforcement of "how easy it is to kill yourself when you go IMC without thinking about it, and you can do that quite realistically in the aircraft in a safe environment," Mayhew said.

While L3Harris is using legacy helicopter simulators at LATC, the company's position at the leading edge of flight simulator technology means the center is well prepared for future evolution. Mayhew is particularly excited about the promise of virtual reality (VR), a technology that L3Harris has been actively pursuing for the U.S. Army.

"I think we have the ability to enhance the pilot training here by using virtual reality walk-arounds," he suggested. "My vision would be for the pilot to come in, brief, and then go into our room, put the VR headset on, do a walk-around of the aircraft that [he or she is] about to fly. Then from there, get into the simulator and fly the sortie."

He added that VR could also be used to practice checklists "in a much more economical environment, so you don't waste simulation time in the device when you could do it in a virtual reality format." He also sees near-term applications for VR in maintenance as well as pilot training. Eventually, VR could displace much of the training that is currently performed in 30,000-pound (13,600-kilogram) sims — the average weight of an L3Harris FFS.

"I believe in the future, we will get to a point where the fidelity is high enough in the virtual environment [that] the FAA would certify you to sit in a chair with a virtual reality headset on and call it Level D," Mayhew said. "Right now it's not there, but that's where we need to get to in my mind."



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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The TH-119, based on the AW119, was recently chosen as the U.S. Navy's new helicopter trainer, now known as the TH-73A. **Leonardo Photo** 119

DIGITAL BONUS > LEONARDO TH-119

PILOT ROB ERDOS HAD THE OPPORTUNITY TO GET BEHIND THE CONTROLS OF THE LEONARDO TH-119 HELICOPTER, WHICH WAS RECENTLY CHOSEN AS THE U.S. NAVY'S NEW HELICOPTER TRAINER. BY ROB ERDOS

VERTICAL VALOR MAGAZINE 99 WINTER ISSUE 2020

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I remember my first helicopter flight. My instructor gave me control in the hover, and the cockpit was soon a flurry of elbows and knees as I struggled to remain within roughly a cubic mile of sky. Characteristically unstable, learning to hover the CH-139 JetRanger, in which I received my Royal Canadian Air Force (RCAF) pilot wings, was like learning to swim by being thrown into the deep end of the pool. But, alas, that was a long time ago; technology changes everything.

My recollections of helicopter training came to mind as I arrived at Leonardo Helicopters' modern facilities in Philadelphia, Pennsylvania, in October of 2019. My mission was to help ferry the TH-119 to the Naval Helicopter Association fly-in in Pensacola, Florida.

As of mid-January 2020, the TH-119 is now known as the TH-73A, following the U.S. Navy's Jan. 13 announcement that it chose the TH-119 as its new helicopter trainer under the Advanced Helicopter Training System (AHTS) program; the TH-73As will replace the Navy's aged and threadbare Bell TH-57B/C Sea Ranger helicopters.

As I prepared to ferry the (then-known) TH-119, a few questions came to mind: What attributes make an ideal trainer? A training helicopter? A military training helicopter? I would have ample opportunity to muse over these questions during my upcoming two days of familiarization with the TH-119, and as a good trainer, it would teach me a few things along the way.

MEET THE TH-119

I met Leonardo pilot and former-U.S. Navy flight instructor Doug Edge outside at the helicopter as a tepid dawn began to warm the horizon. He would be pilot-in-command and my adult supervision as I familiarized myself with the new machine. To be honest, I really didn't know what role I was to fulfill during our roughly seven-hour ferry flight to Florida - beyond occupying space in the cockpit. But pilots make bad passengers. Not thinking that he would endorse my cunning master plan, I ventured to Edge that a good trainer shouldn't present any obstacles to an experienced pilot, so perhaps the best way to assess it was to climb onboard and see if I could start it and fly it to Florida. He shrugged his assent, pointed at the checklist on the right seat, and wandered away to take care of some last-minute paperwork. I had never before sat in a TH-119.

Besides, I still didn't think we were going anywhere that day. The skies southwest of Philadelphia were ominously dark, and the forecasts dire. The remnants of a tropical storm were rolling up the Atlantic coast, leaving large portions of our route under low ceilings and precipitation. In my experience, it was the sort of day when helicopter pilots clean the garage.

Edge was undaunted. The TH-119 had just received its FAA instrument flight approval - the first certification of a singleengine helicopter under the current standards for instrument flight





The weather appeared unsuitable for helicopter flying on the day of the TH-119's scheduled departure from Philadelphia. Leonardo pilot Doug Edge thought the conditions ideal to demonstrate the TH-119's new IFR capabilities. Debbie Erdos Photos







rules (IFR), according to Leonardo. (A singular Navy requirement was for its new trainer to be IFR certified.) Edge thought the conditions ideal to demonstrate the TH-119's capabilities.

The aircraft is the latest incarnation of the well-proven A109 helicopter lineage. Originally a twin-engine civil utility helicopter, the A109 has undergone decades of seasoning and tuning, as engineers optimized the design for a variety of missions.

The TH-119 is a conventional aluminum single-rotor helicopter on skid undercarriage. It features a Pratt & Whitney Canada PT6B-37A engine, with a takeoff power rating of 1,002 shaft horsepower. Its maximum gross weight is 6,283 pounds (2,850 kilograms).

The cockpit features the very capable Genesys Aerosystems integrated avionics suite. The panel is dominated by four six- by eight-inch displays, which incorporate all of the latest aeronautical acronyms: instrument-certified dual GPS/WAAS navigation; a synthetic vision system with Highway-In-The-Sky (HITS) imagery; helicopter terrain avoidance warning system (HTAWS) with terrain and obstacle database; moving map, and integrated communication and navigation systems.



A TRAINER SHOULD BE SIMPLE

My first impressions of the cockpit were positive. Ingress was comfortable, and with fore-aft adjustable seats and pedals, everything fell easily to hand. Controls featured a conventional collective-mounted twist-grip throttle - a critical mechanism that I thought particularly robust and well-designed. It will even feature an air conditioner, although our example was not so equipped. Engine start-up was typical for a PT6 installation: press the "start" button, crack the throttle at 12 percent Ng, and monitor. The start can be a bit warm if the helicopter had run recently, so attention is warranted. Starter cut-out is automatic, although there is no over-temperature protection during start, which should serve to keep students alert.

Pre-flight checks were quick and painless, consisting of testing the warning lights and tones, the fuel transfer pumps, hydraulic system and the electronic engine control's (EEC's) manual mode.

The Genesys displays were bright and flexibly reconfigurable to suit pilot preference. I'm frankly not a big fan of the Genesys avionics interface, however. Eschewing keyboard data entry for hot keys and knobs, the interface was often very keystrokeintensive. By way of example, pre-selecting the altitude on most aircraft requires twisting a dedicated knob. On the Genesys system however, that same action demands pressing the "menu" button, followed by "BUGS," then "MINS," then specifying which minimum altitude by pressing "MIN ALT," and then twisting the value into the scratchpad using the knob. It could be easier.

In many display modes, the critical engine torque and rotor speed indications are small enough to hide behind my baby finger. The



caution and warning system (EICAS) is a bit too talkative, offering frequent chirps, bongs and tones informing me of things that seemed of little significance. I don't really care to be interrupted, for example, with news that the forward-looking terrain awareness feature of the HTAWS was inhibited in the vicinity of the airport ("FLTA INHIBIT" appeared on the primary flight display with an associated tone). In other cases, audio warning (such as altitude minima) were heard in one seat but not the other.

Despite the clunky interface, the TH-119 cockpit was awash in information, and the system worked perfectly during the course of multiple legs. Besides, whatever quirks the Genesys avionics may feature, keen young student pilots will master them, developing new skills in the process.

About 30 minutes out of Philadelphia, the clouds threatened to envelop us, so we picked up an instrument clearance. The autopilot did a fine job in the transition and handling of an instrument landing (ILS Runway 21) to Clarksburg, West Virginia, and later on a GPS approach (RNAV 23 Right) in Knoxville, Tennessee. The TH-119 left me in no doubt of its merits as an instrument trainer.

In terms of performance, the TH-119 had a lot to offer, with an 1,800-foot-per-minute published sea level rate of climb and a hover in-ground-effect of 11,000 feet (3,350 meters, standard conditions, maximum gross weight).

En route in cloud at 6,000 feet (1,828 meters, air temperature 11 C/51 F), I pulled collective to 75 percent, cruising at 130 KIAS, which seemed like a reasonable cruise power setting, delivering a respectable 143 knots true airspeed. The flight manual reported a fuel flow of approximately 400 pounds per hour fuel flow. With 1,516 lb. (687 kg) usable fuel, Leonardo quotes a maximum (no reserve) range of 515 nautical miles. I found the ride quality guite reasonable. Edge explained that speed and range are a benefit to a trainer, as they afford efficient instrument training without undue wasted transit time.

As evidenced by the appearance of U.S. Navy Raytheon T-6 Harvard II trainers churning up the Florida sky, the military tends to favor high-performance trainers. In that regard, the TH-119 fits the bill nicely.

A TRAINER SHOULD BE CHALLENGING

On the day after our arrival in Pensacola, I got another chance to fly the TH-119, this time with Leonardo instructor-pilot Scott Walden. We treated the flight like a Navy student training mission, with Walden demonstrating a series of standard maneuvers, and critiquing my attempts to replicate them.

We performed instructional traffic pattern work at Pensacola International Airport, including maximum performance takeoffs and steep approaches. We simulated stuck-pedal procedures and a hydraulic malfunction. Walden demonstrated a touchdown autorotation.

Throughout the series of maneuvers, I kept thinking, "There's nothing unusual about that." The TH-119 seemed wellmannered and entirely conventional. Walden demonstrated his approach style, hastened slightly to reduce the sharp vibration peak during translational lift. In keeping with my personal definition of a good trainer, it was easy to fly, but with enough power and performance to make it challenging to fly precisely. I found the undercarriage - which features an internal suspension damper on the aft crosstubes - to be among the most pleasant and forgiving skids that I have flown.

By selectively disabling the automatic flight control system (AFCS),

the TH-119 can be as difficult to fly as one wishes. There was much discussion about how the Navy would configure the AFCS for training. It consists of dual stability augmentation systems (SAS) to enhance damping, with a selectable attitude-command control loop, which provides attitude retention stability to the helicopter, extensively reducing control activity. Recalling my prior experience training in the unaugmented Bell JetRanger, I couldn't help but wonder whether hovering the TH-119 in attitude mode wasn't too easy. Alternatively, the Navy may elect to challenge students' fundamental "stick handling" skills in either SAS mode or with the AFCS off entirely. Such flexibility will prove invaluable.

It may arise from the relatively low pedal gearing, but I found the TH-119 a rather pedal-intensive machine, needing large and conscious coordinating footwork; on balance, a merit for a trainer as it will teach the lower half of each student how to fly.

It has a few oddities, to be sure. The cyclic force gradient is too high, requiring nearly constant use of the force trim release button during maneuvers to avoid overtorquing one's right arm. Similarly, even with minimum friction selected, the high collective breakout forces made small, smooth inputs a trick.

Its torque response to collective inputs is slightly underdamped, with a characteristic small overshoot of a two- to three-percent indicated torque whenever collective is increased. It required a bit of additional attention, although I suspect that this last "bug" is more "feature," in that it will teach students to be mindful of power.

A third voice on the intercom reminded me of a further training capability that the TH-119 offers. I had almost forgotten that Edge was riding along in the cabin-mounted forward-

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facing observer's seat. The wide-open cabin interior affords an unobstructed view of the displays and controls, and from his perch, Edge could ostensibly learn from my instructional mistakes before taking his turn at the controls.

FROM TH-119 TO TH-73A

Leonardo's TH-119 — known by the Navy as TH-73A — beat out the twin-engine Airbus H135 and single-engine Bell 407GXi for the Navy's new training helicopter; the new aircraft will meet advanced rotary-wing and intermediate tiltrotor training requirements for the Navy, Marine Corps, and Coast Guard through 2050.

Under the contract, which has a total value of \$648.1 million, the Navy will acquire 130 TH-73A aircraft. This will ensure that hundreds of aviation students are able to train at Naval Air Station Whiting Field in Milton, Florida, each year.

The aircraft will be assembled at Leonardo's FAA part 21 facility in Philadelphia, Pennsylvania, through FAA airworthiness certification. The OEM said deliveries are scheduled to begin in calendar year 2020 and will continue through 2024.

Since submitting its plan in early 2019 to provide training helicopters to the Navy, Leonardo remained confident it had the solution to the Navy's training needs; that solution is, indeed, the TH-119.



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Rob Erdos | Rob is a contributing editor for *Vertical* magazine. He is a graduate of the U.S. Naval Test Pilot School and a professional test pilot. Also an aviation enthusiast, his spare time activities include displaying vintage airplanes and flying his RV-6 kitplane.

Leonardo will provide 130 TH-73A/TH-119 aircraft to the Navy. Deliveries are scheduled to begin this year and will continue through 2024. **Leonardo Photo**

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ROLLA BOGGS

ROLLA BOGGS IS A FORMER U.S. COAST GUARD AVIATOR WHO NOW FLIES FOR THE VENTURA COUNTY AVIATION UNIT IN CALIFORNIA, PERFORMING A RANGE OF MISSIONS INCLUDING FIREFIGHTING AND SEARCH-AND-RESCUE. WE ASKED HIM TO TELL US MORE ABOUT HIS BACKGROUND AND THE AVIATION UNIT, A PARTNERSHIP BETWEEN THE VENTURA COUNTY FIRE AND SHERIFF'S DEPARTMENTS.

INTERVIEWED BY SKIP ROBINSON

Vertical Valor: When did you become interested in helicopters?

Rolla Boggs: I became interested in helicopters at a fairly young age. My father was in the Army and I was exposed to aviation and was intrigued by it. I would see all the military helicopters flying around and thought it was the coolest thing. So I decided I would love to do that for a living when I grew up. In middle school is when I and my best friend, Jason Reeder, decided we wanted to fly in the Coast Guard.

VV: You started as a U.S. Coast Guard pilot; tell us about your career there.

RB: I actually started as a pilot at Mount San Antonio Community College. While I was attending California Polytechnic University in Pomona, I also attended the community college and joined their flight program. I started flying fixed-wing and later transitioned over to helicopters. Honestly I would have loved to start learning to fly in helicopters, but it was too expensive.

When I finished college I applied for a flight program with the Coast Guard and was accepted. After attending Officer Candidate School, I was assigned to Naval Flight School in Pensacola, Florida - all Coast Guard aviators attend Naval Flight School. After completing Naval Flight School I then transitioned to flying the [Airbus] HH-65C Dolphin in the Coast Guard. This is where I was taught by some of the best pilots in the world to conduct a multitude of different operations. An interesting fact about Coast Guard Aviation is it is a mixing pot of pilots from all of the other military branches as well as some who have worked intensively in the civilian aviation world. At my first unit we had pilots that had flown in the Army, Marines, and Navy before transitioning to the Coast Guard. With their instruction I was able to progress through multiple syllabuses to become an aircraft commander in just under two-and-a-half years.

While in the Coast Guard I was able to fly all over. I have flown on missions in all four corners of the United States as well as Alaska. I was even able to fly border operations and aerial intercept missions protecting the nation's capital and airspace surrounding the U.S president when they travel.

I actually am still in the Coast Guard. I left active duty after 13 years due to some family health issues, but still serve in the Coast Guard Reserve. Unfortunately the Coast Guard doesn't have Reserve Aviation unlike all the other branches of the military, so I had to transition over to another field.

VV: What was your most memorable mission flown with the Coast Guard?

RB: The most interesting case I ever flew on was on the morning of Jan. 9, 2018. I was on duty with my co-pilot Joe Heal and received a call from a friend, Fire Captain Glen Dupont, who works with the Santa Barbara County Aviation Unit, asking if we could fly on an emergency happening in Montecito as they were unable at the moment due to weather. After some communication with our dispatch and command, we were able to launch in the early morning night, in half-mile visibility and low ceilings, to arrive in Montecito. All we knew was there was a burn victim needing to be transported to a hospital.

As we made our way through the weather, terrain, and obstacles to land in some random person's yard to on-load our patient,

all we could see at the moment was a large flame shooting out of the ground - later to find out it was a gas line that had been ruptured by the mudslide [a historic event that followed the devastating wildfires of December 2017]. We on-loaded the patient and took off to deliver her to a hospital. As it was still dark and weather still pretty bad, we had to pick our way through the air to deliver the patient. After we got airborne again, the dawn light slowly started lighting up the sky. This is when the crew and I were blown away at the devastation we all saw. Homes were completely blown off their foundations as the earth just moved whatever was in its way. The next hours were spent rescuing people off their roofs, cars, and roads.

VV: Tell us more about the Ventura County Aviation Unit.

RB: The unit is pretty unique. It is operated by both Ventura County Sheriff and Fire. Both agencies provide members to serve onboard the helicopter. A typical crew would include at a minimum a pilot, one sheriff deputy, one firefighter, and one volunteer rescue medic. All the sheriff and fire personnel cross train in all the different jobs. It's pretty cool. You could technically do a law enforcement call with a firefighter and a fire call with a deputy. Currently [we] operate variants of the Bell 206, 205, 212, and Sikorsky UH-60s.

Ventura County is a pretty diverse area of operation. In a typical day you could have a medical call in the high desert town of Lockwood, followed by a boat sinking in the ocean, followed by a fire in the afternoon. You are always on your toes as to what could possibly pop up next. In a typical year you should expect to complete mountain rescues, ocean rescues, swift water, medical transport, law enforcement calls, fire calls, and much more. It's fun! You never get bored, that's for sure.

VV: Ventura County is adding Firehawks to the fleet *(see p.18)*. What does the future hold for the unit?

RB: Well, we are just looking forward to getting the Firehawks here, but also the Sheriff's Department is looking into upgrading their fleet as well. The current airframes we fly are all from the Vietnam era, so they are beginning to require a lot more maintenance. Otherwise, the future always holds people being in distress and us here to answer the call and provide a helping hand whenever we are called upon.

This interview has been edited and condensed.

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