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FALL ISSUE 2019 // AMTC BOOTH #345

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GERMAN NH90s
RISING TO THE CHALLENGE

PILOT INCAPACITATION
AIR EVAC SHARES TRAINING

PREPARING FOR THE WORST
COPING WITH TRAGEDY

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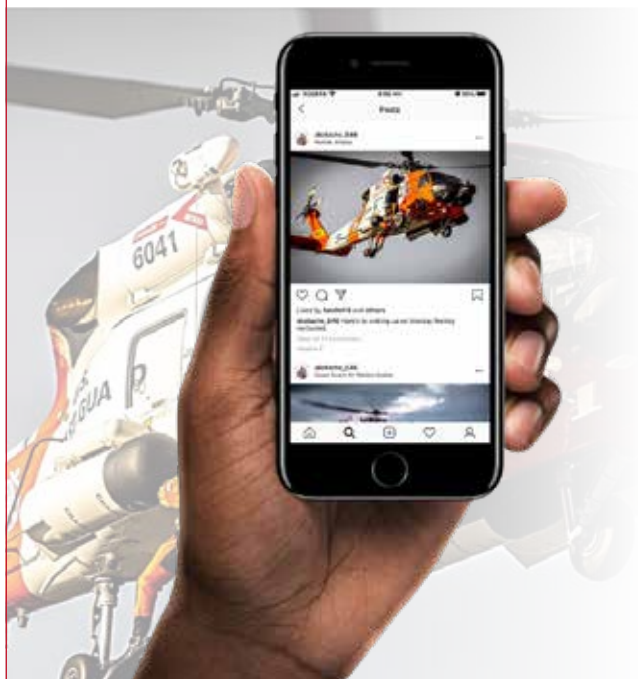
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TALKING POINT // IAIN HOLMES



On June 24, Boston MedFlight made the news when one of its helicopters, with a pilot allegedly asleep at the controls, overflowed the intended destination.

Although it's rare to hear about helicopter pilots falling asleep at the controls — in part because many helicopters lack the autopilots that would allow it — fatigue has long been an issue for pilots. In 2008, two go! pilots fell asleep for approximately 18 minutes, passing their destination during a flight from Honolulu to Hilo, Hawaii. In 2013, a survey by the British Airline Pilots' Association reported that over half of its members surveyed admitted to falling asleep at the controls, and 29 percent said they woke up to find the other pilot asleep too.

Some pilots have been fired for what appears to be a pervasive problem. In 2009 aboard Northwest Flight 188, Captain Timothy Cheney and First Officer Richard Cole were unreachable by radio for over an hour and overflowed their destination by 100 miles. Although it was suspected they fell asleep, Cheney and Cole reported they were distracted by scheduling software on their computer. Whatever the truth of the matter, it's reasonable to think that a punitive approach to such incidents may force people to lie.

Events like these are a balancing act for management. They have to make sure they assess conduct, capitalize on opportunities to coach to excellence, and try not to blame the individual — oftentimes in front of boards of directors, regulatory authorities, and the media. When reviewing personnel matters with any incident, there are three categories to take into account: conduct issues, performance issues, and system issues.

Conduct is how a person behaves, while performance is the action of carrying out a task. Conduct, based on choices people make, can generally be corrected with coaching and

may be appropriate for progressive disciplinary action. An example of conduct issues is a pilot who chooses not to utilize their checklist, or fly the helicopter knowing they do not have the required fuel reserves. The pilot in both of these examples consciously decides to deviate from the standard operating procedure or violate regulation.

With all medical helicopter crewmembers having extensive prior experience, performance issues should be relatively easy to manage. By identifying each individual's learning style and the concept they are struggling with, management can develop a performance improvement plan to ensure they develop the skills needed to carry out the task.

“Although it's rare to hear about helicopter pilots falling asleep at the controls — in part because many helicopters lack the autopilots that would allow it — fatigue has long been an issue for pilots.”

My friend was a captain at a regional airline when his first officer, newly off initial operating experience, struggled with a landing. On short final, the approach was so unstable my friend had to take the controls. After disembarking the passengers, the first officer broke down into tears, fearful of being reported and losing her job. This fear surprised my friend, as he had already decided the next four days were going to be dedicated to helping her overcome these difficulties.

They worked together to help her regain her confidence and develop the skills she needed to fly the aircraft safely. After the trip, she was much improved, and he bid her farewell. A few months later, they flew together again; she had settled into her role and was immensely thankful for his help and goodwill. This example shows how kindness and additional training, even informally, can easily overcome performance issues.

System issues may work independently or in conjunction with conduct and performance issues. For example, did the Northwest pilots

not report an event due to a punitive culture and fear they would get in trouble? Did the first officer my friend flew with struggle because their company had shortened their onboarding process to get more pilots flying on the line? Systems need to be reviewed in all events as they can affect a large number of associates, not just one person.

The frequency of pilots falling asleep at the controls shows that all pilots are vulnerable to fatigue. Unless a pilot is deliberately neglecting to rest prior to their shift due to irresponsible choices, there should be no reason for a pilot to lose their job for becoming a victim of fatigue.

In August, we learned a bit more about the incident over Boston. Maura Hughes, Boston MedFlight's CEO, released this statement: “The transport was completed successfully, and there were no injuries to the patient or flight crew. Our investigation determined that fatigue was a factor, and we are now working with a fatigue management consultant and a safety consultant to review our policies and procedures so that this isolated incident does not happen again.”

While some news stories went on to share the pilot was no longer employed by Boston MedFlight, his departure had nothing to do with this incident, the program said. The pilot had recently accepted another position and was working his notice at the time the event happened. When I approached Boston MedFlight for comment on this article, there was no hesitation in sharing details or answering questions. It was clear they believed this was a risk any pilot could have experienced. They appeared grateful for the opportunity to learn from it and enhance their fatigue management system to benefit their entire organization and the people they serve.

This non-punitive approach is best practice for all incidents. Michael Origel, the first officer of American Airlines 1420 — a fatal crash in which the flight crew made several mistakes — is still flying for American Airlines. It was determined that the decisions he and the captain made were not uncommon in the industry, so instead of blaming Michael, the industry went to work on resolving the system issues. I feel we could all learn from American Airlines and Boston MedFlight. Their employees know their organizations take a system approach to resolving human factors issues, creating a safe environment for them to learn, share, and grow together. 🍀

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I recently completed an analysis of two fatal mishaps that occurred to a part 135 charter operator this summer, and while I know that the *Vertical 911* crowd may not think this applies to their world, when you hear what was discovered, you may want to think again.

The short version of this tragedy is that an organization with a robust safety management system and good risk management policies stopped implementing what they had worked so hard to develop. Pilots with limited experience were assigned to flights that they probably should not have been, and would not have been if they had followed the policies as written. Of course there were reasons for this. High operations tempo, new people, supervisors who were too busy to pay close attention to what was going on, and others. But *reasons* are not *excuses* for violations. When they become excuses, your system has failed.

Policies must map to the reality of your mission and your people. If either of these change, your policy might have to change, your people might have to change, or your mission might have to change. In the case cited above, several new hires had come into the system and the dispatchers failed to apply the risk management criteria for assigning them to flights. Which leads us to our next key point.

Policies are only as good as the people who must implement them. Well-intentioned people often fail to comply with policy for a variety of reasons. To understand this, we have to look at the four types of noncompliance most often seen in aviation.

- *Willful acts by trained and knowledgeable people.* This type of noncompliance is more rare than we suspect. Most professionals understand the need to comply, and seldom deviate merely for personal convenience.
- *People who don't know or understand the guidance.* This one is on management. Far too often, we see a new policy we push through as "completed staff work." Until everyone is trained, and quality assurance processes put in place, the job is not done. This includes making certain that all new hires are fully up to speed before putting them into unsupervised operations.
- *Normalization of deviance* — sometimes called "procedural drift" — is culturally accepted sloppiness leading

to violations. Over time, "just this once" events become normalized. What you might have done the first time out of necessity eventually becomes a habit.

- *Forced noncompliance* occurs when one procedure or guidance document conflicts with another, or when a new procedure is put into effect before anyone is trained on it. Sometimes, a policy is put into place by someone who is not aware that it conflicts with other existing guidance. When this occurs, you put line personnel into a no-win situation. A standard, cross-functional review process will eliminate these events.

Noncompliance with policies must first be recognized and then dealt with appropriately. This doesn't always mean disciplining the people who were at the end of the error chain. If you suspect that your organization might be at risk, I'd suggest the following steps to make sure you are doing it right.

- Conduct a serious management review of all your operational policies. Ideally, this is done in a meeting with your operations, safety, and quality managers in the room. Has anything changed since the policy was written? Is it working? How would we know?
- Conduct a "soft audit" of each specific policy in practice. Take a look at how people are implementing the letter and intent of the policy through observations of them on the job. The goal here isn't correction (at least not yet), but an understanding of the state of compliance.
- Talk to line personnel about your important policies to see if they are fully aware of the content. If there is any lack of knowledge, schedule training to address it.
- Finally, look at any new risks posed by changes in your people, mission, or competition. Does this impact compliance in any way? What adjustments do you need to make?

Policies and procedures are the skeleton of safe and effective operations, but your people are the sinew and muscle to make it work. Take the time to ensure that all aspects of our organizational system are healthy and providing the protections you think they are.

Fly smart. 🚀





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The first two lines of the old Carly Simon song “Anticipation” go like this: “*We can never know about the days to come / But we think about them anyway.*”

After writing a column in this space on highly reliable organizations, I was discussing high reliability with another safety advocate recently. We talked about the importance of “anticipation.” In any high-risk, high-consequence endeavor, it pays to *anticipate*. As well, it’s good to focus on the attributes of high reliability, one of which is “*a preoccupation with failure.*” If we take it for granted that people will make mistakes, then our next step is to anticipate where and when those mistakes might occur, and devise “safety nets” to trap the errors and lessen or eliminate the ill effects.

I recently reconsidered a purposeful behavior that I blogged about long ago, the “objective continuous risk assessment process” (O-Crap). You continuously and objectively consider the proximate threat to your safety while flying. You discuss this threat and you formulate a tactic, technique, or procedure to deal with it. *What’s going to kill me right now, and what am I doing to prevent that from happening?*

I am a proponent of helicopters having instrument flight rules (IFR) capability. Even singles. I think we spend enough time flying in marginal weather and at low altitudes to warrant the extra expense that IFR entails. But IFR comes with its own pitfalls, which we should anticipate.

Sit back and ask yourself, “When is an IFR pilot most likely to encounter problems?” Perhaps you, like me, come to the conclusion that the end of an IFR approach in O-Crap weather could be the time and place when things get woolly.

At the bottom of the approach, the pilot is understandably interested in breaking out of

the weather, seeing the surface, and landing the helicopter. She might continue for a few seconds if she can’t see the ground at the decision point, and she also might drop a few feet lower than the published decision or minimum descent altitude. She might slow the aircraft to expand the time available to react to an opening. Doing these things is human nature, and this natural tendency has to be *aggressively* trained out of us IFR pilots.

The mind-set of an IFR pilot should be, “I am *not* going to break out, even though the reported weather at the beginning of the approach points to that happening. I am *not* going to break out and I am going to perform the missed approach as published. And it’s going to be the best missed approach ever!”

“

Perhaps you, like me, come to the conclusion that the end of an IFR approach in O-Crap weather could be the time and place when things get woolly.

”

“I will anticipate problems and have my hands and feet ready to take control of this aircraft if need be, because there isn’t much room for error at the bottom. If the aircraft has a tendency to get squirrely at low speeds, I will keep my speed up. *I will maintain my scan and fly this aircraft on instruments*, and if we do break out in the clear I will be pleasantly surprised.”

Here’s an excerpt from an accident report: “During the instrument approach to the destination airport, the weather conditions deteriorated. The pilot was using the helicopter’s autopilot to fly the GPS approach to the airport, and the pilot and the medical crew reported normal helicopter operations. Upon reaching the GPS approach minimum descent altitude, the pilot was unable to see the airport and executed a go-around. The pilot reported that, after initiating the go-around, he attempted to counteract, with right cyclic input, an uncommanded sharp left 45-degree bank. Recorded flight data revealed that the helicopter climbed and made a progressive right

bank that reached 50 degrees. The helicopter descended as the right bank continued, and the airspeed increased until the helicopter impacted treetops...” What we had here was a failure to anticipate.

During my travels to present air medical resource management training, I hear and tell stories. I tell on myself. Some of my stories are embarrassing; how could I have been so *dumb*? But I would rather be embarrassed and hopefully make a life-saving impression on some young man or woman than shelter my ego and perhaps read about how they died in a helicopter crash. Stories *can* save lives.

The pilot was performing an instrument approach in dark night instrument meteorological conditions. At the missed approach point, he wanted to have weather to continue. He wished it so — even though it was not. He did not initiate the missed approach procedure and continued toward the destination, partly on his instruments and partly by looking out the windscreen. He became disoriented and got lost in the goo. While struggling to maintain control of the helicopter and reorient himself, he latched onto a patch of good visibility — a “sucker hole” — that enabled him to get the aircraft down near the ground.

The team members on board were understandably upset when they realized that they were at ground level right next to the multi-story hospital building, and that the helipad they were supposed to be approaching was on a rooftop several stories above them, in the clouds.

This is a true story. So what do you think happened here? I think a good guy with good intentions — a normally safe and conscientious pilot — made a snap wrong decision at the decision point. *“It’s almost good enough. Let’s keep going and hope it gets better.”*

Our simulator training scenarios should be tricky, the way life is, to engender thought and discussion. You can learn almost as much sitting at a table and discussing a flight after the fact as you can while performing one. And it is during calm thoughtful discussions of what *actually* happened versus what *should have* happened that values and norms and ingrained behaviors are written into our psyche.

As Carly Simon also sang, “I’m no prophet and I don’t know nature’s ways.” But I do know that we should try our best to *anticipate* human nature, and train for it. 🍀



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Recco detector proves effective in avalanche searches

Utah DPS initially used the Recco detector on the hoist of its Airbus H125, but has since switched to using it on the belly hook to eliminate the need for a cable operator. **Adam Clark Photo**

BY DAYNA FEDY

The Recco SAR Helicopter Detector is saving operators and rescuers time and resources when locating avalanche victims. Currently in use by seven helicopter operators across Europe, the detector's success overseas led to its introduction to the North American market in December 2018. Since then, Two Bear Air in Whitefish, Montana; North Shore Rescue in Vancouver, British Columbia; and the Utah Department of Public Safety (DPS) Aero Bureau in Salt Lake City have added the detector to their operations.

Since receiving the Recco SAR Helicopter Detector just under a year ago, Utah DPS has deployed the system on three avalanche incidents, and was successful in locating the victim each time.

"We serve the entire state of Utah," said Luke Bowman, chief pilot at Utah DPS. "Utah is very diverse and has a lot of remote areas. . . . With all three avalanches

we got ahead and we were able to mark an area within roughly 20 feet of the victim. What we do is we find a location and then we insert a [ground crewmember] with a handheld Recco device and a canine. . . . So, within a half-hour [or] 45 minutes, we've been able to get a find and dig the person out.

"So far, [the Recco device] has been great to minimize people's exposure to risk and the exhaustion of the ground crews, and its able to speed up the [search] process quite a bit."

The idea behind the Recco detector followed a tragic incident in 1973 when Magnus Granhed, who is still one of the principals of the company, lost his friend in an avalanche. While taking part in the search using a probe pole, which can be a very slow process, Granhed thought there had to be a better way to find people.

The Recco detector started out as a handheld device, which emits a signal that hits a Recco reflector in a piece of outerwear on the victim and echoes back to the res-

cuer — allowing the rescuer to pinpoint the victim's location. The helicopter detector, which was first tested in 2014, works the same way. The battery-powered helicopter detector can hook up to either the hoist cable or the belly hook as an external load, and uses Bluetooth to connect to the control head in the cockpit.

Utah DPS initially used the Recco detector on the hoist of its Airbus H125, but has since switched to using it on the belly hook for a few reasons; the detector weighs roughly 170 pounds (77 kilograms), and Bowman said if it's attached to the hoist, an extra crewmember is required to control the cable.

"Most of these avalanches that we've responded to have been up really high, like 10 or 11,000 feet," he said. "To have three people on board, plus trying to manage the cable, and it's windy — that was creating some problems. So, [Recco offers] the belly hook option . . . and we're doing it that way now. It's a lot easier because the pilot can control it like a sling load."

Utah DPS also operates an Airbus AS350 B2, which is not equipped with a hoist; operating the Recco detector from the belly of the aircraft allows the organization to use the detector on both of its helicopters.

Ultimately, each operator develops their own protocols on how they want to use the Recco detector, whether on the aircraft's hoist or the belly hook, said Daniel Howlett, Recco's director of training and technical support in North America. "There's a lot of hangar practice, and [the operators] thoughtfully decide the best configuration of [the Recco detector] for their aircraft . . . and then they fly with it in practice."

Howlett worked with Utah DPS to train its pilots and crew to use the Recco detector, as he has done with many organizations. "I go over the principles, how the detector works and the best flight patterns for different types of terrain," he said. Pilots and crew practice flying with the detector using visual targets, and then transition to hidden targets.

When flying with the detector at a speed up to 62 miles per hour (100 kilometers per hour), operators begin with a large radius below the helicopter, up to 328 feet (100 meters) wide, and fly a pattern until a signal is received — which comes in the form of a beeping sound, Bowman said. The beep strengthens as the detector gets closer to the victim, and crews mark where the signal is strongest. The pilot then flies perpendicular to the strongest point and a marker is dropped.

Before the helicopter detector, Utah DPS initially used the Recco Handheld Detector, "so we knew the effectiveness of the whole system," said Bowman. "We've been really happy with it . . . we love it."

There are now over 2,000 handheld detectors in the world in 800 ski resorts and search-and-rescue organizations, and over 15,000 professional rescue workers who are trained to use Recco, said Howlett.

With over 200 clothing brand partners, the Recco reflector is implanted in a wide range of winter gear, which is why the detector is used primarily for avalanche searches. However, Howlett said the reflector is now also being introduced into summer and fall clothing, so people spending time outdoors during these seasons can be more easily located if they become lost.

"If you think about winter rescue and avalanche rescue, it's pretty small on the scale when you talk about missing people in the summer," said Howlett. "The search-and-rescue organizations throughout the country are really, really busy in the summer because there's so much more activity."

He emphasized that a major factor in successfully locating missing people is knowing if they have the Recco reflector in their clothing. "From the search-and-rescue viewpoint, we have to know if you're searchable," said Howlett, "and the only way we know that is if you tell people and let your family and friends know that you have a Recco reflector."



Since receiving the Recco SAR Helicopter Detector just under a year ago, Utah DPS has deployed the system on three avalanche incidents, and was successful in locating the victim each time.

Adam Clark Photo

RotorBits

ROMANIAN MINISTRY OF

INTERIOR ORDERS 3 H135s

FOR AIR MEDICAL

Christian Keller Photo



Airbus Helicopters and the Romanian Ministry of Interior have signed a contract for the purchase of three H135 helicopters and associated support and services for air medical services and search-and-rescue (SAR) missions in the country. This follows a four-year framework agreement signed at the end of July 2019 that foresees the procurement of up to 10 H135s.

"During 15 years of air medical services, the well-known SMURD mission, the H135 has proven its utility, being a rotorcraft which adapts rapidly to all types of requests," said Cdr Dache Paul Catalin, of the General Inspectorate of Aviation.

"All advantages — mainly the flexible maintenance; management of space for the transport of passengers and patients; the speed; the capability to land in a limited area; the possibility to operate life-saving medical interventions during flight; the capability to fly during day and night; and its versatility for mountain missions thanks to the hoist — are essential when it comes to critical life-saving missions," Catalin added.

"Airbus has been an active player in Romania for almost 50 years, and we are proud that the Ministry of Interior has selected the H135 for such critical missions. As a market leader with more than 600 helicopters in service for air medical service missions worldwide, I have no doubt that it will be a valuable life-saving asset to the country," said Georges Durdilly, head of Airbus Helicopters in Romania.

LEONARDO AND OLMEDO TO IMPROVE EMERGENCY RESPONSE TIMES



The agreement between Leonardo and Olmedo was presented at the Montichiari Emergency Show in Italy, including the unveiling of an EMS-configured AW169 mockup. **Leonardo Photo**

Leonardo Helicopters will collaborate with Olmedo, a European company that modifies vehicles for healthcare applications, to develop new technologies for rescue helicopters and motor vehicles.

Under a collaboration agreement announced in October, the companies aim to create a “seamless environment” for the joint use of helicopters and ground ambulances in emergency response, with the goal of improving the times and effectiveness of emergency medical interventions.

The companies will prioritize the creation of a research and development organization and a joint research team, which will explore the development and prototyping of new components and universal solutions for both helicopters and ground ambulances. The companies will also develop data sharing platforms to transmit medical information including vital signs in real-time during patient transfers.

Olmedo will also create a new “Fly Division” within its organization completely dedicated to the design of increasingly efficient products and technologies for air ambulances.

“Olmedo’s experience in the automotive field and Leonardo’s helicopter experience come together to inaugurate a new era

of EMS which will guarantee the constant enhancement of products and technologies for the community,” the companies stated.

Leonardo and Olmedo said the partnership’s foundations were built at the international REMOTE helicopter rescue meeting, which took place in December 2018 at Leonardo’s Helicopter Division plant in Vergiate, Italy. The agreement was also presented at the Montichiari Emergency Show in Italy, where an EMS-configured AW169 mockup was unveiled as the first example of an integrated helicopter/ambulance capability developed by the partners.

Leonardo also recently signed an agreement with the scientific society SIAARTI (Italian Society for Anesthesia Analgesia Resuscitation and Intensive Care). SIAARTI aims to increase the mission capabilities of air ambulance and the effectiveness of their medical services through the study of new medical interior configurations, and the creation of new guidelines and standards for doctors and their training, both in Italy and internationally.

Leonardo noted that nearly 700 of its helicopters are in use for air medical and rescue missions around the world.

RotorBits

Robinson Photo



PHILIPPINE POLICE CHOOSE R44s FOR TRAINING

Robinson Helicopter Company has delivered two R44 Raven IIs to the Philippine National Police (PNP). The aircraft were purchased through Robinson’s longtime dealer Lionair Inc., marking the first acquisition of Robinson helicopters by the Philippine government.

The PNP is the armed civilian national police force tasked with law enforcement throughout the Southeast Asian country’s more than 7,000 islands. The acquisition is part of an overall effort by the government to strengthen and expand its law enforcement.

Upon their arrival in Manila, the R44s will be turned over to the Special Action Force Aviation Unit (SAF-AU) to be used for training. Police LCol Ruel Zalatar, chief of PNP-SAF-AU, believes the R44 is well suited for training and enhancing police-related skills — namely surveillance, patrol, and aerial reconnaissance.

The R44’s ease of maintenance and low operating costs allow more pilots to receive additional training before moving up to the fleet’s higher category rotorcraft.

LZSO USES ONLINE PLATFORM TO TRAIN FIRST RESPONDERS

Landing Zone Safety Organization (LZSO) has launched online courses focused on helipad and scene safety for operations around helicopters in the field.

The courses are tailored to first responders including firefighters, police officers, and ambulance personnel. They are designed to be informative and easy to understand, imparting valuable knowledge and insights while also fulfilling continuing education credits.

LZSO was founded by a group of EMS helicopter pilots and “brings a wealth of knowledge to each user by way of industry experience, solid education, and a strict dedication to safety,” said co-founder Jake Harmon.

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The Apache pilots of the Utah National Guard are renowned for their high-altitude expertise.



Joint training in the high desert

In a first for both services, Utah Army Guard AH-64D Apache crews recently took part in the Navy's Seahawk Weapons School at Naval Air Station Fallon.

STORY & PHOTOS BY SKIP ROBINSON

The Boeing AH-64 Apache is a versatile helicopter that operates effectively in a wide range of conditions. The Apache pilots of the Utah National Guard are the U.S. Army's high-altitude experts in the model, and pride themselves on their power management techniques and efficient high-altitude training scenarios.

Located in the high desert around 60 miles (95 kilometers) east of Reno, the terrain surrounding Naval Air Station (NAS) Fallon, Nevada, is not unlike parts of Utah's deserts, with salty flats and dry, rugged terrain. This

base is the U.S. Navy's only facility where all elements of a carrier air wing can fly complete warfare scenarios, enabling a full spectrum of realistic training. NAS Fallon has more than 300 clear flying days per year to utilize its four bombing ranges, and a unique and well-equipped electronic warfare range. The surrounding high mountains allow helicopters to train in high-altitude environments in both very hot and very cold conditions.

Training takes place year-round at NAS Fallon, but twice a year, the Naval Aviation Warfighting Development Center (NAWDC) hosts the Navy's Fighter Weapons School, or "Top Gun." For eight weeks, this school takes some of the best fighter aviators from different fleet squadrons and trains them to be the best dog fighters and weapons managers. There is little room for error — if a pilot in the course fails to meet its standards in only three missions, they're removed from the program.

NAWDC also has a Rotary-Wing Weapons School that runs at the same time as Top Gun. It is known as Seahawk Weapons School, as the primary helicopters used by

the Navy are variants of the Sikorsky H-60 Seahawk. Based at Fallon is N8 — not a squadron but instead part of the NAWDC organization — which flies four MH-60S Seahawks, some of which are painted in exotic camouflage paint schemes to represent enemy helicopter types.

A unique and interesting event took place during the Seahawk Weapons School in March of this year, Class 19-01. The Utah Army Guard's AH-64D Apaches from 1-211th Attack Reconnaissance Battalion (ARB) out of West Jordan, Utah, spent two weeks at the eight-week course. The "Air Pirates" went not as students, but as participants in the NAWDC's training curriculum — marking the first time that the two services have worked closely together to integrate Apaches into the Navy's top-level training. Joining them were joint terminal attack controllers (JTACs) from the Canadian Special Forces (CANSOF). Privately owned Dassault/Dornier Alpha Jets also took part in the training, providing aggressor close air support and intelligence, surveillance, and reconnaissance.

Utah's 1-211th ARB flew three Apaches to



Pilots from Utah's 1-211th ARB served as armed escorts in numerous training scenarios during Seahawk Weapons School.

the training event at NAS Fallon. There, they served as armed escorts in numerous training scenarios, both day and night. One week was focused on decisive action (DA), while the other emphasized counterinsurgency (COIN) techniques. DA training included multiple iterations of live fire, including 2.75-inch Hydra rockets on 360-degree ranges against moving targets. To make this training even more realistic, radar threats were used against the aircraft, forcing appropriate tactics to counter each threat.

COIN training included escorting the Navy MH-60S helicopters to the objective, where the Seahawks offloaded CANSOF personnel. As the Apaches maneuvered against a simulated insurgent opposing force, blanks and pyrotechnics were used to simulate anti-aircraft guns and surface-to-air missile threats. The Navy's specially equipped tactical vans also triggered the aircraft survivability equipment on board the Apaches, including their Common Missile Warning System. All of this added up to a fight that was about

as real as it could get without anyone actually pulling a trigger or putting the defending aircraft under real threat.

There is no doubt that flying at night can be challenging — something the Apache is well suited for with its forward looking infrared (FLIR) capability. Crews spend much of their careers perfecting the art of flying at night, for that is when the Apache is at its best: hard to detect and lethal in its execution. Apache crews also use night vision goggles (NVGs) to augment FLIR, as many JTACs



The terrain surrounding NAS Fallon in Nevada is similar to parts of Utah's deserts.



The Navy's N8 has some MH-60S Seahawks painted in exotic camouflage schemes to represent enemy helicopter types.



During counterinsurgency training, Seahawks were used to move Canadian Special Forces personnel to the objective.



Integrating Apaches into the Navy's top-level training helped improve understanding and coordination between the services.

and ground commanders rely on IR devices, such as IR pointers and flashing lights that can only be seen using NVGs. This was the case during some of the training missions at Fallon, with CANSOF using IR pointers to highlight a target or direct the Apaches to investigate points of interest.

Beyond NAWDC, both the U.S. Marines and Air Force have high-end tactics training programs focused on a wide range of mission profiles and threats. The Marines have the Marine Aviation Weapons Tactics School (MAWTS-1) out of Yuma, Arizona, while the Air Force has its own version of Fighter Weapons School called Red Flag, which has been staged twice a year since the 1970s out of Nellis Air Force Base near Las Vegas, Nevada. Yet the Army has no dedicated tactics school equivalent, despite its long history with aviation.

Some people — including CW5 (Ret) Ken Jones, who retired from the Army with more than 10,000 flight hours in the AH-64 — have suggested that all the branches of the U.S. military should form a joint tactics school to benefit from each other's strengths while reducing training costs. With the Army specializing in large-scale combat operations, the Navy and Marines in overwater and amphibious operations, and the Air Force in defeating integrated air defense systems, combining their insights into a unified training organization could potentially enhance integration between the branches.

Until that happens, however, exercises like the one at Fallon earlier this year can help facilitate that type of high-level understanding, while delivering tangible skill enhancements to everyone involved.

COLLINS AEROSPACE HELPS BRING POWER TO CH-53K



Collins Aerospace is the supplier for the complex drive system on the CH-53K, which has three engines and a folding tail boom. **Mike Reyno Photo**

When the Sikorsky CH-53K “King Stallion” enters service with the U.S. Marine Corps, it will replace its predecessor, the CH-53E, as the largest and heaviest helicopter in the U.S. military. With three GE Aviation T408 engines packing around 7,500 horsepower each — compared to the roughly 4,500-horsepower engines on the CH-53E — the K will have a maximum gross weight of 88,000 pounds (nearly 40,000 kilograms) and carry up to three times the payload in hot-and-high conditions.

A mighty helicopter requires a mighty drive system, and the company tasked with building the latter is Collins Aerospace, a subsidiary of former Sikorsky parent company United Technologies Corporation (and created through last year’s merger of UTC Aerospace Systems and Rockwell Collins). At its Power Transmission Systems (PTS) facilities in Rome, New York, Collins has been designing, manufacturing, and testing the CH-53K’s drive system all under one roof.

“We make the entire drive system transmitting power from each of the three engines into the main rotor gearbox, and then from that gearbox back to the tail rotor,” explained Ed Marron, Collins’ PTS business development director. “And that also includes a disconnect mechanism where the shaft can disconnect because the tail boom needs to fold for storage.”

Sikorsky awarded the drive system contract to what was then UTC Aerospace Systems in 2007. “The drive system of course needed to be very robust and very highly reliable,” said Marron, noting that the diaphragm flexures in Collins’ drive systems are specially contoured to be able to transmit torque while also accommodating angular misalignment and axial compression and stretch. “The 53K, being such a large helicopter, obviously has very high torque requirements. And as with any helicopter, it has misalignment that needs to be accommodated,” he said.

In Marine Corps service, the CH-53K will be operating frequently from ships, necessitating both corrosion resistance and the ability to fold the tail boom to save space. Marron said the K’s drive shaft is made from titanium and high-strength aluminum which, in addition to being lightweight, are “wonderfully suited for the Navy environment.” Meanwhile, the company worked collaboratively with Sikorsky to design a mechanism to disconnect the tail boom driveshaft once the pilots have landed and parked. “For obvious reasons, that’s not something you ever want an error with, so it has fail-safe features,” Marron noted.

Although Collins has “always had a very robust test procedure” for its driveshafts, Marron said, the CH-53K drive system underwent additional levels of testing, with “more test articles [taken] beyond what they’ll ever see in the aircraft. And that assures that the reliability is there.”

In 2018, Sikorsky recognized the PTS division as its CH-53K Supplier of the Year for the company’s “quick repair turn-around time, early flight tests, and [being] forward-looking on product improvements using the latest technologies.” Although news reports since then have cited “deficiencies” with the CH-53K’s tail rotor and driveshaft, Marron told *Vertical 911* these are not related to Collins’ work on the systems.

As massive as the CH-53K is, Marron pointed out that Collins has plenty of experience with even higher torque drive systems. The company’s highest torque airborne application is the lift fan drive system on the Lockheed Martin F-35B, the short takeoff and vertical landing version of the Joint Strike Fighter. “Yet we have torques even higher than this in our industrial couplings,” Marron continued. “They’re used in power plants and they have shipboard applications as well. And those are very large diaphragm flexures which transmit a tremendous amount of torque.”

NEONATE MEDICAL WRAP FINDING USES IN PATIENT TRANSPORT



The Aegis Neonate Medical Wrap holds babies securely against an adult chest without interfering with adult transport seatbelt protection. **SaplaCor Photos**

BY JEN BOYER

As a first assistant in the maternity ward, Mary Chiesa watched in horror when a mother lost grip of her newborn shortly after a C-section. The baby fell to the hard operating room floor when the mother's blood pressure cuff inflated, opening her arm enough for the child to slip out. The baby was whisked away, and due to privacy laws, Chiesa never heard more about the baby. It has haunted her ever since.

"When the nurses and other teams were discussing it later, I was surprised to learn this wasn't uncommon," Chiesa said. "In fact, more than 1,600 babies are reported dropped in the first days of life. And it's believed only about one third are actually reported. I felt on a deep level I had to do something."

Not long after the incident, Chiesa founded SaplaCor and began designing and testing a solution: the Aegis Neonate Medical Wrap. Originally designed to comfortably and securely hold baby close to mom, dad, or other caregiver in the hospital while leaving the adult's hands free, the Aegis quickly showed promise for medical transport.

Aegis is made of seamless four-way stretch nylon and elastin, interwoven with X-Static silver thread for thermal, antimicrobial, and anti-odor protection.

The tube top style device securely holds baby in a frog leg position against an adult chest without interfering with adult transport seatbelt protection. A side locking zipper access allows for tube, line, and monitor access for mother and baby while a shoulder sling allows for mobile support. Meant to be sent home with the mother, the device is available in five adjustable sizes to accommodate a range of adult body types and is designed to hold infants from four to 14 pounds (1.8 to 6.3 kilograms).

"Transporting a newborn has always been a challenge and that's particularly true in the air where it's louder and colder," Chiesa said. "Mother is restrained, and the infant is often held unrestrained or separated from mom, which increases risks of hypothermia and transport injuries. Wrapped securely with skin-to-skin contact, baby's transport risks are greatly reduced while the benefits include keeping baby warm, reducing stress, providing access to food that is otherwise not available on an aircraft, and, of course, increased physical safety."

Named after the Greek myth around the protective shield of Zeus and Athena, Aegis underwent significant testing before receiving designation as a Food and Drug Administration-approved general wellness device. Testing included frontal, rear, and side impact force testing; ASTM

testing for strength and chemical safety; and Nobel Lab testing, where it received designation as antimicrobial and antifungal. After more than a year of research, development, and testing, Aegis hit the market in April 2018. Today, more than 1,000 have been sold to hospitals, ground transport services, and air ambulance companies.

"Maternity is the only time a patient is expected to care for another patient," Chiesa said. "Mom and baby need skin-to-skin contact for post-partum recovery. With blood pressure cuffs, IVs, medication, and a host of other things happening to mom, and sometimes baby too, there was a real need for a secure way to secure baby in transport to take advantage of those skin-to-skin benefits of reduced stress, improved heart and lung function, stabilized body temperature, regulated blood sugar, reduced postpartum depression, colonizing good bacteria, and boosted bonding. Aegis allows babies to experience these immediately after birth even if they need transport. Moms report they keep using the Aegis for months after to keep baby safe and close every day."

The Aegis is available online from SaplaCor. Hospitals and ambulances can purchase the device for \$79. The reusable ABEO pregnancy seatbelt attachment is available for \$20.

AIR GREENLAND SELECTS H225 FOR SAR

Air Greenland has ordered two Airbus H225 heavy helicopters to support its bid to win its home country's search-and-rescue (SAR) contract.

Under the terms of a firm contract assisted by Airbus Helicopters, two H225s repurposed from the oil-and-gas industry will be delivered over the coming months to replace the aging Sikorsky S-61 helicopter currently used for the service.

Airbus will provide a comprehensive maintenance and support package as well as pilot and crew training.

Airbus Helicopters' head of Europe Region Olivier Michalon said: "At Airbus, we are proud that the deployment of the H225 will help ensure the safety of global maritime traffic transiting the Greenland-Iceland gap to and from the Arctic region."

The 11-tonne category, twin-engine H225 is the latest member of Airbus Helicopters' Super Puma family, with more powerful engines providing a smoother ride and enhanced performance compared to earlier models.

It is the largest model in Airbus Helicopters' portfolio and has accumulated more than 600,000 flight hours out of more than 5.5 million flight hours recorded by the Super Puma family.

Equipped with electronic instruments and a four-axis autopilot system, the H225 offers a fast cruise speed and endurance, and can be fitted with a wide range of SAR equipment. Operated by two pilots, it can be configured with up to 18 seats or six stretchers and has all-weather capability including full anti-icing.

Air Greenland CEO Jacob Nitter Sørensen said: "These two specific aircraft have low numbers of flight hours and their remarkable capability on SAR operations ensures that they will be able to provide a highly effective service in that role for many years to come."



Air Greenland will use two H225s repurposed from the oil-and-gas industry for its SAR contract bid.
Airbus Photo

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INZPIRE DEMONSTRATES TARGETED FIDELITY SIMULATOR AT DSEI



The simulator module on display at DSEI was a generic Airbus EC135 cockpit, with imagery directly projected onto a half dome. **Garry Ridsdale Photo**

BY JON DUKE

British defense services provider Inzpire showcased its Targeted Fidelity Simulator (TFS) at the Defence and Security Equipment International (DSEI) event in London in early September. The new system promises a synthetic training environment completely bespoke to individual training requirements without unnecessary cost and complexity.

“Almost every element of the system is customizable, and can deliver the level of fidelity that the customer requires,” said Chris Raynes, head of Inzpire’s helicopter services division. “Every customer’s requirement is different,” he explained. “But whether they want to focus on emergency drills or tactical procedures, the TFS can be adapted to meet their specific priorities and can also be linked to other modules locally or remotely to deliver federated training.”

The module being demonstrated at DSEI was using Bohemia Interactive Simulations’ Virtual Battle Space Blue IG engine, which is a whole-earth renderer capable of accepting many different industry-standard object formats. This allows any location on earth to be modeled and scenery customized. However, with its emphasis on total customization, the TFS is designed to be software agnostic and so can operate with a variety of image generators.

Inzpire itself has a track record of delivering training to military customers, through live aviation, synthetic training, and exercise coordination. The company has staff embedded in the U.K.’s Air Battlespace Training Centre and provides qualified helicopter instructors to the U.K.’s AH-64 Apache force.

The simulator module on display at DSEI was a generic Airbus EC135 cockpit, with imagery directly projected onto a half dome. Raynes pointed out that every aspect of the specification of the sim is customizable. “The flight model here is proven to be capable of certification up to EASA full flight simulator standards,” he said. “But customers that don’t need that fidelity aren’t tied to it. The number and type of projectors could be changed, and the system is completely virtual reality [VR] compatible. We can even deliver crew training in a module where the pilots have a projected image and the rear crew are in VR.”

“The aim is not to provide the highest level of fidelity,” Raynes continued. “But rather to provide a whole-mission simulation where the focus is on specific training requirements.”

The demonstration scenario focused on the ability of the device to handle not only complex flight models but also a tactical scenario using both human-controlled units and artificial intelligence (AI) entities. Despite being only a level-B model, the flight dynamics were

convincing enough to be recognizable as an EC135 and invoke the cognitive demands involved in flying the aircraft. The short set-piece involved coordination with troop lift and attack helicopters as well as artillery, demonstrating the capability of the TFS to model a relatively complex tactical environment, as well as a range of sensors such as electro-optical and infra-red cameras. While the scenario was exclusively helicopter-focused, the TFS is capable of modeling other aircraft and ground vehicles, including fast-jets.

The capability of the system to model malfunctions and system failures was also demonstrated, with a representation of first a single, then double engine failure necessitating an autorotative landing. All the malfunctions were certainly delivered at a fidelity that would be sufficient for crew procedure training.

The demonstration unit, including the cockpit module, filled an area of approximately 12 feet (four meters) square, and the whole scenario was generated and run by a single instructor. This footprint, along with the capability of the system to recreate scenarios involving combined air and ground forces as well as joint fires, seems likely to make this kind of system attractive to special operations forces, as Raynes explained. “Mission rehearsal is certainly one area that the TFS could be employed, particularly given its deployability and its ability to operate remotely,” he noted. “The system includes a complete earth model with basic terrain database, but custom terrain and objects can be created easily, either by the end-user or by us, and then delivered digitally.”

“The main focus of the TFS is customizability,” said Raynes. “It’s a cliché for people in my position to say that we are led by the customer but in this case, it really is true. We can deliver a flight model, systems emulation, and a customizable scenario that is specifically tailored to the areas in which our customer needs to train.”

The value of such customizability rests almost entirely on being able to deliver realistic scenarios, a capability that can only be delivered by personal expertise. For this, Inzpire will likely depend on the vast experience of its largely former-military staff. The company’s challenge will now be to convince customers that the flexibility of its TFS offers a significant advantage over the narrower focus of more traditional synthetic systems.



From left: Wilhelm Schnedl, COO; Nicole Kuntner-Hudson, CEO; and Johannes Waidbacher, Mayor of Braunau, Austria. **Air Ambulance Technology Photo**

AIR AMBULANCE TECHNOLOGY CELEBRATES 25 YEARS

Air Ambulance Technology, based in Ranshofen, Austria, is celebrating 25 years of designing emergency medical services (EMS) interiors for rotary- and fixed-wing aircraft

Since its inception, Air Ambulance Technology has installed over 950 interiors in more than 60 countries across the globe, helping operators save lives. The company owns over 40 supplemental type certificates (STCs) for both medical and VIP interiors for rotary- and fixed-wing aircraft.

Company founders Egon Kuntner and his wife Dorothea wanted to develop a medical interior for helicopters and fixed-wing aircraft that could be removed within minutes instead of days. Beginning with an EMS interior for the Airbus AS355 for a customer in Brazil in 1993, Air Ambulance Technology has since designed and developed aircraft interiors for numerous aircraft types ranging from the Airbus AS332/H225 to the Mil Mi-8.

Over the years, Air Ambulance Technology has equipped a fleet of Ukrainian Mi-8/17s with a modular medical interior, allowing for different mission configurations, and designed 30 medical interiors for ÖAMTC's Airbus EC135s. The company also designs medical interiors for the Sikorsky UH-60 Black Hawk.

Air Ambulance Technology's 25th anniversary marks the beginning of a new era, as Egon and Dorothea have now retired, naming their daughter, Nicole Kuntner-Hudson, as CEO and managing director. Together with Wilhelm Schnedl as chief operating officer, Nicole will lead the team in continuing to design and manufacture life-saving equipment.



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MORE FARA COMPETITORS REVEAL CONCEPT AIRCRAFT



The concept art of the Bell 360 Invictus attack reconnaissance helicopter. **Bell Image**

The competition for the U.S. Army's Future Attack Reconnaissance Aircraft (FARA) is heating up, with four of the five contenders now having revealed concept aircraft.

Earlier this year, the Army awarded competitive prototype contracts to Bell, Boeing, Karem, Sikorsky, and a team from AVX Aircraft and L3. AVX and L3 were the first to reveal their concept, a compound coaxial helicopter design featuring a wing for lift during high-speed forward flight, plus two ducted fans that provide forward and reverse thrust. The fly-by-wire aircraft also features a side-by-side cockpit "optimized for pilot efficiency," the companies said.

Bell revealed its tandem-cockpit FARA concept, called the 360 Invictus, on Oct. 1. It features a single main rotor with a hub and rotor blades that have been "ported over" from the Bell 525 Relentless program, but which will be scaled to fit the Invictus, according to Keith Flail, vice president of advanced vertical lift systems at Bell. Where the 525 has five main rotor blades, Invictus will have four. Invictus also will use a version of the 525's fly-by-wire flight control system and modular, open-systems avionics provided by Collins Aerospace.

In cruise flight, two "lift-sharing" wings will offload half the burden from the 360's fully articulated main rotor system. Horizontal stabilizers controlled by the fly-by-wire system will keep the aircraft trimmed in the lowest drag position at high speed. The ducted tail rotor is canted to reduce drag and provide additional lift, Flail noted. Invictus will carry munitions internally and

features retractable landing gear to further reduce drag at high speed.

In mid-October at the Association of the U.S. Army's annual conference (AUSA) in Washington, D.C., Sikorsky unveiled the Raider X, a sleek, beefed-up version of its S-97 Raider coaxial compound helicopter. The new concept retains the Raider's basic coaxial main rotor configuration with an aft pusher propulsor, but is 20 percent larger than the S-97.

Raider X increases the weight of the aircraft from about 12,000 to 14,000 pounds (5,445 to 6,350 kilograms), according to Sikorsky's FARA program director, Tim Malia. The design features a side-by-side cockpit, which also widens the fuselage to increase its internal weapon storage. Sikorsky chief test pilot Bill Fell said Raider has already flown 207 knots in level flight and 250 in a shallow dive, and the larger, more powerful Raider X should be able to fly faster than

that — well above the Army's 180-knot requirement.

Meanwhile, Karem Aircraft has teamed with Northrop Grumman and Raytheon on a concept called the AR40, which has been revealed to be a winged compound helicopter with a rear propulsor and an actively controlled main rotor.

The only competitor so far declining to show a concept is Boeing. According to Boeing FARA program manager Shane Openshaw, a concept exists and the Army is "fully aware" of where Boeing is in the initial design phase of the competition, but the company's approach is "not to necessarily be out in the public sphere pumping our chest. . . . We will gradually go public and start revealing the nuances of our design when it makes sense for us to do so if we can," Openshaw said.

Dan Parsons contributed reporting to this story.



Sikorsky's Raider X is a beefed-up version of its S-97 Raider. **Sikorsky Image**

ITT ENIDINE ADAPTS ITS 'ADAPTIVE' DAMPING

BY ERIC TEGLER

Sometimes the project you embark on takes you somewhere you didn't intend. That's essentially what happened with an effort to address vibration in the variable-speed rotor helicopters now coming to market.

Buffalo, New York-based ITT Enidine develops and implements vibration absorption technology for commercial and defense markets. In 2017, the company initiated a project targeting in-cabin vibration hot spots for helicopters with multi-rpm rotors. ITT Enidine has a long-standing relationship with Bell, providing cabin vibration damping in the latter's 505 Jet Ranger X and 525 Relentless, which has a multi-rpm main rotor.

The company's principal engineer, Mark Ott, explained that his team was looking to develop a simpler, less costly vibration attenuation approach than current fully active systems, which use force generators. They turned to the time-tested Frahm damper, patented by Hermann Frahm in 1911.

The simple mass/spring system attaches to a vibrating structure and is tuned to resonate 90 degrees out of phase with the input source. It dampens vibration at a given frequency, but can't effectively attenuate vibrations at the various frequencies which multi-rpm rotors create.

ITT Enidine sought an "adaptive" Frahm damper, able to alter its behavior to attenuate vibrations at two specific frequencies representative of 100 percent rotor rpm and 90 percent rotor rpm. The system isn't as quick to respond or as flexible as a fully active damping system, but is cost-effective — offering cabin vibration damping where it's wanted most, in long duration forward level flight rather than quick transients.

Engineers essentially developed a controlling algorithm to locate the damping mass of a conventional configuration Frahm in near-real-time (generally within five seconds rather than the milliseconds of a fully active system response).

"We're calling it adaptive because we're actually changing the characteristics and behavior of the isolation device to react

This diagram shows where ITT Enidine's adaptive Frahm damper might be installed on a helicopter. **ITT Enidine Image**



to whatever it's sensing," Ott said. "That takes a little bit of time."

The system is also novel in that it uses a single vibration sensor located on the input side of the adaptive Frahm, Ott noted. "Most of the time people look at vibration input versus the frequency response and those two have to be 90 degrees out of phase for attenuation to work. Ours is a little bit different. We're doing it with only one sensor."

ITT Enidine bench tested the quarter-scale system, which showed the ability to achieve an average of 70 percent attenuation for both frequencies of interest. The successful test was reason enough to continue further development, but then something unexpected happened.

"What happened," Ott explained, "was we were talking with an OEM and we displayed this [system] with them [at a trade show]. The interest that that generated

is causing us [to shift effort] to a different type of adaptive system."

Enidine won't reveal exactly what the new, different type of adaptive vibration system is or who they're developing it for. The goal is similar, reducing or isolating in-cabin vibration at specific points, like at the pilot's feet, below a cockpit seat, or near electronic systems/sensors. A Frahm damper is not used, but the capabilities — a controlling algorithm and single vibration sensor — demonstrated with the Frahm project will be employed.

Mark Ott put it this way: "Although this new application is different in scope, our proven capabilities to adapt a system's behavior will be used to improve performance on an unspecified platform."

ITT Enidine already has a name for the new damping system, though Ott won't share that, either. He did say that bench testing is expected to be complete by mid-2020, with installation on a flying aircraft by early 2021.

ITT Enidine plans to return to the adaptive Frahm damper once this project is done. For now, they're adapting to the market.

DART ACQUIRES SIMPLEX AEROSPACE

DART's acquisition of Simplex Aerospace will allow DART to broaden and diversify its firefighting product portfolio. **Simplex Photo**



DART Aerospace recently acquired aerial firefighting mission equipment manufacturer Simplex Aerospace.

Based in Portland, Oregon, Simplex Aerospace is an aviation industry veteran serving thousands of operators and original equipment manufacturers (OEMs) worldwide.

The newly combined entity, which will transition into operating under the DART brand, will now have more than 320 employees in eight locations worldwide, including four manufacturing centers of excellence.

DART's acquisition of Simplex Aerospace will also allow the Canadian-based mission equipment manufacturer to broaden and diversify its firefighting product portfolio. It will enable DART to offer several new product categories to its global network of OEMs and helicopter operators, including firefighting belly tanks, aerial cleaning supplies and agricultural spray systems.

"With the support of Simplex's 200-plus international product certifications and its years of experience in the aerial firefighting sector, DART will strengthen its global leadership position by providing helicopter mission equipment for offshore, firefighting and utility applications, as well as an increased portfolio alongside our current product offering of 900-plus STCs [supplemental type certificates]," said Alain Madore, DART's president and CEO.

"We are proud to be delivering the added value that Simplex's products and capabilities will bring to the DART brand," said Mark Zimmerman, president and CEO of Simplex. "Together, our unique STC portfolio and complementary product lines will enable us to achieve revenue synergies and expand our reach across the aerial firefighting sector worldwide."

The terms of the transaction have not been disclosed.

RotorBits

ARS RESCUE VEST APPROVED

BY MILITARY

Air Rescue Systems Corp. (ARS) has received air worthiness approvals for its Air Rescue Vest-Quick Connect (ARV-QC) rescue device from the U.S. Army, Navy and Marine Corps. These approvals capped a long testing and substantiation process by the respective branches of the military. Approval for the U.S. Army medevac program includes use on both the Sikorsky UH/HH-60 and UH-72 aircraft.

The ARV-QC is a one-size-fits-all rescue device capable of securely hoisting persons from 35-400 pounds (16-182 kilograms). The ARV-QC incorporates lightweight multicomposite materials that significantly reduce overall system weight but increase device strength, resulting in a minimum breaking strength of 4,000 pounds (1,815 kilograms).

Utilizing a highly engineered pivoting "key-lock lift" system, the device increases safety by eliminating additional hardware to lock and secure the victim in place.

The ARV-QC provides the benefits of full body capture with the speed of a rescue strop, ARS said.

SIMPLEX INTERNAL FIRE ATTACK

SYSTEM CERTIFIED BY FAA

Simplex Aerospace has received a Federal Aviation Administration (FAA) supplemental type certificate (STC) for an internal fire attack system (FAS) for the Sikorsky UH-60A Black Hawk. The Model 370i FAS is certified for installation and operation on the Timberline Helicopters Inc. TC type.

Simplex will be working quickly to add additional Black Hawk type certificates to the Model 370i FAS approved model list (AML). The Model 370i FAS is the first and only FAA-certified internal FAS for the Black Hawk helicopter, developed primarily for restricted category civil aerial firefighting operators, and requires no modifications to the aircraft structure.

The 900-gallon internal tank system utilizes a single dispersal door that drops water/foam through the cargo hook well. The internal tank system is made from a proprietary lightweight composite matrix that provides superior corrosion and fatigue resistance compared to metal tanks.

The tank utilizes a 1,000-gallon-per-minute hover refill system and has dual ground fill ports for increased flexibility and safety during ground filling operations.

MERCY AIR CELEBRATES 30TH ANNIVERSARY

PHOTOS COURTESY
OF MERCY AIR



Mercy Air's coverage area encompasses alpine mountain, coastal, and desert regions.

The air medical transport provider Mercy Air is celebrating three decades of service to the people of Southern California and Nevada.

Established in 1989, Mercy Air acquired or merged with several other programs over the years, including LifeFlight-Long Beach, LifeFlight-San Diego, and Flight for Life in Las Vegas. Mercy Air was acquired by Air Methods in 1995. Since then, it has opened additional bases in Clark County, Nevada, and in Mojave, Twentynine Palms, Hesperia, Big Bear, and Barstow, California.

Today, Mercy Air encompasses 23 rotor-wing and one fixed-wing operation, including pediatric and neonatal transport on CHOC1 (Children's Hospital Orange County), Mercy Air 19 in collaboration with Rady Children's Hospital (San Diego County), and Mercy Air 25 dedicated to Loma Linda University Hospital Specialty Transport (Riverside County).

Accredited by the Commission on Accreditation of Medical Transport Systems (CAMTS), Mercy Air links communities in its coverage area to advanced trauma care and other specialty care. Its transport teams have access to specialized equipment including intra-aortic balloon pumps and Impella devices. Mercy Air also partners care teams with perfusionists to transport patients requiring ECMO (extra-corporeal membrane oxygenation).

Mercy Air's coverage area encompasses alpine mountain, coastal, and desert regions. Its aircraft fleet is correspondingly diverse, including Airbus EC145, EC135, Bell 407, Bell 412, Leonardo A109, and Kawasaki BK117 helicopters, and a Pilatus PC12 airplane. This allows Mercy Air to tailor airframe capabilities to particular regions and missions to deliver better service to the communities.

"Mercy Air's commitment to the region is not just through adding new bases, but by ensuring that they work collectively with local officials, fire departments and hospitals to make sure that our services are effective and efficient for the community," the organization stated. "The service is looking forward to many more decades in the Southern California and Nevada region."



Mercy Air has a mixed fleet to best service its diverse operating area and missions.



Today, Mercy Air encompasses 23 rotor-wing operations, as well as one fixed-wing service.

TO BRING ON MORE PILOTS, CBP STREAMLINES HIRING PROCESS



CBP is rethinking its hiring process in order to fill more pilot seats. **James Deboer Photo**

BY ELAN HEAD

U.S. Customs and Border Protection (CBP) is streamlining its hiring process for fixed- and rotary-wing pilots, with the goal of bringing on new hires in as little as 60 days.

That's a significant acceleration for a complex government hiring process that in the past could drag on for more than a year. Even as recently as two years ago, with the CBP's pilot recruitment efforts in full swing, applicants could expect to devote six months to the process before receiving a job offer.

Now, according to supervisory air interdiction agent Jamie St. Dennis, CBP is doing everything it can to bring qualified applicants on board. "We're here to help them," he said. "We want quality people and are trying to make this process as easy as possible."

To that end, CBP is launching a series of "new hire rodeos" at its National Air Training Center in Oklahoma City, Oklahoma. There, applicants will be able to complete all three phases of their pilot assessment — an oral exam, a flight evaluation, and a structured interview — in a

single day. Applicants who complete the assessment successfully will receive an immediate job offer.

Supervisory air interdiction agent Michael Carter explained that the oral exam is similar to the oral exam on a Federal Aviation Administration commercial pilot checkride, while the flight evaluation — conducted in an Airbus EC120 or AS350 for rotary-wing applicants — combines elements of a flight review and instrument proficiency check. The structured interview, conducted before a panel of three pilots, encompasses scenario-based questions that "anybody should be able to answer," such as how one would handle a difficult co-worker, he said.

"We let the applicant know all day as they're going through the process how they're doing," Carter added.

Additionally, CBP will have a polygraph examiner available for those applicants who have not yet completed their requisite polygraph test. Although CBP has added informational videos and frequently asked questions about the polygraph to its website, the exam remains a source of apprehension for many applicants, so CBP will also have an applicant care specialist on

hand to discuss the polygraph with each applicant before they take it.

"In the field oftentimes, an applicant would just show up at a testing facility . . . and go right into the exam with little instruction or understanding of how it even works," St. Dennis noted. "We've found that by having this applicant care specialist in the process, we're increasing our success rate."

Finally, CBP will also have a quality control specialist available at the rodeo to assess the results of each polygraph immediately.

The first two new-hire rodeos took place in August and September, and CBP Air and Marine Operations (AMO) hopes to do up to 10 more rodeos in fiscal year 2020 (which started Oct. 1). The rodeos are open to any pilot applicant who would otherwise need to schedule the evaluations individually — which remains an option.

CBP has also made some other changes to make it easier for pilots to join AMO. Previously, applicants who failed any part of the pilot assessment had to wait six months before reapplying. That has been reduced to just 90 days, and applicants who return within a year can pick up where they left off. The agency has also eliminated the requirement for pilots to have flown 100 hours in the past 12 months, opening the door for applicants who haven't flown professionally for a while, due to any number of possible life circumstances.

While CBP is still seeing stiff competition for pilots from industry and the airlines in particular, St. Dennis noted that a recent pay increase has made its pilot positions much more competitive. He added that many pilots also appreciate the structure of the job, where "you're not sleeping in hotels, you're not doing long trips like the airlines do."

For many applicants, Carter observed, the mission and variety of the job are also a big part of its appeal. "I get a lot of new hire applicants coming through that have done the airline thing," he said. "They go to the regional airlines and they say, 'I want more out of my job — I want it to mean something.' And so I get a lot of airline applicants that want a mission."



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Ornge powers up fleet stretcher system with HeliMods upgrade



Ornge has completed the installation of the HeliMods PAL stretcher system across its fleet of 11 Leonardo AW139s. **Rob Reyno Photo**

BY OLIVER JOHNSON

Ornge, Ontario's air ambulance operator, has completed the installation of a new powered stretcher system across its fleet of 11 Leonardo AW139s.

The Powered Aero Loader (known as PAL), produced by Australian company HeliMods, is a push-button-operated powered stretcher loader system that allows crews to quickly and easily load and unload road ambulance stretchers into and from helicopter air ambulances.

The system is compatible with the popular Stryker Power Pro XT stretcher system, which is used by the vast majority of road ambulances across Ontario. According to HeliMods, the system allows for the transfer of patients weighing up to 700 pounds (318 kilograms) without the need for any manual lifting, achieved with the push of a button.

"This system allows for a seamless transition

from the helicopter to the land system," Justin Smith, chief flight paramedic at Ornge, told *Vertical 911*. "It's really elevated the ability for us to bring critical care to the patient's side."

HeliMods was established by Will Shrapnel in 2002 in Caloundra, Queensland, and specializes in providing customized mission configurations in helicopters — particularly in the AW139.

The contract with Ornge represents the first large-scale commercial delivery of the company's PAL system, which itself has been in development for a number of years.

"When we looked at developing the system, we took a step back and looked at the patient and the caregiver, and asked ourselves, 'Where would you start?'" said Shrapnel. "You'd start with the best stretcher technology you could find. You'd want to be able to carry all your gear with the patient. You'd want bed transfer to be

easy. You'd want power lifting from the ground to a high height.

"I think that's really the difference of this product compared to others: It's really putting the stretcher at the core, next to the patient and the paramedic, and saying, 'Well, I want to start there.'"

The system required intensive research and development up front, with HeliMods working with local ambulance services in Australia to create the first-generation proof of concept for the integration. The design, which allows the entire stretcher to be fully cantilevered from the aircraft during loading and unloading, presented some difficult engineering challenges.

"It does require a lot of structural support from the aircraft," said Shrapnel. "So our team set out to solve the engineering challenge of integrating power loading and lifting technologies into what's essentially called an aircraft interface, which then connects into the aircraft floor. It does that

without tools, so the aircraft can be reconfigured quickly."

Ornge began exploring options to improve its patient transfer process a number of years ago, and called for proposals in a competitive bid process last year. "We realized that we needed to look outwards to find a better solution for the way we move patients, and the way that our paramedics were able to provide care to our patients," said Smith.

"There are a number of really great things about this stretcher system, but if you were to summarize it, it really just allows us as paramedics to have a piece of equipment that acts more of an extension of our work and works with us, and not necessarily something that we're having to fight with during the course of our duties," Smith continued. "It really is an extension of our care."

HeliMods was awarded the contract in October 2018, with a tight schedule requiring delivery of the first systems in April 2019. The company worked closely with Ornge ahead of that delivery to customize the system to the organization's exact requirements.

"Will and his team were absolutely outstanding as far as taking our direction and working together collaboratively to come up with a system that is, I think, one of the best I've ever seen, quite frankly," said Smith. "The end product is something that

I think Will, his team, and us are all very proud of."

One of the key customizations was the design of the bridge — the mounting attached to the stretcher that houses various pieces of medical equipment, such as the cardiac monitor, infusion pumps, and mechanical ventilator. The design of the previous bridge often required the various tubes, lines, and pieces of equipment required to treat a patient to be deconstructed and reconstructed during a transfer — a time-consuming and laborious process.

"You can imagine over the course of a shift having to remove and replace equipment on and off an equipment-carrying bridge," said Smith. "Over time, that leads to musculoskeletal injuries, repetitive strain injuries, and just overall fatigue during the course of a shift. We don't have to do that anymore. We've now got a system whereby all of our equipment stays on the equipment bridge for the duration of the transport."

Inside the aircraft, the stretcher sits a little higher than the previous system, giving paramedics improved access to the patient during flight.

The PAL system also allows Ornge to transport bariatric (heavier) patients more effectively.

"There were times in the past where we would have to come back to base and

essentially reconfigure our helicopter to be able to go service those [bariatric] calls," said Smith. "We no longer have to do that, as this new system really allows us to service them in a way that is appropriate."

The PAL system is "slightly heavier" than the previous stretcher system, said Smith, but he highlighted the efficiency it provides as being worth the extra weight.

Ornge has installed the new system throughout its fleet over several months, to ensure a smooth integration.

"We wanted to make sure that we didn't impact our provision of care in our daily operation when transitioning over to the system," said Smith. "One of the nice things about this system is that the learning curve — for paramedics, for pilots, and anybody who's going to interface with this — is not steep at all. It's very easy to learn."

The final aircraft to receive the new system entered operation with it at the end of August. Throughout the Ornge fleet, the organization has already completed close to 1,000 transfers with the PAL stretcher system, and feedback from crews has been "outstanding," said Smith.

The PAL system has been certified by the regulatory authorities in Australia, the U.S., and Canada for the AW139, and is also certified in the Airbus H145 in the U.S. HeliMods is also planning to certify it in the AW169, and potentially the Bell 429.



The HeliMods PAL system allows the stretcher to be loaded into the helicopter at the push of a button. **Mike Reyno Photo**

U.S. ARMY TESTS MODERNIZED UH-60V DIGITAL COCKPIT



Aircrews conduct final pre-mission checks for a nighttime air assault mission during operational tests of Army modernization efforts with a new digital cockpit in the UH-60V Black Hawk. **Tad Browning Photo**

Combat aviators have conducted operational tests of U.S. Army modernization efforts using three UH-60V Black Hawk helicopters.

The UH-60V Black Hawk will retrofit the Army's remaining UH-60L helicopter fleet's analog cockpits with a digital cockpit, similar to the UH-60M helicopter.

Retrofitting aircraft that are already owned by the Army is a major cost-saving measure over purchasing new builds, according to Derek Muller, UH-60V IOT test officer with the U.S. Army Operational Test Command's Aviation Test Directorate.

Muller and his test team worked with aircrews from Company A, 2nd Battalion, 158th Aviation Regiment, 16th Combat Aviation Brigade by applying realistic operational missions, post-mission surveys and after-action reviews along with onboard video and audio instrumentation to collect data directly from crewmembers.

Instrumentation installed by Redstone Test Center (RTC), Alabama, provided audio, video and position data for the test team to review after each mission.

The evaluation will inform a full-rate

production decision from the Utility Helicopter Program Office at Redstone Arsenal, Alabama.

Aircrews flew over 120 hours under realistic battlefield conditions. They conducted air movement, air assault, external load and casualty evacuation missions under day, night, night vision goggle, and simulated instrument meteorological modes of flight.

"Anti-aircraft weapon simulation emitters are a valuable training enabler and reinforce much of the Air Mission Survivability training assault aircrews have received with respect to operations in a threat environment," said Capt Scott Amarucci, A Co. 2-158 company commander.

"This approach permitted evaluators from the U.S. Army Evaluation Center to see and hear how a unit equipped with the UH-60V performed operational missions against a validated threat in a representative combat environment," said Muller.

The U.S. Army Center for Countermeasures employed three types of threat simulations to stimulate the aircraft's survivability equipment and trigger pilot actions using the updated cockpit capabilities.

"The three independent threat simulation systems enhanced the quality of the test and enriched the combat-like environment," said Muller.

"Each day I hear feedback from the crews about the testing," said LCol Christopher Clyde, 2-158 BN commander. "Each soldier I talk to is glad to place a fingerprint on a future Army aviation program."

Aircrews executed their mission essential task lists using the UH-60V, conducting realistic missions against accredited threat systems.


Testing at A Co.'s home station allowed the application of key expertise and resources, provided by the test team, while flying in its routine training environment.

New equipment collective training and operational testing caused A Co. to focus on several critical areas, including mission planning, secure communications, aircraft survivability equipment, and internal/external load operations, improving its overall mission readiness while meeting operational test requirements, according to Muller.

"Moreover," Muller said, "the test's rigorous operational tempo provided an ideal opportunity for 2-158th Aviation Regiment to exercise key Army battle command systems including, but not limited to, Blue Force Tracker [BFT], secure tactical communications, and mission planning."

Ground crews from the 1-2 Stryker Brigade Combat Team (SBCT) prepared and hooked up sling loads during 18 missions, allowing pilots to see how the UH-60V cockpit displays provided situational awareness while carrying an external load.

"Static load and external load training not only improved unit readiness, but fostered safe operations during day and night missions throughout the test," said Sgt 1st Class Jason Keefer, AVTD's test non-commissioned officer in charge.

Future operational testing will ensure soldiers continue to have a voice in the acquisition process, guaranteeing a quality product prior to fielding. 

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The PAL is a zero-lift, push-button operated powered stretcher loader system used for rapid loading and unloading of road ambulance stretchers into HEMS aircraft.

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PERSONNEL FROM ALL SECTORS OF THE GLOBAL HELICOPTER COMMUNITY HAVE BEEN PARTICIPATING IN THE "TETRIS CHALLENGE," WHERE CREWS LAY OUT THEIR EQUIPMENT AND THEMSELVES IN NEAT ROWS, ALONG WITH THEIR AIRCRAFT. THIS CHALLENGE IS REMINISCENT OF THE 1980s VIDEO GAME, TETRIS. HERE ARE SOME OF OUR FAVORITE ADAPTATIONS OF THE CHALLENGE.

 A CHC HELIKOPTER SERVICE AIRBUS AS332L SUPER PUMA AND CREW IN FLORØ, NORWAY.
RUNE HELLAND/CHC HELIKOPTER SERVICE PHOTO

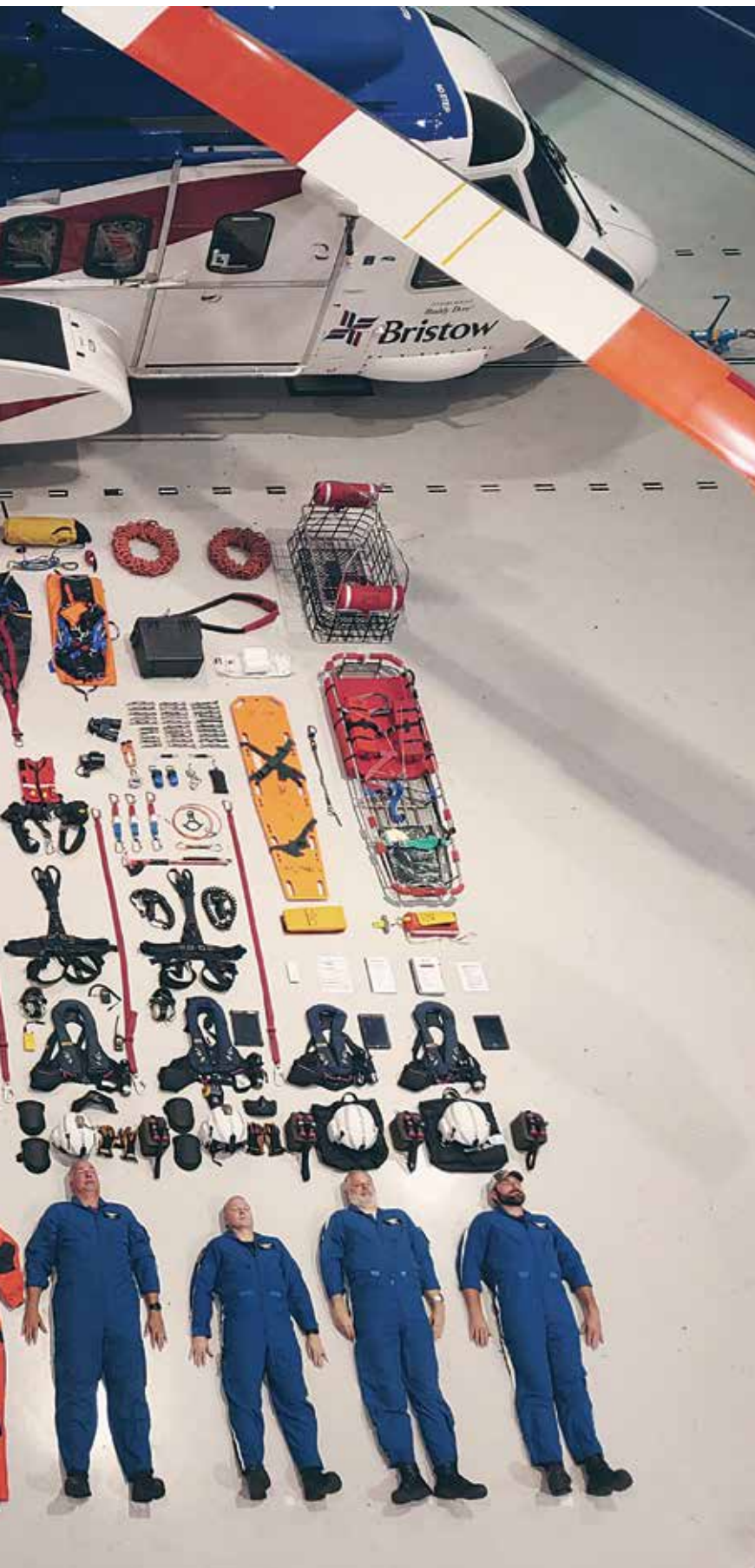




 A PREFECTURA NAVAL ARGENTINA (ARGENTINE COAST GUARD) AIRBUS H225 SUPER PUMA AND CREW. PREFECTURA NAVAL ARGENTINA PHOTO









✚ BRISTOW SEARCH-AND-RESCUE SIKORSKY S-92 AND NIGHT DUTY CREW IN GALLIANO, LOUISIANA.
NURI VAN HATTUM PHOTO



 THE GERMAN FEDERAL POLICE MECHANIC CREW WITH A DISASSEMBLED AIRBUS EC135 IN BAVARIA, GERMANY.
FEDERAL POLICE REGIONAL OFFICE 11/FLORIAN POSCHNER PHOTO





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RISING TO THE CHALLENGE



Replacing the Huey in German service, the NH90 had big boots to fill. But with deployments to Afghanistan and Mali under its belt, the world's first fly-by-wire helicopter is finally coming of age.

**BY JON DUKE // PHOTOS BY
LLOYD HORGAN, VORTEX AEROMEDIA**

With the fall of the Berlin Wall starting in 1989, Germany found itself preoccupied with reconciliation and reunification. Defense equipment programs the world over suddenly attracted scrutiny and criticism in equal measure as the “end of history” seemed to render them obsolete overnight. Without a unifying threat, pan-European equipment programs languished.

In 2002, however, German support to the North Atlantic Treaty Organization (NATO) mission in Afghanistan changed the nation's long-held stance on deploying combat troops overseas. It was the first time that they and their equipment had seen combat — and the NHIndustries NH90 would play a central role.

BORN IN THE EYE OF THE STORM

In the 1980s, several European nations began collaborative military projects in an effort to make use of the economy of scale. France, (then West) Germany, Italy, and the Netherlands began developing a helicopter specifically to meet a NATO requirement for both battlefield support and maritime roles. NHIndustries was established as the aircraft manufacturer, wholly owned by companies that are now known as Airbus Helicopters, Leonardo Helicopters, and Fokker Aerostructures.

By the '90s, the Cold War was over. The glass cockpit revolution was well underway and automation of helicopter cockpits was advancing. What aircraft manufacturers lost in scale of orders they made up for in complexity, as European militaries in particular sought helicopters that could integrate into civilian airspace, regulations, and processes.

In 1995, NHIndustries flew its NH90 prototype — the quadrilateral consortium's effort to meet the requirement that had been decided a decade prior. It was incredibly ambitious. The aircraft was designed to be exclusively fly-by-wire, with no mechanical control linkages between the pilot and the rotors — something never before attempted in a production helicopter. (It was not until 2004 that the third prototype had its manual backup controls removed.) The world had changed and with NATO now embroiled in Afghanistan, so had the sense of urgency. In 2006 the Bundeswehr (Germany's collective armed forces) finally took delivery of the first NH90 Tactical Transport Helicopter (TTH) variant.

The NH90 program was incredibly ambitious, and had its fair share of problems. The role of the Bundeswehr has been critical in bringing the aircraft to maturity.

Capt Bastian W. (who requested that his surname be truncated for security reasons) has been an NH90 pilot with the unit since 2014. His main role includes tactics and mission preparation, a job hugely facilitated by the aircraft's digital infrastructure. "We don't really do anything on paper anymore," he said. "We do all our planning on a digital system, so if I have five aircraft, I write one mission onto five DIDs [direct input devices], and all the pilots have the same information. For a simple training mission, planning [on this system] just takes 10 minutes, but for a large exercise I can have various overlays; multiple aircraft, jets, and other units."

Systems such as this are vital for improving crew situational awareness about friendly forces, threat units, and navigating using GPS. They are also critical to modern warfighting tactics that depend on high-speed data transmission for battlespace managers to stay abreast of the rapidly changing situation.

In the NH90, the integration of digital systems has gone beyond both the mission system and the avionics — and into the flight controls themselves.

"Every system is redundant," Bastian said. "If you have a degraded system you can normally continue, and for the flight controls there is a four-by-four active/active concept." This quadruple redundancy not only provides resilience against electronic failures in the traditional sense, but can actually be more survivable to

battle damage, as it is easier to distribute critical components around the aircraft than it is with a mechanical system.

The NH90 replaced the Bell UH-1D in service — the German, license-built version of the legendary "Huey." It is a very different aircraft in size, weight, and complexity. The 10.6-tonne (23,400-pound) NH90 is capable of lifting the three-tonne (6,600-lb.) UH-1 as an external load. The Huey was revered as a warhorse, capable of shrugging off all but the worst battle damage. The NH90 is designed to survive an entirely different battlefield, using electronic warfare systems to protect against anything that can see in the dark, and flying at night to conceal against threats that cannot.

"We have an obstacle warning system which can warn us of wires, poles, and even trees," explained Bastian. And if they do stray too close to the enemy, defensive armaments include either an FN Herstal M3M .50-caliber machine gun or the 7.62mm Rheinmetall MG 3. The TTH variant of the NH90 has the capacity for 16 troop seats and enough fuel for around three hours and 30 minutes of endurance at normal operating weights.

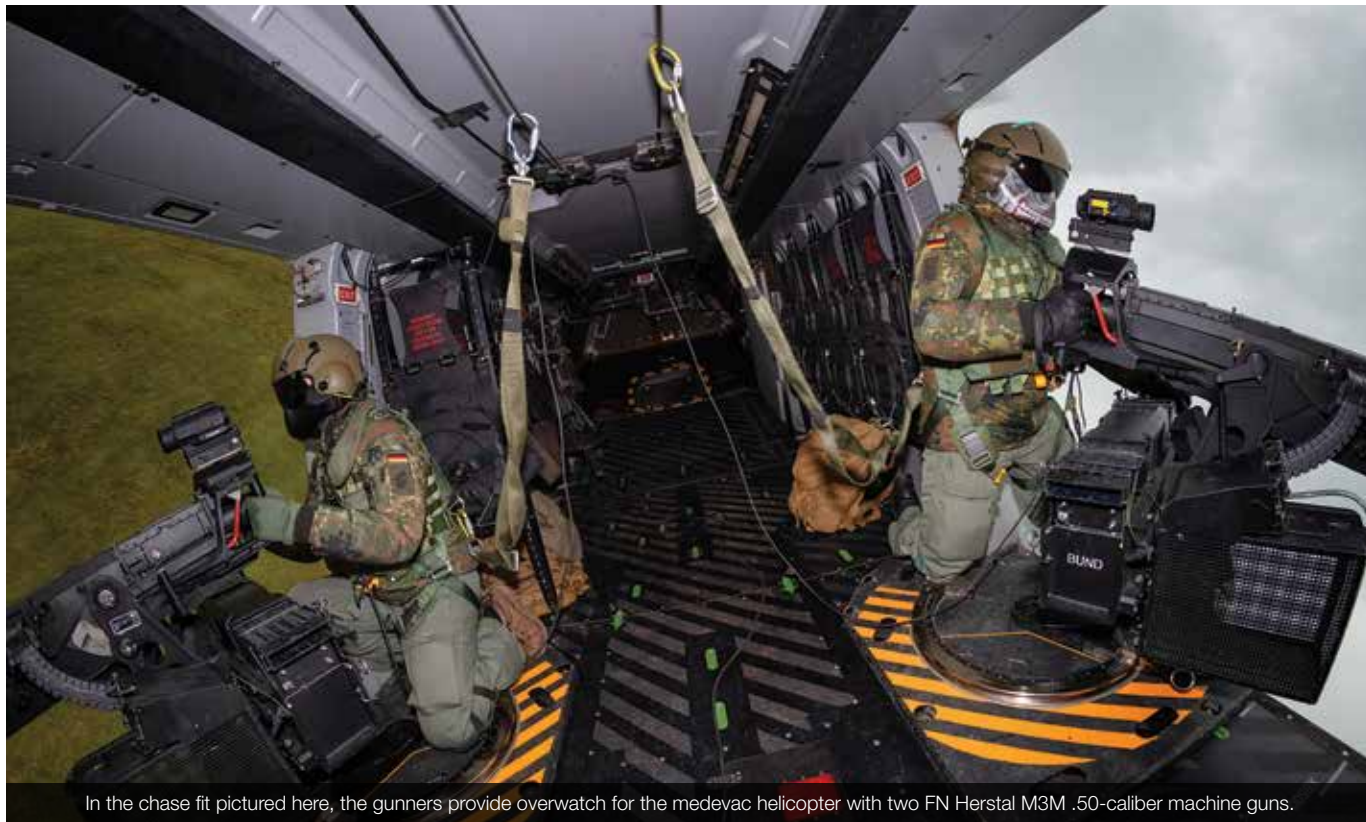
Unsurprisingly for a fly-by-wire aircraft, a four-axis autopilot is provided and communication, navigation, and mission system suites are fully integrated. Information is presented to the two pilots on five flat-panel displays, and the Thales TopOwl Helmet Mounted Sight Display (HMSD) is also integrated. "I have all the



DOWNLOAD THE WALLPAPER!



An NH90 beats the air into submission as it lifts off after picking up two casualties during a medevac training mission.



In the chase fit pictured here, the gunners provide overwatch for the medevac helicopter with two FN Herstal M3M .50-caliber machine guns.

important information on the HMSD, so I fly mostly only using that,” said Bastian.

All this technology comes at a cost. While it allows the flexibility to upgrade the fleet incrementally during its period in service, these upgrades take time. There is now a mixed fleet of aircraft in service, many at the older Initial Operational Capability (IOC) level, some at Full Operational Capability (FOC) and a few at the most recent Maintenance Release (MR) 1. Bastian explained that 28 of the 32 aircraft scheduled for his unit have been delivered, but approximately half are still undergoing inspections or upgrades by Airbus Helicopters Germany at its Donauwörth facility. Airbus Helicopters also supports the aircraft at a unit level, with inspectors working alongside military technicians.

EARLY ADOPTERS

Bastian’s regiment, Transporthubschrauber (Light Transport Helicopter) Regiment 10, was the first unit to receive the NH90. The regiment has two flying squadrons and one squadron that acts as a headquarters. Three more are dedicated to maintenance, with each one responsible for inspections, routine maintenance, and rectification work. Collectively, they carry the nickname “Lüneburger Heide” after the vast heathland in lower Saxony, in Northern Germany, that sits between the cities of

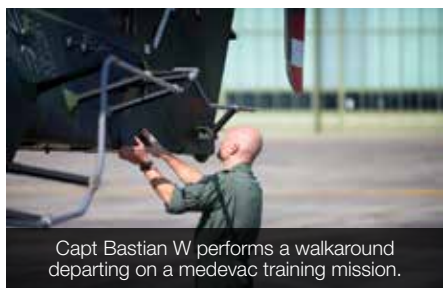
Hamburg, Bremen, and Hannover. Founded nearby at Celle in 1971, they have been based at Fassberg Air Base since 1981, but the heath is their stalking ground as it is also home to one of the largest military training areas in Europe.

This location gives the regiment not only easy access to excellent training locations for everything from tactical flying to live weapon-firing, but also provides opportunities to train with the various multi-national forces that make use of the training ground that covers over 70,000 acres (28,300 hectares).

“We have a lot of international guests here,” Bastian explained. “The Netherlands are often here, as are the British. The Americans had a big exercise here with over 5,000 soldiers.” One of the most impressive facilities is located in the town of Schnöggersburg, built specifically for military training. “They have around 500 houses, hotels, an underground rail network, a power station... it is really awesome,” said Bastian.

Naturally, the units that Regiment 10 train with most are German. Fallschirmjägerregiment (Airborne Regiment) 31 is based only 25 minutes of flying time away at Seedorf.

“One of our biggest partners here is the 31st Airborne Regiment. We have a low-level route to their landing field, and we often train with them for external cargo [operations] or parachuting,” said Bastian.



Capt Bastian W performs a walkaround departing on a medevac training mission.



MSgt Maurizio Coda began his career servicing Leopard tanks before qualifying as an avionics technician.



Training personnel for the NH90 is a lengthy process, exacerbating shortages of pilots and technicians.

Members of the Küsteneinsatzkompanie shield a simulated casualty from the downwash of the approaching NH90.



This close relationship with ground units is invaluable when deployed, particularly when they are relied upon as force protection for medical evacuation missions, which require the troops to be at constant readiness to operate in close cooperation with helicopter crews without an opportunity to rehearse specific drills.

TURNING UP THE HEAT

The NH90s of Transporthubschrauber Regiment 10 were called upon to provide medevac force protection capabilities in Afghanistan in 2013, where the aircraft spent 18 months and proved capable of operating well outside their normal operating environment.

"We had 100 percent mission effectiveness," Bastian said. "We had no technical malfunctions that meant we had to abort the mission." This was the first time the NH90 had been deployed overseas, and it proved a vital learning experience for the crews — particularly in the intense darkness of the desert nights without the cultural lighting that would have been ever-present during their training in Germany.

"At night the light levels were often so poor that even with NVGs [night vision goggles], visibility was not enough," said Bastian. Crews made use of the ability to project the forward looking infrared (FLIR) image into the HMSD, and slave the camera direction to the helmet position. This presents the pilot with an infra-red image overlay of the world that does not depend on ambient light, resulting in better visibility and much safer operations.

This success was followed by another deployment to Gao, Mali, in support of the United Nations Multidimensional Integrated Stabilization Mission in Mali (MINUSMA), where the crews applied the lessons learned from their experiences in Afghanistan. "The first thing I did was get sandbags to protect our accommodation from insects," Bastian recalled. "Three thousand sandbags, and I'm not finished yet."

Insects weren't the only concern. Once the crews began flying, they soon realized that discriminating between friend and foe was nearly impossible given the range of Islamist fighters and other factions, some of whom were loyal to — or even integrated within — government forces. All were similarly clothed and armed.

"Standard operating procedure is to spend no more than five minutes on the ground," explained Bastian. "This gives time for the casualty to be packaged and loaded into the helicopter."

In one particular casualty evacuation mission, the medevac spent 25 minutes simply sorting out who the casualties were, as the NH90 only has space allocated for two critical and two urgent casualties. "On this mission they transported eight," he said, "but there were a lot of people around the helicopter and nobody knew exactly if they were friendly or hostile. They were so close to the aircraft that the pilot in the supporting helicopter circling around couldn't have engaged them without hitting the medevac aircraft."

There were lessons for the ground crews, too. MSgt Maurizio Coda began his career servicing Leopard tanks before qualifying as an avionics technician on the UH-1D, and finally transferring to the NH90. "It was easier to understand how the Huey worked," he said. "In the NH-90 you have a lot of black boxes, and you don't know what's going on inside the black box." These black boxes are line replaceable units (LRUs), designed to be swapped out with a spare when one stops working. This allows the aircraft to quickly be airborne again, but only when spare LRUs are available.

The ground crews were surprised at how well the high-tech NH90 performed in the desert, but there were some issues. "In Afghanistan the main problem was that the aircraft were in cold



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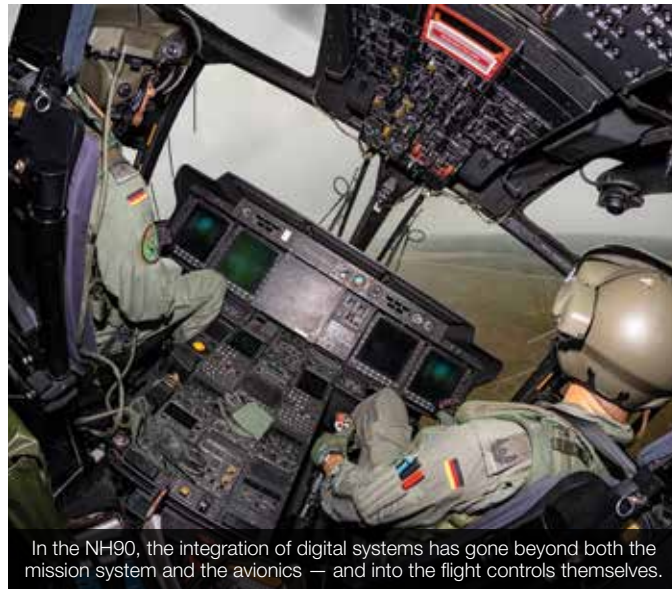
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Performing night underslung load training at the regiment's Faßberg base, with the green LED rotor tip lights clearly visible.



In the NH90, the integration of digital systems has gone beyond both the mission system and the avionics — and into the flight controls themselves.



The NH90 has been exported in both TTH and NATO Frigate Helicopter (NFH) variants to 10 nations, in addition to the original partners.



Members of Küsteneinsatzkompanie working alongside the NH90 crew during a joint medevac training mission.

tents, and we had a lot of problems with the electronics because of the constant change in temperature as we moved them from the cold tents to the hot environment,” said Coda, adding that the resulting condensate became a problem in an unusual way: “The water mixed with the dust and it became like concrete.”

In Mali the aircraft were kept in tents at ambient temperature, but environmental dust entering the LRUs was causing them to over-heat. With limited spares and critical missions hanging in the balance, crews were compelled to open the LRUs to clean them out.

Meanwhile, the dust was attacking the rest of the aircraft. “You could see that the dust was affecting the main rotor blades,” Coda said. “One of our guys had an idea to laminate them with a type of tape.” While similar techniques are common in other aircraft types, this had not yet been attempted with the NH90. Erosion had damaged 78 blades within four months, much faster than they could be repaired. After the tape was applied, the problem was largely eradicated.

LOOKING FORWARD

The Afghanistan and Mali deployments proved beyond doubt

that a technically complex aircraft could be operated in a hostile environment, but keeping them airworthy demanded a different mindset and experienced people. It is this area in particular that the German armed forces are feeling pressure; training personnel for such an advanced helicopter is time-consuming.

“The whole training course for new technicians is two-and-a-half years,” said Coda. “And by 2023 we must be compliant with civilian regulations, which will take even more training.”

The NH90 also has a complex maintenance schedule. “The aircraft requires a lot more work than the Huey,” explained Coda. “We have two inspection systems, one based on flight hours and [the] other on the calendar.”

Most of the inspections are done at the unit, but some are carried out under contract at Donauwörth. Up to three aircraft can undergo a 600-hour service at once, but this procedure takes a staggering 18 months in which the aircraft is completely stripped and rebuilt. “Often there is still sand inside [the aircraft] from Mali,” said Coda.

The situation is no easier for aircrew, Bastian told *Vertical 911*. “The German army is suffering with a lack of pilots,” he said.

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Ab-initio pilot training takes three to five years, and is followed by NH90 conversion training at the International Helicopter Training Center Bückeburg, Germany. Combat-ready work-up can take up to an additional three years. "If you start flying training at 22, you will be in your early 30s by the time you are ready for combat missions," explained Bastian. "Out of 29 combat pilots on this unit, the average age is 41."

MAKING IT WORK

The crews at Fassberg were more than prepared to admit that despite their skepticism, the NH90 had performed well on its first two deployments. This is no small feat for a unit that previously operated the Huey — a famously rugged design — particularly

given that the environment pushed both man and machine to their limits. The technology on the aircraft is impressive, from the fly-by-wire flight controls to the HMDS. Incremental upgrades will continue to provide capabilities that would be unthinkable in a Huey, albeit along timelines that would be equally alien.

Few would call the NH90 rugged. Detractors point to the 18-month maintenance periods and wonder about battlefield survivability, but being able to patch up bullet holes is a moot point when the threat has moved from guns to guided missiles. In modernizing its helicopter fleet, the German army is committing to facing those threats, but that modernization has its roots in programs that are as much as three decades old.

Aircraft procured in the optimism of the 1990s had a far from painless inception as budgets shrank and demands inflated. The NH90 was no different. The more roles required of a helicopter in design, the more compromises are necessary — and great expectations were placed on the NH90. Its designers realized that doing more did not just mean flying more, but being able to fly in degraded visual environments, operate within civilian airspace to civilian rules, beat complex threats, and remain upgradable to meet future challenges.

The reality that the capability of the aircraft was not completely compromised is a near miracle, particularly given the technological leap into fully digital flight control. Despite all its shortcomings, the NH90 has been exported in both TTH and NATO Frigate Helicopter (NFH) variants to 10 nations, in addition to the original partners. Contracts were signed as recently as 2018.

The NH90 has had its share of negative press. It would have been easy for its operators in Transporthubschrauber Regiment 10 to lose faith in an aircraft that they must have, at times, felt like they were beta-testing. Instead, they have adapted, exploited the technological advantage the aircraft offers, and forced it to work in challenging conditions. The export success must owe a lot to the efforts of the people who were given the NH90 to work with, and who made it work. 🚁

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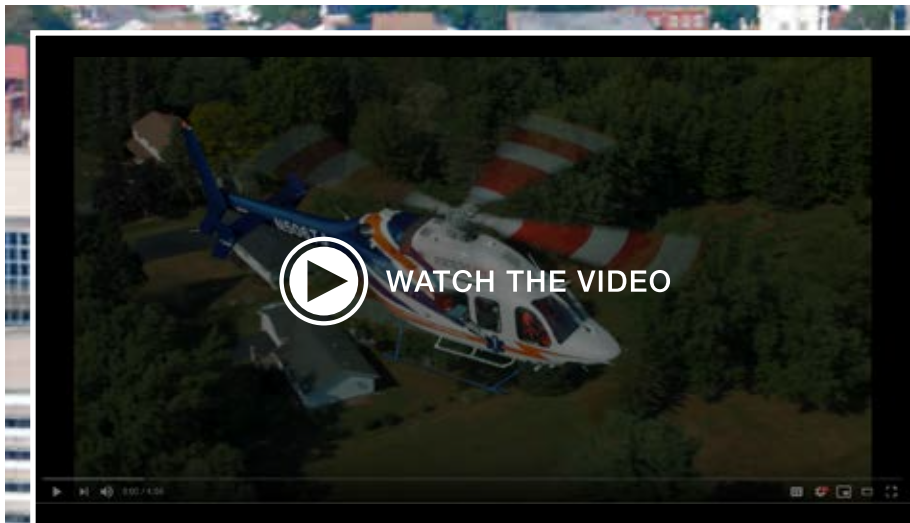
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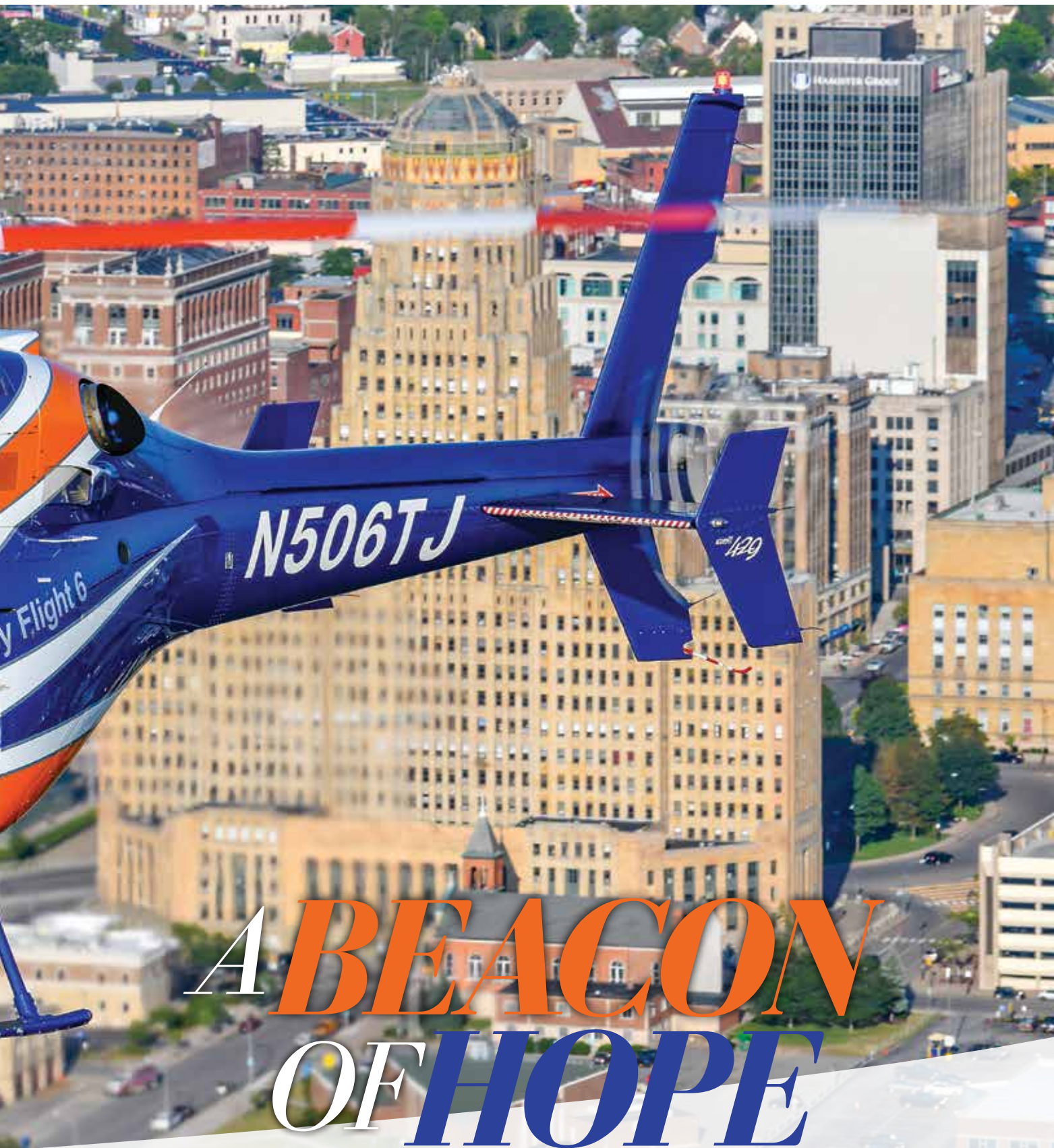
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Non-profit air medical provider Mercy Flight serves all of western New York out of four bases with four Bell 429s.



For non-profit air medical provider Mercy Flight, it's not about the money; at the end of each day, it's about doing everything possible to provide supreme care to people in need.

BY DAYNA FEDY // PHOTOS BY MIKE REYNO

Mercy Flight recently retired its fleet of Airbus BK117s, which the organization replaced with an all-Bell 429 fleet.



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The sound of rotor blades chopping through the air above western New York might, for some, signify the worst day of someone's life. But from another perspective, it offers reassurance that there is a service in the area that is dedicated to helping people and saving lives. That service is non-profit air medical provider Mercy Flight.

Headquartered in Buffalo, New York, with three other New York state bases in Springville, Olean, and Batavia, Mercy Flight — along with its ground ambulance division, Mercy Flight EMS — is a program that is truly there for the people.

"To know that you're a part of impacting somebody's outcome on one of the worst days of their life is just so gratifying," said Margie Ferrentino, executive vice president at Mercy Flight. "And it doesn't always go well, but what we know and find comfort in is that no matter what the outcome, hopefully the family and loved ones know that we gave the patient every chance possible... and that we were there for them."

Mercy Flight began operations in 1981, originating from an idea that founder/president Doug Baker had while running a ground ambulance service that transported high-risk babies and mothers from all over western New York and northern Pennsylvania.

During his time transporting acute patients by ground, Baker realized it was taking too long to get the patients to the care they needed. "I thought to myself, this would be a great situation for a helicopter," he recalled. "I had some experience in the [U.S.] Army flying — some. I was no expert. But I got this idea. . . . And I thought if I could break even, it would be terrific because we'd be helping patients and their families."

With an idea in place, the next step was to get the ball rolling with some help. Baker visited two hospitals in the Buffalo area and asked for support with medical direction for the paramedics. One after the other, they said no — with the concern for potential exposure to lawsuits.

"Then I went out to the Mercy [Hospital], which was a hospital that I operated the ambulances for," Baker said. "I sat down with Sister Sheila Marie Walsh, who was the CEO of the Mercy at that time, and explained what I wanted to do. She said, 'OK, go downstairs and see Dr. Burke,' who was the head of the emergency room at the Mercy at that time. And he said, 'OK, when do we start?'"

Launching with one single-engine Bell 206B JetRanger and a handful of paramedics in the early 1980s, Mercy Flight was



up and running — relying on fundraising and public support to operate. There were no helicopters associated with hospitals in the area at the time, and certainly no ground or rooftop helipads in place. “We painted an ‘H’ in the doctor’s parking lot [at Mercy Hospital] . . . and that was the first helicopter associated with a hospital in Buffalo,” said Walsh, who now sits on the board of Mercy Flight.

Now, Mercy Flight transports patients to four major hospitals in the Buffalo area — all equipped with rooftop helipads. Aside from Mercy Hospital, the organization frequently flies to ECMC Hospital, John R. Oishei Children’s Hospital, and Buffalo General Medical Center.

Baker said he never imagined the program would grow beyond one helicopter, but as it gained traction, the need for more aircraft became clear. Over the years, the organization has transitioned from the 206B to a few Bell 206 LongRangers, followed by MBB Bo.105s, and then onto Airbus BK117s.

As its BK117 fleet began to age, Mercy Flight made the decision to replace those aircraft with the Bell 429, taking delivery of its first of the type in 2011. In 2018, the program got an additional three 429 helicopters, and officially retired its BK117s.

Now, with a fleet of four 429s and over 200 employees — both

ground and air — Mercy Flight has transported thousands upon thousands of patients over the years; in 2018 alone, the organization transported over 12,000 patients with a combination of air and ground ambulances.

“To see this program transform and grow from this fledgling little helicopter program to what it is today has just been a blessing to witness,” said Ferrentino, who was instrumental in helping Baker and Walsh launch Mercy Flight 38 years ago.

THE WORKHORSES

The Bell 429 brings several benefits to an operation like Mercy Flight where every minute counts. Topping the list are power and efficiency.

“About half of our calls are on-scene transfers, [and] the other half are hospital transfers,” said Marc Boies, director of flight operations. “With the on-scenes we generally are landing on roadsides, fields, [and] somewhat challenging environments. . . . The nice thing about the Bell 429 is it has the power to get you in and out of anywhere that we operate.”

When a call comes in to Mercy Flight’s communication center, the goal is to get the aircraft off the ground within 10 minutes.

Mercy Flight regularly transports patients to four major hospitals in the Buffalo area, all equipped with rooftop helipads.



From left: Doug Baker, Sister Sheila Marie Walsh, and Margie Ferrentino. Baker said the team at Mercy Flight is a family. “We’ve got one person who’s going to celebrate his 50th anniversary [here] . . . and there’s many here at 25 and 30 years. It’s something special,” said Baker.



Chief flight nurse Jennifer Crotty said the flight nurses and paramedics at Mercy Flight “stay with our patient from start to finish.”



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Jennifer Crotty, chief flight nurse at Mercy Flight, said the 429’s quick start-up time makes the 10-minute goal easier to reach. The quick shut-down time also allows for the engine to be shut off while loading and unloading patients. “It allows us to be in and out faster,” she said.

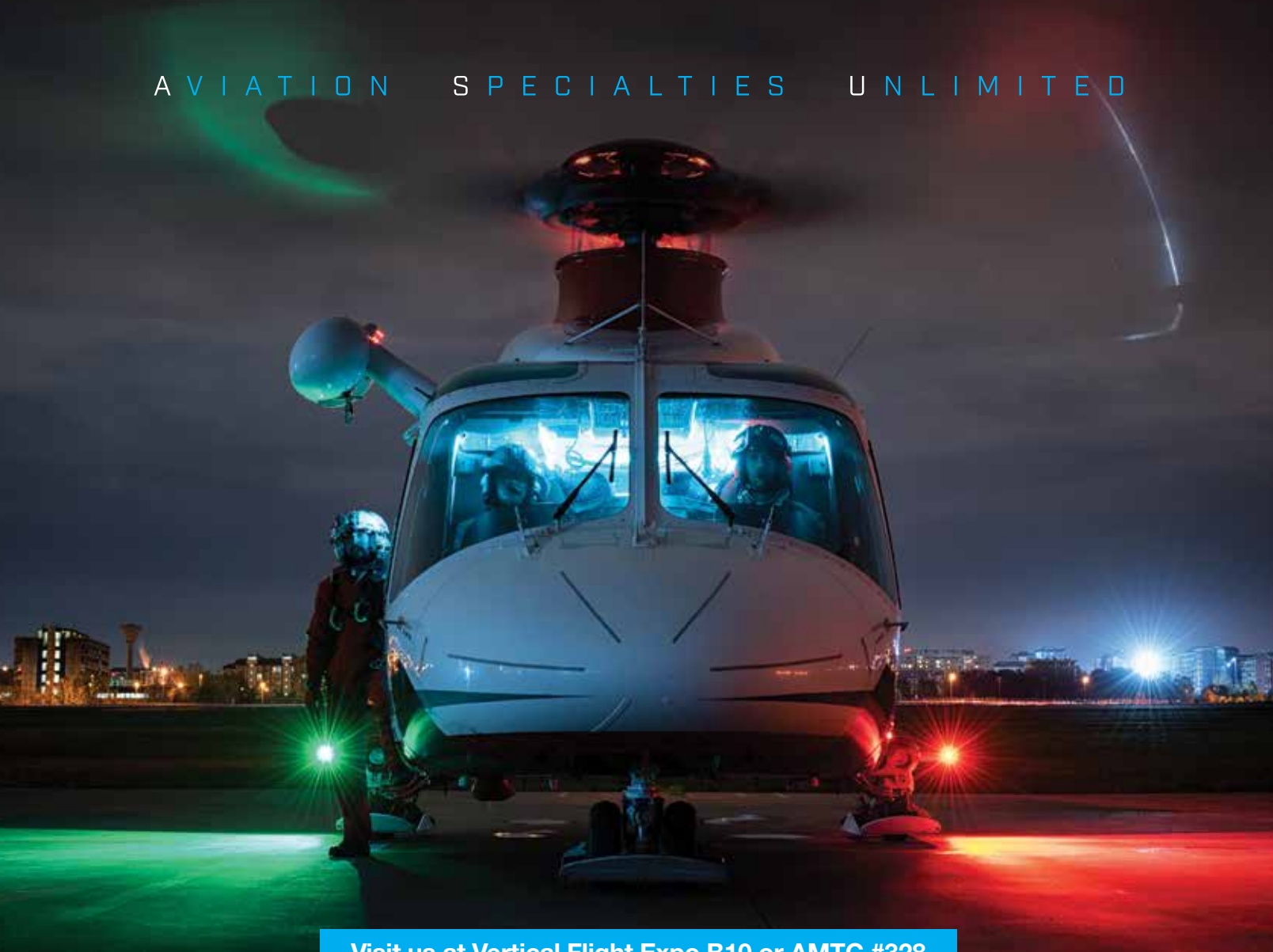
Furthering the program’s efficiency, Mercy Flight made the decision to standardize its 429 fleet in terms of the cockpit, medical equipment, and loading platform, which makes operations easier on the organization’s 14 pilots — who completed ground and flight training on the 429 in Fort Worth, Texas.

It was decided that a tactical radio that could be operated in New York and Pennsylvania was necessary, which led Mercy Flight to select the four-band Technisonic 9300 radio — which allows pilots to communicate with fire and law enforcement type agencies.

The 429s also feature a Garmin avionics suite, with the 650/750 touchscreen flight displays, traffic collision avoidance system, helicopter terrain avoidance and warning system, and automatic dependent surveillance-broadcast (ADS-B) in and out. Boies said fuel flow is also integrated into the Garmin, which helps with flight planning for on-scene calls.

The medical interiors on the 429s have been standardized across the fleet, but

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All four of Mercy Flight's bases are night vision goggle qualified and current. The organization recently began offering NVG training for pilots and crew in-house.

Boies said the organization started out with a slightly different interior on its first 429, and made the decision to change it when the other three aircraft arrived.

"Over the last five years, we've designed a different package to accommodate the myriad of patient transports we could be doing," he added. "We're doing more and more specialty transports with balloon [pumps] and ECMO [extracorporeal membrane oxygenation machines]. We've always done ICN stat-type incubator transports, too."

Developed by AeroLite AG, with the completions done by Uniflight Global, the medical interior in Mercy Flight's 429s allows the aircraft to accommodate the "worst-case-scenario patient," said Boies.

The interior features three seats in the back with swivels for medical crewmembers, along with a unique loading tray with modified brackets that allows for the ventilator, monitor, oxygen, and IV pump equipment to be stored on one unit. There is also an area on the cabin wall that provides suction on board — charged and powered by the aircraft — with the ability to pull the unit off the wall and bring it right into the hospital with the patient.

The stretcher can hold up to a 480-pound (215-kilogram) patient, while the litter weighs only 22 lb. (10 kg). In the case of bringing a patient out of an entrapment situation, the litter can be taken out of the aircraft and brought right to the scene to load the patient. "There are four different positions that [the litter] can be locked in during the flight, other than for takeoff and landing," said Boies.

The organization acquired its first 429 in 2011, and received the other three aircraft in 2018. "The nice thing about the Bell 429 is it has the power to get you in and out of anywhere that we operate," said Marc Boies.



"So, it [offers] multiple different areas for the medical crew to work on the patient."

Mercy Flight recently opted to switch from the clamshell doors to a side-loading door for various safety reasons. "It enhances safety because nobody ever then has to go past the sliding door," Boies explained. "Ground crews are restricted to that as part of our ground crew safety program. And even the crews for a walk-around — you don't have to check any security on a clamshell and walk underneath the tail of the aircraft."

Moreover, "sometimes we will hot load patients and the pilot has better visibility [with the side load] as they come in and out of the aircraft," he added.

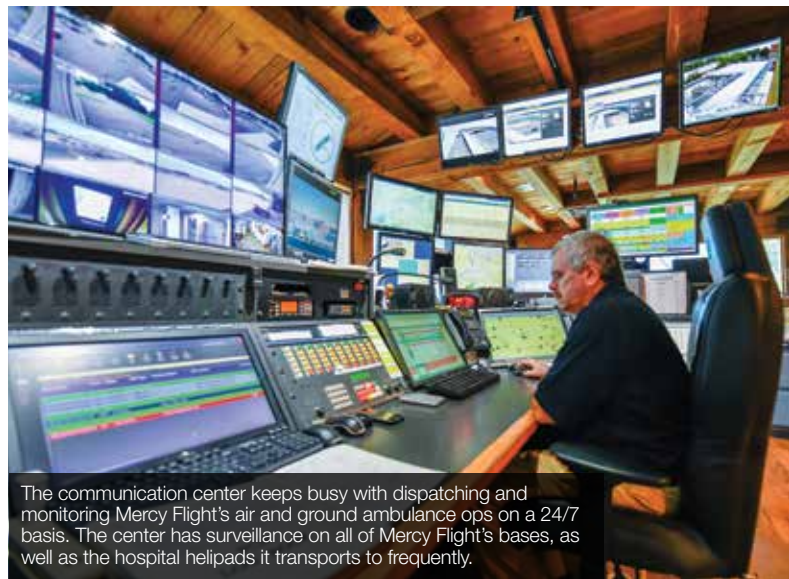
Aside from improved safety, getting rid of the clamshell doors also took 40 lb. (18 kg) off of the aircraft, which is that much more fuel that can be carried, said Rick Parson, director of maintenance. According to Parson, having a fleet of standardized Bell 429s keeps the work inside Mercy Flight's base hangars running smoothly.

The Buffalo base is a certified repair station, which allows maintenance personnel to remove and install transmissions and engines, and perform the typical maintenance that is done on a 429 in-house. Parson said the 429s are easy to maintain; "the systems seem to be a lot better, and a lot of it is self-diagnostic with the computer systems."

One thing that has really made a difference on the maintenance side is upgrading the main rotor head on the fleet. The shear bearing on the old-style rotor head would typically only last 800 to 1,000 hours, and would put the aircraft out of commission for two days for repairs. Since doing the upgrade, there has yet to be a failure on a shear bearing in 5,000 flight hours. "Makes our lives a lot easier," said Parson.



Mercy Flight's Buffalo base is a certified repair station, which allows maintenance personnel to perform the typical maintenance that is done on a 429 in-house.



The communication center keeps busy with dispatching and monitoring Mercy Flight's air and ground ambulance ops on a 24/7 basis. The center has surveillance on all of Mercy Flight's bases, as well as the hospital helipads it transports to frequently.

The air medical interior in Mercy Flight's Bell 429s, developed by Aerolite AG, provides the efficiency for the aircraft to operate like a flying ICU.



Mercy Flight operates 24/7. Every flight is staffed with a pilot, a flight nurse, and a flight paramedic, who each have a designated bedroom at the bases where they can sleep or brush up on skills.



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WHEN MINUTES MATTER

"At Mercy Flight, we've always had the slogan "When Minutes Matter," said Boies. "Our goal is to safely and efficiently get the aircraft off the ground [and] on the way to the patient, so we can speed up the process to the hospital or the higher level of care."

Mercy Flight's communication center keeps busy with dispatching and monitoring its air and ground ambulance operations on a 24/7 basis. The center staffs two communication specialists — as well as a supervisor and manager during peak times — who are responsible for the intake of emergency or transfer requests from either a 911 center or a facility that is looking to transfer a patient.

Dispatchers have real-time visibility of the 429s thanks to the satellite GPS automatic vehicle locator tracking installed on each aircraft, which is done through SkyTrac.

For additional surveillance, the organization's bases and the hospital helipads it transports to frequently are constantly monitored by cameras. With an eye on the helipads, Mercy Flight's communication specialists have the ability to coordinate some landings, either for the organization's own aircraft or for aircraft from other communities.

"We're also monitoring a lot of the fire departments and the 911 centers throughout our community," said Rob Woodford, communication center manager. "And because of that, a lot of times [we have] knowledge of an emergency call as it's being dispatched to the fire service, and we're getting ourselves positioned, looking up the location of the incident, and briefing the crew long before the incident commander or fire chief requests for the helicopter to respond."

Before Mercy Flight's 429s leave on a call, the aircraft must be staffed with a pilot, a flight nurse, and a flight paramedic. Upon arrival for each shift, the trio will do an inspection of the aircraft and every piece of equipment to ensure everything is clean, intact, and running properly. A walk-around of the aircraft will also be done by each of the three crewmembers before getting in and lifting off.

Chief flight nurse Crotty said the 429 has made the work in the back of the aircraft a lot smoother — quite literally. "I don't really ever feel any vibrations," she said. "And I do give my patients a heads up about that to make them feel a little bit more comfortable." The 429 also boasts a large cabin, with one rear-facing seat



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The organization raises donations to supplement its budget, and works with uninsured or under-insured patients to help forgive some of the costs of receiving air medical care.



and two front-facing seats that allow for better coordination.

"In the aircraft we are constantly communicating," said Crotty. "Even prior to a flight . . . if there's any question on whether or not we should take the flight regarding weather [or] things that are going on in the area . . . we will make a decision together."

Flying in western New York near Lake Erie and Lake Ontario brings on all types of weather conditions, ranging from lake-effect snow storms to convective activity to severe thunderstorms. "The pilots certainly have to be on their toes to make sure they can get from point A to point B," said Boies.

While the organization is currently flying under visual flight rules, it is very close to implementing single-pilot instrument flight rules, which will reduce the number of times that flights have to be turned down due to weather.

Being a 24-hour operation, all four of Mercy Flight's bases are night vision goggle (NVG) qualified and current. The organization now offers NVG training in-house, but initially had Aviation Specialties Unlimited provide the training to pilots and crew.

In addition to the enhanced safety that comes with wearing NVGs, Mercy Flight also boasts a range of critical care and advanced medical capabilities thanks to the crew's experience and training — both of which are complemented by the range and speed of the Bell 429.

To earn a spot on Mercy Flight's air medical team, flight crews must have their critical care certificate and/or their flight paramedic certificate.

"Once they are approved, they'll go through . . . what we call our flight boot camp program," said Denise Cuillo, director of education and paramedic at Mercy Flight. "They'll go through orientation and they'll do some flight training. They do additional classwork and . . . finally a simulation test to see if they're ready to fly."

Flight nurses and flight paramedics on the Mercy Flight team also constantly keep up with education and skills during down time, Cuillo added.

ALL ABOUT THE CARE

A non-profit organization since its inception, Mercy Flight has always aimed to keep the cost burden on the community as low as possible, while still maintaining sustainability as a business. Being a 501(c)(3) charitable organization, the program is able to raise donations to supplement its budget.

"Western New York has just been the best place in the world to do that," said Scott Wooton, vice president of finance. "I think the people here are incredibly generous and really understanding of our mission and what we're trying to do."

Through its charity care program, Mercy Flight

In 2018 alone, Mercy Flight transported over 12,000 patients with a combination of air and ground ambulances.



When Mercy Flight receives an air medical call, the goal is to get the aircraft off the ground within 10 minutes. The pilot, flight nurse, and flight paramedic each do a walk-around of the aircraft before taking off.



works with patients who are uninsured, under-insured, or going through financial hardship to reduce or forgive some of the costs of receiving air medical care.

"It was never about money," said Walsh. "It was always about care — offering care that was badly needed. And you didn't ask the people how much money they had or if they have insurance. That's why we could be not-for-profit. . . . If [a patient] has no money, [or] if they're rich, it doesn't make any difference. If the need is there, we're going to take care of it."

Mercy Flight is able to raise upwards of US\$700,000 per year through fundraising efforts, said Wooton; for every dollar that is brought in through donations, 90 cents are put back into the program, and the other 10 percent goes to administration and fundraising itself.

Acquiring four \$7 million aircraft has been a challenge for the organization, but it has been fortunate enough to get the aircraft under 20-year loans.

"I never worried about where the money was going to come from, or if it would come," said Walsh. "I was more concerned with the service that was needed, and I knew that God was going to take care of it. And all these years, He has."

At Mercy Flight, it has always, and will always continue to be about the patients and the care, first and foremost. These are the standards that Walsh has instilled in the team through the years. And with that said, the people of western New York can know that in times of need, they are in good hands. 🚁



Dayna Fedy | Dayna is associate editor of *Vertical* magazine. She completed her undergraduate degree in communication studies in June 2017, joining MHM Publishing later in the year to pursue a career as a writer and editor.



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When the pilot of an Air Evac Lifeteam helicopter suffered an in-flight medical emergency on Jan. 12, 2018, two things on board the Bell 206L LongRanger helped achieve a successful outcome. The first was a recently installed Genesys HeliSAS stability augmentation system and autopilot, which kept the aircraft stable until the pilot recovered enough faculties to land in an open field. The second was the high-functioning team of flight paramedic Lane Abshire and flight nurse Tara Coupel, whose refusal to give up was just as instrumental in getting the helicopter safely to the ground.

We shared their incredible story earlier this year in the Winter issue of *Vertical 911*, where we also described the training that Air Evac developed to cope with similar events in the future. Now, Air Evac wants to share its training tools and insights with the industry so that other organizations can likewise prepare for the rare but potentially catastrophic emergency of pilot incapacitation. The company has developed a 30-minute video that shows one of the specialists in its operations control center (OCC) talking a crewmember through an approach to an airport in a flight simulator, culminating in a successful run-on landing. Available to other flight programs upon request, the video showcases the clear, robust guidance that Air Evac's OCC specialists developed through months of testing and refinement.

As Air Evac president Seth Myers explains in the video, following the 2018 event in Kinder, Louisiana, Air Evac asked from a safety management system (SMS) perspective, "What could we do to manage this risk in the future? Because frankly, we weren't prepared, and as we've heard from many others in the industry, they are not prepared either for this." Now, going on two years later, Air Evac's OCC specialists are experts on the avionics and autopilot systems in the company's fleet. They have cockpit diagrams they can reference, and extensive practice in getting non-pilots to a location where their odds of a survivable landing are greatly increased. By sharing an example of how that works, Myers said, Air Evac wants to help other organizations devise their own training to similarly manage the risk.

"One of the things that had come up in our initial conversations was, 'Well, isn't this just a part of the risk to a flight crew? And there's probably really nothing that can be done here,'" Air Evac director of safety Tom Baldwin recently told *Vertical 911*. "We were not going to buy into that. There had to be something we could do. There had to be some way that we could give our flight teams a fighting chance."

A SCRIPTED PROCESS

Air Evac's OCC is mandated by regulation, as is the case for other large U.S. air medical providers. Because OCC specialists are required to take part in pilots' pre-flight risk assessments and provide them with weather information, many OCC specialists are themselves pilots or have otherwise strong aviation backgrounds. But when Air Evac's OCC in O'Fallon, Missouri, received a mayday call from the medical crew of Air Evac 125, no one there knew what to do for them. The Genesys HeliSAS system was still fairly new to the company, and the OCC specialists didn't know how to explain it. They didn't have any reference material to help orient the med crew to the layout of the cockpit. They felt, in a word, helpless.

After the incident and its miraculously successful conclusion, Air Evac developed a risk control in two parts. First, it created a video-based training program for medical crewmembers to familiarize them with the HeliSAS and associated avionics. All of the company's current nurses and paramedics have now been through the training, which has also been integrated into initial training for new hires.

However, Air Evac knew that it couldn't count on crewmembers under extreme duress to recall complex sequences of button-pushing that they might not have thought about for months. So the company focused its most intensive efforts on developing guidance and training for OCC specialists, preparing them to play a leading role should a pilot incapacitation event occur in the future.

"I said, 'Hey, let's think about this the way that we think about EMD — emergency medical dispatching,'" recalled Baldwin. "I can take an individual who knows nothing about CPR and I can have them performing chest compressions on a patient, on the street, within a matter of seconds." Dispatchers can do this, he explained, because relevant organizations have "analyzed these events, and they've developed scripted processes that are very, very black-and-white, very straightforward, very simple to understand." Air Evac decided to do something similar for pilot incapacitation, developing a script for talking a crewmember through an approach as efficiently and unambiguously as possible.

According to Air Evac OCC manager Brian Allison, a former U.S. Army Apache helicopter pilot, coming up with an initial procedure took about a month. However, it took another eight to nine months to really perfect that guidance "through a lot of trial and error" in the flight simulator. One of the most important things the OCC specialists did was involve their communication specialist colleagues as simulated crewmembers. As Allison explained, "We started training using each other, and since we're all pilots and we're familiar with the procedure, we had a really hard time playing [non-pilot crewmembers]. So we started using our communicators downstairs, the people who take in our initial calls — they're not pilots at all."

By putting comm specialists in the simulator, he said, OCC personnel were able to study their natural reactions and figure out what worked and what didn't. "We learned a lot about how to communicate with people who are not pilots by doing that," Allison continued. "We also learned that they caught on faster than we thought. So we changed our script and how we say things, how we present things after doing that."

One important lesson the OCC specialists learned from their simulator runs was to build safety buffers into their guidance. For example, the HeliSAS autopilot in Air Evac's helicopters will disengage below a forward airspeed of 45 knots. Initially, the OCC specialists coached "crewmembers" to slow the aircraft to around 50 knots before touching down in a run-on landing. "We were finding that things could change so rapidly that all of a sudden the aircraft would get too slow," Allison recalled. "[The autopilot] would kick off and it would have happened so fast that we couldn't react to it, because we just weren't in the cockpit." The result was usually an uncontrolled descent short of the runway, with catastrophic results.

Rather than persist with that strategy, Allison said, "we started doing landings at higher speeds and they turned out a lot better than we thought. So instead of trying to touch down at 50, 55 knots, we were touching down at 65, and that run-on worked just fine every time and we never got into any of these dangerous situations."

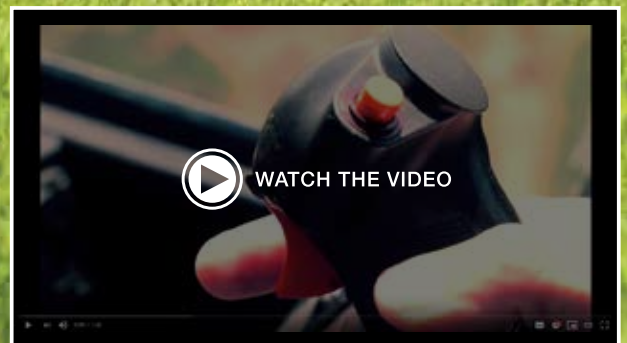
The OCC specialists also gained new appreciation for the importance of empathy in communications. While running through their pilot incapacitation guidance, they also bear in mind that the crewmember they're talking to "may be stressed out, may be upset, may be scared," Allison said. He noted that this awareness is becoming more apparent in the specialists' day-to-day operations, too: "When people sound stressed, when sound people sound worked up, [the

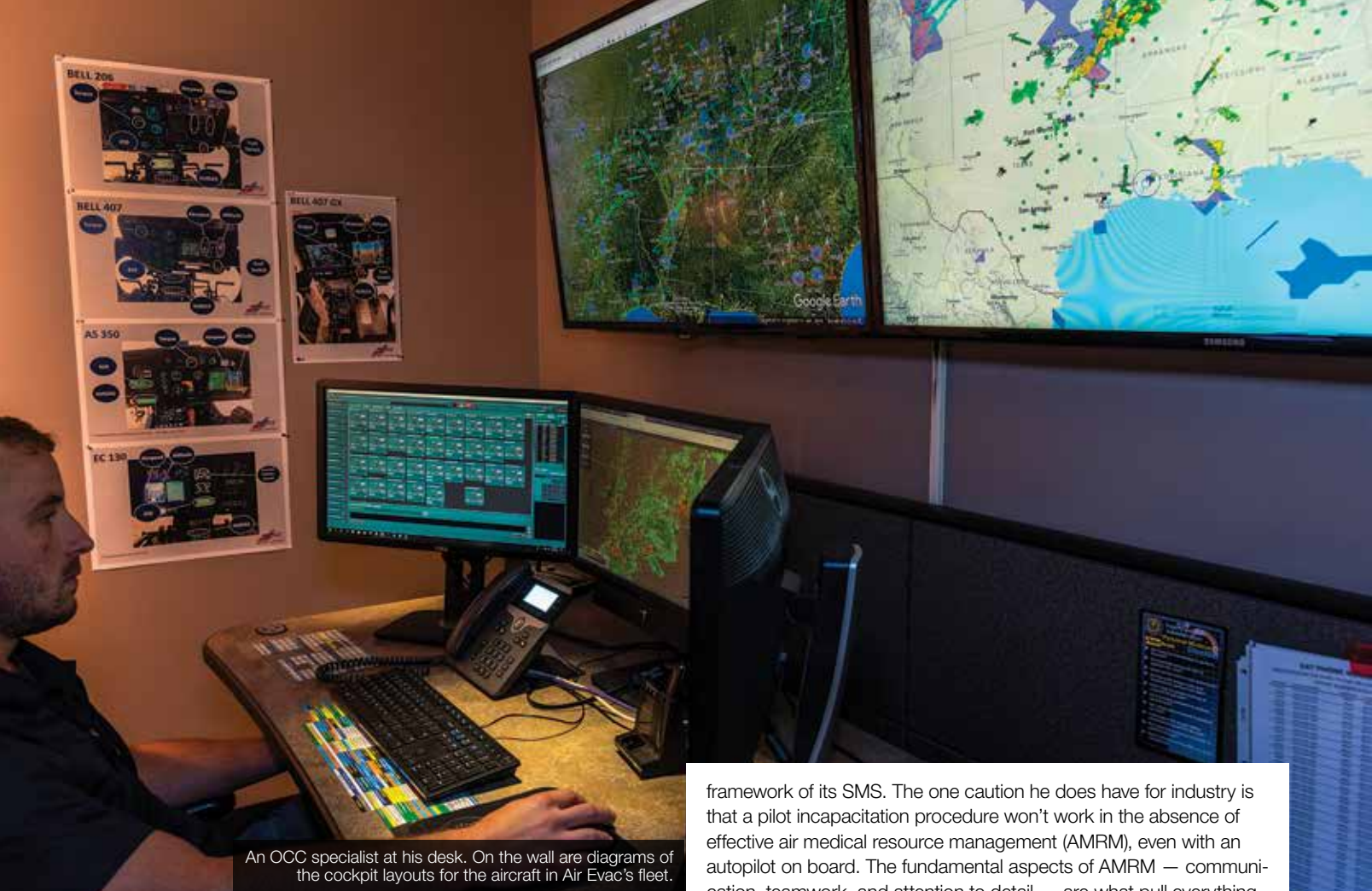
Air Evac Lifeteam wants to share the lessons it learned from a 2018 pilot incapacitation event.

GIVING OTHERS A FIGHTING CHANCE

In the aftermath of a pilot incapacitation event with an extraordinary outcome, Air Evac Lifeteam wants to help other flight programs prepare for this unthinkable emergency.

BY ELAN HEAD // PHOTOS COURTESY OF AIR EVAC LIFETEAM





An OCC specialist at his desk. On the wall are diagrams of the cockpit layouts for the aircraft in Air Evac's fleet.

OCC specialists] are able to handle that and keep an even tone and not add more stress to a situation."

WORTH THE EFFORT

Air Evac's OCC specialists now practice their pilot incapacitation procedure with a volunteer in the simulator around once a month. "I'm really proud of them," Allison said, emphasizing how competent his team has become with the procedure. "It has really given us some confidence that if something were to go wrong, especially this extreme, that we have at least an answer for it."

As Baldwin stressed, "We're not teaching our flight teams to fly the aircraft. We're teaching them and our operations control specialists to basically set up an approach and get ourselves to an environment where we can have response personnel [standing by], and really trying to control the severity of this event inasmuch as we can."

Baldwin, who has shared Air Evac's lessons learned at industry events including the Air Medical Transport Conference (AMTC), noted that he sometimes receives pushback from people who can't imagine that the Federal Aviation Administration (FAA) would be on board with the company's training.

"I've had this come up two or three times, maybe even more," he said. "So what you're telling us is that you are telling your flight team to unbuckle, come out of the restraint system, crawl up to the front of the aircraft, and interface with the controls, autopilot, and GPS? And my answer is pretty simple: 'Yes, we are.' What's the alternative? Because if we don't do something to help them, to prepare them for this type of event, we're going to lose the whole flight team. And that is not acceptable."

In fact, Baldwin said, Air Evac developed its guidance with the full support of its FAA certificate management team, within the

framework of its SMS. The one caution he does have for industry is that a pilot incapacitation procedure won't work in the absence of effective air medical resource management (AMRM), even with an autopilot on board. The fundamental aspects of AMRM — communication, teamwork, and attention to detail — are what pull everything together, he said.

"When you actually got to have a front seat into what happened inside that aircraft and the communication between the team, even with the technology on board, if the communication or the AMRM aspects had failed or not been utilized, we would've had the same result as not having the technology," he emphasized.

For paramedic Lane Abshire, who actually did crawl up to the front of the aircraft when his pilot became medically incapacitated, Air Evac's new procedure has given him and others in the organization "a sense of comfort," he said. That's in contrast to "the feeling that I had up there without that procedure in place, where we were having to wing it and honestly just hope for the best."

Abshire acknowledged that the process might not result in a successful outcome every time, as is true for any emergency procedure. That doesn't mean the company's investment has been misspent.

"If this happens again, we have spent the time and the effort in putting the training together to where we legitimately have given flight crews a chance," he said. "It's all about that fighting chance. It's about having that plan of action in place to where if this impossible situation were to happen, if that flight crewmember can get to the front of the aircraft, we've got stuff that you can do." 🚑

If your flight program would like to view Air Evac's pilot incapacitation training video, contact Shelly Schneider, shelly.schneider@air-evac.com.



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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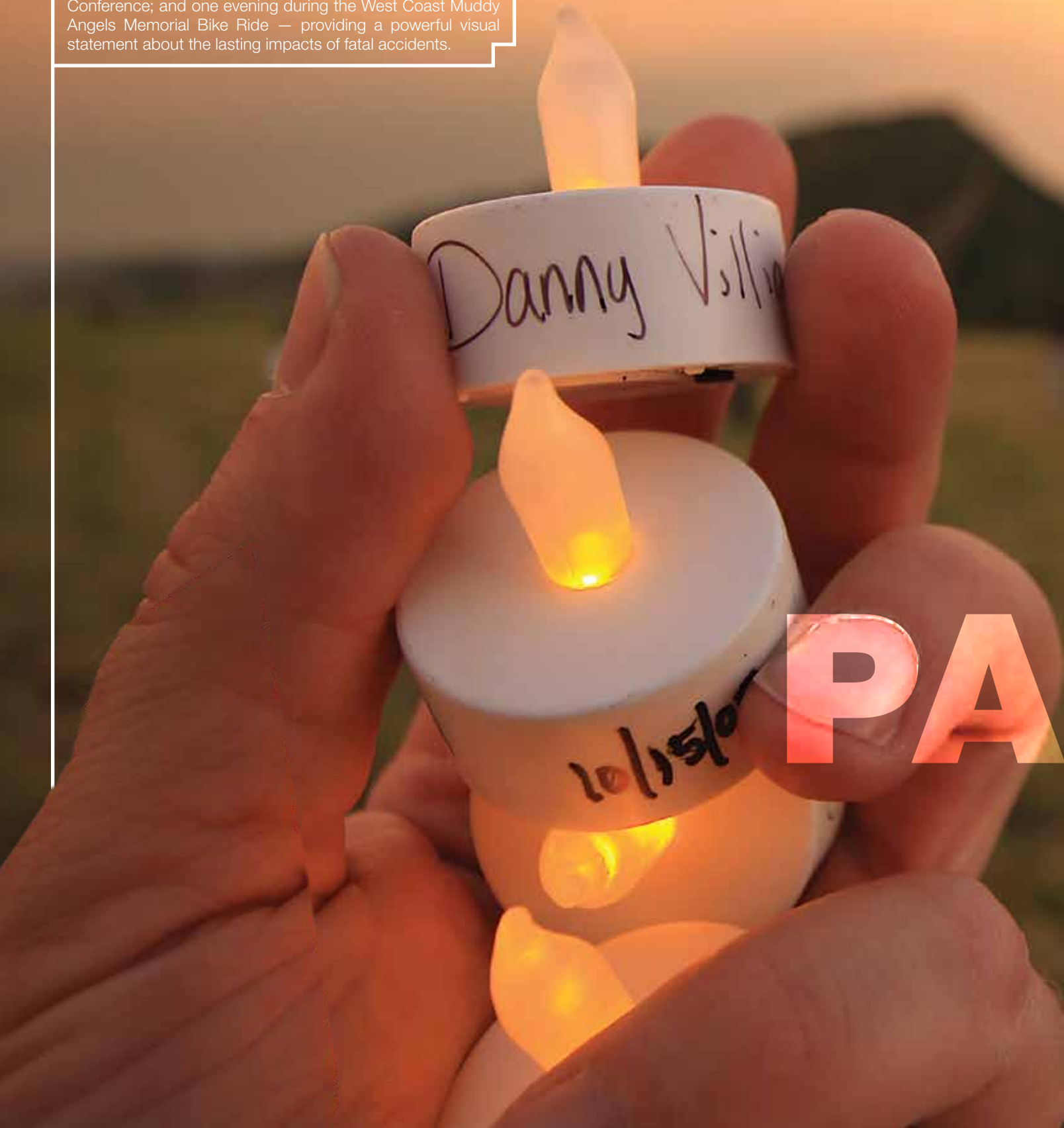
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MEMORIAL LIGHTS

The photos in this article are from the Memorial Lights, an artistic project created in 2013 by photographer Mark Mennie. There are currently over 430 lights in the collection, with each one commemorating a line of duty death in the air medical community. The Memorial Lights are displayed annually on the night before the Air Medical Memorial in Littleton, Colorado; the Sunday before the opening of the Air Medical Transport Conference; and one evening during the West Coast Muddy Angels Memorial Bike Ride — providing a powerful visual statement about the lasting impacts of fatal accidents.



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PREPARING FOR THE WORST RT III

No one wants to contemplate a fatality within their organization, but fatal aviation accidents can and do happen with unfortunate regularity. Here's how your organization can prepare to cope with a line of duty death.

BY DANIEL J. MCGUIRE
PHOTOS BY MARK MENNIE

Editor's Note: This is part 2 in a two-part series by Daniel J. McGuire, a board-certified grief educator and counselor who works with emergency response agencies to prepare for losses within their organizations. Part 1 appeared in the Summer issue of Vertical 911, available to read online at verticalmag.com/issues.

All too often when there is a line of duty death (LODD) in an emergency services agency, our instinct as first responders is to take charge of the situation in a desire to honor our deceased colleague. However, as I mentioned in the first part of this series, that instinct can lead to us pushing aside the employee's surviving family — a serious misstep that can result in damage and disruption before we realize what is occurring.

A primary rule when dealing with any employee's death, be it a LODD or the death of an employee off duty, is that the surviving family is your number one concern. It is imperative to make sure that there is no "running over" the family with the agency's well-intentioned ideas for bereavement and remembrance activities. I repeat, the surviving family's wishes simply have to come first and foremost in all of our thoughts and actions.

A highly important and visible position in any LODD pre-plan is going to be the family liaison (FL). The FL position is not, nor should it ever become, a decision-making position — that is not your job. Instead, the FL serves as the primary contact between the surviving family and agency leadership for all wake, funeral, and memorial arrangements. Also, the FL ought to help guide and advise the surviving family on traditional commemorations, tributes, and funeral traditions in the public safety sector.

The FL should be someone from your agency who is well known and respected, who has excellent communication skills and the ability to think on their feet, and who won't fall into the well known trap of "over-promise, under-deliver." The surviving family does not need or want multiple calls from agency representatives suggesting funeral and memorial ideas beyond what was originally written on the employee's emergency contact form (ECF). That is why the ECF, which I addressed in part 1 of this series, is all important, since it contains decisions and requests from the employee that should be followed as closely as possible.

The Memorial Lights travel in a dedicated box to each ceremony location, where they are set up by volunteers. The lights are not organized and are stored all together, which compels volunteers to read the name on each light and remember the life it represents.



Widow Melody Piehl holds the light of her husband, Russ.

The FL must become and remain the single point person between the surviving agency and the surviving family throughout the LODD event. The FL ought to be a “one-stop” resource for the surviving family and all communications, of any type, to and from the surviving family ought to go through the FL so the family is not overwhelmed with offers from well-meaning agency representatives. This line of communications must remain organized, closed looped, and effective for the surviving family’s needs and wants.

The FL will be with the family, offering whatever support they desire. Sometimes the family will ask the FL to be at their home to answer the phone and take messages in the first several hours or longer after the death is confirmed. Many well intentioned people will be calling to extend their sympathy, offer support, ask if any food can be brought over, etc., and the surviving family simply may not be ready for or want to take those calls for the first 12 to 24 hours.

One very important caution: the FL will be exposed to the surviving family’s raw grief, unfiltered anger, and other visceral emotions. Witnessing these reactions can be physically and emotionally taxing, especially since the FL will have their own personal grief to contend with. For this reason, it may be beneficial to have two agency members assigned on a 12-hour-on, 12-hour-off rotational basis. A rotational schedule should be planned and completely discussed with the surviving family to get their understanding and approval. If there will be two FLs, be sure the surviving family has cell phone and other contact numbers for both of them so they feel empowered to contact one or the other at any given time.

The FL should also be working with the agency’s subject matter experts to address other important tasks that need to be covered. For example, will the surviving family require assistance in arranging transportation for extended family members and friends flying in from out of town? The FL does not need to be directly involved in all of these supporting tasks — a transportation subgroup reporting to the FL can handle the details.



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Lights placed at a 2016 memorial event.



Widows and mothers embrace each other as lights are placed out at twilight.



A family member cradles the light of Bonnie Cook, a flight nurse who died in an accident in 2018.



Musician Greg Hildenbrand performs his song "Never Forget" during the ceremony held this July in Littleton, Colorado.

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Be prepared to support the surviving family not just in the immediate aftermath of a LODD, but also long after their loss. As I frequently emphasize, "This isn't over when you depart the cemetery." Surviving employees will also need support and understanding in the weeks and months to come. This may require that some employees receive additional time off duty as they process the death event and their personal sense of loss. In particular, because FLs are so intimately exposed to the surviving family's reactions of grief, hurt, and sorrow — in addition to coping with their own reaction to the event — they should be offered some type of peer support or other counseling once they are done with their immediate assignments.

REACTIONS TO GRIEF

As a board certified grief counselor, I want to take a moment to prepare you for the fact that you may be surprised or even puzzled by the reactions you notice in yourself, your colleagues, and the surviving family following a LODD.

You may have worked with your crewmembers and other agency personnel for many years, and feel that you know them very well. However, a line I use often when teaching stress and grief programs is: "A sudden death can change the closest of friends in less than a moment."

A LODD can trigger unpredictable

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From 2014, the second appearance of the Memorial Lights at the site of the Air Medical Memorial in Colorado.



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reactions that can evoke surprise or even anger between people with previously solid professional relationships. Some of these unpredictable reactions can manifest as deep sadness, anger, or questioning the safety of one's job, which often leads to an erosion and disruption of one's work habits. It should also be well noted that when an agency goes through a LODD event, subsequent employee attrition is usually directly related to how well the event was managed. This can have an impact on current and future flight operations.

A note on grief reactions: sudden, traumatic tragedies can and will affect everyone with feelings of significant loss, depressive thoughts, and disbelief. There should be no expectation that people closely affected by the loss should "be strong" or "keep their head up." Moreover, we all have our own ways of expressing our grief and bereavement. Therefore, no one should be made to feel that their showing of grief is not normal when compared to others. Your reactions are just that — yours — and should not be judged by anyone else.

Also, there is no "foot race" or specified timeline for our individual grief paths ahead. Yes, some people will seem to recover and metabolize faster than others, but that doesn't mean they are the "stronger" ones. We all need to follow our own grief path that suits our past losses, other traumas, our cultures, and customs that we have developed over our lives.

There is a strong cultural barrier in the United States and some other parts of the world that prevents us from talking openly about end of life issues, facing them, and planning for them. This means that for many of us, the entire category of death is rarely talked about and poorly understood. There are many resources that can help your agency cope with varied grief reactions, including literature from your local funeral home director or religious leader and industry specialists.

The ultimate questions for any agency in the aftermath of a LODD event are: "Did we do it right?" and "Did we do enough?" The only way to be prepared to answer these questions in the affirmative is, "Get to work, now!" If you don't already have a comprehensive LODD pre-plan, then I ask and implore each of you as leaders in your flight operations to take this matter to the top of your current priority lists. Too late is merely that — too late. 🚫



Daniel McGuire | President and senior consultant of CISM Perspectives, Inc., a nationally known and respected training and consulting practice that specializes in establishing line of duty death response programs and peer support programs. Contact him through www.cismperspectives.com.



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As Storm Emma intensified in March 2018, Greater Dublin was brought to a standstill and outlying areas prepared to be cut off for days. Irish Coast Guard helicopter crews were also temporarily grounded, but began responding to emergency calls as soon as the weather began to abate.



FACING THE STORM

HOW IRISH COAST GUARD RESCUE
CREWS RESPONDED TO EMMA.

BY DAN MEGNA // PHOTOS & VIDEO BY COLLINS AEROSPACE

Editor's Note: This story was reported by Vertical Magazine and sponsored by Collins Aerospace.

The 2017-18 European winter storm season will go down as one of the most momentous on record. A number of intense winter storms, producing bitterly cold temperatures and damaging winds, wreaked havoc all across Europe. In some instances, these storms merged with other weather systems, developing into "super storms."

Storm Emma was one such super storm. It first developed during the last days of February over Western Europe. In the days that followed, the moisture-laden storm and its dangerous winds tracked northwest toward the United Kingdom and Ireland. There, it merged with another system: an unstable polar air mass pushing in from Siberia, dubbed by local media as the "Beast from the East."

By mid-day on March 2, Dublin, Ireland and the surrounding countryside was beginning to experience Emma's wrath. Temperatures fell rapidly as winds increased. By late afternoon, heavy blowing and drifting snow blanketed roadways, making vehicle travel nearly impossible.

By evening, airports suspended operations, public transportation ceased, and mobile EMS resources were rendered largely ineffective. Greater Dublin was brought to a literal standstill while the outlying rural villages, isolated farms, and cottages prepared to be cut off, likely for days.

Just ahead of the storm, around 1 p.m., Sid Lawrence, a Sikorsky S-92 captain for CHC Helicopters, arrived for his shift at the Irish Coast Guard

(IRCG) facility at Dublin Airport. He recalled, "We had plenty of warning for Storm Emma; we knew it was coming. We had prepared for it and the island battened down the hatches."

CHC provides five search-and-rescue (SAR) S-92s, four primary and one spare, to IRCG, along with flight crews, rescue crews, and flight engineers who operate from four coastal bases. While their primary responsibilities are emergencies at sea, they are also tasked with public safety and emergency missions all across Ireland. Each four-person flight crew comprises two pilots, and a winch operator and a winch man who are also trained paramedics. Two engineers on each shift are responsible for servicing the aircraft and keeping them airworthy.

"We came in the first day, the winds were gusting over 40 knots from the east," said Lawrence. "Visibility was about two kilometers [1.2 miles] in falling snow and cloud bases over the airfield were around 800 feet. And that was pretty consistent throughout the whole period. Obviously, the clouds went up and down and the wind shifted around, but that was pretty much indicative of Storm Emma."

FINDING THE LIMITS

Within seconds of walking in the door, the SAR bell went off. Lawrence and his "Rescue 116" crew received their first mission: a male with chest pains and possible head injury in an inaccessible

The scene was 50 miles south of Dublin and reportedly only a short



distance inland from the coast. Lawrence said, “We launched and flew down IFR [instrument flight rules] and then let down offshore and tried to make land break under the clouds. We couldn’t... I mean, the weather was appalling.”

Rescue 116 operated offshore for about half an hour, assessing weather and logistics with rescuers on scene. It was soon determined the casualty was much farther inland than first reported, and visibility between the coast and the scene had deteriorated to near zero. Rescuers had little choice but to look for alternatives. Rescue 116 was cleared to return to their base.

“The difficult jobs are always the ones you can’t actually do,” said Lawrence. “So that ranked bad because there was somebody who needed help and we couldn’t help. Now thankfully, a land ambulance got access and, between them and the fire brigade, they got him to safety and to a hospital.”

As Storm Emma intensified outside, Lawrence and his crew spent the rest of the shift uneventfully, warm and dry in the crew quarters. The following day, after the 1 p.m. crew change, the relief crew was also stuck indoors, away from the fierce conditions swirling outside. However, this enforced idleness wouldn’t last much longer.

It was 5 a.m. when the first SAR bell went off. An 81-year-old female had been bleeding all night with an uncontrollable nose bleed. She had reportedly lost a tremendous amount of blood and was in critical condition, and ground EMS assets had not been able to access her.

At the IRCG hangar, the overnight storm had blown eight-foot snow drifts up against the hangar doors. It took Dublin Airport ground support personnel an hour to remove the snow and clear a path before the S-92 could be rolled out.

The scene was a rural village in the foothills west of Dublin. While the IRCG crews do have moving map technology, it is intended for locating vessels offshore. For these overland missions, the computers can do little more than aid the crew in getting into the general area.

Identifying the scene is strictly visual.

The helicopter crew maintained radio contact with EMS dispatchers talking with persons at the scene, asking for landmarks to guide them in. Once on target, the weather, deep snow, and overall environment dictated tactics for accessing the patient. Landing was simply not an option. Hoisting — using the aircraft’s Collins Aerospace Goodrich 44311 rescue hoist — was the only alternative.

The crew methodically ran through their checklist before paramedic Derek Everitt was deployed down to the scene. He recalled, “The biggest challenge we had was understanding how our depth perception goes after 25 or 30 feet below the aircraft. Everything below was just white. And as I approached what I thought was the ground, it was actually a nine-foot-deep snow drift.”

Once inside the residence, “now, basically it’s an ambulance scene call,” said Everitt. “You’re in someone’s living room.” As Everitt began working to stabilize the patient, a ground medic/rescue team arrived after a three-hour trek on foot through the snow. After stabilizing the patient, the two paramedics prepared the patient for the hoist extraction.

The area surrounding the home had several antennas and crisscrossing utility wires. Everitt identified a small 10-foot-square patch near the house adjacent to several large trees that was suitable for the extraction. The medic from the ground team was the first to be hoisted aboard the helicopter hovering 80 feet above. Everitt and the patient followed in a “double-up” configuration.

With weather conditions changing rapidly, Rescue 116 quickly ducked out of the scene. Everitt said, “We carefully assess exit routes and make a plan. If things go [wrong], the fall back recovery plan is to immediately climb to the MSA [minimum safe altitude] and return to Dublin.”

NO OTHER OPTIONS

In this instance and all throughout Storm Emma, because deep

During Storm Emma, Irish Coast Guard rescue helicopter crews had to contend with rapidly changing weather conditions, deep snow, and an urban environment with numerous wires, antennas, and other obstacles.



snow blanketed all traditional landing zones near the hospitals, crew had no option but to fly back to Dublin Airport and transfer patients to an ambulance. (Some ambulances were escorted by snow plow to ensure safe passage.)

It was near 7 a.m. when the helicopter landed at the airport. Almost immediately the crew was tasked again: a six-year-old boy needed medical attention in a remote village in the foothills. The weather check reported winds of 21 knots, outside air temperature of 1 C, visibility 2 kilometers, clouds broken at 800 feet, and snow showers. The crew decided to make an attempt.

Four minutes from the destination, they were re-tasked on a higher-priority call — a three-month-old child was in urgent need of medical attention after two apneic episodes (a transient cessation of respiration) overnight. His parents had been on the phone with the ground ambulance service for nearly six hours being told, “Look, we just can’t get to you.”

Again, finding the village was relatively easy. Locating the house, however, proved a challenge. Everitt said, “There were loads of people everywhere. There was no movement of cars. Just people walking, people waving. Finally we said, what’s really close to you? They said there’s a church steeple really close up the road a little bit. We could see two churches. So we pulled up alongside the first one... no, nothing there. We then pulled up alongside the second one and there they were; this man was frantically waving!”

This was a small village with clusters of small bungalows, church steeples, utility wires, and communication antennas — certainly not an ideal setting for hoist evolutions with an S-92. But the crew assessed the situation and protocols before deploying Everitt from a 120-foot hover into a neighboring yard. Because the weather was rapidly changing with snow showers moving through the area, the helicopter remained on scene, parking itself in a 300-foot hover adjacent to the church.



Irish Coast Guard search-and-rescue captain Sid Lawrence recalled of Storm Emma, “In all my years in Ireland, I’ve never seen snow like it.”



Irish Coast Guard winchman Derek Everitt is normally rescuing people from ships offshore. During Storm Emma, he found himself in patients’ living rooms.

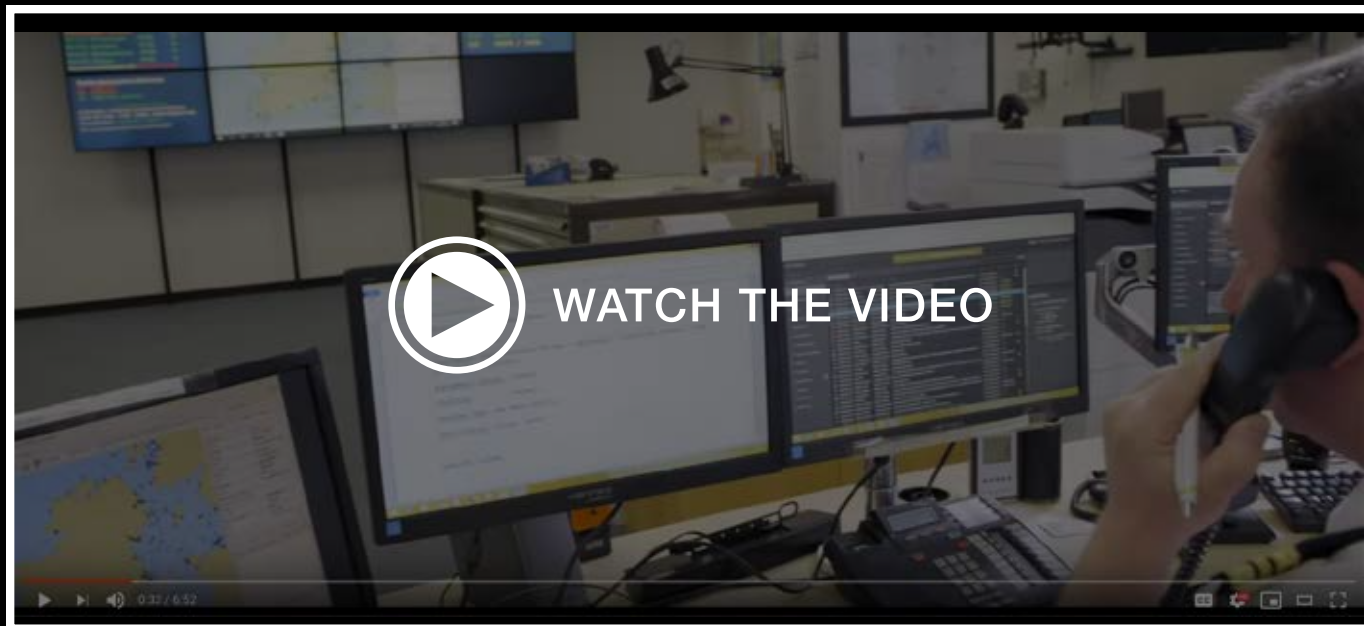
“I was met with two young parents of two young twin boys, a local girl who was a nurse, and the mom’s sister,” said Everitt. “It was a fairly hectic scene. A lot of concern, a lot of panic, and a lot of worry from the mom and her sister. And dad was just trying to be the dad, which is, ‘What can I do to help...?’ The baby was flat, flaccid, lack of [skin] tone, very quiet. And for us, a quiet baby is a sick baby. But all and all they handled it pretty well considering the child had stopped breathing overnight.”

Everitt determined the baby needed to get to a hospital. He explained to the parents that because landing the helicopter was not safe or practical, the baby, along with the mother, would need to ride the hoist to get aboard the helicopter. Everitt would secure the baby in a special baby pod securely attached to him for the ascent.

A retired firefighter arrived on scene offering assistance. Fortunately he was familiar with handling a high-line to stabilize a hoist load to prevent spins. Everitt recalled, “I moved everybody next door into the garden where I landed in initially. I put the fireman in position with the high-line. I explained [the process]: mom is going up on her own in a rescue strop and me and the baby will follow. The poor woman was absolutely petrified!”

CONTINUOUS OPERATIONS

Arriving at the airport, the pair was turned over to a waiting ambulance. It was now approaching the end of this crew’s shift and their relief crew was standing by across the runway at their hangar. Just



then, another call came in — they were being requested again for the six-year-old boy from earlier in the day.

“We were told, go back to your base, hot refuel, and hot change,” said Everitt. “Don’t shut the machine down. So we basically briefed our relief crew and restocked the aircraft as it was running. They were going to pick up where we left off.”

For their departure, the airport was calling wind 30 knots, visibility 2 kilometers, cloud base at 900 feet and snow showers. Arriving on scene, the crew found it to be a small cottage on a farm. The windward side of the cottage was completely covered in a snow drift. An adjacent field was identified as the most suitable location for the hoist evolutions.

Lawrence said, “We do our winching from as low as possible but as high as we have to. On that particular occasion, because it was very remote, we could actually get down to about 80 feet. But the S-92 has a vicious downwash and we have to be aware of the risk of whiting ourselves out.”

When the young boy was stabilized, he and his mother were prepared for hoisting. Mom was lifted first, followed by the paramedic and the boy secured in a stretcher. Again, an ambulance met the aircraft at the airport for the handoff.

Then Lawrence and the Rescue 116 crew received yet another mission: a 73-year-old man in need of dialysis. The scene was remote and members of a mountain rescue team had reportedly trekked two miles through chest-deep snow to access the patient. One more hoist evolution and this patient, too, was extracted from Storm Emma’s frigid grip and delivered safely to medical care.

THE TOOLS FOR THE JOB

Storm Emma was reportedly Ireland’s worst snowstorm in 30 years. Eastern Ireland and the greater Dublin area definitely took the brunt of it. “In all my years in Ireland, I’ve never seen snow like it,” said Lawrence. “There were roads completely lost for days and days and days and days because snow plows just couldn’t get to them.”

Looking back on the mission tempo during the final hours of Storm Emma, Everitt said, “So we went from 5 a.m. all the way through to mid-day. And from mid-day, the next crew came in and took it until about 4:30 p.m. So the aircraft was on the go for almost 11.5 or 12 hours, only stopping to hot refuel and then go again.”

The other IRCG bases and aircraft also supported many storm-re-

lated missions. IRCG aircraft flew a number of inter-hospital patient transfers from outlying areas into Dublin hospitals, and ground assets ferried critical medical staff between facilities all across the island.

As is the case for any first responder, complete confidence in one’s equipment is absolutely paramount. And the Rescue 116 crew is quick to heap praise upon the machinery and hardware that take them out, bring them back, and make them effective and efficient on scene.

“The S-92 is an amazing machine,” said Lawrence. “In terms of icing, it’s the king. The S-92 can go down to minus 40 C and quite frankly laughs in the face of it.”

Everitt likewise praised the aircraft’s Goodrich rescue hoist, which boasts features including single-point cable payout due to a proprietary translating drum cable management system, variable speed performance, symmetrical braking, and continuous operational duty cycles.

“I’ve been flying here for 20 years, and in one form or another, I’ve been using Goodrich hoists,” said Everitt. “And the dual hoist system for me is simply the gold standard for all-weather search-and-rescue operations, on land or offshore. I’m sure if you talked to anyone in UK SAR, they’d tell you the same thing.”

He added, “From an operational point of view, we batter the hoists. They’re operating in salt water environments all the time. Ireland is an island and every one of our bases is within a salt water environment. We work in cliffs, mountains, all kinds of ship decks... There are very few things that are SAR-proof and these hoists are.”

For the men and women of the Hoist & Winch business segment of Collins Aerospace, rescues like the ones performed during Storm Emma are a powerful source of pride and motivation.

“It brings immense personal and professional satisfaction to work on a piece of life-saving equipment that allows these rescue crews to perform their missions, and we shared the details of this particular mission across our entire Hoist & Winch headquarters in Brea, California,” said Nick Demogines, Collins’ associate director, business development for Hoist & Winch. “Everyone here takes great pride in providing hoists that help get people out of harm’s way and bring them home safely.” 🚁



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.

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Photo courtesy of Paul Bradley

PAUL BRADLEY PILOT, HENRY-1

Paul Bradley is a longtime pilot for Henry-1, the Sonoma County (California) Sheriff's Office helicopter unit that is one of the busiest rescue helicopter programs in the U.S. The unit is particularly renowned for its technical long-line rescues, in which the pilot uses vertical reference techniques to fly a rescuer and victim at the end of a long line. We asked Bradley to tell us more about his background and experience with the program.

VERTICAL 911: HOW DID YOU GET INVOLVED WITH AVIATION, AND WHAT LED YOU TO HENRY-1?

PAUL BRADLEY: I got into aviation at a very young age as it was in my family. My grandfather was an aviation mechanic in World War II and my grandmother was a pilot in World War II. They helped spark my interest in aviation. I performed my first flight lesson in an airplane at the age of 13. I performed my first solo on my 16th birthday. I joined the United States Marine Corps at 24 and became a crew chief on a CH-46. This continued to fulfill my interest in aviation. Once I left the military,

I completed my helicopter flight training and became a flight instructor in helicopters. Working and building time, I held multiple jobs that sent me all across the country performing instruction, firefighting, and utility work. I knew that I wanted a job in law enforcement also performing search-and-rescue missions. Henry-1 fit all the molds that I wanted in my career.

V911: TELL US MORE ABOUT THE HENRY-1 PROGRAM.

PB: The Henry-1 program is unique. We hire a professional pilot that is well versed in vertical reference flying, with the ability to work with crews, work under pressure, and a clean record. We also hire

professional medics. These medics must have two years of experience performing as a paramedic with numerous patient contacts, the ability to deal with stressful medical situations, the ability to swim, and of course a clean record. We also bring on a deputy from within the Sheriff's Office; one who has been a deputy for some time, has the ability to swim, work with crews, work under pressure, and of course, also has a clean work record. Finally, we have a well-equipped helicopter that has speed, ability to lift a lot internally and externally, cargo space, and is a proven aircraft. Our Bell 407GXP fits this bill. You put together the four above — pilot, rescue TFO [tactical flight officer], rescue medic, and the Bell 407 — and you end up with Henry-1, which can do some incredible missions: law enforcement, rescue, EMS, and firefighting. We train like we rescue, we rescue like we train. We have been able to successfully make our rescues easy or even routine by sticking to our training motto.

V911: WHAT HAVE BEEN SOME OF YOUR MOST MEMORABLE RESCUES?

PB: If I look back, I can almost remember each one. But the one that's the easiest to remember was the one in May 2013 where we rescued nine first responders over 200 miles outside our normal response area.

While on a 30-minute call back from home, we were paged out with a request for a "night cliff rescue" in the area of Crescent City, a place I was not familiar with. The three of us — rescue TFO and rescue medic — all arrived at the hangar about the same time asking the same question, "Where is Crescent City?" Once we realized Crescent City was over 200 miles away, we had a few considerations. First was our fuel status upon arrival. We were able to at least arrive in the area, but would be empty and unable to perform the rescue. Considering the location and it being late at night, an FBO being open was going to be an issue. After making a few calls and securing a fuel stop with an FBO, we satisfied the fuel issue.

Two, the weather was not the best. Weather reporting is very slim in our coastal areas, and receiving accurate weather is not something we are fortunate to have — which means sometimes we will accept a flight to only end up turning around. We had a report of local area fog but [it was] high enough to safely navigate underneath. This report came from the U.S. Coast Guard, so I was confident the weather satisfied us going. Making it to the coast was vital [to] getting out of the mountainous area. If we could not achieve that task, we agreed to return home.

Three was our SMS [safety management system]. Given all that was involved, our SMS needed a higher level of approval, considering fuel, weather, and not to forget our duty time, which was going to be exceeded in a couple of hours. We documented a plan for staying after the rescue and not returning home until the next day. [We decided we would] evaluate ourselves after completing the rescue, to determine if returning home was a safe option. This plan was vital to getting approval for us to go.

Now the mission. Initially, we were told [there were] nine people stuck on rocks surrounded by the high tide. Our first question was, when does the tide go out and can they walk out? The answer was not for another seven hours. The second question was, is anybody injured? The answer again was no, but the people needing rescuing were first responders that were initially on a rescue three hours earlier while the temperatures in the area were 75 F. The current temperature now was around 48 F,

and they were all soaked from the waves, and two of them were experiencing hypothermia.

The one thing we pride ourselves on is not to let the mission drive the crew. Anybody that is flying EMS, law enforcement, rescue, etc. all know that is the truth — don't let the mission drive the call. We all would be lying if we did not admit that sometimes knowing the mission justifies our purpose in going, but at no time can you let it drive the call. The three of us discussed and understood the task, but consistently discussed that our mission would only exist if we could safely make it to the scene, and that alone was going to take the three of us continually evaluating ourselves.

As planned, we departed flying our first leg, stopping for fuel 1.5 hours after departure. The fuel stop was literally on the coast about 60 miles south of the rescue. The fog was about 600 feet [above ground level], and we had decent visibility below, especially using NVGs [night vision goggles]. We flew the coast to the scene and within moments located all nine first responders frantically waving on the rocks pretty much 30 feet or so from the cliffs,

surrounded by the ocean. Once we determined the rescue portion was going to be somewhat straightforward, we needed to locate the LZ [landing zone]. The LZ was about three miles north of where the rescue was going to take place and where we would be setting up.

About two minutes after landing at the LZ, I flew the crew to the scene, dropping them off to do the triage. Because we use vertical reference and a static line with a strength of over 10,000 pounds, we were able to remove two victims along with one rescuer for a total of three people at a time. We took the two hypothermia patients first, flying them to the LZ. We continued this until all first responders and crew were back safely at the LZ. This entire rescue portion only took 15 minutes.

After the rescue, we quickly loaded our gear and headed back to the airport where we originally got fuel before the rescue. Once we landed at the airport, we had another discussion about our SMS. We were on the border of our duty time, but excited from the rescue so pretty much wide awake. We discussed "get-home-itis," and the safety hazards associated with that. We eventually decided to

fly to the next closest airport which was 70 miles away, and re-evaluate from there. End of the story, we flew to that airport, evaluated, and then flew back to our home base successfully.

V911: WHAT ARE THE BIGGEST CHALLENGES INVOLVED WITH THIS TYPE OF WORK?

PB: The biggest challenges I believe are keeping yourself in the game. It is very easy to get caught up in any call that we do — law enforcement, rescue, or EMS. Being able to manage the rapid changes at a moment's notice can also be a challenge. Most challenges are somewhat easy to figure out, but sometimes we end up overhead a scene that requires immediate attention. In our industry we all want to help catch the suspect or rescue the victim. Making sure that the cockpit remains a cockpit sometimes can be a challenge to manage.

For example, an officer-involved shooting. While sitting at the hangar, we heard a deputy yelling [over the radio], "Shots fired, I've been hit." Hearing those words and knowing that officer caused our adrenaline to spike in a way I will never forget. We took off and headed in his

Henry-1's Bell 407 has speed, ability to lift a lot internally and externally, cargo space, and is a proven aircraft, Bradley said. **Skip Robinson Photo**





direction with about 10 minutes to go, listening to him fight on the ground through the radio. I noticed I kept trying to go even faster than I already was, but was already at Vne [never-exceed speed] and power limits. I started to get frustrated I could not go faster. All I was doing was staring at the gauges, not looking outside. It was at that

time I realized the call itself was flying the helicopter and dictating my emotions and piloting, and [could make] me do something stupid or even worse, dangerous.

After a brief moment, I was able to bring myself back to where a pilot should be, flying the aircraft. Slowing myself emotionally down, thinking about us and the

helicopter helped bring safety and CRM [crew resource management] back into the helicopter. All three of us don't remember the beginning of that call because we were so caught up. Being a routine pilot with a regular crew means nothing when it comes to safety. It doesn't matter how much flight time a pilot has, "nobody is exempt from making mistakes." We discuss calls like this regularly just as a reminder. We have an awesome job, but emotions need to be understood and protected from the cockpit's CRM. Fly expeditiously, and fly smart.

V911: WHAT DOES THE FUTURE HOLD FOR YOU?

PB: I am very excited for the future. I look forward to hopefully a lot more flying. My son currently flies a Bell 407 at the same airport as me working for a charter company. I hope to continue to fly with him and see him continue on within the industry. I also have a two-year-old daughter who I cannot keep away from the airport. She loves airplanes and helicopters just like me and my son. I look forward to growing with them and having a family that enjoys aviation as much as I do. 🍀

This interview has been edited.

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