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042 | Hot & High with the CHP

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COVER An Airbus Helicopters H125 operated by the California Highway Patrol's Valley Division flies through the Sierra Nevadas. The division operates two H125s and two airplanes. **SKIP ROBINSON PHOTO**

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MHM PUBLISHING

Vertical **In Canada:** 500 Trillium Dr., Unit 23, Kitchener, ON N2R 1E5
In the United States: 701 S. Main Street, Fall River, WI 53932

THE TEAM

PUBLISHED AND PRODUCED BY: MHM Publishing Inc. **SUBSCRIPTION INQUIRIES CALL TOLL-FREE:** 866.834.1114

Vertical Magazine (ISSN 1703-8812) is published six times per year (Dec/Jan, Feb/Mar, Apr/May, Jun/Jul, Aug/Sept, Oct/Nov) by MHM Publishing Inc., paid at Fall River, WI. Postmaster please send address changes to: *Vertical* Magazine, PO Box 8, Fall River, WI, 53932.

International Serial Number ISSN 1703-8812
Canadian Publication Mail Agreement Number: 40741549 ■ Postmaster: If undeliverable, return mailing label only. ■ Printed in U.S.A.

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by Tony Kern

How the Aviation Profession has Turned Upside Down

I have a question for you. Are you a professional because you fly or work on good equipment for a great organization? Or is your company more professional because you are in it?

Think about this for a minute, because it is an important distinction, especially for first responders. If you connect your professional identity to the organization you work for, or the equipment you operate, or your title on your business card, you are making a dangerous and self-limiting assumption.

Don't get me wrong here. This is not a negative judgment of the professionalism of anyone or any organization, but rather a simple question designed to sort out who is responsible for what. Organizations are responsible for a lot of things: training and checking for competency, ensuring safety, and making sure you are ready to accomplish your mission. But what they are *not* responsible for are things such as ensuring compliance when no one is looking, identifying opportunities for you to improve above the bar of mere competency, or working on areas where you meet standards, but still have room to add to the mission accomplishment equation. That, my professional friend, is up to each of us.

I call this upside-down mindset the *system-personal inversion* — a world turned upside down where we ask the system to provide for all our safety, compliance, and improvement needs, as opposed to asking more of ourselves. The system-personal inversion is similar to what some who study automation and its impact on the way we think call *primary-backup inversion*, or PBI. PBI occurs when new automation provides inputs that used to be made by humans. For example, most modern vehicles will tell you when you have low tire pressure, supposedly negating the need for us to routinely check our tire pressure manually. While automated and systems protections are nice, they have the undesired effect of gradually lowering our personal vigilance and motivation.

As an industry, aviation as a whole has moved from self-reliance to system reliance. I also believe this to be true for society in general. What's bad about this is that after turning over responsibility to the system, many then start to ignore the systemic protections. We need only look to the example of the Gulfstream IV accident at Bedford, Massachusetts, in 2014, where both pilots were shown to have routinely and regularly stopped doing basic flight control checks, and eventually tried to take off with the flight controls still in the locked position *(see p.6, Vertical 911, Spring 2016)*. This is even more difficult to comprehend when taken with the fact that their company had a Stage Two IS-BAO safety management rating, with glowing remarks on their most recent audit. The results of this system-personal inversion were predictable — and preventable.

So why does this happen? And more importantly, what can we do about it?

When we forget about personal responsibility for improvement, we invite all kinds of demons inside our heads. They creep in through many doors, including low perceived risk of discovery for small acts of noncompliance, low perceived consequence as long as nothing bad happens, poor role models, cultural norms of averageness, and simple laziness. The result is a slow leak of personal responsibility, which leads to deteriorating performance.

The solution to all of these problems is to slam the door on these dangerous demons with a mindset of personal accountability — taking actions to stay well inside the lines when tempted to deviate, and fine tuning your game to reach the pinnacle of your personal potential as an aviation professional. One of my first flight instructors once shared that the true secret of success in our industry is contained in one sentence comprised of 10 two-letter words: "If it is to be, it is up to me." To do anything less is to disrespect yourself, and the gift that has been given you.

Fly smart.

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Check. Check. And Check.

Better situational awareness makes flying safer for all of us. That's why, early this year, the FAA enacted new rules for commercial adoption of both radar altimeters and HTAWS (Helicopter Terrain Awareness and Warning Systems). Radar altimeters will be required for all Part 135 operators – and air ambulance operators will also be required to equip with HTAWS – by April 24, 2017. What's more, most aircraft flying in U.S. controlled airspace will also need ADS-B "Out" capability by year-end of 2019. All of these technologies are aimed at helping pilots keep their distance from flight path hazards: With visual and aural advisories. Crisp 5-color terrain shading displays. Real-time traffic alerts. And with voice callouts that announce height above terrain when descending below 500 feet. For all these must-have solutions, Garmin is your go-to source. So why wait? Call your dealer now to avoid that last-minute scheduling crunch.

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RadAlt, HTAWS, ADS-B

by Bill Winn

For DOs, CPs, SOs — and You

You readers who are working in the helicopter air ambulance (HAA) community are aware that air medical transport services are provided in a complex system with a variety of entities that must work together to facilitate the safe and expeditious transport of seriously ill or injured patients.

The list of diverse elements in this system begins with the air medical provider organization and then goes on to include the national airspace system, which is changing even as you read this. It also includes air traffic control along with federal and state oversight agencies, national and local weather reporting services, aircraft and equipment manufacturers, aircraft maintenance services, local first-responder organizations, and the system of hospitals that treat high-acuity patients — or that call for a helicopter to transfer a patient when they find that they can't.

You can probably think of other elements associated with the system. The point is that all of these entities are subject to organizational flaws or human errors that can line up like the holes in a large stack of Swiss cheese in a manner that can lead to another aircraft accident. Managing the interaction and requirements associated with this array of entities is primarily the responsibility of directors of operations, chief pilots, safety officers — and you.

A well-designed safety management system (SMS) includes features that address all the risks present in the total system. It is important that every SMS recognize that the last slice of cheese in the stack is virtually always one or more members of the aircraft crew, usually the pilot. This is why experience and continuous training are so important for air medical transport crewmembers. For every risk that could be encountered during an air medical transport operation, the crew must either have a process in place to preclude that risk, or a procedure to effectively mitigate the risk if it is not possible to avoid it altogether.

Careful planning and preparation for each flight, along with effective crew resource management (or air medical resource management for HAA flight crews) will contribute greatly to the avoidance of known risks. When unexpected risks are encountered in flight, an en-route decision point (EDP) protocol will protect the crew from entering inadvertent instrument meteorological conditions. An instrument flight rules (IFR)-equipped aircraft along with a pilot qualified and proficient for IFR flight can provide a mission-saving option for air medical flight crews. Night operations are made safer by the use of night vision goggles or other night vision technologies. Helicopter terrain awareness and warning systems (HTAWS) enhance the safety of operations at night or in other conditions of reduced visibility.

Although it remains a challenge to obtain accurate weather information for the (relatively) low-level en-route flight profile typical of HAA operations, recent upgrades to the HEMS Weather Tool are making it easier for air medical pilots to make a safer go/no-go decision. All HAA pilots should be familiar with both the capabilities and the limitations of the HEMS Tool. The tool is available online at www.aviationweather.gov/hemst. If you have not previously accessed the HEMS Tool on a specific computer or mobile device, then you may have to access it the first time via the page at http://testbed.aviationweather.gov/hemst. This is so that you can acknowledge the precautions associated with the use of the tool.

With all of the updated technology, new regulations, and other forms of attention that HAA operations have received, it appears that the primary causes of recent accidents in HAA ops continue to be associated with decision-making by pilots. Other factors are very likely associated with problems in the safety culture of some air medical provider organizations. These areas will continue to be a focus for study and mitigation by the National EMS Pilots Association (NEMSPA) now and in the future.

In the meantime, if you are an HAA pilot then you own that last slice of cheese in the mishap sequence. That means you have the responsibility to eliminate any holes that could lead to an accident. I suppose we might say that a good HAA pilot must transform that last slice of cheese from Swiss to American — "Look, Ma! No holes!"

> With all of the updated technology, new regulations, and other forms of attention that HAA operations have received, it appears that the primary causes of recent accidents in HAA ops continue to be associated with decision-making by pilots.

Bill Winn is the general manager for NEMSPA and the safety officer for Intermountain Life Flight in Salt Lake City, Utah.

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TSB points to organizational and regulatory failings in 2013 Ornge crash

by Oliver Johnson

The Transportation Safety Board of Canada (TSB) has blamed organizational and regulatory failings for the fatal crash of an Ornge-operated Sikorsky S-76A in Moosonee, Ontario, and said its investigation into the incident had revealed "safety deficiencies" that needed to be addressed in Canada's aviation system.

The TSB revealed its findings on June 15 as it released its long-awaited report into the crash. The wide-ranging report concluded that the crew wasn't operationally ready for the flight, having failed to receive sufficient and adequate training, and that Transport Canada knew that Ornge — Ontario's air ambulance provider — was struggling to comply with regulations and company requirements.

"Despite clear indications that Ornge RW [rotary-wing] lacked the necessary resources and experience to address issues that had been identified months before the accident, [Transport Canada's] approach to dealing with a willing operator allowed non-conformances and unsafe practices to persist," said Daryl Collins, the TSB's lead investigator on the accident.

The crash took place in the early hours of May 31, 2013, as the crew — captain Don Filliter, first officer Jacques Dupuy, and flight paramedics Chris Snowball and Dustin Dagenais — responded to a request for an emergency medevac flight for a patient in Attawapiskat, Ontario. At 11 minutes after midnight, the helicopter took off under night visual flight rules (VFR), and as it climbed through 300 feet into the darkness, Dupuy began a left-hand turn while the crew carried out post-takeoff checks.

During the turn, the aircraft's angle of bank increased, and an inadvertent descent developed. As he completed the post-takeoff check, Filliter identified the excessive bank angle and Dupuy indicated that he would correct it. Seconds later, Filliter recognized that the aircraft was descending and called for Dupuy to initiate a climb. However, it was already too late for the aircraft to recover, and it struck the ground, killing all four on board.

"It is critical that pilots who conduct night VFR flights, particularly in sparsely settled areas, possess strong night- and instrument-flying skills," said Collins. "As the crew turned toward Attawapiskat that night, they were turning into an area of total darkness, devoid of any ambient or cultural lighting — no town, no moon, no stars. With no way to maintain visual reference to the surface, they would have had to transition to flying by instruments. Although both pilots were qualified according to the regulations, they lacked the necessary night- and instrument-flying proficiency to safely conduct this flight."

However, Collins said the causes of the accident extended far beyond the cockpit, with Ornge failing to ensure the crew was operationally ready for the flight. Further, he

The Transportation Safety Board of Canada has made a number of recommendations to Transport Canada as a result of its investigation into the 2013 crash of an Ornge-operated Sikorsky S-76A. **Gustavo Corujo Photo**

said Ornge's standard operating procedures didn't address the hazards specific to night operations, and this was compounded by having insufficient and inexperienced personnel in key positions. This "led to some company policies being bypassed and, ultimately, a sub-optimal crew pairing that night."

Kathy Fox, TSB chair, said the investigation had identified deficiencies in Canada's aviation system, and revealed 14 recommendations designed to address them.

"It's not often that we make so many recommendations at the conclusion of an investigation, but in this case, it's a sign that what went wrong that night went far beyond the actions of this crew," she said. "They weren't operationally ready for the conditions they faced that night — that's true. But they never should have been put in that situation. The system in which they were operating let them down that night."

In a statement issued following the release of the report, Ornge president and CEO Dr. Andrew McCallum said the organization had cooperated fully with the TSB throughout the investigative process.

"Immediately following the accident, we initiated a full review of our safety processes, procedures and technology and took steps to minimize risk," said McCallum.

He said these steps included retiring the S-76A from the Ornge fleet (replaced with the Leonardo Helicopters AW139); introducing night vision goggles in its fleet (due to be fleet-wide by the end of 2017); introducing a proficiency flying program that requires pilots to complete specific exercises and flight time within a 90-day period; and adding key personnel with extensive rotary-wing experience to Ornge's aviation management team.

"With the investigation now complete, we will review and study the recommendations and findings outlined in the report carefully as we strive to be industry leaders in safety," said McCallum.

TSB RECOMMENDATIONS

The TSB's recommendations target three broad areas: improving the equipment onboard aircraft; changing the rules by which pilots operate, and how and when they are qualified to fly; and how Transport Canada oversees the system.

"In taking over its aviation operations, Ornge RW was undertaking a significant and challenging transition," said Fox. "Its willingness to operate safely and within regulatory requirements exceeded its capacity to do so. Which led us to ask: when Transport Canada has significant concerns about an operator, as was the case with Ornge RW, when and how should the regulator intervene? When is enough, enough?"

The TSB's first three recommendations address this issue, calling on Transport Canada to require all commercial air operators to implement a formal safety management system (SMS); conduct regular SMS assessments to evaluate the capability of operators to effectively manage safety; and adapt its surveillance policies, procedures, and inspector training to ensure that its oversight activities, including enforcement, are commensurate with an operator's capability — rather than willingness — to identify and fix problems.

The fourth and fifth recommendations call on Transport Canada to amend its regulations to ensure that visual references are clearly defined for night operations, and that pilots maintain instrument proficiency (at present, some pilots are still considered current even if they haven't conducted any instrument flying for up to 12 months).

The TSB revealed that the captain of the accident aircraft — Filliter — had passed his proficiency check two months before the accident, but that the evaluator had expressed concerns about the Filliter's limited instrument experience and ability to operate in a multi-crew environment, and recommended he first gain experience in a first-officer capacity. However, as the standards for the proficiency check didn't differentiate between captain and first-officer skills, Filliter flew as a pilot-in-command without additional training or supervision. The TSB's sixth recommendation calls on Transport Canada to revise the pilot proficiency check standards to clearly distinguish between and assess the competencies of captains versus first officers.

The seventh recommendation is to have terrain awareness and warning systems required on all helicopters.

Recommendations eight through 14 are aimed at improving another technology — the onboard emergency locator transmitter (ELT) — to improve search-and-rescue (SAR) capabilities in the event of future accidents. (The TSB said no signal was received from the accident aircraft's ELT, but that this wasn't a factor in the accident outcome.) The recommendations call for improved ELT construction standards to increase their survivability in a crash, and to ensure ELT transmissions are able to be detected by the international SAR satellite system.

"Although Ornge RW and Transport Canada have taken significant steps since the accident, we feel much more must be done," said Fox. "If implemented, the 14 recommendations we make today will have a profound impact on Canadian aviation, making flights safer for passengers, for crews, for those who fly at night, and for those who fly by instruments. Our recommendations will help ensure that the right equipment is on board, that pilots are suitably prepared, and that operators who cannot effectively manage the safety of their operations will face not just a warning, but a firm hand from the regulator that knows exactly when enough *is* enough, and is prepared to take strong and immediate action."

HEMS lands in India

by Jen Boyer

India's first helicopter emergency medical services operation is a collaboration between AMGH and Aviators Air Rescue. **AMGH Image**

New regulations from India's Directorate General of Civil Aviation (DGCA) are paving the way for helicopter emergency medical services (HEMS) operations in the country, while established United States operators are positioning themselves to enter the market.

Leading the charge is Air Medical Group Holdings (AMGH) of Lewisville, Texas. In June, AMGH announced the purchase of three Airbus Helicopters H130s and a partnership with India firm Aviators Air Rescue to launch India's first-ever HEMS service. Slated to begin operations in October 2016, the service will serve Bangalore, Chennai, and Hyderabad in India's southern region.

"India is about a third of the size of the continental United States with 1.2 billion people, four times the population of the U.S.," said AMGH CEO Fred Buttrell. "There are millions of cars on the road, making it difficult to get anywhere in a timely manner. And despite all that, there is no HEMS service in the entire country. There is a tremendous need for this service and we're excited to be the first to bring it to India."

Prior to the updated regulations, only limited air charter operations were allowed in the country for medical transport, via prior approval. The new regulations, spelled out in the DGCA's Operations Circular released earlier this year, allow for organ transport, hospital-to-hospital patient transport, and scene response.

AMGH and Aviators Air Rescue began their partnership toward HEMS service more than three years ago, working to provide input and recommendations to the DGCA as the new regulations were drafted. Aviators Air Rescue, an established air charter service, has worked on developing HEMS for the better part of a decade and will be the official operator of the service in India, while AMGH assists with aircraft and consulting services.

"We want to start by walking," Buttrell said. "We're developing our service model and delivery small, then hope to build from there. We feel an initial triad of cities gives us the best option for service, allowing us to concentrate on geographical coverage."

AMGH secured the purchase of the aircraft from Airbus and will lease them to Aviators Air Rescue, which will provide the clinical care, air charter certificate, and operate the aircraft. AMGH will also provide hands-on HEMS consulting services, sharing from its depth of experience in the field.

To date, medical consultants from AMGH have visited India, providing insight and support in setting up the service. Additionally, all pilots are coming to Grand Prairie, Texas, for aircraft training at Airbus Helicopters Inc., while the operational team visits Dallas to refine operational oversight, flight following, communication capabilities, and new-hire orientation and training, Buttrell said.

"We're really providing support in all areas — operating manuals, maintenance training, flight following, and medical," Buttrell stated.

The helicopters will be fully equipped with EMS interiors and staffed by two pilots, a doctor, and a paramedic. Aviators Air Rescue is designing the full operation to Commission on Accreditation of Medical Transport Services (CAMTS) standards, including the operations center, medical support, and training. The medical director for the operation is Stanford-trained, Buttrell said, and the decision was made internally to carry a doctor and paramedic onboard in addition to dual-pilot operations, as a higher standard.

"The hardest part of setting up a HEMS service in many international markets has been developing a model that assures a revenue stream," Buttrell said. "There is not broad-based insurance coverage everywhere and no Medicare or state Medicaid for patient support like in the United States."

The AMGH/Aviators Air Rescue model provides two revenue streams. First, there will be agreements with health systems to provide flights. Second, a subscription membership product is being developed that will be marketed to clients such as high-risk businesses, communities with health access issues, and directly to individuals.

"This model makes it affordable to the masses while coordinating with ground response to assure the member is supported," Buttrell said.

AMGH isn't the only air medical player from the U.S. jumping into India. In March, Era Helicopters of Houston, Texas, announced the signing of a memorandum of understanding to work exclusively with India firm Global Vectra Helicorp Limited, India's largest private charter helicopter company, to deliver HEMS to India.

Very early in the planning phase, neither company was willing to discuss their progress further, beyond confirming they were working together to develop a plan to deliver HEMS to India.

REACH, CALSTAR announce air medical services merger

Under a new agreement, CALSTAR will become one of three firms under REACH Medical Holdings, which is part of AMGH.
Skip Robinson Photo

REACH Air Medical Services LLC and California Shock Trauma Air Rescue (CALSTAR), two of the preeminent air ambulance providers in Northern and Central California, are entering into an agreement that will place CALSTAR within the same corporate holding company as REACH (REACH Medical Holdings LLC).

In a joint announcement, Sean Russell, REACH president, and Lynn Malmstrom, CALSTAR CEO, said the air medical operation of CALSTAR will become a limited liability company (LLC) as part of the terms of the agreement, and will operate under the current CALSTAR brand as CALSTAR Air Medical Services LLC.

The new company will be one of the three firms under REACH Medical Holdings, LLC, a holding corporation that is part of Air Medical Group Holdings, Inc. (AMGH), one of the largest air medical firms in the United States. Cal-Ore Life Flight, which merged with REACH in 2011, also is a part of the holding company.

CALSTAR Air Medical Services LLC will continue to operate with its own unique brand and flight nurse staffing model. REACH and CALSTAR officials said at the time of the announcement that they did not foresee base closures; no other decisions had been made related to services. Financial terms were not disclosed, but the parties said the proceeds of the transaction would fund a new, not-for-profit foundation to benefit the public, with a mission and activities that were yet to be determined.

"Our companies have been competitors for 30 years, built upon similar foundations of high-quality services, patient care, and loyalty to our communities, to our patients and to our members who rely upon us for safe, reliable air medical transport," said Russell.

Malmstrom said a team composed of staff from each company would be appointed to help guide the integration process. "We want to ensure that the resources of both programs are reviewed and utilized in a manner that is reflective of the best practices from our 30-year commitments to community and patient care, to industry-leading employee training, and to the safe operations of one of the most modern rotor- and fixed-wing fleets in air medical care."

CALSTAR's current members will become members of the AirMedCare Network, extending their membership benefits with no out-of-pocket expenses related to transport across 32 states and more than 251 aircraft locations that are part of AMGH.

Malmstrom and two others on his senior executive team — Tad Henderson (COO) and Mark Vincenzini (CFO) — will assist with the integration, but their respective roles will cease within the next 12 months as part of the agreement. Both Russell and Malmstrom told employees that the goal is to maintain current operations and that no other decisions affecting base locations, staffing, and fleet had been made.

▪ RotorBits

EHAC SYMPOSIUM FOCUSES ON FUTURE OF AIR RESCUE

Airbus Helicopters Photo

More than 50 experts from around Europe convened in Baden-Baden, Germany, on June 15 and 16 to discuss the future of air rescue at the 2016 symposium of the European HEMS and Air Ambulance Committee (EHAC).

EHAC's goal is to ensure optimal care for emergency patients by continually striving to make air rescue as safe, effective, and consistent as possible. According to EHAC president Stefan Becker, EHAC also wants to actively drive innovation in air rescue together with air rescue organizations, medical professional associations, public authorities, and manufacturers.

To that end, the EHAC symposium included numerous presentations from international experts on regulatory, medical, and flight operations issues. Symposium attendees included representatives from air rescue organizations, helicopter manufacturers, and suppliers of medical and other equipment.

In addition to discussing relevant scientific studies and best practices, participants discussed potential future applications for rescue helicopters. They also highlighted the increasing hazard posed by private drones during air rescue missions, and ways to avoid accidents.

During the conference, DRF Luftrettung presented its operations center at Karlsruhe/Baden-Baden Airport, and shared its experiences as a launch operator of the new Airbus Helicopters H145. During a guided tour of the maintenance area by DRF Luftrettung technical director Thilo Scheffler, participants had an opportunity to take a closer look at the aircraft formerly known as the EC145 T2.

Scheffler and medical director Dr. Jörg Braun emphasized the excellent performance of the helicopter and the flexibility of the medical interior concept, which DRF Luftrettung played an important role in developing. According to Scheffler and Braun, the H145 is proving to be particularly well suited for nighttime rescue missions using night vision goggles.

Trauma institute renamed to honor Dr. James 'Red' Duke

A legend in the air medical community, Dr. James "Red" Duke was instrumental in creating Memorial Hermann Life Flight in 1976. **Memorial Hermann Photo**

In honor of the late James H. "Red" Duke, Jr., M.D., Memorial Hermann Health System has renamed the Memorial Hermann Texas Trauma Institute. Now named the Memorial Hermann Red Duke Trauma Institute, the system said it is proud to honor the legendary surgeon who is known for transforming trauma care for not just the city of Houston, but for the entire country.

The renaming was officially announced May 7 at the system's annual Circle of Life gala, which honored Memorial Hermann Life Flight, trauma care, and Duke. The gala, along with the approaching 40th anniversary of Life Flight in August, created the perfect backdrop to announce the institute's new name.

"Renaming our trauma program in honor of Dr. Duke is a testament of our appreciation for the man who revolutionized trauma care," said Craig Cordola, senior vice president and regional president for the central/west region for Memorial Hermann. "Dr. Duke was a mentor, teacher and friend to so many, and we are privileged to work with the Duke family to continue his legacy."

Duke, who was the John B. Holmes professor of clinical sciences at McGovern Medical School at UTHealth, was instrumental in creating Life Flight in 1976, the first lifesaving air ambulance service in Texas, and served as the medical director of the program for nearly four decades. He spent many years dedicated to discovering new ways to better care for patients and enhance the trauma center overall.

Duke was a founding member of the American Trauma Society and played a critical role in the development of the emergency medical services (EMS) and trauma system in the state of Texas. He was well-known within Memorial Hermann, the greater Houston community, Texas and beyond, for his commitment to educating the public about health issues and accident prevention, while providing extraordinary patient care and training of EMS, paramedics, medical students, and surgeons.

The institute is one of only two level I trauma centers in the greater Houston area treating adult and pediatric patients under one roof.

STARS stocking blood for life-saving transfusions

The Shock Trauma Air Rescue Service (STARS) has become the first air medical program in Canada to begin stocking blood in advance for life-saving transfusions. Kelvin Goertzen, Manitoba Minister of Health, Seniors and Active Living, visited the STARS Winnipeg base on June 21 to announce the new service offered by STARS in Manitoba.

STARS is the first air medical program in Canada to begin stocking blood in advance. **Colin Kunkel Photo**

"A prompt response can mean the difference between life and death for STARS patients," said Goertzen. "Having blood on board will improve outcomes and help save lives."

STARS' Winnipeg base is now one of six in Western Canada to offer this service. It is anticipated that STARS in Manitoba will use 30 units of blood per year, with a typical critical patient requiring two units during a transport.

"Access to blood in-transit will give the STARS flight team one more tool to use when they respond to scene calls and during patient transport," said Dr. Rob Grierson, chief medical officer, Winnipeg Regional Health Authority Emergency Response and Patient Transport. "Being able to provide this service to Manitobans is another example of the strong partnership we have with STARS, Diagnostic Services Manitoba, and Canadian Blood Services."

EuroAvionics expands product range

By Thierry Dubois

In addition to enhancing its current product line, EuroAvionics is expanding into some new ventures, including unmanned aerial vehicles. **EuroAvionics Photos**

EuroAvionics, known for its EuroNav digital moving map system, is creating new products to enhance situational awareness in flight and on the ground — with a particular focus on law enforcement and other public safety operators who have specific needs but limited budgets.

The German company's flagship product, EuroNav, is now in its seventh version, and has continued to offer operators a growing number of capabilities since that version's introduction in 2012. "Typically, cockpit avionics focus on flight aspects but, when you add a function to a helicopter, such as search-and-rescue, the specific mission equipment has to be supported," EuroAvionics business development director Geert Mansvelt told *Vertical 911*.

While traditional cockpit avionics have not always been able to interface with equipment such as search radar, electro-optic/infrared cameras, and automatic identification system (AIS) receivers, Mansvelt said that EuroNav 7 can interface with a diverse range of airborne equipment, hooking up on either existing cockpit displays or dedicated mission displays.

Using the company's map engine as the basis, "we have integrated over 300 interfaces of different systems," Mansvelt said. "Every time a new sensor is connected, we can add a layer of information."

According to Mansvelt, the computing power that EuroNav embeds is a competitive differentiator. "Our graphics run at 30 Hertz, three times faster than your brain can recalculate a situation," he said. Even when traveling at high speeds, he emphasized, all of the information is geo-referenced correctly, with traffic and weather information shown in a consistent way, and all distances represented accurately on the map.

The information can be shown in 3D to give daytime-like situational awareness in dangerous areas like fjords. "We call it a situational awareness and mission system; on top of the maps we show the most diverse types of data — ships, mountains, wires, radar imagery, et cetera," Mansvelt said. Hazardous terrain, relative to the helicopter's altitude, is depicted with colors as per the helicopter terrain awareness and warning system (HTAWS) European Technical Standard Order (ETSO) C194. The system is certified to design assurance level C under ETSO C165.

Asked how suitable EuroAvionics' database is for North American operators, Mansvelt said that his company developed its own "map concept." He described this as a worldwide map dataset based on various sources and optimized for each region. A broad range of maps are available, from a small-scale instrument flight rules map up to street-level address data. "A unique feature is also that the maps can be modified for language," Mansvelt added.

On the Airbus Helicopters H175 medium twin, EuroNav 7's dual graphic output may be configured in different ways, depending on the helicopter version. In search-and-rescue, the mission console in the cabin can use one of the outputs. In a public service variant, the two outputs enable independent left and right (co-pilot and pilot) cockpit displays.

"We took over a major part of the mission system integration on some Sikorsky, Leonardo, and Airbus Helicopters aircraft, making sure everyone can connect the third-party systems he needs," Mansvelt said.

An example of integration is the searchlight. It can be slaved to a position found in the internal address database. Reciprocally, the system can determine the street name and closest house number to an illuminated target.

New is EuroAvionics' Enhanced Reality System, which entered into service in mid-2015. The system has specifically been designed for law enforcement operators. It overlays vector map data on a real-time camera feed. In addition, it enables images from different sensors — such as a forward-looking camera, infrared sensor, and hoist camera — to be processed and distributed on different screens. Moreover, the same unit has a four-channel digital video recorder for debriefing and training purposes.

Also new is the EasyTask ground operations system, acquired when EuroAvionics bought United Kingdom-based Aerotech, now EuroAvionics UK. EasyTask allows personnel on the ground to plan missions with the same map and database as the helicopter crew. Additional functions include flight following, crew management, and weight-and-balance and performance calculations. For example, said Mansvelt, "In offshore operations, it determines if you can go from rig to rig with a given number of passengers, in such weather conditions, a cargo load, and a specified fuel amount."

All EuroAvionics ground tools residing in different ground mission stations can be networked, thanks to a new Data Communications Server. Moreover, said Mansvelt, "We have developed a server where the customer can register its aircraft; we can follow what configuration they have and make suggestions for map, software [and other] updates," he said. The service will be rolled out this year.

According to Mansvelt, product evolution is a continuous process at EuroAvionics. Supporting this is a customer conference organized every other year in Germany, which serves as a way to gather feedback from customers and keep them apprised of new developments. "That's when we show how our products are evolving," Mansvelt said.

EuroAvionics is even branching out into unmanned aerial vehicles (UAVs). The company recently created a subsidiary in Switzerland, a country in which it found experts in optionally piloted rotorcraft. "We are developing a UAV dedicated to law enforcement; it will be able to be used in combination with a helicopter, or as a replacement in some instances," Mansvelt said.

In North America, EuroAvionics has an office in Sarasota, Florida, which has recently grown with the addition of a dedicated software development team.

The Durham Regional Police Air Support Unit's flight hour milestone was recognized at a reception in May. **National Helicopters Photo**

Durham Police Air Support reaches milestone

By Sarah Grandy

The Durham Regional Police Air Support Unit (ASU), which polices one of the five jurisdictions of the Greater Toronto Area, recently recorded the 10,000th flight hour in its Bell 206 JetRanger.

Captain Bruce Buck from National Helicopters, which is contracted to provide the ASU with pilots as well as provide maintenance, was at the controls when the aircraft reached the landmark on March 29 — and he was also the pilot when the aircraft took its first flight back in December 2003.

"I couldn't think of a better job-specific platform than the 206," said Lyndon Greene, detective constable and tactical flight officer in the Durham Regional Police ASU. "Its reliability and practicality made reaching the 10,000-hour mark painless."

Durham Regional Police established the ASU in 1999, becoming the first municipal policing agency in all of Ontario to benefit from helicopter patrol. The unit began operations using a leased JetRanger before purchasing its current Bell 206 JetRanger new from Bell Helicopter.

Based out of the Oshawa Municipal Airport, the ASU covers all 2,500 square kilometers of Durham, making it the largest regional police service in Ontario from a geographical standpoint. In 2015, the ASU responded to 781 calls for service, assisted in 88 arrests in those calls, was first on scene 402 times, and had 190 locates, which could range from a missing person to a fleeing criminal.

Greene said that the aircraft has proven itself to be a huge benefit to public safety over the years. "The missing child would stay missing that much longer, the home invaders or any other 'in progress' criminals would be well on their way to an escape without an air support unit."

Tokyo Metropolitan Police selects AW109 Trekker

Leonardo Helicopters announced in June that the Tokyo Metropolitan Police had selected two brand-new AW109 Trekkers for its law enforcement fleet. The two helicopters are scheduled to be delivered in 2017, making this customer the first Asian law enforcement operator of the type. Civil certification of the AW109 Trekker is expected by the end of this year.

Through its Regional Business Headquarters, opened in Tokyo in 2008, Leonardo Helicopters has been supporting its growing business in Japan. Over 150 helicopters of various types have been sold in Japan to date, for a wide range of commercial and government roles.

More than 80 AW109 series helicopters are in service or on order in Japan, with more than 40 for law enforcement applications, including the AW109, GrandNew, AW139, and AW101 models.

Certification of the AW109 Trekker is anticipated this year, with deliveries to the Tokyo Metropolitan Police planned for 2017. **Leonardo Helicopters Image**

RotorBits

ASU OBTAINS FAA TRAINING CONTRACT

For the third time, Aviation Specialties Unlimited (ASU) has been selected as the company that will train Federal Aviation Administration (FAA) Aviation Safety Inspectors (ASIs) on the use of night vision goggles (NVGs). ASU will provide both initial and recurrent training to FAA ASIs starting July 23, 2016.

During the previous two contracts awarded to ASU, the company conducted 1,015 flight hours and 956 academic hours of training. ASU provided initial training to 87 ASIs and recurrent training to 70 ASIs.

“Our pilots’ unmatched experience and depth of knowledge will provide great value to the FAA,” said chief pilot and director of training Justin Watlington. “Our flight instructors have 30 years’ or more experience in aviation and NVGs, have been with ASU for more than a decade, and have worked with the FAA’s POIs, ASI test pilots and managers during two previous NVG training contract awards.”

ASU’s training will take place in Boise, Idaho, in the high desert mountains and in remote areas where low-light conditions are ideal for training. FAA ASIs will receive eight hours of ground school training, 1.5 hours of aircraft familiarization, and 10 hours of flight training using NVGs.

“Our ultimate goal with anyone flying NVGs is to increase safety. If even one life is saved because of the proper use of NVGs, then we have accomplished our goal. We have heard countless stories of lives saved, criminals apprehended, and lost people found because of NVGs. We are honored to work with the FAA on ASU’s third NVG contract award and look forward to working with their aviation professionals once more,” said Watlington.

ASU has sold and serviced NVGs for more than 20 years, has modified almost 1,000 FAA-certified aircraft worldwide, and has trained more than 6,000 people. ASU will begin scheduling training sessions immediately.

S-92 helicopter fleet surpasses one million flight hours

Sikorsky has delivered more than 275 S-92 helicopters since 2004. The global fleet recently surpassed one million flight hours. **Mark McEwan Photo**

In less than 12 years since the model's entry into service, the global fleet of Sikorsky S-92 helicopters has surpassed one million flight hours.

"We are incredibly thankful to our customers, suppliers, and employees for reaching this milestone, and we are tremendously proud of the S-92 helicopter's industry-leading safety record," said Sikorsky president Dan Schultz. "Sikorsky is committed to providing world-class customer support and technological advancements to our customers who select the S-92 helicopter for their most demanding missions in some of the world's toughest conditions."

According to Sikorsky, the S-92 has an accident rate less than 1/10th the U.S. civil multi-turbine engine helicopter accident rate. The model was certified to Federal Aviation Administration and European Aviation Safety Agency harmonized Part 29 requirements, as amended through Amendment 47, making it the first aircraft to be certified to this rigorous standard.

In this milestone year, the American Helicopter Society International honored the S-92 helicopter program with the Harry T. Jensen Award for its outstanding safety record. In 2002, the S-92 helicopter was honored with the prestigious Collier Trophy.

Since 2004, Sikorsky has delivered more than 275 S-92 helicopters, predominantly to operators serving the worldwide offshore oil-and-gas industry, and for civil search-and-rescue. Eleven nations fly the dual-engine S-92 helicopter for their head of state missions.

In May 2014, Sikorsky was selected to build the next U.S. presidential helicopter fleet using the S-92 platform.

Bristow Nigeria introduces new helicopter rescue service

Bristow Helicopters (Nigeria) Limited has announced a new dedicated helicopter rescue and recovery service (RRS) for Nigeria's oil-and-gas industry to provide critical life-saving assistance currently not available in the country's aviation landscape. The new service is expected to launch in August 2016.

Bristow's new RRS service complements the company's suite of industrial aviation offerings, including its fixed-wing service between Lagos and Port Harcourt launched last year. Bristow will deliver the new service from its base at Port Harcourt, which is strategically located to transport resources quickly and efficiently to oil installations in the area.

The company will dedicate a Leonardo Helicopters AW139 to the operation, equipped with state-of-the-art technology for search-and-rescue (SAR) missions, including forward looking infrared camera technology, dual hoist, and mission management capabilities. Bristow plans to add subsequent service from Lagos as soon as a second AW139 becomes operational, which is expected by year's end. Both Port Harcourt and Lagos will offer night medical evacuation services.

Bristow provides SAR services as a core part of its helicopter services in most of the countries in which it operates. Since 1971, Bristow has flown more than 56,000 SAR operational hours and conducted more than 18,750 SAR missions, during which more than 9,650 people have been rescued by its crews and helicopters worldwide.

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RHINO AIR LAUNCHES FUNDRAISING CAMPAIGN

Photo courtesy of Rhino Air

Rhino Air, a new organization dedicated to combating rhino poaching using the latest in helicopter technology, is now actively seeking donations to support its mission.

Founded by Eric Rudzinski, currently the chief pilot of Rotor Zen Helicopters in Chicago, Illinois, Rhino Air aims to use helicopters equipped with thermal imaging cameras and night vision goggles (NVGs) to support anti-poaching efforts in South Africa with a high level of effectiveness and safety.

The organization was registered in the United States as a 501(c)(3) nonprofit charity in December 2015 and shortly afterward received a Letter of Authority to fly KwaZulu-Natal Protected Area Wildlife Enforcement. Rudzinski attended HAI Heli-Expo 2016 in March to introduce the helicopter community to Rhino Air, securing sponsorships from Night Flight Concepts, Churchill Navigation, and *Vertical* Magazine, among others. The most recent sponsor is the Chicago Vertiport, where Rhino Air is now based.

Now, Rhino Air is accepting financial contributions from individuals and organizations who would like to join the fight to save South Africa's endangered rhinos and elephants. The organization's ultimate goal is to operate a dedicated Rhino Air helicopter equipped with NVGs, an infrared camera system, and other law enforcement technology. However, it will also direct some funds toward assisting current anti-poaching helicopter crews in South Africa with training and equipment.

For more details on how to contribute to or partner with Rhino Air, contact Rudzinski at 1-312-841-1595 or president@rhinoair.org.

AW101 Norwegian all-weather SAR helicopter unveiled

The AW101 Norwegian all-weather search-and-rescue helicopter is the latest version of the AW101. **Leonardo Helicopters Photo**

Leonardo-Finmeccanica announced in May that the AgustaWestland AW101 Norwegian all-weather search-and-rescue (SAR) helicopter was unveiled by Anders Anundsen, Norway's Minister of Justice and Public Security, during a roll out ceremony held at Leonardo Helicopters' Yeovil facility in southwest England.

"This roll out ceremony marks the accomplishment of a very important milestone," said Anundsen. "The helicopter that will be an important and crucial resource for the Norwegian rescue service is now complete and ready for testing. I am very pleased with the effort made by Leonardo Helicopters so far."

"This aircraft, the latest version of the AW101, can claim to be the world's most capable and advanced SAR helicopter in the world," said Daniele Romiti, managing director, Leonardo Helicopters. "The combination of the platform's large cabin, exceptional performance and all-weather capabilities along with the very latest advanced sensors and mission equipment give the aircraft unmatched capabilities.

"We look forward to starting deliveries next year and the AW101 taking over life-saving duties from the Westland Sea King that has served Norway for more than 40 years, saving thousands of lives."

Aircraft deliveries to the Royal Norwegian Air Force, who will fly and operate the helicopters, will start in March 2017 and continue through to 2020. As part of the contract, a 15-year turn-key support solution will be delivered, comprising spares, technical support, and training services.

The aircraft is equipped with an advanced SAR equipment package including Leonardo-Finmeccanica's newly launched Osprey active electronically scanned array radar. Based around a flat-panel antenna design, Osprey is the world's first lightweight airborne surveillance radar to be built with no moving parts and will provide a 360-degree field-of-view for crews.

Other equipment includes a four-axis digital automatic flight control system, two rescue hoists, searchlight, electro-optical device, mobile telephone detection system, and a fully integrated avionics and mission system.

The aircraft is equipped with advanced systems that enhance flight safety, including a Laser Obstacle Avoidance System and Obstacle Proximity LiDAR System, which provide warnings of wires and other obstacles.

The large cabin doors and rear ramp provide easy access for personnel, survivors and equipment into the 27-cubic-meter cabin, which has stand-up head room throughout.

The AW101 benefits from three-engine safety, a full ice protection system for flight in known icing conditions, and a proven 30-minute "run dry" gearbox, as well as multiple redundancy features in the avionics and mission systems.

Boost Systems gains FAA approval for new dual-hook HEC system

Boost Human External Cargo Systems Inc. has secured Federal Aviation Administration (FAA) approval for an innovative new human external cargo (HEC) system for light helicopters. This provides United States-based operators and rescue teams access to the dual-hook equipment for HEC fixed-line helicopter operations.

Boost Systems specializes in HEC kits that are certified to 1,100 pounds (500 kilograms), effectively doubling the capacity of most systems currently in use. Originally certified by Transport Canada, the equipment does not use a belly band, and can be used with the helicopter doors on or off. The pilot is in control of the primary hydraulic release and back-up electrical release, making the spotter position optional.

"This equipment radically changed North Shore Rescue's HEC program by expediting our response and allowing for double the payload at the end of line," said Mike Danks, team leader for North Shore Rescue in British Columbia. "We now have more options for insertion and extraction in the field and can safely evacuate double the number of people at one time. The advance in technology and safety is welcome and long overdue."

To develop its kits, Boost Systems tapped into a wealth of experience in search-and-rescue, helicopter operations, and aviation engineering to change the scope and capacity of teams undertaking long-line rescue activities.

"Aspects of HEC equipment have not changed for over a decade," said Derek Thomas, president, Boost Systems. "The system's design improves helicopter utilization and personnel safety, as the hook assembly can remain on the helicopter through refueling and positioning flights."

The company said transitioning to the new system is smooth, and adoption of the kit does not require additional rescue technician training; only installation training is entailed. A dual hook system for the Bell 407 will be completed shortly, with the personnel carrying device system being interchangeable from the Airbus Helicopters AS350/AS355 and EC135, and the Bell 407.

The Boost Systems HEC kit is certified to 1,100 pounds. **Boost Systems Photo**

Airbus to retrofit Sécurité Civile's EC145 helicopters

Airbus Helicopters has been awarded a contract by the French Defense Procurement Agency to retrofit the avionics suite of the 35 EC145 helicopters operated by the Sécurité Civile, an agency of the French Ministry of Interior that performs critical search-and-rescue (SAR) and medical evacuation services throughout the French territory.

As part of this retrofit, all aircraft will be equipped with an improved avionics suite, allowing them to retain their ability to perform missions in all weather conditions with the highest levels of safety, while at the same time complying with the latest performance based navigation regulations.

"We are very proud of the trust that the Sécurité Civile has placed in our support and services with this second contract in less than a year," said Matthieu Louvot, Airbus Helicopters executive vice president of customer support and services. "It is a great honor for us to be confirmed as the industrial partner of choice by this reference EC145 operator to which we are also providing a comprehensive, nose-to-tail global service solution."

The retrofit of the 35 aircraft follows on from the global services solution contract for the Sécurité Civile and Gendarmerie Nationale's EC145 fleet awarded at the end of 2015. The aircraft, with this new contract managed by the Military Support Center France (MSC-F), will be retrofitted over a seven-year period by Airbus Helicopters personnel deployed at the Sécurité Civile base in Nîmes in order to minimize the impact on the operational activity.

The mechanical and electrical modifications necessary to integrate functions such as localizer performance with vertical guidance/satellite-based augmentation system guidance, digital maps, and GPS installations have also been optimized to reduce the length of the retrofit operations.

Established in 1957, the helicopter division of the Sécurité Civile operates a fleet of 35 EC145s on call 24 hours a day, seven days a week, throughout France for SAR and medical evacuation missions. In 2015 alone the division flew over 16,000 flight hours, rescuing 16,000 people.

Airbus Helicopters will upgrade the avionics on the Sécurité Civile's EC145s.
Airbus Helicopters Photo

CH-53K King Stallion achieves 27,000-pound external lift

In a key program milestone, the CH-53K performed OGE hover maneuvers while carrying a 27,000-pound load. **Sikorsky Photo**

Lockheed Martin on June 23 announced the CH-53K King Stallion successfully completed an external lift of a 27,000-pound (12,247-kilogram) payload at Sikorsky's Development Flight Test Center in West Palm Beach, Florida.

The aircraft executed an "out of ground effect" (OGE) external load test at 100 feet above the ground while performing hover maneuvers to demonstrate its control authority in this flight regime. "OGE" is defined as an altitude greater than the helicopter's main rotor diameter (79 feet or 24 meters in the King Stallion's case) where power demand greatly increases due to loss of the benefit of ground effect.

"This 27,000-pound external lift is yet another key milestone for the program," said Dr. Michael Torok, Sikorsky vice president, CH-53K Programs. "The King Stallion achieved this external lift with ease, and we are on track to successfully complete the initial operational assessment this year."

Sikorsky, a Lockheed Martin Company, is developing the CH-53K King Stallion heavy lift helicopter for the United States Marine Corps (USMC).

The CH-53K has already achieved speeds exceeding 140 knots, and a third CH-53K King Stallion helicopter has joined the flight test program, thereby accelerating the pace to full aircraft maturity and production. The first two aircraft have already verified the King Stallion's capabilities well in excess of the predecessor CH-53E. A fourth King Stallion is currently in final preparation for flight status and on track to join the flight test program this summer.

"Lifting 27,000 pounds in OGE conditions is another key milestone for the program, which further confirms our confidence in the design and performance of the aircraft," said Col. Hank Vanderborght, USMC program manager for the Naval Air Systems Command's Heavy Lift Helicopters Program. "This is the most strenuous condition we had to demonstrate from a performance standpoint prior to achieving Milestone 'C' and entering production."

The King Stallion will carry a 27,000-pound external load over 110 nautical miles at 91.5 F at an altitude of 3,000 feet — a Navy operational requirement for "high hot" conditions.

The U.S. Department of Defense's Program of Record remains at 200 CH-53K aircraft. The first four of the 200 are scheduled for delivery next year to the USMC. An additional four aircraft are under long lead procurement for parts and materials with delivery scheduled in 2019. USMC initial operating capability is scheduled for 2019. The Marine Corps intends to stand up eight active duty squadrons, one training squadron, and one reserve squadron to support operational requirements.

Sikorsky conducts Combat Rescue Helicopter design review

Lockheed Martin has announced the successful execution of the Combat Rescue Helicopter (CRH) program air vehicle preliminary design review (PDR). This important review signals that the CRH program is proceeding with detailed design activities for the HH-60W air vehicle and logistics system. In addition, the team will continue toward the CRH training systems preliminary design review in August, three months ahead of schedule.

Sikorsky, a Lockheed Martin Company, and the United States Air Force (USAF) hosted a five-day meeting in April to gather stakeholders and key collaborators from government and industry for an in-depth review that demonstrated that the overall design meets the systems requirements, setting the stage for the next phase of the program. Review participants included members of the Office of the Secretary of Defense, both the USAF acquisition team and representatives of the USAF operational combat rescue community, as well as the Sikorsky and Lockheed Martin industry team and several other key suppliers.

"The successful air vehicle PDR confirms the program is on the right track and marks a significant step for the CRH program," said Tim Healy, Sikorsky, CRH program director. "Sikorsky and the USAF are well aligned in this collaboration effort and this successful PDR moves us closer to bringing this vital aircraft to the warfighter."

The USAF awarded Sikorsky the combat rescue helicopter contract in June 2014. The Program of Record calls for 112 helicopters to replace the Air Force's rapidly aging HH-60G Pave Hawk helicopters.

Elbit Systems' BrightNite performs demo flights

The BriteNite sensor system creates an ultra-wide field of regard, which is transmitted to a helmet display and tracking system. **Elbit Systems Photo**

Elbit Systems recently performed a series of successful demonstration flights using the BrightNite system, a solution that it said enables utility helicopters to successfully perform degraded visual environment (DVE) missions during more than 90 percent of nights.

The goal of the flights was to demonstrate the system's performance in DVE conditions, in moonless, pitch-dark nights. Dozens of pilots from a variety of air forces around the globe participated in the demo flights in Israel, which were performed using an Airbus Helicopters AS355 TwinStar. Elbit Systems reported that feedback was "extremely positive," with pilots emphasizing the contribution of the system to flight.

Lightweight, compact, and cost-effective, BrightNite is a multi-spectral end-to-end panoramic piloting solution that delivers the essential data directly to both eyes of the pilot, enabling intuitive flight in a head-up, eyes-out orientation. The BrightNite solution consists of non-gimbaled, uncooled forward-looking infrared and highly sensitive complementary metal-oxide semiconductor sensors that present an ultra-wide field of regard intuitive image to a display system. This projects to an Elbit Systems Helmet Display and Tracking System, a helmet-mounted display with line-of-sight capabilities.

The display is overlaid by a synthetic layer that follows the contours of the landscape, and a third layer of 3D mission conformal symbology, which displays hazards and tactical data. Multiple crewmembers can simultaneously scan the entire field of regard, using a single sensor and the synthetic world.

Low-flying aircraft are especially vulnerable to threats such as difficult terrain, enemy fire, and utility wires in the flight path. Sorties must often be carried out in a DVE, adding to the already heavy workload and leaving flight crews to rely on night vision goggles to accomplish their mission. Factors limiting the pilots' field of view include complete darkness, poor weather conditions, brownouts, whiteouts, and sandstorms.

Elbit Systems said its BrightNite system overcomes these visibility limitations and greatly improves situational awareness, mission effectiveness, and flight safety.

Bluedrop to extend aircrew training for Canadian Maritime Helicopter Project

Bluedrop Training & Simulation Inc., a subsidiary of Bluedrop Performance Learning Inc., has received a $13 million contract from Sikorsky, a Lockheed Martin Company, to provide instructors and training courseware for pilots and maintainers learning to operate Canada's new fleet of 28 CH-148 Cyclone maritime helicopters. The agreement extends by three years the training that Bluedrop has provided to the program — known as the Canadian Maritime Helicopter Project — since 2010.

"This training agreement will ensure that RCAF [Royal Canadian Air Force] aircrew and maintenance personnel remain in complete readiness to fly and maintain the Cyclone helicopters as the Canadian Maritime Helicopter Project transitions from development to operational status," said Jean-Claude Siew, Bluedrop vice president of technology and simulation. "We thank Sikorsky for its continued trust in Bluedrop and our Halifax-based training team. This contract extension provides stability to our business."

Bluedrop will provide over 30 highly-skilled technician and aircrew instructors, simulator operators and training program support personnel for the 406 Operational and Training Squadron located at 12 Wing Shearwater in Nova Scotia. The Cyclone training suite includes two flight simulators, two operational mission simulators, six mission procedures trainers, and two aircraft maintenance trainers, supplemented by several maintenance part task trainers.

Designed for anti-submarine and anti-surface warfare, the CH-148 Cyclone aircraft was developed as a sophisticated maritime helicopter for operation aboard Royal Canadian Navy Halifax-class frigates. The new aircraft are replacing Sikorsky Sea King helicopters, which have served Canada in the maritime role for the past 50 years.

Canada accepted the first six aircraft with a Block 1 configuration in mid-2015, and will accept six Block 2 aircraft with enhancements to the mission systems and airframe in 2018. All 28 aircraft with full operational capability are expected to be fielded in 2021.

CMC Rescue introduces new Helitack HotSeat

CMC Rescue has introduced a new Helitack HotSeat rescue extrication device, designed for rapid transport of a subject by means of helicopter hoisting or short-hauling. The quick-donning device expedites the rescue by enabling the rescuer to secure a victim in a stable, semi-seated orientation for fast and efficient extrication, without the need for donning them into a harness. The HotSeat adjusts rapidly and secures rescue victims from small juvenile patients to larger persons up to 500 pounds (227 kilograms).

According to CMC Rescue, the HotSeat, made from durable and easy-to-clean Cordura nylon, incorporates heavy-duty construction for long life in harsh environments. It has an adjustable center strap that allows for variable positioning of the victim, while its exclusive integrated restraint system for juvenile patients features secure Cobra Buckle fasteners to expedite the loading and unloading process. A high-visibility support handle aids positioning and loading of the subject during hoist operations, and safety-glow accents reflect and glow in the dark for enhanced visibility. Hoist straps feature rigid connection points for optimal grip and handling.

With length and depth dimensions of 16 and seven inches (41 and 18 centimeters) respectively, the HotSeat's compact design uses minimal stowage space. A quick-detachable storage bag is included with purchase.

CMC Rescue's Helitack HotSeat enables the rescuer to secure the victim in a stable, semi-seated position. **CMC Rescue Photo**

RotorBits

FAA APPROVES MAG MEDICAL INTERIOR FOR H145

Mecaer Aviation Group, Inc. (MAG) announced it has successfully validated its Airbus Helicopters H145 medical interior system with the U.S. Federal Aviation Administration (FAA). The initial system was launched with Inaer, part of Babcock International Group.

"Inaer was the first H145 air ambulance customer for Airbus and in 2012 we partnered with MAG to develop a customized medical interior," said Monica Mazzei, Inaer's sales director and fleet manager. "MAG was the first to certify the HEMS [helicopter emergency medical services] kit for the H145 model. The launch ship went into service in 2014 and Inaer has since purchased 10 additional systems, with more to come."

The system incorporates lightweight components, cost-effective cabin choices, and is certified for more than 10 layout alternatives. The interior can be converted quickly without special tools to fulfill various operating needs, ranging from dedicated air medical to search-and-rescue and law enforcement.

FAA issues final rule for commercial drone use

Under the FAA's new rule, commercial drone operators will be required to hold a remote pilot certificate with small UAS rating.

On June 21, the United States Federal Aviation Administration (FAA) finalized the first operational rules for routine commercial use of small unmanned aircraft systems (UAS), opening pathways towards fully integrating UAS into the nation's airspace.

"We are part of a new era in aviation, and the potential for unmanned aircraft will make it safer and easier to do certain jobs, gather information, and deploy disaster relief," said U.S. Transportation Secretary Anthony Foxx. "We look forward to working with the aviation community to support innovation, while maintaining our standards as the safest and most complex airspace in the world."

According to industry estimates, the rule could generate more than $82 billion for the U.S. economy and create more than 100,000 new jobs over the next 10 years.

The new rule, which takes effect in late August, offers safety regulations for unmanned aircraft weighing less than 55 pounds (25 kilograms) that are conducting non-hobbyist operations.

The rule's provisions are designed to minimize risks to other aircraft and people and property on the ground. The regulations require pilots to keep an unmanned aircraft within visual line-of-sight.

Operations are allowed during daylight and during twilight if the drone has anti-collision lights. The new regulations also address height and speed restrictions and other operational limits, such as prohibiting flights over unprotected people on the ground who aren't directly participating in the UAS operation.

The FAA is offering a process to waive some restrictions if an operator proves the proposed flight will be conducted safely under a waiver. The FAA will make an online portal available to apply for these waivers in the months ahead.

"With this new rule, we are taking a careful and deliberate approach that balances the need to deploy this new technology with the FAA's mission to protect public safety," said FAA administrator Michael Huerta. "But this is just our first step. We're already working on additional rules that will expand the range of operations."

Under the final rule, the person actually flying a drone must be at least 16 years old and have a remote pilot certificate with a small UAS rating, or be directly supervised by someone with such a certificate. To qualify for a remote pilot certificate, an individual must either pass an initial aeronautical knowledge test at an FAA-approved knowledge testing center or have an existing non-student part 61 pilot certificate.

If qualifying under the latter provision, a pilot must have completed a flight review in the previous 24 months and must take a UAS online training course provided by the FAA. The Transportation Security Administration will conduct a security background check of all remote pilot applications prior to issuance of a certificate.

Operators are responsible for ensuring a drone is safe before flying, but the FAA is not requiring small UAS to comply with current agency airworthiness standards or aircraft certification. Instead, the remote pilot will simply have to perform a preflight visual and operational check of the small UAS to ensure that safety-pertinent systems are functioning property. This includes checking the communications link between the control station and the UAS.

Although the new rule does not specifically deal with privacy issues in the use of drones, and the FAA does not regulate how UAS gather data on people or property, the FAA is acting to address privacy considerations in this area. The FAA strongly encourages all UAS pilots to check local and state laws before gathering information through remote sensing technology or photography.

As part of a privacy education campaign, the agency will provide all drone users with recommended privacy guidelines as part of the UAS registration process and through the FAA's B4UFly mobile app. The FAA also will educate all commercial drone pilots on privacy during their pilot certification process; and will issue new guidance to local and state governments on drone privacy issues.

The FAA's effort builds on the privacy "best practices" the National Telecommunications and Information Administration published last month as the result of a year-long outreach initiative with privacy advocates and industry.

Part 107 will not apply to model aircraft. Model aircraft operators must continue to satisfy all the criteria specified in Section 336 of Public Law 112-95, (which will now be codified in part 101), including the stipulation they be operated only for hobby or recreational purposes.

If you would like to submit a press release or if you have a new product or service that you believe is newsworthy, please e-mail our news editor at news@verticalmag.com.

A Leonardo Helicopters AW139 operated by Ornge prepares for departure from St. Michael's Hospital in Toronto. **Jason Crockett Photo**

The Irish Coast Guard Sikorsky S-92 Rescue 117 lands at UH Galway on June 20, 2016. **David McGrath Photo**

Tomas Kika took this shot of Martin 1, an MD 900 rescue helicopter that is based at Heli Austria's headquarters near Salzburg.

Alexandru Cozma captured this photo of an IAR 330 Puma SOCAT of the Romanian Air Force.

TECHNOLOGICAL *Advantage*

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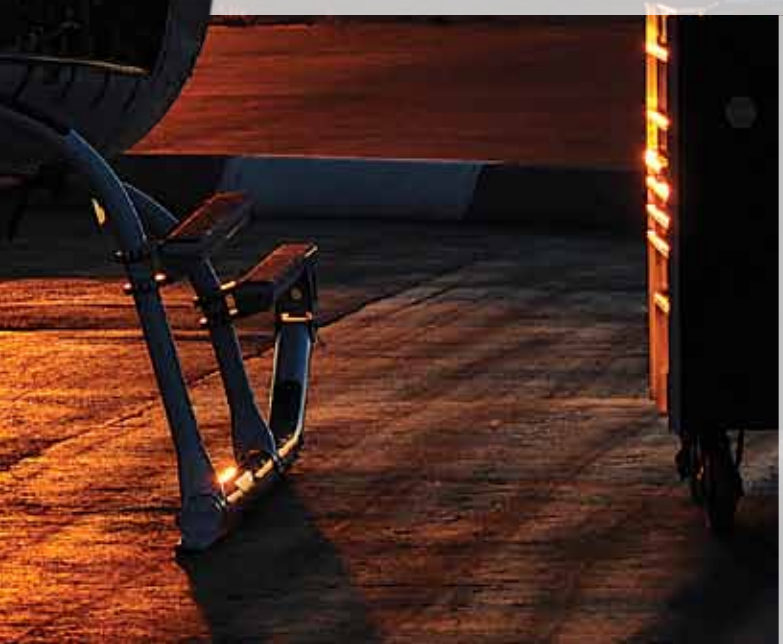
Six or seven years ago, broadcast technology was "leaps and bounds ahead of law enforcement," recalled CNC managing partner Ron Magocsi. Today, airborne law enforcement is on the leading edge of technological developments.

With airborne law enforcement technology advancing all the time, CNC Technologies helps its customers adopt the right solutions for their missions. **Story by Elan Head | Photos by Skip Robinson**



Since the earliest days of airborne law enforcement, the situational clarity provided by an "eye in the sky" has been vital to the success of countless operations. For decades, ground commanders relied on well-trained tactical flight officers (TFOs) to verbally communicate that big-picture perspective. In recent years, downlinking technology has allowed agencies to supplement the TFO's narrative with real-time video feeds, providing the bird's-eye view of a perimeter or pursuit directly to the people in charge.

"They say a picture's worth a thousand words, and that's absolutely true," said Sergeant Eric Weidner, who oversaw the implementation of downlinking during his time at the Ontario (California) Police Department Air Support Unit. According to Weidner, downlinking has "become the kind of thing that we use on a weekly basis or even a daily basis." For the agency to go back to the old way, he said, "would be like turning off the picture on your TV and listening to it just with sound."

Now, new technologies promise to further evolve the role of law enforcement helicopters and TFOs. The development of sophisticated digital mapping systems and the ability to transfer data both to and from the aircraft are opening up possibilities that, just a few years ago, might have seemed unimaginable. Ground commanders are no longer limited to the same screen view as the TFO — the digital transfer of metadata allows them to turn on overlays that the TFO might have turned off. Meanwhile, GPS and identifying data from ground officers' radios can be "uplinked" into the TFO's own mapping system, giving the TFO a real-time display of who and where everyone is.

Weidner is retiring from the Ontario PD this summer, but he will be staying on the forefront of airborne law enforcement technology as one of four partners in CNC Technologies, a newly formed aviation technology and wireless communications company serving the law enforcement, government, and military markets. In advance of the 2016 Airborne Law Enforcement Association (ALEA) Expo in Savannah, Georgia, CNC's partners spoke with *Vertical 911* about the latest solutions available to law enforcement operators, and how the company is helping its customers implement them.

SUPPLYING KNOW-HOW

Although CNC Technologies was only incorporated in January of this year, its principals aren't new to the business. Managing partners Alex Giuffrida and Ron Magocsi were previously

New “bi-directional linking” capabilities will allow data and video to be sent from ground units to the helicopter, as well as vice versa.

Innovations in hardware as well as software are expanding the capabilities of airborne law enforcement operators.

Alex Giuffrida is one of four partners in the newly formed CNC Technologies. **CNC Photo**

involved with Helinet Technologies, which they left following the tragic death of Helinet chairman Alan Purwin in a plane crash in September 2015. To launch CNC Technologies, they partnered with Weidner and Clay Thom, the owner of the exotic car dealership CNC Motors in Ontario, California. The company is headquartered in Ontario, but will have its main service facility in Linden, New Jersey.

As Giuffrida described it, “We provide technology that allows for the movement of any type of data.” Traditionally, this has meant line-of-sight microwave downlinking systems, but it has come to include other types of wireless and satellite transmissions, too. Although this type of technology can be incorporated on virtually any moving platform, most of CNC’s customers utilize it on aircraft, with about 65 percent of the company’s installations involving helicopters, and 35 percent fixed-wing aircraft.

For CNC’s primarily law enforcement and government customers, the company provides specialized expertise that is often missing from their own agencies. “Downlinking technology requires a lot of engineering technology and know-how,” said Giuffrida, noting that many law enforcement agencies may have avionics and information technology (IT) specialists, but no one to bridge the gap between them. And the number of outside experts who can fill this role is limited. Said Giuffrida, “There aren’t too many companies that know aircraft inside and out, and know downlinking inside and out.”

When CNC is working directly with a law enforcement customer, the first step is to visit with the agency to determine exactly what its needs are. “We first ask them, what is your department looking to do in the mission?” Giuffrida explained. “Obviously all of this stuff can get very expensive, so you really have to manage mission requirements and budgets.” Once the agency has identified the type of solution that best fits its needs, it will undergo any necessary procurement process. When the contracts have been awarded, Giuffrida said, CNC will “manage the integration of all this into the aircraft from day one.” This includes a bench test partway through the installation process and a commissioning at

In addition to supporting operators, CNC Technologies has contracts with several airframe manufacturers, including Airbus Helicopters.

the integration facility, followed by another commissioning at the customer's facility. CNC will then provide 24/7 customer support for as long as the customer requests it.

Giuffrida noted that, increasingly, law enforcement agencies are choosing their helicopters to fit their mission equipment, rather than the other way around. "One of the things that has taken place in the past six years is that the mission suite has taken a primary role," he said. "Before it was more of an afterthought; now it's front and center." This means that airframe original equipment manufacturers (OEMs) are starting to receive much more sophisticated inquiries from customers about possible mission suites, but the OEMs themselves may not be fully up to speed on the available technology.

Here, too, CNC is available to help (and the company already has contracts with Airbus Helicopters, Inc., Bell Helicopter, and Pilatus Aircraft). "When a customer reaches out to the OEM, we can support them as part of their mission suite team," Giuffrida explained. Not only does having that support available help sell aircraft, it also relieves the OEM of ongoing liability for the mission equipment. "Once we implement the solution, we assume all the liability on the mission suite," said Giuffrida. "The OEM no longer has that liability, which has been a source of headaches for the OEM because they don't have that kind of expertise."

THE TIP OF THE ICEBERG

Keeping up with the ever-evolving landscape of airborne law enforcement technology can be a challenge. CNC managing partner Ron Magocsi's background is in electronic news gathering and broadcasting, and he recalled that when he first got involved with public safety downlinking around seven years ago, "broadcast technology was leaps and bounds ahead of law enforcement. Slowly, that has changed."

Whereas broadcasters are still primarily concerned with the same objective they've had for decades — "getting an image from point A to point B and putting it up on the air" — law enforcement operators are increasingly taking advantage of the ability to transmit large amounts of data to find new and better ways to do their mission. "It's not just video downlink; it's data, a lot of data," Magocsi said. "It has become less video engineering, and more IT engineering."

Airborne law enforcement operators have only started to scratch the surface of the new capabilities enabled by today's technology. Augmented reality mapping systems provide a huge advantage to flight crews in the air, but the overlays that are most useful for a TFO aren't always the overlays that are most useful for a ground commander. As previously mentioned, sending video feeds and metadata separately can give ground commanders more flexibility in how they use those video feeds, without compromising the TFO's effectiveness. And beaming information — such as GPS and identifying data from police officers' radios — back into those mapping systems can provide TFOs with an even better picture of how things are unfolding on the ground.

This "bi-directional linking" can even be used to send video

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back to the helicopter. For example, in the recent mass shooting at The Pulse nightclub in Orlando, Florida, police used a Ballistic Engineered Armored Response Counter Attack Truck, or BearCat, to punch through the club wall and end the standoff. In similar incidents in the future, bi-directional linking could be used to transmit a BearCat's video feed to a helicopter overhead, allowing a TFO to better anticipate a suspect's movements. "That's kind of the tip of the iceberg of what these bi-directional links are bringing to the table," said Magocsi.

While the capabilities of mapping systems, cameras, and downlinking systems are constantly improving, the equipment itself is becoming smaller, lighter, and easier to install. This reflects the evolution of technology in general; as Magocsi observed, "Five years ago, for your cell phone to do what it's doing today, it would have had to have been the size of a suitcase." Large antennas have shrunk to small pods. The integration of controls into touchscreen mapping systems has freed up space on the instrument panel, and the ability to beam video to tablets using wifi has eliminated the need for some hard-wired monitors, making cabin layouts more flexible.

Perhaps most importantly, technology is becoming simpler and more reliable. "I think one of the tremendous advances has been the reliability," said Weidner. He recalled that early downlinking technology was notoriously unreliable, which could undermine the "sense of calm and control" that airborne law enforcement crews are expected to bring to tense operations. As he put it, "The flight crews will not embrace something that doesn't work."

All of these advancements — in capability, compactness, and reliability — are evident in CNC's work with Airbus Helicopters, Inc. and the Los Angeles Police Department (LAPD) to upgrade the LAPD's downlinking system with an Internet Protocol (IP)-based solution. "This is the new technology, Ethernet instead of imagery," said Magocsi. The LAPD's previous downlinking solution relied on converters and switches that malfunctioned more often than the agency would have liked; the transition to a digital solution has eliminated the need for them. "It's lighter, less equipment, and it's also fewer points of failure," said Macogsi. "It's great for us and it's great for them, too." The solution is being adopted as the LAPD upgrades from AS350 B2 to H125 (previously AS350 B3e) helicopters, and will eventually be implemented fleet-wide.

Looking to the future, Magocsi predicts that satellite technologies and wireless mesh networks will become increasingly important to airborne law enforcement operators, further improving the redundancy and reliability of communications. In the United States, the pending development of a Nationwide Public Safety Broadband Network also promises to play an important role in how data is transmitted within and between agencies.

All of these tools are giving law enforcement agencies the ability to respond to public safety crises more effectively and efficiently. "It allows a lot of collaboration," said Weidner, noting that "when something big, bad, or disastrous happens," there's now an expectation that downlinking capabilities will be available. "It seems like we're moving to a more unified front in how we respond to these incidents, and downlinking isn't all of the reason for that, but it's part of it," he said.

With their new venture, CNC's partners aim to ensure that when those big, bad, and disastrous events do happen, airborne law enforcement units will have every advantage technology can offer. "There are two reasons to work — one is for a good cause, the other is to make people happy," said partner Clay Thom. With their public safety focus, the close-knit team at CNC is solidly dedicated to their "good cause." Said Thom, "The whole group is a mirror of what I have at CNC Exotics . . . they're a good group of people who care about what we do."

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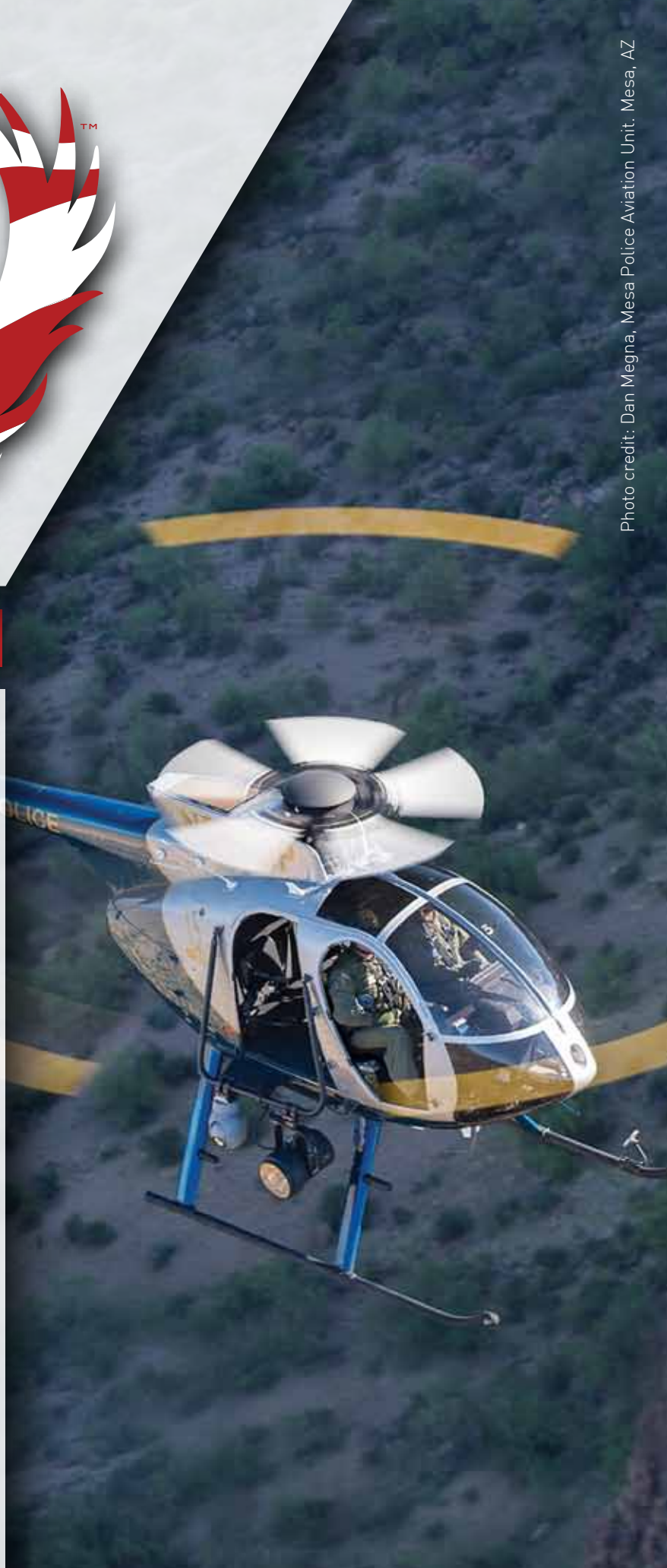

Photo credit: Dan Megna, Mesa Police Aviation Unit. Mesa, AZ

Even during the summer months, there is still snow pack in the Sierra Nevada mountain range. Here, two CHP H125s work together during some pinnacle landing operations. The H125's power allows the CHP to perform rescues where many helicopters would not be able to operate.

Hot & High with the CHP

Operating four aircraft, including two Airbus Helicopters H125s, the California Highway Patrol's Valley Division works in some of the most diverse and challenging environments in the state.

Story & Photos by Skip Robinson

"H-24" performs a body recovery at 10,600 feet density altitude in the Sierras. CHP flight crews praise the H125 — and its predecessor, the AS350 B3 — for its strong tail rotor authority and exceptional engine performance at these high altitudes.

Covering any state with airborne law enforcement and search-and-rescue (SAR) support is difficult; covering a state as large and diverse as California is a true challenge. But, this is a challenge that the California Highway Patrol (CHP) has been accomplishing successfully for over half a century.

As California's state police, the CHP does much more than simply patrol the highways. Among other things, it operates eight aviation bases across the state. These include Northern Division (Redding), Golden Gate Division (Napa), Valley Division (Auburn), Central Division (Fresno), Southern/Border Division (Fullerton), Border Division (Thermal), Coastal Division (Paso Robles), and Inland Division (Apple Valley).

Because of the incredible diversity of these bases — which together provide coverage for the more than 163,000 square miles (422,000 square kilometers) of the third-largest U.S. state by area — this article focuses on only one of them, the CHP Valley Division. Based at Auburn Airport in Placer County near the base of the Sierra Nevada mountain range, the unit operates from sea level to some of the highest and most remote mountains in California, and can switch between these extremes in the space of a 20-minute flight.

The Valley Division's 13,983-square-mile (32,615-square-kilometer) operational area encompasses some of the most popular outdoor destinations in California, including Lake Tahoe, the Desolation Wilderness, and large portions of the Pacific Crest Trail. The division also covers California's state capital, Sacramento, and other highly populated urban and suburban areas. Within this area, the division provides aerial law enforcement, SAR, and emergency medical services (EMS) to any police, sheriff, or fire agency requesting air support.

FLEXIBLE AND CAPABLE

The CHP Valley Division operates four aircraft between its helicopter and airplane sections: two Airbus Helicopters H125s (formerly known as the AS350 B3e), a GippsAero GA8 Airvan, and a Cessna T206H Stationair.

The H125 helicopters (call signs H-20 and H-24) are relatively new to the unit, part of a fleet replacement program that commenced deliveries in 2015. The H125s are replacing well-worn AS350 B3s that were first procured in 1999. Over 16 years of service, the B3 proved itself as a highly flexible and capable aircraft, particularly in the hot-and-high conditions in which the Valley Division operates. When the CHP decided on a replacement for the AS350 B3, the H125 was the obvious choice.

"No helicopter is perfect, but the old B3 was very reliable and had the performance that we required, and the new H125 with its revised engine and upgraded avionics has brought this to a new level," said CHP pilot Monty Emery. "The CHP H125 mission equipment includes a hoist, mission avionics, camera turret, and medical gear and rescue gear. This added weight requires power to lift it, and so far the H125 is showing more power plus the same reliability and capability as the B3."

Each new CHP H125 is equipped with a full night vision goggle (NVG)-capable Garmin glass cockpit (including a G500H, GTN650, and GTN750); Genesys Aerosystems HeliSAS two-axis autopilot system; FLIR 380-HDc camera system; Trakkabeam A800 searchlight; Churchill Navigation system; Technisonic, Becker Avionics, and Flightcell DZM communications systems; Goodrich rescue hoist; external load cargo hook; and state-of-the-art Advanced Life Support (ALS) medical equipment,

CHP Valley Division flight crews train year-round in diverse environmental conditions. Strong winds and high density altitudes are common challenges.

including Zoll X Series monitors. Completed by Hangar One, they also sport an attractive new white, midnight blue, and gold paint scheme, and are equipped during winter months with Dart Aerospace bear paw pads on the rear of the skids for snow landings.

Valley Division's Helicopter Section is made up of one sergeant/pilot supervisor; six officer pilots, all of whom are required to be emergency medical technicians (EMTs); and seven tactical flight officers (TFOs) who are also qualified paramedics. To be accepted into a CHP air support unit as either a pilot or TFO/paramedic, applicants must be sworn CHP officers and have worked at least two years in a ground patrol assignment. Pilots must possess a commercial pilot certificate with an instrument rating and have at least 300 flight hours prior to beginning CHP flight training. Because of this, many CHP helicopter pilots have prior military flying experience, although civilian pilots are becoming more prevalent than in years past.

Once a pilot candidate meets the minimum requirements, he or

From right to left, Sergeant/pilot Duncan Jensen, Officer/paramedic Matt Calcutt, Officer/pilot Jason Hertzell, and Officer/paramedic Brandon Hallam.

The Valley Division's 13,983-square-mile operational area encompasses some of the most popular outdoor destinations in California, including Lake Tahoe, the Desolation Wilderness, and large portions of the Pacific Crest Trail.


CHP
DANGER

THE POWER OF TEAMWORK

The CHP Valley Division's Helicopter Section and Airplane Section work closely together. How closely was apparent during a critical incident in April 2016, which began when a motor officer assigned to the North Sacramento area stopped behind a seemingly disabled vehicle on a busy freeway.

Before the officer could dismount his motorcycle and approach the vehicle, the driver placed the vehicle in reverse, rapidly accelerated, and intentionally ran the officer over, causing near-fatal injuries. The driver fled the scene in his vehicle, with only citizen reports providing an indication of his direction of travel.

Both CHP H-20 (an Airbus H125 helicopter) and Air-21 (a GA8 Airvan) were on patrol at the time. Hearing the report of the officer down, both aircraft responded to the scene. Arriving first, the H-20 crew landed on the freeway, loaded the injured officer into the helicopter, and quickly transported him to a nearby Level 1 trauma center. Thanks to the quick response of the helicopter, as well as the advanced care provided by the TFO/paramedic, the officer survived.

Meanwhile, Air-21 arrived in the area and began a search for the suspect vehicle. As more reports surfaced, it was learned that the suspect had exited the freeway and carjacked a pickup truck from a construction site. The suspect, now in the stolen pickup truck, re-entered the freeway and continued to flee until he was spotted by an observant CHP officer from the Woodland area.

The officer attempted to stop the vehicle and a pursuit ensued. Air-21 was quickly overhead and was able to follow the pursuit through three counties, until the suspect's vehicle was disabled with a spike strip. The suspect was arrested and charged with attempted murder of a law enforcement officer. In this case, the quick response of CHP air assets played a vital role not only in saving the injured officer's life, but also in assisting with the capture of the perpetrator.

she can test and be placed on the CHP pilot eligibility list. Pilots who are selected will be trained to the required competency by the units they transfer to. This advanced training includes practice in hoist rescues; flying external loads; NVG operations; high-altitude mountain flying; water rescues including insertion of divers or lifeguards; and hover/toe-in/one-skid and confined area landings. The extensive training prepares pilots for the full range of demanding CHP missions.

Airborne law enforcement around the highly populated Sacramento Valley is one of the Valley Division Helicopter Section's main missions. "Our primary role is providing aerial support to our road patrol units, but since we are a state agency, we also respond without hesitation to assist other law enforcement agencies requesting an aircraft," explained pilot Jason Hertzell. "On a typical night shift, we spend the majority of our time assisting police and sheriff agencies within the Sacramento region, followed by the San Joaquin region. Our calls range from vehicle pursuits, suspect searches during burglaries or robberies, domestic violence, assault, assault with deadly weapons, and searching for missing persons from the young to the elderly.

"If we see a single ground unit doing a traffic stop, we will circle to let the vehicle's driver know we are there. With our camera and infrared equipment, we can quickly and effectively search large areas for the ground officers; this increases their safety and saves everyone time and allows us to move onto the next call."

Hertzell also pointed out that the division's Airplane Section plays a key role in supporting officers on the ground through aerial surveillance. "I have to give credit to our airplane unit — these guys are in the sky most of the night and are credited with many, many successful law enforcement actions," he said. "They do the same as us, but at a higher altitude that gives them a different angle and wider view over a scene. Honestly, these guys are unspoken heroes within our operational area."

TO THE RESCUE

In addition to its airborne law enforcement missions, the CHP's Valley Division stays busy with SAR and EMS missions — which is why the agency requires its pilots and TFOs to hold medical qualifications. TFO/paramedic Greg Norrgard explained that in most cases, TFO/paramedic candidates must already be paramedics licensed with the state of California. They must also complete a written and oral


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exam, and complete a department orientation flight prior to selection. After being selected, they are trained and must demonstrate competency in skills including general aircraft operations, mission planning, crew resource management, communications and navigation, camera system operation, hoist operations, and other procedures.

"Interestingly, because we are expected to be a self-sufficient two-man flight crew, all CHP helicopter pilots must be certified as EMTs," noted TFO/paramedic David White. "This is done to provide support to the TFO/paramedic during remote operations. There are times when we will shut down and the pilot becomes my medical assistant; with his EMT training, it's a great help to the paramedics who might have many things to do."

TFO/paramedic Matt Calcutt also pointed out, "A unique part of a CHP air unit's mission is its ability to transition from law enforcement to an EMS transport or rescue role, including hoisting. . . . If a pursuit turns into a traffic collision and causes injury, the aircraft can land, render medical aid, and transport to a hospital. This capability allows the unit to back up and transport a CHP or police officer after an injury, shooting or accident.

"Considering the size of our operational area, just because we are operating in an urban area at the moment doesn't mean that 20 minutes later, we might [not] be out in the middle of nowhere without additional medical support," Calcutt continued. "Because of our ability to self-support, having a paramedic and advanced medical gear on board makes us unique."

As fully equipped Advanced Life Support air rescue helicopters, the CHP H125s carry medical gear similar to that found in ALS ground ambulances, in addition to a limited amount of supplies in portable bags in case a hike to a patient is required. The aircraft also carry an assortment of rescue gear, including a Bauman Bag, screamer suit, and collapsible backboard for conducting hoist rescues. Each helicopter's Goodrich hoist has a lifting capacity of 500 pounds (226 kilograms) and approximately 160 feet (48 meters) of cable installed.

"A typical hoist rescue consists of a high recon of the scene prior to any deployment of equipment to confirm a nearby LZ [landing zone] is not present," explained TFO/paramedic Brandon Hallam. "If no nearby LZ is found, the crew will locate the most appropriate area to set down and reconfigure the aircraft for the hoist mission. Reconfiguring consists of removing the medical gear and any non-essential equipment from the aircraft to reduce weight. With our new helicopters and the pallet system our medical gear is mounted to, a typical reconfiguration will take no more than five minutes to complete."

Hallam continued, "Once complete, the crew will fly back to the scene and depending on the type of rescue, can lower equipment down to the ground rescuers below. In the use of the Bauman Bag for patient extraction, the bag will be lowered down to the rescue crew and the helicopter will remain overhead while the patient is placed inside to confirm proper placement. Once the ground crews are ready for the extraction, the flight officer will verbally guide the pilot directly over the scene and lower the hook. The flight officer will continue to paint a verbal picture for the pilot throughout the hoist operation and work in tandem to safely extract the patient.

"Once the patient is hoisted up to the aircraft, the crew will fly to a designated LZ with the patient still on the hoist outside the

Providing support to the state government in Sacramento is part of Valley Division's mission profile. Here, CHP H125 "H-20" overflies California's State Capitol building.


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With summer temperatures routinely in the high 90s F, Valley Division is often called on to perform search-and-rescue missions along the middle fork of the American River.

Pilot Jason Hertzell and TFO Jim Hendrix work an evening call outside of Sacramento. Patrols over cities and urban areas are a daily routine.

aircraft. We frequently act as the sole medical provider on a scene and will land, reconfigure and place the patient inside our helicopter for flight to the nearest trauma center."

CHALLENGING CONDITIONS

While any rescue operation can be challenging, the high altitudes and weather associated with the Sierra Nevadas routinely test the CHP pilots' skills. The Valley Division's Helicopter Section supervisor, Sergeant Duncan Jensen, told *Vertical 911*, "Flying this mountain range offers spectacular views, but this high-altitude environment has its share of challenges.
A pilot must have experience understanding mountain weather, winds, and an ability to operate a helicopter when its performance is limited. Having flown the older AS350 B3 and the new H125, we cannot ask for a much better machine for mountain operations; that said, even the H125 needs to treated with respect in the conditions [in which] we operate.

"During the winter months, weather can change very quickly and mostly for the worst," Jensen continued. "Our pilots plan for these contingencies and will do a detailed risk assessment before a rescue flight. Winter weather can trap a helicopter within minutes because of reduced visibility and lowering ceilings. We will not take unnecessary risks, but realize getting people out is important during the cold months." Searches for lost people and vehicles are common during the winter months. The Air Ops crews will also hoist out and medevac injured skiers and snowboarders, and handle other medical emergencies related to exposure to the extreme weather in the remote inaccessible areas.

The summer months bring warmer temperatures, but also an increase in turbulent winds. CHP pilots routinely encounter severe turbulence during afternoon calls;

occasionally this gets so bad that a rescue must be delayed until early evening, when the winds calm down. Thunderstorms are another consideration associated with summertime around the Sierra Foothills. These can create hazards with strong winds, rain, and hail downpours. They also produce unpredictable downdrafts that can limit CHP operations.

"Performing missions in the mountains can be very technical and takes an integrated crew possessing proper judgment and coordination," said Jensen. "Our pilots need to understand wind direction, strength, and the best angle to approach a landing. Sometimes to complete a rescue we have to make do with what the conditions are. In remote or forested areas our landing options are many times limited, and then might require a toe-in or single-skid landing. These are quite routine, but from a pilot's standpoint takes a level of practice, skill, and interaction with the TFO."

At other times, "making do" may entail performing a hoist rescue in downdrafts with 100-foot trees to the right of the aircraft, and a rock face on the left. "These are the missions where a pilot earns his pay, but gets great satisfaction from being well trained enough to do it with confidence," Jensen said.

The unique job satisfaction that comes from performing life-saving missions under pressure is something that most of the CHP's air crews appreciate. Said TFO/paramedic Hallam, "Our typical day is far from typical and is much more rewarding than most jobs. Seeing someone on their worst day, potentially fearing imminent death, and being able to take that fear away and give them some relief is a personal reward that is indescribable and is all the motivation to continue to strive to do your personal best day in and day out."

Jensen wanted *Vertical 911* readers to know that the CHP is currently searching for new pilots and TFO paramedics "with a desire to make a difference in the community" to replace those who are retiring. He noted that initial officer assignments are no longer limited to the Los Angeles area; there are often openings in the Bay Area and northern regions. "Those interested in the Air Operations Program find that every division has its perks, and a pilot or paramedic has many opportunities across the state."

As for his own career flying with CHP, Jensen said, "I've been doing this for many years and still love the mission. There is truly no greater reward than finding a lost child in the forest, catching a wanted felon, or saving the life of a person who would have certainly died without your assistance. Ask any pilot or medic here at Valley Division — each [of them] can remember a mission where they saved a person's life and returned them back to their family. It's an incredible feeling, and the reason our crews go to 'work' everyday."

Rescues are Valley Division's bread and butter. Here, the flight crew discusses with the ground units how a operation will take place while working out of Strawberry Meadow, near Lovers' Leap.

To say the cabin of the CHP H125 is fully equipped is an understatement. Every storage space on the aircraft holds mission equipment.

CHP H125 "H-24" after dark. Night operations, including NVG searches, are routine for Valley Division.

CHP "H-24" flies over Lake Tahoe. The H125 proves itself everyday in these challenging high-altitude environments.

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SWEDISH SAR

The Swedish Maritime Administration's new Leonardo Helicopters AW139s are proving to be a good fit for the organization's life-saving missions.

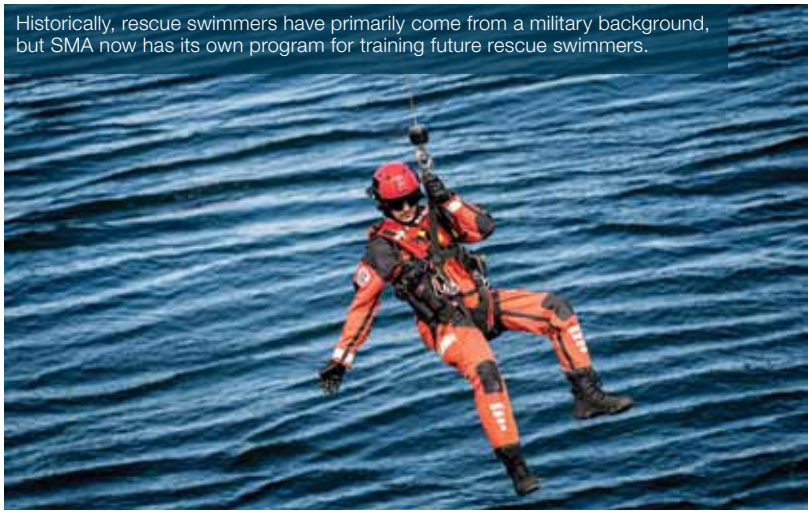
Story by Jon Duke

Photos by Lloyd Horgan/Vortex Aeromedia

This Leonardo AW139 is one of seven operated by the Swedish Maritime Administration, carrying over the distinctive paint scheme that was worn by its previously operated Sikorsky S-76 helicopters.

The sleek lines of the AW139 are shown off as the crew takes part in a search and rescue training sortie in the Baltic Sea.

The SMA can be requested to take part in exercises with the Swedish military. Here, it is shown working with one of the Swedish Navy submarines.



Historically, rescue swimmers have primarily come from a military background, but SMA now has its own program for training future rescue swimmers.

The Swedish Maritime Administration (SMA) has responsibility for one of the largest Scandinavian search-and-rescue (SAR) regions, stretching from the Southern Baltic Sea right up to the Northern Gulf of Bothnia. Overland, Sweden's SAR responsibilities also extend well into the Arctic Circle under its commitment to the Arctic Search-and-Rescue Agreement.

The SMA recently replaced its fleet of Sikorsky S-76C+ aircraft with the Leonardo Helicopters (formerly AgustaWestland) AW139. Seven of these medium twin-engine helicopters were delivered to the SMA between 2013 and 2014, the latest chapter in Sweden's somewhat complex history of airborne SAR.

Today's SMA Helicopter Rescue traces its lineage to the founding of the Norrlandsflyg company in 1961. Initially operating fixed-wing aircraft in the northern wilderness, the company quickly established helicopter operations with a mix of types ranging from Bell 47s to Sikorsky S-55Ts operating in the utility role. After gaining its first emergency medical services (EMS) contract in 1970, the business went from strength to strength, with more contracts following and the acquisition of an Aérospatiale SA-360C Dauphin in 1981.

Norrlandsflyg acquired its first S-76 in 1993, and the model would become a staple for the company as it moved away from the utility market to concentrate on the EMS and SAR sectors. It received its first civilian SAR contract in 2002, and had five SAR contracts by 2007, when Norrlandsflyg's owners sold the majority share of the company to Scandinavian Helicopter Invest (SHI). With the company then operating S-76C+ and C++ models, a deal was signed in the same year to procure eight brand-new S-76D helicopters, a model that at that time had yet to fly.

The S-76D deal was later in canceled, and in 2011, in a bid to ensure the continued financial viability of domestic SAR, the Swedish government approved the purchase of Norrlandsflyg by the Swedish Maritime Agency under the banner of "SMA Helicopter Rescue." In the same timeframe, the SMA launched the procurement process that ultimately led to the fleet of AW139s — and the acquisition hasn't been without controversy.

In April 2015, the Swedish public broadcaster SVT aired an investigative story on the deal, claiming that SMA management and AgustaWestland had come to a private agreement on the acquisition before announcing a public tender that was structured to favor the AW139. The broadcast prompted a government investigation, which included a high-profile raid of SMA offices in June of last year.

In a statement, Leonardo Helicopters said it was "deeply concerned" about the allegations, adding, "The company confirms to be a responsible company whose compliance system conforms with international best practices." Shortly before this issue went to press, Noomi Eriksson, Deputy Director General of the Swedish Maritime Administration, told *Vertical 911*, "We strongly reject all forms of fraud and corruption. It is wrong to do business that way. The procurement is currently being viewed by the Swedish Competition Authority and we are looking forward to their decision."

The controversy may not be settled, but in the meantime, the AW139s have been fully incorporated into the SMA and now provide all of Sweden's civilian SAR coverage from five bases along the coastline. In May of this year, *Vertical 911* visited the Ronneby base in southeastern Sweden to see first-hand how the aircraft are being used in the field.

PUTTING THE AIRCRAFT TO WORK

In August 2014, Ronneby became the second base to receive the AW139 after operations had begun from the northernmost base at

Umeå four months prior. The base at Norrtälje on the Baltic coast would follow, then Gothenburg in the west, with Visby on the island of Gotland the last to convert to the new aircraft. This dispersal of assets ensures that everywhere in Sweden's SAR region except the very northern wilderness is within the unrefueled range of the AW139, and gives a degree of overlap in the busier shipping lanes of the southern Baltic Sea.

Vessels large and small are all in abundance in these waters, so a medium-class helicopter was a logical choice for the SMA. Without the prospect of searching large expanses of open ocean, there's little need for the longer legs of larger helicopters. However, with the potential requirement to orchestrate a complex rescue from a large ship such as a cargo vessel or cruise liner, there is a clear need for a large cabin and the sort of maritime SAR capabilities that such a mission might demand.

Here, the AW139 appears to be a good fit. While the S-76C+ that used to be based at Ronneby had previously been used for offshore utility operations — and thus had to be retrofitted for the SAR role — the new AW139 came factory-equipped with two winches, a SAR mission interior, and cabin extension with enough space for a rescue swimmer, winch operator, doctor/flight nurse, and of course the casualty. The 139 cabin also allows for easier egress in the case of an emergency landing or ditching, with all side windows being jettisonable.

Other improvements include the introduction of an airframe anti-icing system and integrated EuroAvionics Euronav 5 mission and situational awareness system. This is an upgrade from the tablet-based carry-on system used previously and includes integrated AIS — the transponder-based Automatic Identification System used to locate and identify ships.

As might be expected of a modern twin-engine design, the aircraft comes equipped for instrument flight rules (IFR) transits in controlled airspace with a full suite of communication and navigation equipment based on the Honeywell Primus Epic integrated avionics suite, with a P701 weather radar. Additionally, enhanced ground proximity warning systems (EGPWS) and traffic collision avoidance systems (TCAS) are fitted, alongside several SAR/EMS-specific items such as TETRA radio, satellite communication, and marine VHF radio.

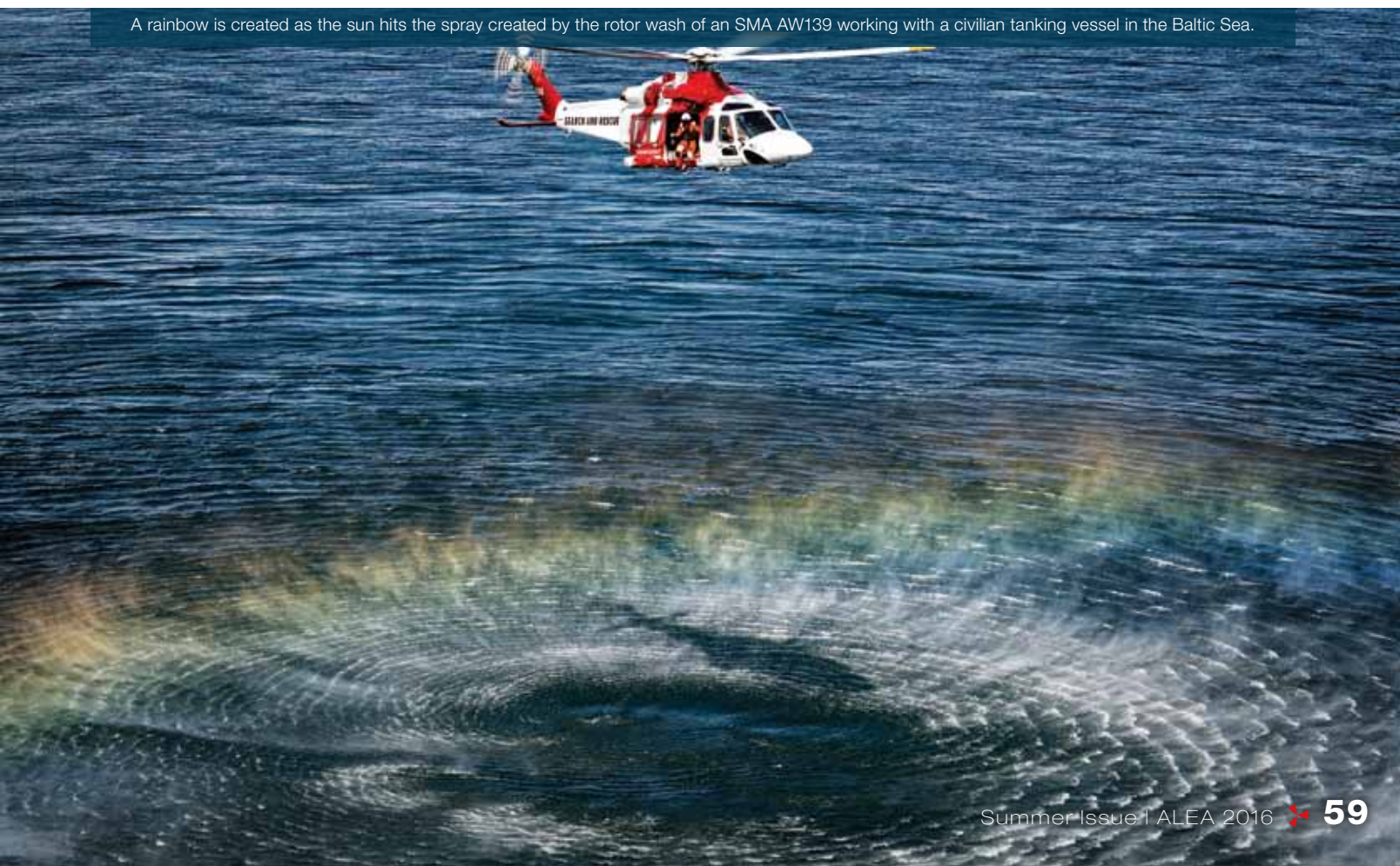
A four-axis fully digital automatic flight control system keeps the aircraft stable throughout the flight envelope — a necessity when undertaking precision maneuvering in turbulent conditions — and crews are fully equipped to conduct nighttime rescues, with the aircraft being fully compatible with night vision devices. A cruise speed of 145 knots and a maximum speed of 167 knots gives it a slight edge over its predecessor, but its power margin is where it really stands out, according to the Ronneby crews.

"In the case of an engine failure in light wind, the AW139 is able to remain hovering for five minutes at standard SAR weight," said Gustaf Lannek, Ronneby base manager and pilot. "This is a big advantage as in the same situation the [older] S-76 would need immediate action from the pilots, who in many cases would have to cut the hoist cable."

Given Sweden's wildly variable climate (in the south it's a lot milder than most people realize!) the aircraft needs to be able to cope with anything the weather can throw at it. Thunderstorms are not uncommon and in the far north temperatures are below zero for much of the year, so it is reassuring for crews that the AW139 is certified for flight into known icing conditions. Its full icing protection system (FIPS) uses electric heating to shed ice from the main and tail rotors, as well as heating the cockpit windshield.

Farther south, where fog is prevalent along the coastlines and out to sea, the extended flight director's SAR-specific modes allow blind transitions down to the hover and back into forward flight, as well as providing pre-programmed search patterns. For additional capacity in the hover, a winchman's hover trim allows the rear crew to maneuver the aircraft directly from the winching station — reducing the requirement for the rear crew to verbally "con" the aircraft via the pilot. This system

A rainbow is created as the sun hits the spray created by the rotor wash of an SMA AW139 working with a civilian tanking vessel in the Baltic Sea.



Rescue swimmer Michael Swärd and winch operator Thomas Höglund pose with the AW139 at their home base.

is particularly useful when the pilot has limited visual references, such as when winching to yachts at night.

The Ronneby base responds to around 100 rescues every year, with year-round operations often resulting from illnesses on the islands or passing cruise ships. According to pilot Magnus Lingwall, however, summer tends to be their busiest season. The fine weather sees more people exploring Sweden's beautiful countryside or taking to the water in small boats, and with more people enjoying themselves outdoors comes an increase in the number of people getting lost or swept out to sea. Winter tends to see some of the islands completely iced-in, meaning that a helicopter may be the best means of hospital transport for even relatively minor injuries. Such missions are not always routine, as exemplified by the transfer of one pregnant woman between hospitals.

"We were getting forced lower and lower by the weather," recalled Lingwall. "Then one of the [medical] pumps broke and we had to turn back and land at another hospital for a spare. We carried on from there but things were getting pretty tense in the back." It may not sound like much in the cold light of day and with a heavy helping of typically Nordic sangfroid, but the combination of weather and the pressure of a life-or-death mission can lead to hazards well recognized by the SAR and helicopter EMS (HEMS) communities. Key to mitigating the risks for all those involved is meticulous and constant training.

The SMA crews usually fly a training sortie every day, and living at the base for seven days at a time gives them sufficient time to develop strong bonds within their teams and build continuity into the training program. They have varying backgrounds, with a mix of military and civilian experience. The pilots' previous jobs range from military SAR through HEMS or offshore flying, to bush flying or charter operations. While the winch operators tend to be from civilian stock, the rescue swimmers have typically cut their teeth in the military, although this is changing — the organization now has its own program for training rescue swimmers using its own facilities.

All of the rear-seat crewmembers have advanced first aid training, as they will often

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The SMA's Ronneby base, in southeastern Sweden, responds to about 100 rescues each year.

The modular glass cockpit and large windows of the AW139, coupled with the Euronav 5 mission system, ease the workload for pilots and enhance their situational awareness.

be the first on the scene of an incident. Additionally, a team of 10 doctors and 16 flight nurses from the local hospital in Karlskrona are fully trained and able to join the SMA aircrew, should specialist medical intervention be required. This additional duty involves close cooperation between the medical staff and the aircrews, with a doctor or flight nurse joining a training sortie once every week.

A SAR crew consists of two pilots, a rescue swimmer and a winch operator. Scrambles usually come in through the TETRA emergency services radio. While the rear crew ready any additional equipment and range the aircraft on dispersal, the front-seaters change into immersion suits and conduct any planning required. If the weather is inclement or the job is particularly complex, this time is extended for additional planning to ensure the safety of the mission. As ever with life-critical flying, a crew is no use to anybody if they never make it to the scene.

The rear-seat crewmembers get changed while the aircraft is started, and once all are aboard the final pre-flight checks are carried out. The aim is to be fully kitted up, crewed in, and ready to fly within 15 minutes from a cold start. Normally the left-seat pilot will fly, with the right seat occupied by the aircraft captain, who takes care of the radios and radar, fuel calculations, and other planning considerations.

A JOB LIKE NO OTHER

With such changeable weather and over 3,000 kilometers (1,865 miles) of coastline to cover, SMA crews certainly have their work cut out, but seem more than up to the task. The combination of skilled, professional aircrew flying a capable helicopter should give comfort to those taking on the notoriously unpredictable Baltic Sea. Even in these crowded waters, in an age of GPS and global communication, the need for pilots Lannek and Lingwall, rescue swimmer Michael Swärd, and winch operator Thomas Höglund is still starkly evident.

This was illustrated dramatically by Lannek, who recalled arriving at a sinking sailing boat with 10 souls still on board. After lifting eight of the ship's crew to the relative safety of his aircraft's cabin, the remaining two sailors elected to stay on board to try to save their stricken vessel. As another helicopter had arrived on scene, Lannek's aircraft departed to drop off the casualties and refuel. When they returned to the scene, the captain had decided to abandon the vessel and was hoisted up and brought to safety.

During the debrief with the 10 rescued crewmembers at the airfield, they received another distress call, from the same location. A second vessel had joined the rescue and attempted to tow the first craft inshore; three people had boarded her when she suddenly sank. Two men tumbled into the water and were quickly picked up by a rescue vessel and transferred to the helicopter. A third had become tangled in the vessel's rigging and, despite a large search effort with many units involved, was tragically beyond help.

Again, Lannek was sanguine about the outcome, preferring to focus on the many benefits of his job and remarking, "It's hard to think of another job that involves high-tech equipment, a professional team, extreme weather conditions, all kind of terrain and such a very satisfactory purpose. There is of course a downside. You do not always succeed in saving others. Fortunately, this does not happen frequently and in total, this must be one of the most rewarding jobs there is." He and all of his crew are at pains to point out that each rescue is carefully risk-managed and that they do not put their own lives at risk to perform their duty. (Of course, when that duty involves flying a helicopter at night, over rough seas and in poor weather, it is very much a matter of perspective.)

It is a sobering thought that taking to the ocean, even on one of Europe's busiest waterways, can carry such risk. But the risk is hugely reduced by the dedication of men and women who are ready at a moment's notice to pour their life's worth of skill and experience into such a technically challenging and dangerous environment "so that others may live."

Jon Duke & Llyod Horgan | Vortex Aeromedia provides specialist media services for the aviation, defense, and aerospace sector. Formed in 2015 by photographer Lloyd Horgan and helicopter pilot Jonathan Duke, Vortex Aeromedia draws on their unique blend of military aviation and media experience to deliver high-impact film, photography, and writing specifically to the defense and aerospace industry. They have flown with, photographed, and filmed for a variety of international military and civilian clients. For more information visit www.VortexAeromedia.com.

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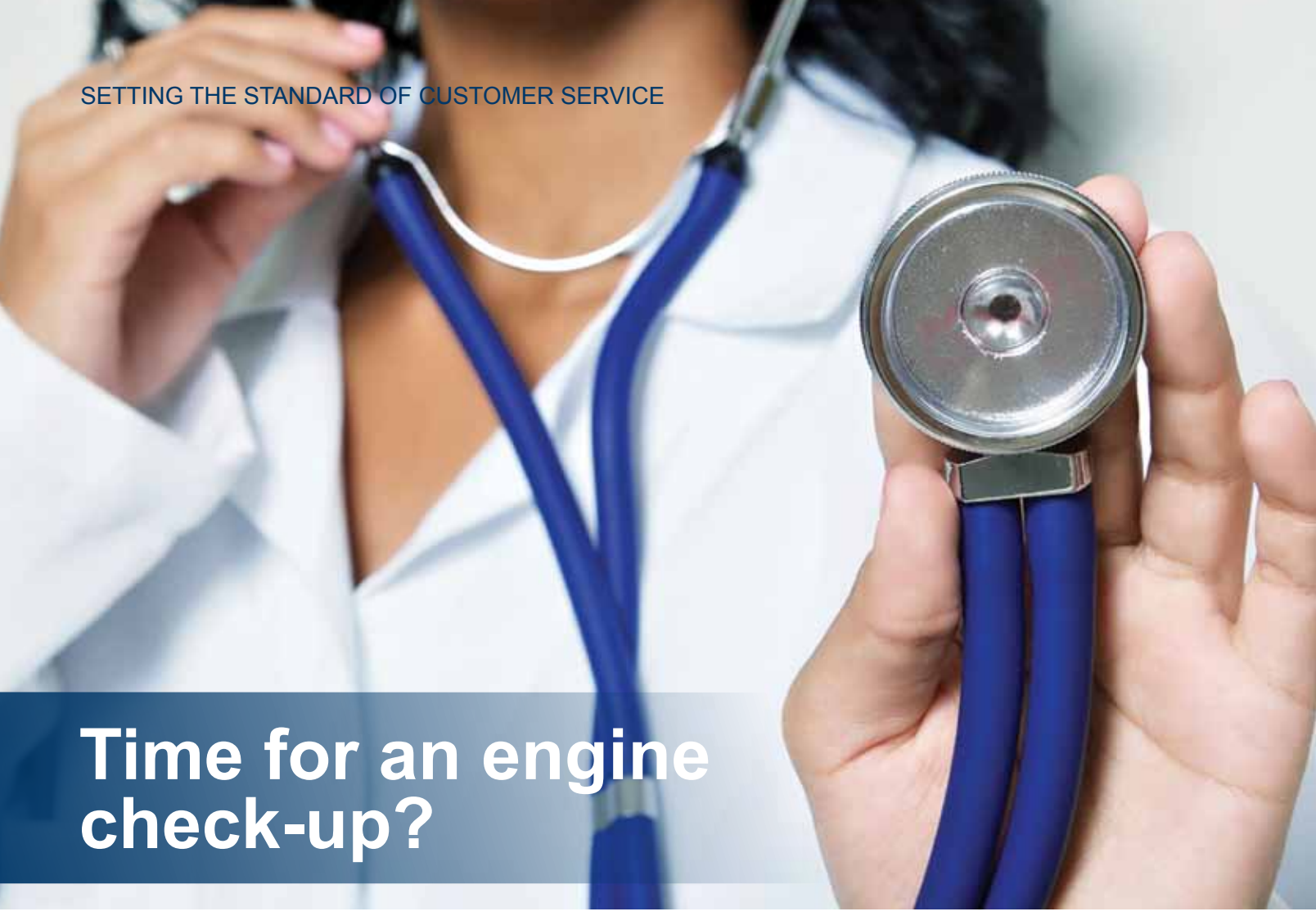

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Puerto Rico

Story & Photos by Dan Megna

Puerto Rico represents the U.S. border closest to South America, and the Puerto Rico Police Department Air Services Division plays an important role in protecting it.

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A Bell 429 operated by the Puerto Rico Police Department (PRPD) is one aircraft used in coordination with other specialized tactical elements to identify, intercept, and detain vessels intent on drug or weapons smuggling, or human trafficking.
Sheldon Cohen Photo

The PRPD Air Services Division (ASD) plays a key role in providing critical public safety to the island including smuggling interdiction, SWAT support, search and rescue, fire fighting, and VIP transportation.

A thousand miles southeast of Miami, Florida, tucked between the Atlantic Ocean and the eastern Caribbean, is the island of Puerto Rico. Home to around 3.5 million people, it is relatively small, encompassing only about 3,500 square miles (9,065 square kilometers).

It is the easternmost island of the Greater Antilles island chain, which includes Cuba, Haiti, and the Dominican Republic. It's also just 450 miles north of South America and the shores of Venezuela and Columbia.

These neighbors have much in common with Puerto Rico, including a proud Latin culture and heritage. But many of these neighboring countries are home to criminal enterprises that produce and traffic large volumes of illegal substances, notably cocaine.

For those looking to move drugs into the United States, Puerto Rico provides a couple of important logistical enticements. First, unlike most islands in the Caribbean, which are independent island nations, Puerto Rico is a U.S. territory; its residents are U.S. citizens and enjoy unrestricted travel and commerce with the mainland.

Puerto Rico is also home to a vibrant commercial freight industry, where shipments are handled in the same manner as they would be anywhere in the U.S. These factors make contraband distribution relatively easy once a smuggler has made it onto the island.

ASD crews are prepared to perform a variety of missions, including specialized SAR operations.

Ricky Perez, here conducting a pre-start check of one of the Bell 429s, is one of 30 helicopter pilots assigned to the PRPD ASD.

ASD crews training with dual video displays integrated into the Bell 429's custom rear cabin mission console.

While the four Bell 407s are utilized primarily for urban law enforcement missions, they can also be configured for over-water operations.

When drug smugglers first set their sights on Puerto Rico several decades ago, they brought with them their own brand of nastiness, which began to inflict deep wounds into the fabric of the tiny island. In 1986, in an effort to combat smuggling as well as homegrown criminal elements, the island's state police, the Puerto Rico Police Department (PRPD), created a new bureau: the Puerto Rico Joint Forces of Rapid Action or FURA (*Fuerzas Unidas de Rápida Acción*).

FURA was organized by integrating several specialized PRPD divisions, including offshore boat teams and divers, search-and-rescue (SAR), special weapons and tactics (SWAT), criminal intelligence, and the Air Services Division (ASD). Today, each component attached to the bureau has dual missions. The first supports PRPD's traditional law enforcement activities throughout the island. The second works in conjunction with the bureau's other divisions to "identify and counteract" illegal entries into the U.S.

BUILDING THE FORCE

The origins of the PRPD ASD go back to the early 1960s, when the agency acquired its first two helicopters: a Fairchild Hiller FH-1100 and a Hiller OH-23 Raven.

During the early years, there was very little in the way of serious police activity for the new aviation section. By the 1970s, however, the illegal drug trade from South America had found its way to Puerto Rico as traffickers figured out that the island was the ideal bridge for smuggling into the U.S.

By the 1980s, the drug trade had brought alarming waves of violence to the once-tranquil island. Every year the homicide and violent crime rates spiked to new levels as smugglers, dealers, and gangs battled for dominance.

"Puerto Rico is used by smugglers because it's the entrance to the Caribbean and the United States," said PRPD pilot Jose Rivera. "Once they get here they can easily move drugs like any local business using container ships."

Shortly after FURA was established, funds were made available from the U.S. government for the purchase of a new fleet of helicopters. Three MBB/Kawasaki BK-117s, three MD500Es and a Bell 206L3 were acquired and pressed into service.

On New Year's Eve, 1986, PRPD pilot Lt. Julio Colón, flying an MD500E, made international news when he, along with several other helicopters, responded to a deadly fire at the 21-story Dupont Plaza Hotel on San Juan's waterfront. Panicked hotel guests climbed to the roof and upper floor balconies to escape the smoke and flame.

Colón and the other pilots took turns making precarious one-skid landings on a corner of the roof, on each trip plucking off small numbers of guests and transporting them to safety. (In the end, 98 people perished in the inferno, which was determined to have been intentionally set.) The rescues were a dramatic

demonstration of the contributions that the PRPD's new helicopters could make to public safety.

As the war on drugs escalated in the 1990s, PRPD received more helicopters and fixed-wing assets. These included a MD520N and five OH-58C Kiowas from the U.S. Army. A Beechcraft Super King Air BT200, complete with the latest surveillance hardware, was acquired thanks to the U.S.-sponsored High Intensity Drug Trafficking Area (HIDTA) program.

Two Bell 407s were added to the PRPD fleet in 2000, along with a Bell 412 equipped with an external rescue hoist. Two additional Bell 407s were acquired later that year, each equipped with a searchlight, camera/infrared technology, and video downlinking capability. New aircraft were also added to the fixed-wing fleet, including a Cessna 310, two Cessna 404s, and a Cessna T-41, a military version of the civil 172.

The multi-mission capabilities of the ASD became a valuable resource for the island. The unit developed swift-water, offshore, and other rescue capabilities, and, along with other PRPD divisions, made an impact on smuggling and related crime.

By the end of the decade, however, wheels began to turn as PRPD assessed its mission needs and the future of its aviation assets. The existing fleet was aging and there were instances in which many aircraft in the fleet were not mission-worthy. A strategy was developed to replace the fleet.

THE RIGHT TOOLS FOR THE JOB

In January 2014, PRPD took delivery of three Bell 429s and one Bell 407. The aircraft arrived sporting only the green zinc chromate exterior coating from the factory and a standard interior configuration. (The PRPD chose to keep three existing Bell 407s, which were refurbished and updated.)

"Even though the previous fleet served us well, we were seeking to standardize our fleet," said Captain Glenn Gonzalez, San Juan Branch Director for the ASD. "It was necessary to choose a single manufacturer that would provide both a single-engine helicopter for the main tasks of daily basis air support and then a multi-engine helicopter capable of flight under IFR [instrument flight rules]. Based on our previous experience with Bell helicopters and its incredible performance, we made the decision to continue with the 407 add a medium twin model, the 429."

The completion of the aircraft was entrusted to a local provider, Ecolift Corporation, a respected MRO shop and completion center located adjacent to the PRPD base at Isla Grande Airport in San Juan. The overall project was ambitious, requiring significant modification and fabrication, all with only 14 months to complete the work.

In the 429's cockpit, the stock Garmin GNS430 was swapped out in favor of the larger GTN750 GPS/Nav/Comm touchscreen multi-function display (MFD). This necessitated modifying the position

After many years flying the Bell 412, PRPD Captain Glenn Gonzalez was reluctant to accept the new 429. But after flying it, he said, "I realized it has the same power, capacity and performance available in the 412, but with a lot of added features and the latest advances in airborne technology that make it the most suitable helicopter for airborne law enforcement."

In 2015, the PRPD ASD flew more than 2,000 missions, 1,700 in helicopters and totaling 2,100 hours, which was nearly double from the previous year.

of a cluster of three analog gauges (airspeed, attitude, and altitude) to fit above the new MFD. Also added was an L-3 Avionics SkyWatch 497 traffic collision avoidance system (TCAS), radar altimeter, and digital audio panel.

The rear cabin and how it was to be utilized was a separate problem entirely. PRPD operates its helicopters with a minimum crew of three: two pilots up front and a tactical officer in the rear cabin (a second tactical officer is often utilized for rescue missions).

This arrangement necessitated the development and integration of a custom mission console for the rear cabin to accommodate all the mission equipment: two monitors (camera and moving map), radio heads, audio panels, video recording/downlink, and light/camera controllers. The console also had to be easily removable so the aircraft could be quickly returned to the standard seating configuration.

Ecolift designers created a console that replaced the rear cabin center aft facing seat. It was built from a sturdy but lightweight honeycomb composite and secured using the existing seat mounting rails in the cabin floor. With all necessary mission equipment including two 12-inch ViewPoint HD monitors, it weighed in at just 70 pounds (32 kilograms).

The installation of some externally mounted police mission equipment required more engineering and fabrication. At the time, the 429 was fairly new to airborne law enforcement and there were limited offerings on the market in the way of mounting hardware for the Wescam MX-10 and Spectrolab SX-16 Nightsun. The 429's newly designed nose radome required that Ecolift develop its own structural nose mount for the MX-10 that integrated with the dovetail mount available from Meeker Aviation.

Because the PRPD 429s had the optional rear clamshell doors, the mounting of the SX-16 required creative thinking as well. The only mount on the market at the time placed the SX-16 at the base of the tail boom. With the clamshell doors, however, a large light mounted in that location created an obstacle for personnel. An alternate location far aft on the belly proved to be a better solution.

The 429s are special mission platforms, each equipped with an external hoist for rescue work and also capable for SWAT deployments. "I refer to the 429 as 'my Bell 407 on steroids,'" said Gonzalez. "Its versatility, dynamism, reliability, the latest systems with the most advanced technology and the available power, makes it the ideal model for any type of mission."

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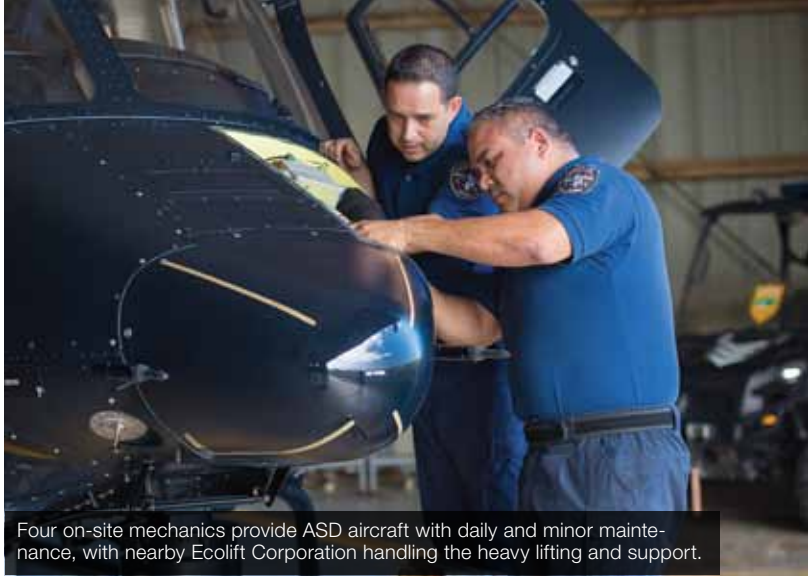
Local company Ecolift Corporation was entrusted with the completion of the PRPD's aircraft. The ambitious project required significant modification and fabrication, with just 14 months to complete the work.

The ASD hangar and office facility at Isla Grande Airport in San Juan serves the north side of the island.



Four on-site mechanics provide ASD aircraft with daily and minor maintenance, with nearby Ecolift Corporation handling the heavy lifting and support.

The smaller 407s are utilized primarily for the urban police mission but are equipped for fast rope or rappel deployments of rescue personnel. They are each equipped with pop-out floats, a Spectrolab SX-5 Starburst searchlight, and an interior configuration similar to the 429.

Two OH58As that were acquired at the end of 2015 from the U.S. Army are used for training and have a police mission similar to the 407. Because they lack some of the modern tactical equipment found in the newer aircraft, they are limited to day visual flight rules (VFR) and no over-water operations.

Currently, the PRPD also operates two fixed-wing aircraft, each with its own mission specialties. A Cessna 206 Turbo Stationair is a daytime patrol aircraft, with its primary responsibility looking for suspicious activity related to smuggling along the island's coastline.

Meanwhile, a twin-engine Beechcraft Baron G58 is tasked with mostly nighttime missions, often farther than 20 miles (32 kilometers) from the coast. Under the cover of darkness, the high-tech capabilities of the aircraft's belly-mounted FLIR Star SAFIRE 230-HD Multi-Sensor (low-light and infrared camera) are used to locate, assess, and photograph vessels that may be involved in smuggling.

A UNITED FRONT

Today, the PRPD ASD operates from two bases, one located at the Isla Grande Airport in San Juan on the north side of the island, and another at the Mercedita Airport in Ponce in the south. These bases and aircraft operate around the clock, seven days a week.

Between the two bases there are 94 officers assigned. Among them are 37 pilots (30 helicopter pilots and seven fixed-wing pilots), 28 tactical flight officers,

> “So yes, Puerto Rico is still a hotbed for the drug trade and smugglers from South America, but our resources and our teamwork are now stronger than ever.”
>
> ***— Captain Glenn Gonzalez***

The PRPD SWAT team was formed in response to the 1972 Munich massacre, as Puerto Rico was being considered as a site for the 1979 Pan American Games. Today, the team works closely with the ASD to support and enhance their tactical mission capabilities. **Sheldon Cohen Photo**

four aircraft mechanics, 18 personnel assigned to internal security, and eight assigned to administrative duties.

The drug smuggling business has evolved in recent years. PRP fixed-wing pilot Jose Fernandez explained, “There are no more [go-fast] cigarette boats like the ’80s and ’90s. Now they are trying to blend in with the legitimate recreational or commercial boats, pretending to be fishing or diving. But they usually aren’t dressed right or have the wrong kind of fishing equipment.”

When a fixed-wing crew spots a suspicious vessel or activity — a daily occurrence — they relay information to the PRPD maritime unit. This unit responds with an appropriate vessel from any one of a dozen bases that ring the island, along with an ASD helicopter, to effect the interdiction.

As the closest U.S. border to South America, Puerto Rico will always be a temptation for those intent on trafficking contraband. Said Gonzalez, “As they find new ways to infiltrate our border perimeter, we’ll keep working as a team to identify their strategies and force them to find new strategies and locations. So yes, Puerto Rico is still a hotbed for the drug trade and smugglers from South America, but our resources and our teamwork are now stronger than ever.”

Dan Megna | Retired after nearly 30 years with one of Southern California’s sheriff’s departments, Dan’s last 18 years were spent serving in the department’s aviation unit, where he logged over 8,000 hours in helicopters as a tactical officer, pilot and flight instructor.

Mike Reyno Photo

A *Shot* in the Dark

Without comprehensive data on the injuries and fatalities that have resulted from helicopter emergency medical services crashes, it's hard to say what their impact has been. But even a conservative estimate of that impact is staggering.

By Krista Haugen

Mike Reyno Photo

When it comes to most helicopter emergency medical services accidents, there are far more autopsy and injury data on the accident aircraft than on the people who occupied them at the time of the crash. Yet from an economic as well as a moral perspective, the occupants are generally far more valuable — and cost-benefit analyses should reflect this.

"Safety is our number one priority."

This is a common mantra that echoes often from every corner of the air medical transport industry, from local organizations to the federal government.

Is it, though? Really?

If we take safety that seriously, we should be heavily invested in truly understanding the complexities of accidents within our industry. However, 322 people perished in the line of duty in helicopter emergency medical services (HEMS) in the United States between 1972 and 2015, and there were 691 survivors of accidents with varying degrees of injuries. And yet, if I were to ask anyone in the industry, the U.S. National Transportation Safety Board (NTSB), or the Federal Aviation Administration (FAA) a question like, "How many of those survivors sustained spinal cord injuries that may have been mitigated by energy-attenuating seats?" the answer would be, "We don't know."

"How many people were burned in post-crash fires in HEMS crashes?"

"We don't know."

"How many sustained blunt traumatic injuries and what was the mechanism of injury?"

"We don't know."

"What are costs of injuries for those who survive HEMS crashes?"

"We don't know."

"How do we find out what types of injuries occupants have sustained in HEMS crashes so we can better understand how to prevent them?"

"We don't know."

"What do we know about injuries to occupants in HEMS crashes?"

"We know whether they were fatal, serious, minor, or uninjured."

"How does a vague description like that help us prevent similar injuries from occurring in the future?"

"We don't know."

We've had over 40 years to better understand HEMS crashes. It's hard to believe that decisions pertaining to safety could be made soundly with the abject lack of detailed accident, injury, and outcome data in the industry. Still, after over four decades of existing as an industry, there is seemingly little to no forward movement on improving data collection, analysis, and subsequent action to decrease the morbidity and mortality of our own.

Despite some improvements in safety, HEMS accidents continue to occur at an alarming rate. Our crewmembers, as well as some patients, are losing life and/or limb in what are often preventable crashes and in what, in some cases, should have been survivable impacts.

Table 1: Selected Sample of Injuries by the Maximum Abbreviated Injury Scale (MAIS)
Source: **Economic Values for FAA Investment and Regulatory Decisions, A Guide - Final Report, Sept. 2015*

MAIS	Injury Severity	Selected Injuries
1	Minor	Superficial abrasion or laceration of skin; digit sprain; first-degree burn; head trauma with headache or dizziness (no other neurological signs)
2	Moderate	Major abrasion or laceration of skin; cerebral concussion (unconscious less than 15 min); finger or toe crush/amputation; closed pelvic fracture with or without dislocation.
3	Serious	Major nerve laceration; multiple rib fractures (but without flail chest); abdominal organ contusion; hand, foot, or arm crush/amputation.
4	Severe	Spleen rupture; leg crush; chest-wall perforation; cerebral concussion with other neurological signs (unconscious less than 24 hours).
5	Critical	Spinal cord injury (with cord transection); extensive second- or third-degree burns; cerebral concussion with severe neurological signs (unconscious more than 24 hours).
6	Unsurvivable	Injuries, which although not fatal within the first 30 days after an accident, ultimately result in death.

Mathematically minded people turn to the cost-benefit analysis to determine whether or not safety measures are a worthwhile investment. But let's return to an earlier question: what are the detailed causes and costs of injuries, including fatal injuries, of HEMS crashes?

With the myriad of cost-benefit analyses that have most certainly been done regarding safety upgrades, one might surmise that this information would be readily available.

The disturbing reality is, it isn't. Not at the FAA, not at the NTSB, and not in the HEMS industry. In fact, detailed injury data for helicopter occupants (survivors and fatalities) in crashes doesn't exist anywhere. (That's probably why conversations regarding some safety upgrades in HEMS often end up in schoolyard, "Yes huh" — "Nuh uh" arguments. Just bring up the single-engine vs. twin-engine discussion in a room full of HEMS people and you'll see what I mean.) We often base our arguments on passionate opinions, our own best interests, and sometimes, pure mythology. And helicopters are still crashing, and our people and patients are still getting needlessly injured and killed.

So how are we making sound decisions when it comes to investing in safety? Where are the data? How can we say that safety is our number one priority if we don't bother to pursue the facts? How can we pursue the facts without the personnel and systems to do that? How can we address the actual causes of morbidity and mortality in this industry if we don't do the research? Sadly, there are far more autopsy and injury data on the accident aircraft than on the people who occupied them at the time of the crash.

The burning question is: how are cost-benefit analyses done and safety decisions being made without knowing the cost of injuries and fatalities? How have these decisions been made historically without this major piece of the equation? I suspect that our current situation has allowed for gross underestimation of justifiable investments in safety, from crash prevention to crash survival.

THE VALUE OF REDUCING RISK

Since the HEMS industry lacks any kind of comprehensive surveillance, data collection, and analysis system, we must turn to other industries that actually do have valid and scientific methods for measuring, reporting, and acting upon the true causes of morbidity and mortality.

The U.S. National Highway Traffic Safety Administration (NHTSA) has sophisticated surveillance systems, data collection/analysis, and the means to take action to decrease morbidity and mortality with regard to motor vehicle crashes. To quantify the benefit of preventing a fatality, it has adopted the concept of the Value of a Statistical Life (VSL), which is defined as the additional cost that individuals would be willing to bear for improvements in safety that, in the aggregate, reduce the number of expected fatalities by one.

The VSL is often misinterpreted as "the value of a life" — it's not. Instead, it's a measure of the implied value that consumers place

Table 2: Relative Disutility Factors by Injury Severity Level
Source: *Economic Values for FAA Investment and Regulatory Decisions, A Guide - Final Report, Sept. 2015*

Relative Disutility Factors by Injury Severity Level			
MAIS Code	**Description of Injury**	**Fractional Fatality Values**	**Dollar Value**
MAIS 1	Minor	0.003	$28,200
MAIS 2	Moderate	0.047	$441,800
MAIS 3	Serious	0.105	$987,000
MAIS 4	Severe	0.266	$2,500,400
MAIS 5	Critical	0.593	$5,574,200
MAIS 6	Unsurvivable/Fatal	1.000	$9,400,000

Table 3: Relative Disutility Factors by Injury Severity Level Based on the NTSB Classification of Injuries*
Source: *Economic Values for FAA Investment and Regulatory Decisions, A Guide - Final Report, Sept. 2015*

MAIS Code (Description of Injury)	NTSB Classification	Modified Fractional Fatality Values Value of Life	Dollar Value
MAIS 1/Minor	Minor	0.003	$28,200
MAIS 2/Moderate MAIS 3/Serious MAIS 4/Severe MAIS 5/Critical	Serious	0.253	$2,378,200
MAIS 6/Fatal	Unsurvivable/Fatal	1.000	$9,400,000

*According to NHTSA author Lawrence Blincoe, "A simple average of the MAIS 2-5 disutility factors will overstate the average disutility for that group. The proper way would be to compute an average weighted by relative incidence of injuries in each category."


Even "minor" injuries can be career-ending for those who work in HEMS. **Skip Robinson Photo**


Without accurate estimates of injury costs, arguments for or against safety upgrades are often based on passionate opinions, not facts. **Heath Moffatt Photo**

on their lives, as revealed by the price they are willing to pay to avoid the risk of death. Estimates of this "willingness to pay" come through studies that examine wage rate differentials for risky jobs, or the prices that consumers pay for products that reduce their risk of being fatally injured.

For analysis conducted in 2015, Office of the Secretary of Transportation (OST) guidance suggests that US$9.4 million be used as the current estimate for the VSL, measured in 2014 dollars. This estimate is also used to determine the value of averted injuries in combination with the Maximum Abbreviated Injury Scale (MAIS), a comprehensive system for rating the severity of accident-related injures. MAIS classes non-fatal injuries into five categories depending on the short-term severity of the injury, with a sixth category corresponding to injuries that result in death 30 or more days after the accident *(see Table 1)*.

A valuation for each MAIS injury severity level is determined by estimating the loss of quality and quantity of life resulting from an injury typical of that level, with the loss expressed as a fraction of the VSL. Those fractions and their current dollar value estimates can be seen in Table 2 — for example, the value of averting a minor injury is currently $28,200, while the value of averting a critical injury is more than $5.5 million.

While HEMS research has traditionally focused on fatal accidents, it is essential that we consider the fact that non-fatal injuries are more common, and vary significantly in terms of severity, outcomes, and cost. Surviving a crash with severe burns, spinal cord injury, or other severe debilitating injury requiring care for the remainder of a lifetime can be far more costly than the current VSL for fatalities.

As referenced earlier, the NTSB classifies injuries in aviation accidents only as "fatal," "serious," or "minor." A "fatal" injury is one that results in death within 30 days of the accident, while a "serious" injury "refers to any injury that (1) requires hospitalization for more than 48 hours, commencing within seven days from the date the injury was received; (2) results in a fracture of any bone (except simple fracture of fingers, toes, or nose); (3) causes severe hemorrhages, nerve, muscle, or tendon damage; (4) involves injury to any internal organ; or (5) involves second- or third-degree burns, or any burns affecting more than five percent of the body surface." (The NTSB does not provide a specific definition for "minor injury.")

In other words, any injury from a broken arm to severe third-degree burns can be classified as "serious," providing absolutely no specificity when it comes to retrospectively reviewing this data. This poses significant problems when trying to determine the nature of injuries occupants sustain in helicopter crashes and, consequently, how to mitigate those injuries.

It should also be noted that it is likely that injuries are under-reported. There are anecdotal examples of occupants whose injuries were not immediately apparent, but caused disability beyond the immediate post-crash timeframe. Even "minor" injuries can be career-ending for those who work in aviation. Incidences of post-traumatic

stress disorder (PTSD) are also under-reported and require far more research as well, as unmitigated PTSD and other "unseen injuries" can have costly ramifications. Moreover, addiction to pain medications can arise as people try to manage their pain from injuries, resulting in another costly variable.

The lack of specificity with regard to injuries, as well as the lack of information on the mechanisms of injury and death, makes accurate injury analysis within the current database difficult, if not impossible. If the NTSB utilized the MAIS scale for injury classification, then the valuation of injuries could be determined more accurately.

Since the NTSB injury classification system does not include all six MAIS categories, the U.S. Office of Aviation Policy and Plans (APO) had to develop another method to make the calculation of injury valuations possible *(see Table 3)*. The APO determined that "minor" injury victims typically (but not always) have injuries at the MAIS 1 level only, corresponding to the fractional fatality value of 0.003 and a current dollar value of $28,200. Meanwhile, it determined that "serious" injury victims typically have at least one injury at MAIS 2 or higher, so it took a simple average of the values for MAIS 2 to MAIS 5. This resulted in a fractional fatality value of 0.253 — which has a current dollar value of $2,378,200, given the VSL for a fatal injury of $9.4 million.

PRACTICAL APPLICATION TO HEMS CRASHES

It should be noted that Lawrence Blincoe, author of the NHTSA's *The Economic and Societal Impact of Motor Vehicle Crashes*, suggests that "taking a simple average of the MAIS 2-5 disutility factors will overstate the average disutility for that group. The proper way would be to compute an average weighted by relative incidence of injuries in each category." Nevertheless, the APO's estimates provide a starting point for estimating the impact of the past 10 years of HEMS crashes, especially considering that the number and impact of injuries are likely under-reported.

According to the NTSB's Aviation Accident Database, between 2006 and 2015, there were 90 HEMS accidents, resulting in 103 fatalities, 31 occupants with serious injuries, and 24 occupants with minor injuries (an additional 130 occupants were said to have no injuries). If we apply the existing VSL dollar values to these totals, we can determine that the fatalities had a combined disutility of $968,200,000; the serious injuries, a combined disutility of $73,724,200; and the minor injuries, $676,800 — resulting in a staggering total impact of $1,042,601,000. Yes, that's more than a *billion* dollars.

These numbers by no means illustrate the comprehensive costs of HEMS crashes; rather, they are likely the tip of the iceberg. It is highly unlikely that all of those categorized as having "no injuries" truly had no injuries. As there is no follow up with crash survivors, there is also little data, other than anecdotal, to know if the initial injury assessments were correct to begin with. But, with the lack of any other system to calculate injury costs in this industry, it's a start.

AND HERE'S ANOTHER IMPORTANT QUESTION: WHO PAYS?

The costs *conservatively* add up to over a billion dollars over the past 10 years. Maybe insurance companies cover some of it, but it is quite feasible that most of it creates an insidious and unseen burden that is absorbed by society. And there is no question that the survivors of HEMS crashes, their families, and the families of the fallen bear the lion's share of this unimaginable economic and non-economic burden.

Another way of determining costs is through determining comprehensive unit costs as in the Summary of Comprehensive Unit Costs utilized by NHTSA *(see Table 4)*. The costs listed in each category in NHTSA's table are clearly far below what they would be in HEMS. Take "EMS" costs for example. Many survivors of HEMS crashes are transported by helicopter from the scene of their crash to a trauma center. The air medical transport costs alone far exceed the listed "EMS" costs on the NHTSA table, even for an MAIS 5. The HEMS industry would need to determine more accurate values in order to calculate costs. However, the HEMS industry currently does not have the data to fill in a similar table *(see Table 5)*. How can we effectively manage what we do not measure?

These comprehensive costs need to be determined. Only when we understand the true costs of these crashes, both economic and non-economic, can we effectively address the accidents and injuries

Table 4: Summary of Comprehensive Unit Costs for Motor Vehicle Crashes
Source: *The Economic & Societal Impact of Motor Vehicle Crashes, 2010 (Revised), L.Blincoe, et al, 2015*

Summary of Comprehensive Unit Costs, 2010 Dollars							
	MAIS 0	**MAIS 1**	**MAIS 2**	**MAIS 3**	**MAIS 4**	**MAIS 5**	**Fatal**
Medical	$0	$2,799	$11,453	$48,620	$136,620	$384,273	$11,317
EMS	$59	$38	$109	$416	$838	$855	$902
Market	$0	$2,726	$19,359	$63,338	$140,816	$337,607	$933,262
Household	$45	$862	$7,106	$22,688	$37,541	$95,407	$289,910
Insurance	$143	$3,298	$4,659	$15,371	$28,228	$72,525	$28,322
Workplace	$46	$341	$2,644	$5,776	$6,361	$11,091	$11,783
Legal Costs	$0	$1,182	$3,351	$12,402	$26,668	$82,710	$106,488
Total Economical Costs	$293	$11,246	$48,681	$169,611	$376,769	$984,468	$1,381,984
QALYs*	$0	$23,241	$340,872	$805,697	$2,037,483	$4,578,525	$7,747,082
Total Comprehensive Costs	**$293**	**$34,487**	**$389,553**	**$975,308**	**$2,414,252**	**$5,562,993**	**$9,129,066**

*The metric commonly used to value these nonfatal injury losses is the quality-adjusted life year (QALY). A QALY is a health outcome measure that assigns a value of 1 to a year of perfect health and a value of 0 to death. QALY loss is determined by the duration and severity of the health problem, with a full year of QALY loss being equivalent to the loss of a full year of life in perfect health.

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Table 5: Summary of Comprehensive Unit Costs for HEMS Crashes

Summary of Comprehensive Unit Costs for HEMS Crashes	MAIS 0	MAIS 1	MAIS 2	MAIS 3	MAIS 4	MAIS 5	Fatal
Medical							
EMS							
Market							
Household							
Insurance							
Workplace							
Legal Costs							
Total Economical Costs							
QALYs							
Total Comprehensive Costs							

The HEMS industry currently does not have the data to fill in a summary of comprehensive unit costs table. How can we effectively manage what we do not measure?

in HEMS. While the numbers discussed thus far represent economic costs — such as medical care, lost productivity, and legal and workplace costs — it is extremely important to additionally consider the non-economic costs of HEMS crashes.

As noted in the NHTSA's most recent version of *The Economic & Societal Impact of Motor Vehicle Crashes*, in the case of serious injury or death, "medical care cannot fully restore victims to their pre-crash status, and human capital costs fail to capture the relatively intangible value of lost quality-of-life that results from these injuries." In the case of death, of course, the victim is deprived of his or her remaining lifespan. In a case of serious injury, the victim may suffer lifelong disability and pain "beyond any economic recompense." Moreover, a victim's friends and family may also suffer economic losses and profound emotional burdens in caring for the victim.

The authors of the NHTSA paper state, "Action taken by society to alleviate the individual suffering of its members can be justified in and of itself; in order to increase the overall quality-of-life for individual citizens. In this context, economic benefits from such actions are useful to determine the net cost to society of programs that are primarily based on humane considerations. *If the focus of policy decisions was purely on the economic consequences of [crashes], the most tragic, and, in both individual and societal terms, possibly the most costly aspect of such crashes would be overlooked"* (emphasis added).

THE BIG PICTURE

The next time someone suggests that the "benefit doesn't justify the cost" of a safety improvement, consider this: between 1972 and 2015 there were 1,013 individuals involved in HEMS accidents in the U.S. That's enough people to fill two Boeing 747s.

Dedicated, highly skilled pilots and medical crewmembers perform amazing work every day, which makes the tragedy of losing them to helicopter accidents even greater. Between 1972 and 2015, 322 people were fatally injured in HEMS accidents in the U.S.
Skip Robinson Photo

Of those individuals, 322 were fatally injured, 113 were classified as having "serious" injuries, 131 had "minor" injuries, and 447 were classified as "uninjured."

What do we know about them beyond that? Not much. But most certainly the economic costs are far into the billions of dollars, and the non-economic costs to crash survivors, families of our fallen, and to the community as a whole are immeasurable.

The injury costs discussed in this article, both economic and non-economic, are clearly understated, as the comprehensive data required to ascertain more accurate numbers does not exist. Further, these costs do not reflect the comprehensive costs of HEMS crashes. If we are to truly understand how to decrease our own morbidity and mortality, then we must be committed to establishing the rigorous data collection and research methods utilized by entities such as NHTSA.

Finally, data alone will not tell the whole story. It is essential that we seek to understand the experiences of crash survivors and surviving family members so that we can develop the means to mitigate both economic and non-economic costs of crashes.

While there is no amount of money that can make up for the loss of life or limb, the financial calculations in this article are intended to spark a conversation about better understanding the true costs of injuries sustained in HEMS crashes so that the costs of safety improvements can be readily justified. What costs are we willing to bear to improve safety and reduce risks? If safety is truly our number one priority, then we should be making every attempt to fully understand all of the realities of crashes and determine a reality-based approach to safety — from preventing crashes to improving crash survivability, to ultimately learning as much as possible from near-misses, as well as accidents.

The FAA is required to determine the economic impact of implementing safety measures; for example, crash-resistant fuel systems and energy-attenuating seats in helicopters. Equally important, however, is determining the cost of *not* implementing these and similar measures, which seemingly has been overlooked. The costs to crash survivors, surviving family members, and society as whole from preventable deaths and injuries can no longer be ignored.

As this story goes to press, a flight nurse is struggling for his life in a burn intensive care unit in Colorado, where he has been for the past *11* months. He was severely burned in a post-crash fire that was likely entirely preventable. And he is not the first one to endure such devastating injuries — similarly preventable accidents have occurred, in which other air medical crewmembers literally burned alive. Why? Because somebody somewhere decided that the benefit of integrating crash-resistant fuel systems was not worth the cost.

These types of preventable deaths and injuries *cannot be allowed to continue to happen*.

The normalization of deviance is defined as the gradual process through which unacceptable practice or standards become acceptable, becoming the social norm for an organization as deviant behavior is repeated without catastrophic results. In the helicopter industry, a normalization of deviance has occurred *even with a history of catastrophic results*, as segments of the helicopter industry — despite hundreds of deaths and injuries over the past decades — continue to balk at crucial safety recommendations and regulations from the NTSB and the FAA.

The popular definition of insanity, meanwhile, is to keep doing the same thing over again and expecting a different result. We've recently lost three more crewmembers and a patient in yet another HEMS crash. That would be a minimum of $37,600,000 in injury costs alone, and immeasurable pain and suffering for the families and friends left behind. Let's stop the insanity. Let's actually strive to truly understand what we're trying to solve, and let's enlist the expertise of those who understand what we clearly do not.

Our crews and their families, as well as the patients we fly, deserve nothing less.

Krista Haugen | Krista Haugen, RN, MN, CEN is a former flight nurse who survived a helicopter crash while on duty in 2005, one month after a fatal crash at her program in which three of her friends and colleagues perished. She has since co-founded the Survivors Network for the Air Medical Community, served as a volunteer for the Air Medical Memorial, and is a former board member of the National EMS Memorial Service. She presently works as an emergency nurse and has 25 years of nursing experience including emergency, critical care, and air medical transport. She is also currently serving as a board member for the Association of Critical Care Transport and is a member of the Rotorcraft Occupancy Protection Working Group. Her special interests include crew resource management and human factors, just culture, medical transport risk mitigation, secondary trauma, post-traumatic stress, and resilience in emergency/critical care professionals.

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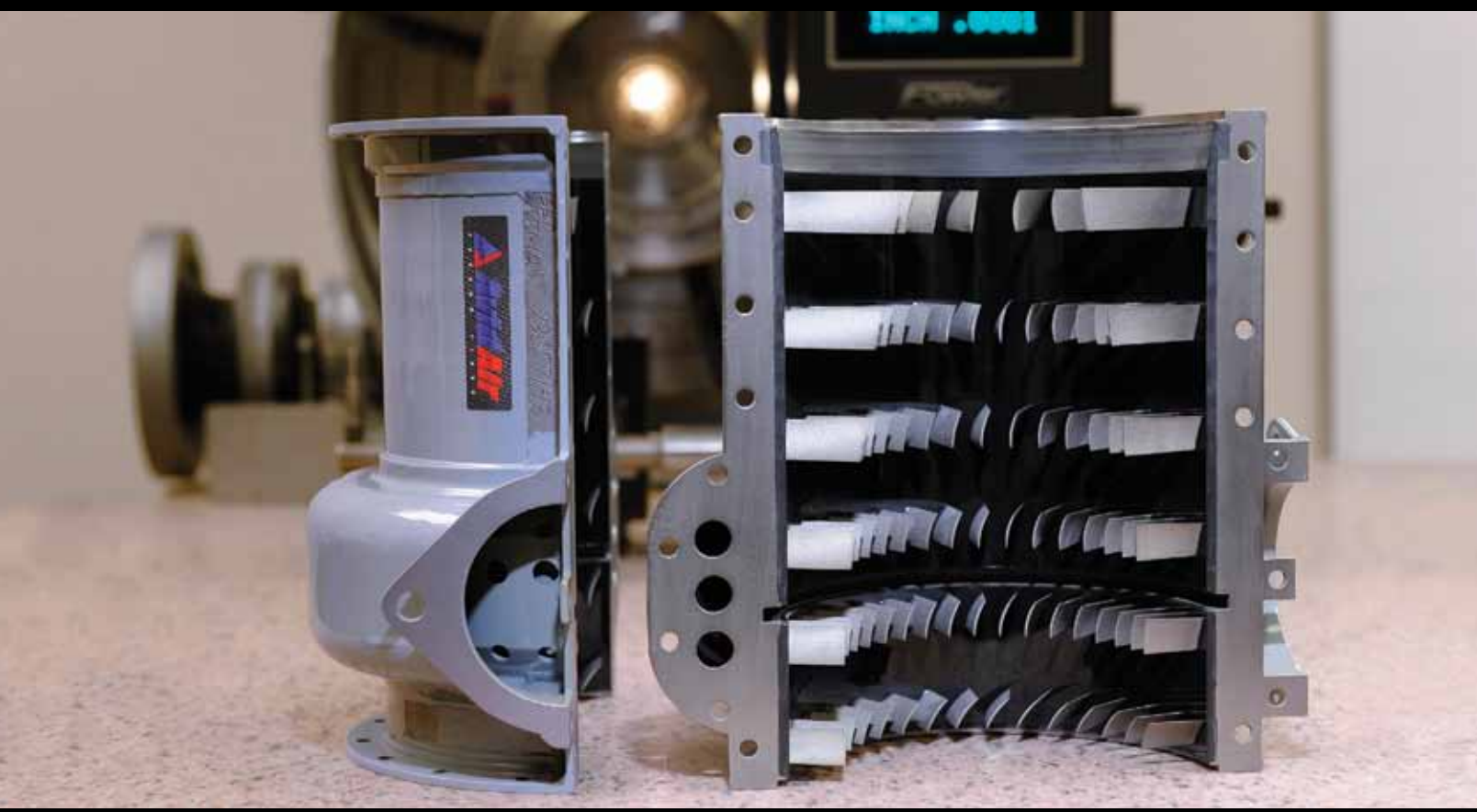

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Interviewed by Elan Head

Jack Schonely

Retired, Los Angeles Police Department Air Support

After more than 31 years with the Los Angeles Police Department (LAPD), much of that time as a tactical flight officer (TFO) and pilot in the Air Support Division, Jack Schonely retired from the force in May of this year. An internationally recognized expert in suspect tactics and perimeter containment, he is widely sought after as a consultant and educator. He will be recognized at the 2016 Airborne Law Enforcement Association exposition with the Robert L. Cormier Award, which recognizes individuals whose personal actions have perpetuated the professionalism and advancement of airborne law enforcement in public service

***Vertical 911:* Tell me about the path that took you into the Air Support Division.**

Jack Schonely: Growing up, I was always interested in aviation. Always, always, always. I went to air shows, did the usual things related to that. I was always fascinated by helicopters. But my life path just didn't go in that direction at all — it went to law enforcement. I was a criminal justice major in college. I ended up joining LAPD in November of 1983, and I was part of a 10,000-officer department, very happy with my choice, and I was working with helicopters on a nightly basis, particularly in K-9. In K-9, the relationship between K-9 handlers and Air Support was very close. We worked with them every night, we knew many of them personally, we knew all of their names, all of their voices. And so I was always intrigued by that, how they enhanced my safety on a nightly basis.

As I was going into my fifth year in K-9, I started thinking about what I was going to do next. And a very good friend in Air Support was a tactical flight officer and said, "Hey, there are some tactical flight officer openings coming up, you should apply. You would be good at this. You're a good communicator, you know the city, you know the tactics, you're doing it all the time. I think you'd love it." I said, "I'll give it a try," and I did. That's how I got there.

***V911:* Bringing that perspective from the streets, what did you identify as some of the most important things that air crews could provide to officers on the ground?**

JS: I would say that the most important was being able to see things ahead of where you actually were, and the tactical insight that goes with that. They would tell us, "OK, the next yard you go into, this is what it looks like, this is what's there, and use caution." Or they would say, "Hey, I've got this heat source a couple of yards away from you. If I were you, I would come back to the street, go up two houses, go down that driveway, and approach from the west." And I remember thinking, "Wow, that's so helpful that they can do that for us. How do they do that?" It wasn't until I was up there that I realized how clear it is many times — not always, but many times — to see those things, and to provide that tactical insight and safety for officers.

***V911:* Tell me about your experience as a TFO. How do you view that role?**

JS: This is one of my passions, the TFO position, because I found out very, very quickly that it truly is the most challenging job in law enforcement, if done correctly. And I always add, "if done correctly," because you can sit there like a bump on a log and be a TFO, and that is not that hard. But if you're doing what a professional TFO should be doing, needs to be doing, must be doing, it is the most difficult job in law enforcement.

I also found out very quickly it's not for everyone. A lot of it is just inside of you; it can't be taught. For instance, knowing north from south after a couple of orbits. How do you teach that? You can give tips to people, but you either have that or you don't. There's a communication layer, obviously, that some people are better at than others. People that can talk, tend to be good TFOs. People that are not as good at talking, communicating — maybe not.

It's a line I use all the time: the TFO job is not for everyone, and that's a fact. I feel lucky that I was able to do it, because it ended up leading to a whole other segment of my career, and a whole other life almost. And I feel really lucky that I made it through the program and enjoyed it, and I did. I loved every minute of it. It was so much fun. The challenge of that job is so incredible that I've never had anything else like that. And that includes becoming a pilot.

***V911:* Speaking of which, how did you transition into flying, and why?**

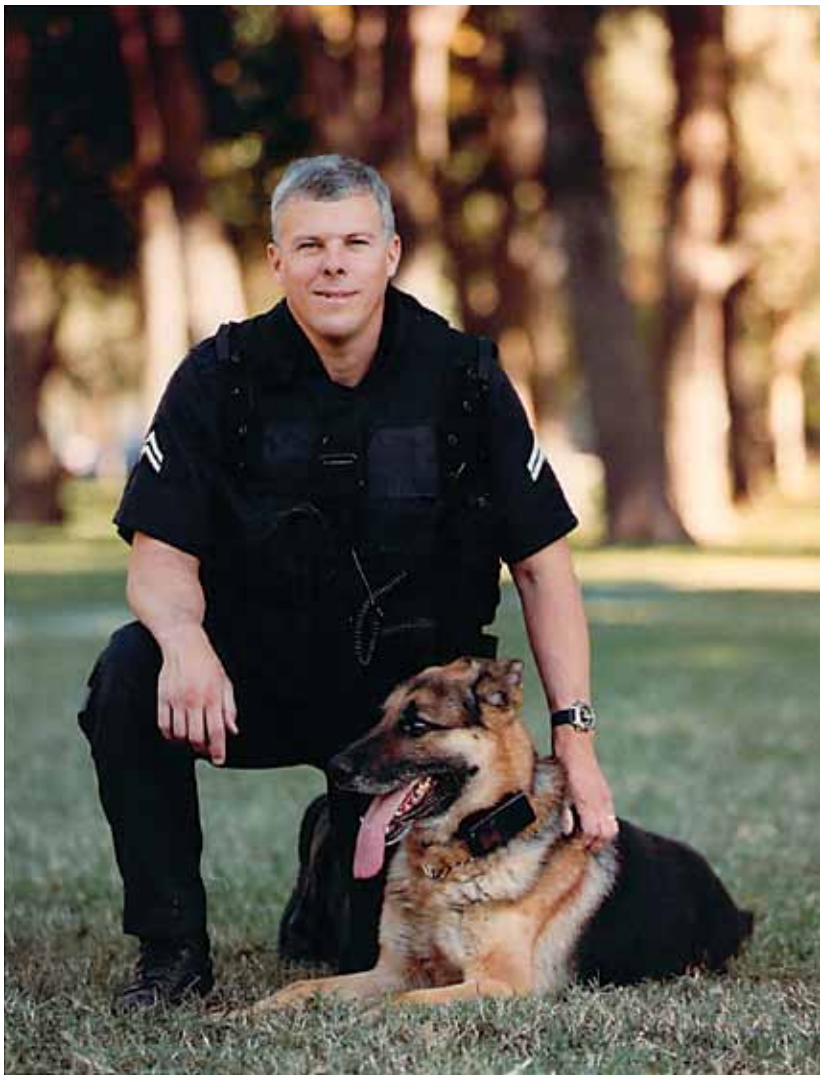
JS: Well, as a TFO obviously you're up there flying every night with the pilot, and back in '97, '98, '99, when I was doing that, there was a significant pay difference as a pilot, so that was a draw. But it was also, "Wow, this is my chance. My interest in aviation all these years since I was little, and I might actually be able to do this now, and get paid for it!" So I went out and got my private fixed-wing — you needed a minimum private fixed-wing with 100 hours of PIC [pilot in command] time. And then I applied, I came out at the top of the list, and boom, now L.A. teaches me how to fly a Bell 206, just like that. What an incredible opportunity!

What I found out very quickly was, I really, really liked it. It was very fun, and it was different from the other seat; less tactical but much more responsibility. I threw myself into that wholeheartedly, and got through the six months of training, and got wings, and went right into the fire. They put me into the TFO training slot right away. The next thing you know, I've got police officers that are sitting next to me that want to be a TFO in their first month, and I'm trying to teach them how to use the radios and how to navigate and how to make calls and all that. That was one of the most challenging things I've ever done as a pilot, I can tell you that. That was harder than being a check airman, that was harder than being a flight instructor — being a primary TFO trainer was quite challenging.

***V911:* How did that influence your later approach to training pilots?**

JS: I can tell you that being a TFO trainer certainly benefited me when I started to train pilots as a flight instructor, because I learned basic teaching techniques, and more importantly, in-cockpit teaching techniques. I saw what worked, what didn't work. I saw very early on that there's enough stress in the world, and in that cockpit, that I don't need to add any to it, if I can help it. I tried that with TFOs, I tried to tone down the stress for them as much as I could, and I found that as a flight instructor, that was kind of my philosophy. Some of the flight instructors I had, they were very, very good at that, at just being cool and calm and not getting too excited, and not getting angry, and not getting frustrated. And those were my best instructors, so I modeled my style after those.

I understand, that everyone has a different style, and the reason is they're different personalities. I'm not one to get angry about something. What sense does it make to me to say, "No! That's not what I told you to do, I want you to land two feet to the right!" That doesn't do them any good. Just say, "Hey, you ended up over here, that's



kind of funny." And they go, "Yeah, sorry about that." "Yeah, well, let's go do it again." It's the same thing, in a different style, and we all end up in the end getting the student ready.

***V911:* What are some of the key pieces of advice that you've given your pilots?**

JS: That's easy. I've said for a long time that you can be the best stick, really have the skills, and that has never impressed me. What impresses me is somebody who's a great decision-maker, and they have good skills. If they have good skills, and they're an outstanding decision-maker, they're going to be safer, they're going to keep themselves alive, their partner alive, and they're not going to do stupid things that are going to get them into trouble. There's enough risk out there without adding risk. Just flying is risky. You start going out in marginal weather, when you shouldn't be, or you start pushing the envelope when you shouldn't be, or you break the rules, you're going to pay. Maybe not today, maybe not next week, maybe not even in the next five years. But someday, that kind of pilot is going to pay the price.

***V911:* Have you seen a shift over the course of your career, where more people in airborne law enforcement are conscious of that?**

JS: Yes, I really think so. I think it's changed a lot. There are a lot of people — agencies, and units, and individuals — that look at things completely differently today than they did 10 years ago, and certainly 20 years ago. I look at our agency, and we are light-years from where we were 10, 20 years ago in the areas of decision-making, risk analysis, SMS [safety management systems], crew resource management, all that. That has come a long way, and I think the average pilot now has bought into it. You've heard that term "buy-in" at safety seminars: "You've got to get the people to buy in." Well, I think most buy in. And when I got to Air Support in '97, I don't know that as many pilots were buying into the idea. More have now, and I think we're safer because of it.

***V911:* What's next for you now?**

JS: I'm continuing to teach; I just got back from Germany. I'm going to Australia for the first time in late August, and I'm going back to the Netherlands in October. There's a lot of instructing ahead, is what I picture, and some of it will be to patrol officers and K-9 officers, but a lot of it is going to be to law enforcement aviation people. I want to continue to do that, as long as someone invites me and thinks I'm worth listening to for a minute. When they stop calling, that's when I'll stop doing it. In between all that, I plan on riding my bicycle a lot, and I plan on traveling with Tracy a lot, and I plan on kayaking and hitting the slopes of Mount Bachelor — there's lots of good things to keep me busy in between the classes.

This interview has been edited and condensed

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