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Carla McKay // Sales Manager
carla@mhmpub.com

Derek Kast // Associate Publisher
derek@mhmpub.com

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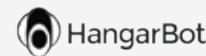




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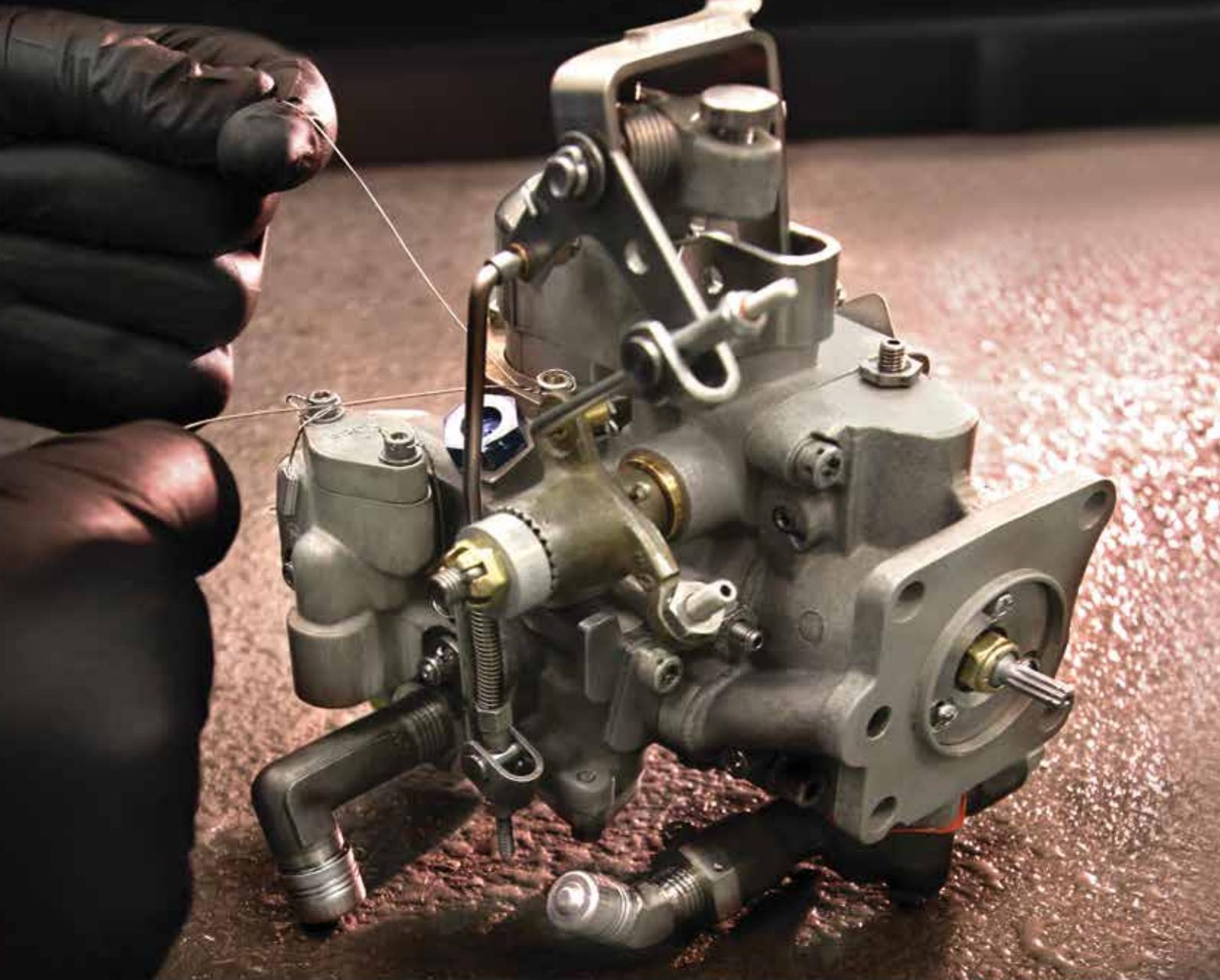
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THE TEAM

GROUP PUBLISHER

MIKE REYNO, MIKE@MHMPUB.COM

GROUP PUBLISHER

LINDA REYNO, LINDA@MHMPUB.COM

ASSOCIATE PUBLISHER

DEREK KAST, DEREK@MHMPUB.COM

EDITORIAL DIRECTOR

ELAN HEAD, ELAN@MHMPUB.COM

EDITOR-IN-CHIEF

OLIVER JOHNSON, OLIVER@MHMPUB.COM

ASSOCIATE EDITOR

DAYNA FEDY, DAYNA@MHMPUB.COM

EDITOR-AT-LARGE

DAN PARSONS, DANP@MHMPUB.COM

COPY EDITOR

CATHY MIEHM

SALES & MARKETING DIRECTOR

TIM MUISE, TIM@MHMPUB.COM

MARKETPLACE SALES MANAGER

CARLA MCKAY, CARLA@MHMPUB.COM

JUNIOR SALES REPRESENTATIVE

MITCHELL REYNO, MITCH@MHMPUB.COM

CIRCULATION MANAGER

LEANNE WILLIS, LEANNE@MHMPUB.COM

PRODUCTION MANAGER

JEN COLVEN, JEN@MHMPUB.COM

GRAPHIC DESIGNER

KAYTLYN WISMAYER, KAYTLYN@MHMPUB.COM

WEBMASTER

SHAWN PIETERS, SHAWN@MHMPUB.COM

CONTRIBUTING WRITERS

JEN BOYER
ED BROTAK
JOHN CARINHA
THIERRY DUBOIS
JON DUKE
ROB ERDOS
GEOFF GOODYEAR
KIM HUTCHINGS
BOB PETITE
ANDY ROE
PAUL SADLER
COREY TAYLOR
DORCEY WINGO

CONTRIBUTING PHOTOGRAPHERS

JAMES ANDERSON
TED CARLSON
GREG DOYLE
DEBBIE ERDOS
KRIS GROGAN
NICOLAS GOUHIER
LLOYD HORGAN
DAN MEGNA
HEATH MOFFATT
ANTHONY PECCHI
MIKE REYNO
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LOOK THE PART, FEEL THE PART!

“Look the part, feel the part!” It almost sounds like advice that would have been passed on to us a couple of generations ago. These days, depending on the work environment, one might show up to conduct a flight in jeans and T-shirt. Not that there is anything wrong with that, except some recent studies have shown it might affect your professional performance.

I have had a shaky history with uniforms and the like. I have written in previous columns about my time in Canada’s army reserves. Having just completed the basic parachutist course in Edmonton, Alberta, I was the proudest male on the planet! Wearing my Canadian Forces dress greens uniform, sporting a brand new set of para wings, I was in the lobby of a hotel awaiting my bus to the airport. As I wandered around the lobby my peregrinations could best be described as a strut meant to maximize visibility and effect. This went on for a few minutes until an elderly lady came up to me and assumed I was one of the bell staff. My strutting ended as I had to move all of her luggage. No glory – no tip.

Another incident was a bit more startling, but also humorous. Like many Newfoundland families, ours was genetically predisposed to kidney stones – that acute malady that simultaneously inflicts

excruciating pain while stripping one of all human dignity. While undergoing one of several attacks, I was admitted for day surgery in St. John’s to take care of this nonsense once and for all.

Before they administered any happy drugs I found myself in a set of OR greens joking with the staff. They did not have my most recent X-rays, so yours truly was given the job of trotting down to radiology to pick them up and deliver them back to day surgery. It was not overly complicated, and I felt up to the task. I did not give a second thought to the figure I cut while transiting the hospital corridors. Having collected the envelope with the X-ray film, I tucked it under my arm and began the 180 backtrack to day surgery.

The large Manila envelope under my arm completed the ensemble nicely, and I began to collect the odd stare as I headed down the corridor. Now, in my defense, I did not have a stethoscope around my neck and I was in stockinged feet. But this did not detract from the professional image I was portraying. Indeed, I suspect the stockinged feet just led to the conclusion I was one of those eccentric doctor types who squeaks though training every now and then and must be endured. Of course, I had no idea what other people were seeing. I had one thing on my reptilian brain, and that was to get my X-ray snaps to the folks in day surgery!

Of course, it was bound to happen. All of a sudden I heard this loud voice echo through the hallway.

“GOODYEAR. GEOFF GOODYEAR!”

I looked back to see a real doctor hollering out to me. He looked vaguely familiar. In double quick time, I remembered it was some kid I threw snowballs at back in school. Now he was a doctor... but hopefully not my doctor. He

came swiftly down the hallway, hand outstretched. With a big smile on his face, he shook my hand, and asked excitedly when I had become an MD. It suddenly dawned on me that with the exception of the stockinged feet, I could have been Marcus Welby or House.

Not wanting to get called into some OR to assist with someone else’s surgery, I quickly explained I was an errand boy for the day, but I was delighted to see him again and please accept my apologies for the snowball thing!

I know most companies have uniforms or dress codes, but that some are enforced more than others, and that these days, deportment might not be thought of as such an important thing as it was in days gone by. But consider a study published in 2012 by professors Hajo Adam and Adam Galinsky of Northwestern University, entitled *Enclothed Cognition*. One very interesting experiment they conducted involved a group of students given various tasks. Half the group were given doctor’s white lab coats, while the other half were allowed to wear their casual street clothing. There were some very interesting results for us as aviation professionals. The students wearing the lab coats made only half the mistakes made by the students without lab coats. The conclusion being that if you look the part, you feel the part – and tend to show more attention to detail.

Hmmm. What if we delete the words “lab coat” and insert the words “flight suit?” Would it have the same effect on our behavior? I always felt that what we wore affected our attitude towards ourselves and also how others perceived us. Dust off the old flight suit and professional wear, folks. The busy season is just around the corner. ✦

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CAREER HELICOPTER FLYING

When I was looking around for a good place to learn to fly, I ran into a lot of negative attitudes towards prospective pilots like me exploring a career option in the helicopter business. At the flight school I finally chose to attend, I was told that most pilots dropped out of the business after a year or two, thoroughly disgruntled. It seemed to me a strange way of selling helicopter training, but I decided to get my license anyway and go to work. The flight training was simply a step along the way.

After being on the job for a few months, I realized that successful helicopter pilots are go-getters. It was up to me to carve out my own destiny as a commercial pilot. I learned to work hard and look for opportunities to get ahead. The pilots who assumed they had a secure job, thinking all they had to do was show up (if they got out of bed in time), soon fell by the wayside. These were the pilots I had heard about who were let go or left the industry early with nothing good to say about it.

Having a job and relying on it will get you nowhere in the helicopter business.

“WITH PERSEVERANCE AND HARD WORK, YOU WILL LEARN TO FLY A HELICOPTER TO A COMMERCIAL STANDARD, BUT YOU MUST ALSO LEARN HOW TO PUT TOGETHER A COMPREHENSIVE MARKETING PLAN TO SELL YOURSELF TO THE INDUSTRY.”

Proving yourself invaluable to an employer by working hard – even when flying work is slow – is the way to get ahead. There are always things that need to be done in any helicopter operation. Logistics, hangar support, marketing, customer service – all of these things are important to the success of any company, and it’s up to you to jump in and get involved in the day-to-day operations of the business that hired you. The problem is that no one teaches you any of this at flight school.

I worked hard for the first company that hired me, and after two years I found a better opportunity somewhere else. I felt guilty about leaving, but my employer wished me well. Many years later, I found myself working at that company once again – this time as an experienced senior pilot. I left the company early in my career, but brought back to them a much improved value-added pilot.

I learned how to fly because I wanted to make a living with my license. Others take lessons for more passionate reasons, with their ambitions perhaps more loosely defined. I have enjoyed a long and profitable career as a pilot and instructor, and given the chance, I would do it all over again in a flash. However, many student pilots find that what they have decided to undertake is more difficult than they first realized – especially if they have been out of school for a while. The training is expensive, and finding work behind the controls of a helicopter is a challenge. Despondency and regret are common emotions when new pilots have difficulty getting a start in the industry, but pilots will be flying helicopters for years to come, and a good instructor’s job is to explain to students just how to tackle the job market to win.

With perseverance and hard work, you will learn to fly a helicopter to a commercial standard, but you must also learn how to put together a comprehensive marketing plan to sell yourself to the

industry. Finding work as a newly licensed pilot is very different from applying for a job at a fast food restaurant. You are trying to gain entry into a profession where you need to prove your worth to an employer.

Having been in the industry for 40 years, I know that good pilots are hard to find. A good pilot can fly effectively and safely, but is also a great sales and marketing rep and customer service specialist. Employers are always looking for good pilots who are ready to go to work with vigor and enthusiasm. Having a license in your pocket is not a ticket to a job.

Some flight schools do spend time with their students explaining the job description of a commercial pilot, but time spent engaged in that kind of instruction is not a revenue source for training schools. Students should expect to be taught how to fly at flight school, but to learn the other traits required of a good commercial helicopter pilot they are on their own.

My advice to those wanting to fly for a living is to research the helicopter business thoroughly, gather your finances, find out where and how you can gain entry into the business, formulate your long-term strategy on how you will progress through the ranks, and then as the final piece of the plan, go to the flight school and get your license.

Flying a helicopter for a living is exciting, especially when someone is paying you to do it. Early morning sunrises and evening sunsets are that much more breathtaking in the air. Traveling through hilly terrain is never mundane, and working with passengers you have never met as their pilot in command is exhilarating. Yes, the weather is not always great, but dealing with less than ideal wind and weather is also part of the job and a proud accomplishment when handled well. Flying helicopters is a great career option for those ready to face the challenges that await them. It’s well worth it in the end. ✦

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LEAVING A LEGACY

A. Gannon, J. Gannon, P. Matero, A. Altobelli, J. Altobelli, K. Altobelli, G. Bryant, K. Bryant, P. Chester, S. Chester, C. Mauser, and A. Zobayan – all names forever associated with two recent fatal helicopter crashes that took place exactly one month apart. On Dec. 26, 2019, an Airbus AS350 B2 crashed while on an aerial tourism flight in Kauai, Hawaii, killing seven (the identities of four of the passengers have not been released); and then on Jan. 26, 2020, nine people died when a Sikorsky S-76B crashed during a charter flight near Calabasas, California. The investigations into both crashes are ongoing.

“THE GRAVITY OF THE TWO ACCIDENTS CONTINUES TO HAUNT ME TO THIS DAY. THERE IS MUCH SPECULATION AS TO WHAT WENT WRONG – BUT FINDING THE ANSWERS WILL TAKE MONTHS OR POSSIBLY YEARS.”

I had been in Kauai 10 days before the first accident. I sat in the crash helicopter, reviewing potential avionics upgrades, and generally being in awe of the surroundings in which these tour operators make their living. My client took me on a similar tour to the one the accident helicopter later flew, and I witnessed the sites and amazing vistas six tourists would later experience on that ill-fated flight.

The day Kobe Bryant and eight others perished just north of Los Angeles, California, I was in a charity hockey tournament. I had just come off the ice as news of the accident spread through the gathering of players and various onlookers. National Hockey League alumni players stood stunned and shocked. There was a communal disbelief as to the validity of the stories making their way across social media sites. The following day, I was in Los Angeles for vendor visits and to attend Heli-Expo in Anaheim. I made my way to the Staples Center one evening to pay my respects to an NBA All Star and legend, and to those that lost their lives alongside him.

The gravity of the two accidents continues to haunt me to this day. There is much speculation as to what went wrong – but finding the answers will take months or possibly years. There are, of course, some factors that one can surmise from what is known.

Both accidents were arguably avoidable; both involved some form of spatial disorientation resulting from flight into IMC (instrument meteorological conditions); and both involved a perceived loss of situational awareness and ultimately control of the aircraft. In this modern era, where we are bound more than ever by regulations, policies and evolving technologies aimed to make air travel safer, why do these accidents persist? Where are the gaps that allow for a sequence of events to manifest in such a fashion that it leads to a loss of life?

I believe that the common denominator in these two examples and many before them is the human element – an individual(s) tasked with controlling a complex aircraft comprised of a multitude of integrated electro, mechanical and pneumatic systems over varying

terrain and with a paying clientele base. Beyond this, the individual(s) has external factors such as weather and air traffic control constraints that influence their decisions and/or flight path, not to mention the ebb and flow of their own personal lives to occupy their minds. We are the variable in an equation that requires a constant or fixed outcome or result. Deciding to fly is optional; landing is mandatory.

Some accidents produce reactionary measures to ensure they are not repeated, or at the very least mitigated to prevent their reoccurrence. There are others that are avoided through foreseen or predicted factors and a more proactive approach. I would like to think that beyond any one aviation accident victim’s personal legacy, the sum of such unexplainable loss will stand to bring a legacy of change to our industry. A series of technological advancements could one day take the variables out and replace them with constants that remove or greatly reduce margins of error. This is not to say that technology should replace the work of a living, breathing person – but it has its place in a solution that will require the great efforts of equipment manufacturers, engineers, designers, regulatory and safety agencies in order to be realized. ✦

A huge thank you to everyone who reached out with supporting words following my column in the last issue. My decision to share a part of my personal journey was to bring to light a difficult life experience some of you have lived, are living and maybe will live. There is truly only one direction out and that is forward.

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WHEN PROMOTING FROM WITHIN GOES WRONG

When a management position becomes available, it's natural to look within the company for someone to fill that role. It can appear to make things a lot easier; you are aware of the person's work ethic and style, they know the company culture and how things work, and you don't have to go through the tedious tasks of sifting through resumes and interviewing potential candidates. That all sounds logical and makes sense. Promoting from within is a good idea, until it isn't. There can be consequences when people are promoted for the wrong reason.

If you promote simply because there's no one else to take the job, or due to seniority or necessity – rather than how well a person manages – you can negatively impact morale and company culture (which also includes your safety culture). It can also lead to losing the person you've promoted!

“HOW MANY TIMES HAVE YOU HEARD OF PILOTS TAKING ON A CHIEF PILOT ROLE, AND THEN SEEKING A JOB AT ANOTHER COMPANY IN ORDER TO GO BACK TO WORKING AS A PILOT? I SAW THIS AS RECENTLY AS LAST WEEK.”

It's bad enough that some people are put into management positions for the wrong reason, but it is made even worse when they are moved into these positions with little or no leadership training or coaching. Far too often it is about filling the spot as quickly as possible to help manage the workload and responsibility,

instead of taking the time to find the right person who possesses actual leadership skills and qualities. Just because someone has a strong work ethic and great technical skills does not automatically mean they have great leadership skills.

The question then becomes, how do you know who to promote into management? Who is best left being a success in their existing role? It's not difficult to spot a good employee, because they generally stand out above the rest. However, the hard-working employee may not actually end up being the best manager. If you look for more than one employee who could potentially take over a position similar to yours, you give yourself options. Sometimes the person you think would be best suited to it ends up not being the right person.

How many times have you heard of pilots taking on a chief pilot role, and then seeking a job at another company in order to go back to working as a pilot? I saw this as recently as last week. You often hear that the chief pilot role is “too much work” and they “just wanted to go back to flying.” This is not unique to pilots; you see it in many roles and many industries. People move into management, realize how much they don't like it, and either go to work for another company in the same industry, or change careers completely to one they “have always wanted to do.”

The question then becomes, how do you know when someone is truly ready to make the move into management?

One of the first things that you can do is ask. Once you have identified a couple of potential candidates, ask them what goals they have for themselves and with the company. Have they even considered moving into management? Is it something they would like to do? Look for these candidates early on so that there is plenty of time to introduce them to the idea before

the job even becomes available. Don't wait until there is an urgent need to fill the position.

Oftentimes employees may feel pressure from themselves or others to take on the management role. This can leave the employee feeling unsure and uncertain as to their suitability for the job, but it is your job as a manager to help ease that feeling. “A central part of your job is to train and develop people,” explains Art Markman in his article *How to Stop Delegating and Start Teaching*. “When you take on the mindset of a trainer – instead of managing and delegating work – you will naturally look for ways to give a little more responsibility to people who work for you.”

As a manager, your job is to start preparing potential candidates for a management role. Start giving them assignments, and see which ones are able to complete them and which ones struggle. If too much responsibility is given right up front, it can make them feel overwhelmed and perhaps create self-doubt. Dumping everything on them at once because you will be out of town, or are being promoted yourself and there is no one else to do the job, is setting them up for failure. Start off with smaller tasks, then build them up to things that are more challenging.

Being a good manager is not only about handling challenging tasks, it has a lot to do with how you manage yourself and others. If someone is not able to express themselves by communicating in a positive way – as well as listening to understand where others are coming from – it's much more likely that they will not be a successful manager. Companies that understand the importance of mentoring early on and providing new managers with leadership training will have a much better outcome in their company culture, which then enhances their safety culture. ✦

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IF UCFIT

I was looking forward to catching up with old friends when I descended into the L.A. basin for this year's Heli-Expo, but the somber mood that greeted our arrival doused any chance of levity, at least for the first few days. Nine lives lost, likely completely unnecessarily, and amongst them a sporting great with family and friends.

Attending the International Helicopter Safety Foundation meeting the following day, the details were barely discussed, but the mood remained. Lots of statements about night flying in single engine aircraft and flying in bad weather visual flight rules (VFR), but we've heard it all before. It's usually accompanied by calls for "more instrument training" or more systems installed in aircraft. My least favorite is the call for "black boxes" – as the media calls data recorders, even though they are almost always orange. I don't object to them, I just find something that will only be examined after an accident to be closing the barn doors after the cows have been stolen, trucked to another jurisdiction, butchered, sold to restaurants, and served to steakhouse regulars.

“REMEMBER THAT HALF THE SPEED MEANS ONE QUARTER OF THE TURN RADIUS OR STOPPING DISTANCE, PLUS YOU HAVE TIME TO PLAN. IT ISN'T ROCKET SCIENCE, BUT IT IS CERTAINLY PHYSICS.”

The pilot was "certified to fly in bad weather" said one media report. What does that mean? He had an instrument rating, but that only means he can fly on the dials and perhaps shoot approaches

into airports. Enter cloud surrounded by hills and an accident is almost always assured, and since this type of accident is "high inertia," it's almost always fatal.

I see these accidents called CFIT, or controlled flight into terrain, but that moniker needs to be reserved for the accidents where the flight crew didn't even know they were about to hit something. The long shallow descent into the ground, or the rising terrain that somehow escaped their attention – those are CFIT accidents, and perhaps some could be avoided with the help of the terrain warning devices available today.

Contrast that with a pilot entering cloud accidentally, but knowingly, and immediately starting to panic. Power changes, pitch and roll perturbations, engines winding up and winding down. Is this when one should transition to instruments? When one knows there are goats at eye-level surrounding the helicopter? I daresay terrain warning is useless when terrain surrounds one's aircraft. This type of accident usually ends in a high-speed impact, often with no semblance of control in the last few seconds. This unfortunate occurrence, completely void of control, should be called UCFIT, uncontrolled flight into terrain.

The ways to prevent this accident are of two types, one involving decision-making and one involving training.

The decision-making piece is dead simple, and perhaps should be called "alive simple." Land the helicopter before the chance of entering cloud is imminent. This is not new and certainly does not require anything beyond a Grade 1 education to comprehend, yet we continue to allow our "drive to complete" to overcome our desire to live. Maybe every pilot needs annual psychological testing and reinforcement of basic values. Your family and friends all need you. Land the damn helicopter, please.

I reject completely that entering cloud surrounded by rocks requires instrument training. Throw the gyros out the window,

they cannot help you now. The type of training that can help you will hopefully give you the skills and confidence to know when to land (see above) but also to know how not to enter cloud accidentally. There seems to be some misconception that any flying experience helps in any scenario. This is not true. To avoid flying into cloud you must be taught (of course, many of us are self-taught, but many more have died attempting their diploma) what to do, and, more importantly, what not to do. My own experience in training other, experienced pilots, has all-too clearly shown me the gaps in what should be universal knowledge.

I'm not an instructor in the sense of creating a pilot from scratch, but I have trained dozens of pilots how to fly individual aircraft types, not to mention the specialized stuff like how to survive in the mountains and how to deliver a load with a long line. I have seen experienced pilots, with thousands of hours, fly at acute angles and great rates of speed, across mountain ridges and into cloud with me sitting next to them wondering what the heck they were doing. I've let them do it only when I knew I could get us out, but clearly there are many pilots out there simply not prepared for what's expected of us in industry.

Barring certain criteria, you never cross a ridge with no option to turn back to whence you came. And slow down. Remember that half the speed means one quarter of the turn radius or stopping distance, plus you have time to plan. It isn't rocket science, but it is certainly physics.

It is time we make every pilot who will ever come near a rock do proper low visibility training. The training required today is almost useless, but there are cheap simulators whose graphics are so good you will scrunch down in your seat and start sweating when the weather closes in. Let's stop talking and start taking action. There are no mysteries here, just a lack of will until the next tragedy happens. ✦

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SKY HELICOPTERS' R66 NEWSCOPTER PERFORMING A TWO-MINUTE COOLDOWN AT TIPTON AIRPORT IN MARYLAND.
GEORGE MCKEON PHOTO











✦ SAVOIE HÉLIPTÈRES AIRBUS AS350 ASTAR SITTING ON TACUL GLACIER IN THE MONT BLANC MASSIF. **BEN GRELIER PHOTO**





➤ AIR ZERMATT BELL 429 DURING A FIREFIGHTING DEMO IN RARON, SWITZERLAND. **ANDREA CAPOFERRI PHOTO**



**GO ABOVE AND
BEYOND FLIGHT**

1 **BELL DEVELOPING FAN-DRIVEN ELECTRIC ANTI-TORQUE SYSTEM**

Bell's electrically distributed anti-torque system is composed of four small fans within a tail rotor shroud.

2

SIKORSKY, BOEING WOW ARMY OFFICIALS WITH FIRST TRIPLE DEMO OF ROTORCRAFT

The much-anticipated SB>1 Defiant was the star of the show.

3

A YEAR IN THE LIFE OF A TUNA BOAT HELICOPTER PILOT

Matthew Hayes tells us about life as a pilot on a Pacific Ocean tuna boat.

4

YOU HAVE QUESTIONS ABOUT BELL'S ELECTRIC TAIL ROTOR. WE HAVE ANSWERS

Bell answers our readers' most frequently asked questions about its new EDAT system.

5

NTSB RELEASES NEW DETAILS ON KOBE BRYANT HELICOPTER CRASH

The helicopter was climbing through a cloud layer when it began a left turn and descended into terrain.

6

AIRBUS PROTESTS NAVY HELICOPTER TRAINER AWARD TO LEONARDO

The protest could disrupt the U.S. Navy's procurement timeline for the TH-73.

7

CAMERA DRONE, HELICOPTER COLLIDE DURING OFF-ROAD RACE

The FAA is investigating the collision of a drone and a helicopter at an off-road truck race in California.

8

CORONAVIRUS FORCES HELICOPTER EMS SAFETY STRUCTURES

Helicopter air ambulance operators are weighing the risks of transporting patients with COVID-19.

9

LEONARDO TO ACQUIRE KOPTER IN BLOCKBUSTER MOVE

Leonardo is to buy Kopter, creator of the upcoming SH09 helicopter, for \$185 million.

10

BOEING WINS LEGAL BATTLE WITH MDHI OVER AH-6I RIGHTS

Boeing won an \$11M judgement against MD Helicopters over the rights to its AH-6i helicopter.



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ROTORBEAT

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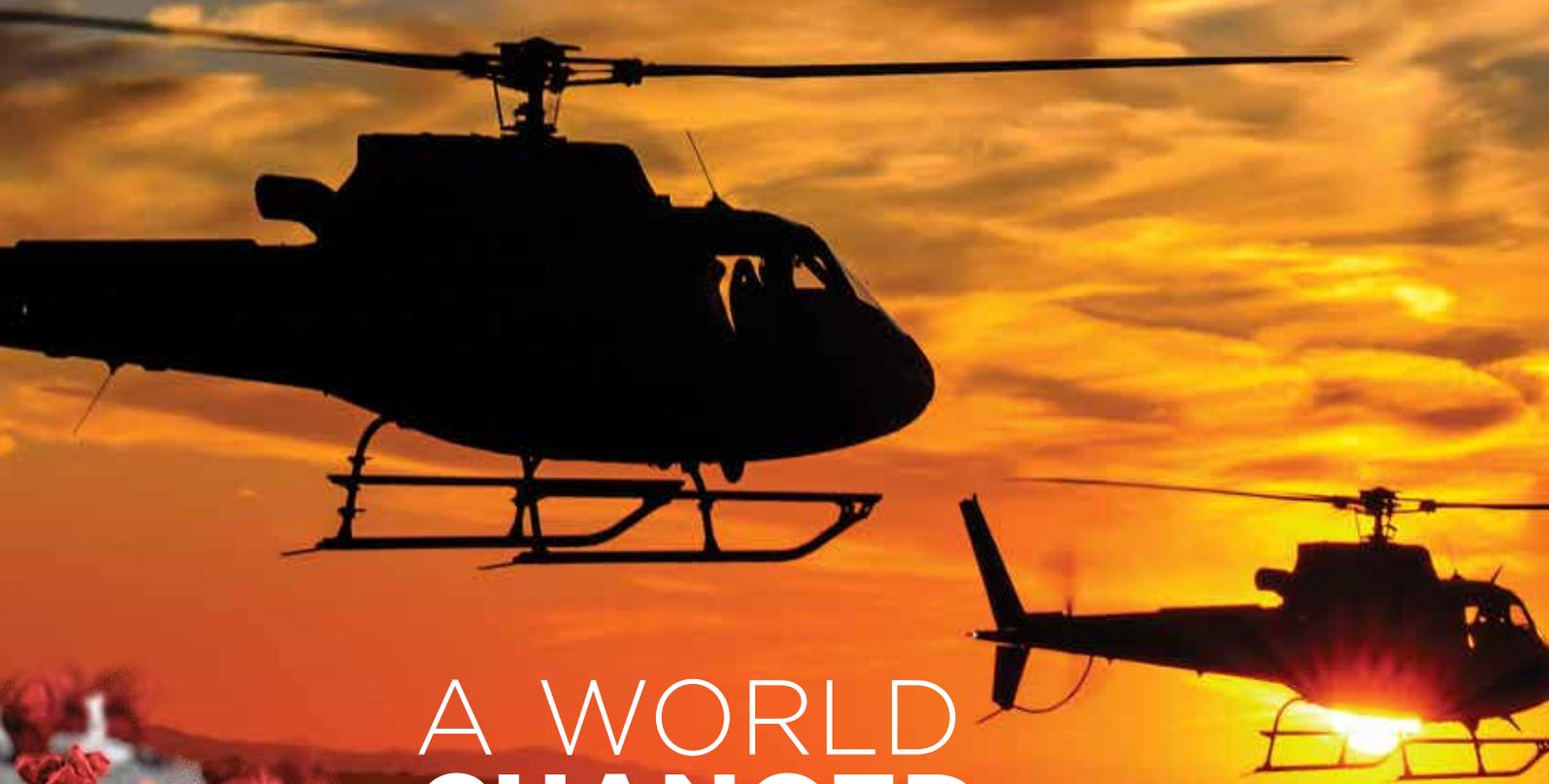
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A WORLD CHANGED

FROM OPERATORS, TO OEMS; SUPPLIERS TO PILOTS; NO ONE HAS ESCAPED THE IMPACT OF THE MOST DEADLY PANDEMIC IN LIVING MEMORY.

BY OLIVER JOHNSON

As much of the world's population struggles to make sense of the new reality enforced on them by the Covid-19 coronavirus, the helicopter industry is similarly finding ways to adapt and find a path forward.

By March 31, there were 785,000 total confirmed cases of coronavirus around the globe, and over 37,000 deaths, according to figures from Johns Hopkins University of Medicine. Those figures are likely to climb substantially over the coming weeks.

The first case of Covid-19 was detected in Wuhan, China, on Dec. 31, 2019. The World Health Organization declared the virus's outbreak a pandemic on March 11, and over the following weeks, countries around the world implemented increasingly restrictive measures on their populations to control the spread of the virus. By the end of March, an estimated three billion people were living under lockdown conditions, while companies deemed to be providing an essential service have been allowed to continue.

Given the helicopter industry's intrinsic connection to emergency response and essential infrastructure and economic activity, many operators, manufacturers and support/service companies are still running in some capacity, while having to adjust to new stringent safety measures and social distancing requirements.

Helicopter OEMs have implemented drastic measures in response to the pandemic, including suspending some operations.

Leonardo, headquartered near Milan in Northern Italy in one of the most affected regions of the outbreak, suspended activity at its offices on March 16 and 17 to start an "extraordinary cleaning and sanitation of company premises."

According to a translated statement posted on the company's website, Leonardo said it continued "essential activities" during the closure, including those related to public utility, security, emergency medical services, and the armed forces.

From March 18 to 25, the company said it began a progressive partial reactivation of operating activities, based on balancing the need to ensure the continuation of business while complying with the safety measures required by the Italian government with respect to Covid-19. For example, workers at its facilities are maintaining a distance of at least one meter between each other.

Meanwhile, the company has made its pilots and three helicopters (two AW139s and one AW189) available to provide technical support to the Italian armed forces' helicopter fleet, organizations, institutions, and to police forces.

Elsewhere in Europe, Airbus Helicopters temporarily suspended production and assembly work at its facilities in France and Spain.

Airbus Helicopters' headquarters in Marignane, France, was the major rotary-wing site affected by the move, but the manufacturer also has facilities in Dugny, near Paris (which focuses on rotor blade design, production and customer services), and Albacete in Spain. The latter is a center of excellence for the production and integration of rear fuselages for all Airbus types.

Airbus said it was "working together with its customers and suppliers to minimize the impact of this decision on their operations."

The move, implemented on March 17, lasted four days with reopening activity in Marignane beginning on March 23. The principle is that a work station does not

reopen until it is deemed safe, a spokesperson told *Vertical*. "We inspect area after area," she said.

If the station is seen as not meeting the requirements, further work is conducted to bring it to the defined level of safety. "We work in close cooperation with unions," said the spokesperson. The process was expected to last two weeks.

Health and safety measures include social distancing, with lines drawn on the floor every 3.3 feet (one meter) in critical areas, such as around entrance turnstiles. Wherever possible, doors are kept open throughout the day. Hand disinfectant has been made available where toilets with soap and water are too far.

Employees are directed to work distantly from each other on a helicopter. When this is impossible, such as during flight testing, they use masks.

Two shifts have been put in place and they are required not to meet. A three-hour period is dedicated to cleaning between the two.

Only 15 percent of Airbus Helicopters employees in Marignane were working on site on March 23. Another 50 percent were working from home. Since then, the numbers have evolved marginally, according to the spokesperson.

As for the design office, some engineers are on site, typically to access those computers with powerful design software programs like Catia.

While the COVID-19 virus is also changing life and working practices in North America, the continent appears to be a few weeks behind Europe in terms of the severity of the outbreak.

A spokesperson for Bell, based in Fort Worth, Texas, said the company began offering "flexible working arrangements" on March 23, including working remotely and staggered work schedules for employees who are able to do so. As of March 19, all Bell manufacturing, production, service facilities and delivery centers were operating on their regular schedules.

"We will continue to adhere to the guidance of the CDC, WHO and local governing health authorities to implement any required changes to our business," the spokesperson said.

In California, Robinson Helicopter Company responded to the state's "Stay At Home" order by closing all non-essential company operations from March 23 to April 20.

"While this curtails many factory operations, customer service and tech support continue to answer phones, field questions, and offer assistance," a Robinson spokesperson said. "We at Robinson remain focused on the safety of our employees, and supporting those in the aviation community that depend on us."

Enstrom Helicopter, base in Menominee, Michigan, said it has taken "multiple steps in order to safeguard our employees and our community," in response to the pandemic. "However, we have responsibility to our customers as well, many of whom are performing critical public service operations," a spokesperson said. "As such, Enstrom's product support department remains open. Technical and parts support is available via email or cell phone. As many of our employees will be working part time and/or remotely, we appreciate [our customers'] patience during this difficult time."

No operator has remained untouched by the outbreak, but the aerial tourism sector is one that appears to have been particularly hard.

Niagara Helicopters suspended all operations on March 17, with a targeted reopening on April 6 "upon reassessment of the situation," the company said in a statement on its website.

"We take very seriously the recommendations that all non-essential businesses are to limit their daily operations," the statement said. "We will be closely monitoring the situation and will continue to update customers through all our social media platforms."

In Western Canada, Blackcomb Helicopters temporarily closed its doors to all non-essential services, while continuing to operate flights for search-and-rescue, medevac, and government agencies. The operator said it will begin accepting online bookings for its aerial tours around Whistler, British Columbia, on May 1.

Papillon Grand Canyon Helicopters, which provides flightseeing tours of the Grand Canyon and Las Vegas, Nevada, put a hold on all aerial tours from March 20 to April 20. "Despite the present challenges we know that brighter days lie ahead," a statement from the company said.

Halfway across the Pacific Ocean, Blue Hawaiian Helicopters has also been forced to temporarily close its doors for flightseeing "until further notice." The company said it will continue to be available "on a limited basis" for essential transport needs on a charter basis between the Hawaiian islands.

Thierry Dubois contributed reporting to this story.



LEONARDO ACQUIRES KOPTER

✦ BY OLIVER JOHNSON

Leonardo is to buy Swiss manufacturer Kopter, creator of the upcoming light single SH09, for \$185 million, plus an “earn-out mechanism” tied to certain milestones over the life of the program.

In a press conference detailing the move at Heli-Expo 2020, Kopter CEO Andreas Löwenstein called it “the highlight of the history of Kopter,” and said it was a “very emotional moment” for him and his team of 320 people.

“After 10 years of very dense, intense work, all these people, building, innovating, we have achieved the product of which we are quite proud and of which we are convinced will be the market leader, which will change the game in the light helicopter segment,” said Löwenstein.

“We are conscious about the fact that Leonardo will bring a lot of things to us. Leonardo will, as a technology leader, help us, back us, in order to finalize the certification in record time. We will have an industrial network, commercial networks, service networks around the world which will support us to make [the SH09’s entry into service] as solid as possible.”

The acquisition, which was expected to close in the first quarter of 2020, will replace Leonardo’s current plans to develop a new single-engine helicopter.

“It’s really an important acquisition for Leonardo because it really completes our product portfolio,” said Gian Piero Cutillo, managing director of Leonardo Helicopters. “I do believe it’s the right product to do this.”

He said the purchase of Kopter was “a unique opportunity” as it offered a shortcut

in terms of time to market with a new light single aircraft, as well as bringing extensive innovation capabilities.

“I believe that working together with the Kopter team will really give us a lot of opportunity, where we can also improve the current product and explore with this platform . . . new technology in terms of hybrid, in terms of unmanned solutions,” said Cutillo.

Kopter is to remain an autonomous company “for the time being,” he said, noting that he wanted to preserve the company’s identity and agility.

“We don’t really want to go and change the way they are doing things,” he said. “All the decisions will be made in the interests of Leonardo, obviously, but from now on, we have a common target in the interest of the company.”

Similarly, the Kopter brand is likely to



Kopter is aiming to certify the SH09 by the end of this year. **Leonardo Photo**

“I don’t see now the need to do any major change on that [planned footprint],” he said. “We’ve got to really protect the development phase, because we don’t want to slow down any of the current programs, to achieve as soon as possible the certification.”

SH09 CERTIFICATION IN SIGHT

Kopter is still targeting certification of the SH09 by the end of 2020, and plans to deliver an “IFR [instrument flight rules] ready” aircraft to the market.

At a press conference held on the eve of Heli-Expo 2020, the company also revealed the final design of the aircraft, which has been in development since 2009.

The evolution of the design has been informed by over 100 test flights of the third prototype (P3) in Sicily, and includes a new main rotor head and rotor blades, new cowlings, a redesigned shrouded tail rotor, an enlarged rear cabin (that brings maximum capacity to eight passengers and one pilot), a three-cell crashworthy fuel system, an enhanced design for the gearbox, and modified landing skids.

The changes will be incorporated into P3 in stages, with all set to be in place by this summer. Perhaps the most eye-catching elements – the new main rotor head and blades – have already been installed on the aircraft, with flights beginning with the new design in mid-January.

Explaining the changes to the main rotor head, Michele Riccobono, the company’s chief technical officer and head of flight operations, said the previous setup provided damping when the blades were subjected to cyclic input – but couldn’t provide collective damping.

“This caused a reaction on the airframe for which the aircraft was every now and then fishtailing,” he said.

Kopter has changed the action of the elastomeric dampers to provide collective damping, and Riccobono said the result has been a “significantly” improved ride quality and stability of the aircraft.

“The comment of Richard Grant, our chief test pilot, after flying the aircraft [for the first time] was that it really flies like a perfect aircraft,” he said. “Even without an autopilot, you can even leave the flight controls unattended and the aircraft remains in trim – which is something that is quite difficult to achieve with a helicopter.”

CERTIFICATION TIMELINE

P3 will share flight test responsibilities for certification with pre-serial four (PS4), which will be completed later this year. Pre-serial five (PS5) will then be used for envelope expansion campaigns, such as hot and high trials in Colorado, and cold trials in Alaska, as well as certification of optional equipment, a four-axis autopilot and IFR. Serial six (S6) will be the first series aircraft, and will be used for a couple of certification tests that require a fully representative serial aircraft that has no test instrumentation.

Riccobono said the capabilities of the Garmin G3000H avionics used in the SH09, combined with the aircraft’s dual hydraulics and redundancies in its design, mean it will be “an easy change” to bring the aircraft to IFR capability.

“ ‘IFR ready’ primarily means that the first certification will be VFR [visual flight rules] day and night only, but . . . the real meaning is that a customer taking delivery of an aircraft with these certification type for VFR can later upgrade to IFR with minimal cost, as most of the aircraft is already meeting the certification standard for IFR.”

The change required, he said, would simply be the addition of a four-axis digital autopilot, which the company has already begun working on.

“We want to be ready with the autopilot when the time comes, right after the first TC [type certificate],” said Riccobono.

Currently, the European Aviation Safety Agency (EASA) doesn’t allow single-engine IFR certification, but Bell and Leonardo have recently had success gaining supplemental type certificates from the Federal Aviation Administration (FAA) for the Bell 407GX and AW119, respectively.

To speed up certification of the baseline aircraft from the FAA, Kopter has gained permission from EASA to have the U.S. regulator involved in its type certification effort — meaning approval from the FAA should follow EASA within “a few months” rather than a year. Deliveries of the SH09 will begin soon after.

“We are targeting to do this if possible in 2020, so quite a speedy process,” said Löwenstein.

The entry into market will be gradual, with launch customers given extensive support and Kopter receiving operational data in return.

remain — at least in the near term. “It’s an identity, and I like the identity,” said Cuttillo. “There’s no final decision, but if I had to say something preliminary I would say it should remain.”

Löwenstein said the acquisition will not negatively impact Kopter’s plan to bring the SH09 to market.

“We feel more solid, because we have all this backing from Leonardo, and this should basically speed what we are doing, in particular in the industrial area where we have a lot of groundwork to do,” he said.

Kopter is building a major extension to its existing facility in Mollis, Switzerland, that will allow the company to centralize its currently well-spread operations. Cuttillo said nothing has been determined yet as to the fate of this site, or Kopter’s fledgling North American facility in Lafayette, Louisiana.

“We will see how the aircraft are flying, and what we have to do better,” said Löwenstein. “This first year will be dedicated to this, and after this launch customer phase, we will deliver in [a] much broader way to other customers.”

‘COMPETITIVE’ PRICING

The baseline aircraft will cost around \$3.3 million, which, given the aircraft’s capabilities, will make it “quite competitive from the beginning,” said Löwenstein. He drew particular attention to the SH09’s suitability for the emergency medical services (EMS) sector, providing a cabin the size of a twin-engine aircraft for the cost of a single-engine helicopter.

“You can bring it to a single [engine] IFR standard very quickly, [so] you will be able to do most of the missions which are normally dedicated to light twins,” he said. “Then we are talking about something totally different: Instead of \$12 million for an outfitted medical helicopter in the twin segment, you would talk more about \$4.5 to \$5 million for an equivalent for a medical helicopter built on the SH09 platform.”

While declining to provide numbers for operating cost, he said Kopter was

designing the aircraft to achieve a very competitive figure.

“We have features that will allow you to bring the operating cost to a very reasonable level,” he said.

The company currently has more than 70 orders for the SH09, as well as more than 100 letters of intent. The orders represent a similar spread to the overall global helicopter fleet, said Löwenstein, and are from operators from a wide variety of sectors, including EMS, public service, passenger transport, and aerial tourism.

The order book covers the first three years of production, with the company now taking orders for delivery in 2024/25.

Kopter plans to increase its staff and capabilities as it ramps up to prepare for the type’s certification. Currently it has 320 staff, with over 200 of those in the design organization.

The company’s facility in Mollis is currently the site of its the site of its assembly, training and production work. The 45,000-square-foot (4,200-square-meter) facility will be expanded to 215,000 square feet (20,000 square meters), and it will be home to a centralized organization, incorporating manufacturing and pre-assembly,

including production of dynamic components. The expected annual production rate at the facility is 50 aircraft.

In tandem, the company is preparing its 97,000-square-foot (9,000-square-meter) site in Lafayette, Louisiana, which will assemble and customize aircraft, and offer product support for the North American market. This site can manufacture 100 aircraft each year, said Löwenstein.

Currently, the manufacturer has seven distributors under contract, and this will have grown to 12 by the end of this year. Service centers are to be deployed in parallel, Löwenstein added.

In terms of future development, Löwenstein said Kopter plans to have “more than one” product, but declined to provide details.

“A lot of things that can be done in terms of CO₂ emissions, reliability of flight systems, and the use of modern electronics to equally contribute to flight safety – which means more autonomous flying,” he said.

“What size [of aircraft] for me is, for the time being . . . not prime. What I do more is [technology] bricks, and these bricks will be put on the most suitable platform for the most demanding market segments.”



The three SH09 prototypes sit on the flight line at Kopter’s facility in Mollis, Switzerland. **Kopter Photo**

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BELL DEVELOPS ELECTRIC ANTI-TORQUE SYSTEM



✦ BY OLIVER JOHNSON

Bell has revealed a groundbreaking new electric anti-torque system in development for its commercial helicopter line, one that promises enhancements to safety and operating cost, as well as a reduction in noise compared to an aircraft with a conventional tail rotor.

The Electrically Distributed Anti-Torque (EDAT) system is composed of four small fans within a tail rotor shroud in an offset two-by-two pattern. Each of the fans contains four blades, and they are powered by four separate motors, with the electrical energy provided through generators driven by the turbine engines.

“In a nutshell, we removed all of the conventional mechanical anti-torque components – which is gearboxes, driveshafts and tail rotor hub and blades – and replaced it with four electric motors and fans,” Eric Sinusas, program director of light aircraft at Bell, told *Vertical*. “They are fixed-pitch blades and they’re changing rpm constantly.”

The system has been installed on a Bell 429 demonstrator aircraft at Bell’s facility in Mirabel, Quebec, and began flight testing on May 23, 2019. Since then, the program has completed about 25 flight hours, with the aircraft gradually expanding its flight envelope.

Bell is not ready to share any performance figures, but Sinusas said the feedback from the customers that have seen the system in action has been positive.

“This is the first time anyone in the world has ever done this, so the first step was just to make sure that it actually works – and yes, it does work,” said Sinusas. “We’re still going to be optimizing it and refining it, but the product feedback in its current configuration has been very positive.”

The system’s anti-torque fans are controlled through pedals, as with yaw control in a traditional helicopter, but the link between the pedals and the motors is entirely electric “fly-by-wire” – all mechanical linkages and the control tubes of a conventional system have been removed. Other than the tail rotor and the control mechanisms, the demonstrator aircraft is unchanged to accommodate the system, using a conventional main rotor, engine, and airframe.

Sinusas said the driving force behind the EDAT system’s development was customer feedback.

“We were looking at what are the customers demanding for aircraft? . . . And safety is obviously always at the top of the list,” he said. “This [system] certainly meets those [requirements] and it has some interesting features that conventional rotors don’t with redundancy, and when the aircraft is on the ground, the electric fans are not rotating at all.”

The redundancy is extensive, with the aircraft capable of still producing a level of anti-torque thrust even if three of the four fans become inoperable.

“What it provides – unlike any conventional helicopter out there today – is the ability to give the pilot some torque authority to get down

safely,” said Sinusas.

The next driver was reduced operating cost, and while Bell is not currently sharing any figures, Sinusas said removing conventional components such as lubricated gearboxes and greased bearings, and moving to a more simplified electrical system, should help keep those costs down.

Thirdly, the design promises a reduction in noise levels.

“[Noise] hasn’t really been a top priority for the helicopter industry for quite a while, but it’s quickly becoming a very important parameter,” said Sinusas.

The visual impact of the system is a blend of the familiar and the strange. It’s not as radical an anti-torque rethink as the tailboom fan-driven system proposed in Bell’s FCX-1 concept helicopter two years ago, or even MD’s NOTAR, which does away with the need for any type of tail rotor, but the sight of four smaller tail rotors instead of one may take a little getting used to.

And while the shrouding around the rotors certainly looks heftier than the simple vertical fin of a traditional tail rotor, Bell says the footprint is similar to that of shrouded tail rotors produced by other manufacturers (think the Fenestron on Airbus’s H145).

Sinusas said the focus of the program to date has been proof of concept rather than optimizing its performance, and the team is not working to a timeline for commercialization – at least not one that Bell is prepared to publicly disclose.

Both retrofit to existing products and incorporation into clean-sheet designs “would be an option” for the product when it does hit the market, said Sinusas, and he confirmed the technology is scalable to larger and smaller aircraft.

“It’s obviously been a secret project – we haven’t been public with it until now,” he said. “So it’ll be interesting to see what feedback we do get.”



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- RETURN-TO-LEVEL (LVL) MODE AUTOMATICALLY LEVELS THE AIRCRAFT
- AUTOPILOT MODE AND TARGET FLIGHT REFERENCES DISPLAY ON PFD

FOR MORE DETAILS, VISIT GARMIN.COM/GFC600H

ERICKSON ENHANCING AIR CRANE & TRIALING AUTONOMY

✦ **BY DAN PARSONS & OLIVER JOHNSON**

Erickson is banking on more than 150 buyers for a souped-up version of the S-64F Air Crane driven by increased demand for the behemoth's firefighting and heavy construction capabilities in coming years.

"Based on what we've seen in the market, we think that there's a market demand of at least 50 to 100 airframes in the world," chief executive Doug Kitani said Jan. 28 at HAI's 2020 Heli-Expo. "[That would represent] a very, very significant increase in the number of airframes today."

The company is developing an enhanced version of the aircraft called the S-64F+ that will feature new, more-modern full-authority digital electronic control (FADEC) engines, composite main rotor blades, advanced cockpit avionics and flight control system and an improved water cannon.

Prioritizing upgrades to the existing fleet of about 50 aircraft, there is a mixed government/commercial market for another

50 to 100 aircraft, Kitani said. Government customers, particularly Italy, South Korea, Greece and Australia will account for the bulk of those orders, followed by commercial customers.

"We're seeing things like in the firefighting realm where there's not enough aircraft to go around. . . . Where operators used to go between northern and southern hemisphere, we're seeing that model break down. We saw that this year, [with] the tragic fires in Australia," Kitani said. "There's significant demand, mostly from sovereign customers but we think commercial customers will follow and build out bigger fleets with more capability."

An aircraft that can demonstrate the functionality Erickson and its intended customers are after could be flying within three to four years because much of the technology Erickson wants to incorporate is available, Kitani said. Certifying the various upgrades could be done through a "combo" supplemental type certificate, he said.

"What we found in the last year-plus as we dug into this is the technology to accomplish what we want is out there, and it's really a systems integration exercise," Kitani said. "We don't see a huge amount of technology risk, but we are going to focus on the things that we think are important for bringing the aircraft to market sooner rather than later."

Using the composite rotor blades and new engines, Erickson should be able to achieve significantly more lift capacity and power right off the bat using the existing Air Crane airframe without modification, Kitani said.

"But that may not be a priority on day one," he said. "Our first priority is to get an aircraft certified and able to start executing missions, not only firefighting but precision construction."

Further power will come from a new pair of engines. Erickson has partnered with aviation research-and-development firm Piasecki to consult on the choice from several commercial and military engines by the end of the year, Kitani said.



The Erickson S-64F+ will feature new engines, avionics and flight control system, as well as an improved water cannon.
Erickson Image

“We have a shortlist of engines, but . . . we’re working with a company called Piasecki aircraft, out of Philadelphia, that knows the airframe and knows Erickson very well. They’re helping us chart this out really to understand with some fidelity what’s the best engine for this airframe for the future.”

It is unclear where the funding for development of the S-64F+ will come from, but chief financial officer Stephen Wideman assured reporters there was a “multi-year plan” in place, without providing details.

MOVING TOWARDS AUTONOMY

The company also revealed it had signed a development agreement with Sikorsky to integrate Matrix Technology for semi-autonomous and autonomous operation into the S-64.

The technology will power the next generation flight controls and navigations systems Erickson is developing for the heavy-lift juggernaut, with the aim of enhancing cockpit awareness and flight crew safety during day and night firefighting operations.

“We can start to look at how do we optimize the way that we fight fires,” said Hayden Olson, Erickson’s VP of aerosystems. “Erickson is committed to that because we feel like this mission, and the heroes that operate this mission are too important for us not to take the best technology that are available and try to figure out the most comprehensive solution that’s safe and efficient.”

The agreement will culminate with a demonstration of the technology in the S-64 in 2021.

“Our engineering crews are working hard right now to get the technology and work on the integration plan,” said Olson. “The way that Matrix is designed, it has a really good application in legacy aircraft. And so for us, that was another reason why this technology was so important to apply to an Air Crane, and we’re looking forward to this integration.”

Sikorsky announced the launch of the Matrix Technology program in 2013, and it has been maturing it on two products: the Sikorsky Autonomy Research Aircraft (SARA) – a customized S-76B, and an optionally piloted UH-60A Black Hawk.

The system is being developed with the capability to adapt to different missions

and aircraft types, and switch between modes enabling flight with two, one, or no pilot(s).

“It’s interesting how similar the system is, and how adaptable it is, to port from the Black Hawk to the [S-]64,” said Chris Van Buiten, Sikorsky’s VP of innovation. “Towards the end of this year, we’ll start flying operations [with the Black Hawk] with the switch in the zero position [full autonomy]. Right now, it’s flying augmenting two crew.”

At last year’s Heli-Expo, Sikorsky announced the S-92B (an upgraded version of the S-92) would become the first production aircraft to incorporate the technology. The agreement with Erickson marks a historic first for the Matrix program, representing its debut on another OEM’s aircraft.

“The whole intent is to learn – learn each other, learn the technology, and we’ll develop subsequent agreements as appropriate,” said Van Buiten.

However, given Sikorsky’s background with the S-64 (Erickson bought the type certificate from Sikorsky in 1992), it isn’t a step into the complete unknown. Van Buiten also highlighted the company’s shared values as an indication that it would be a good fit going forward.

“They had an excellent vision of modernizing firefighting,” he said. “As I understand it, they needed an autonomous technology platform to fulfill that vision. . . . It was just a logical match, and a cultural match and a shared safety focus.”

Van Buiten said the demonstration flights would likely be limited to augmented flight with two pilots on board – at least to begin with. “That’s where you always start, and then you earn the right [to progress toward further autonomy] from there,” he said. “We’re doing the same thing on the Black Hawk. . . . You have to earn the right to have all the data, to have everything lined up, to be able to safely make that next step.”

Sikorsky is seeing “significant interest” in its Matrix technology from other companies, said Van Buiten.

“We’re not shying away from the mind-numbing work of the certification of the software to enable this level of responsibility,” he said. “It’s exciting, [Erickson is] a great partner, we’re looking forward to it.”

ROTORBITS ✈



NEW AS350 B2 FOR GROUP 3 AVIATION

Group 3 Aviation has added an Airbus AS350 B2 to its fleet, with the new aircraft specializing in aerial filming and photography.

“Our AS350 B2 can accommodate a full range of camera systems including the Shotover F1 as well as other popular systems,” said Peter Lowry, Group 3’s chief pilot. “Our systems include camera options for RED 6K Dragon and 8K Weapon cameras, ARRI Alexa M cameras, with various lens options, often rigging in less than two hours. We also mount LiDAR systems such as Riegl for data acquisition missions.”

The company, based at Van Nuys Airport in Los Angeles, California, is now in its 27th year, and provides charter services, aerial tours, and pilot training – in addition to film and TV production support. Its fleet also includes the Robinson R44.

BELL TRAINING ACADEMY INSTALLS PULSELITE SYSTEM IN FLEET

The Bell Training Academy is conducting a fleetwide installation of Precise Flight’s PULSELITE System.

The PULSELITE System is a lightweight electrical system controller that alternately pulses the landing and auxiliary lights of a helicopter, thereby increasing visibility and reflecting the speed and directional movement of the aircraft. The PULSELITE System has been proven to significantly reduce bird strikes and decrease midair and ground collisions.

“The Bell Training Academy is proud to partner with Precise Flight, Inc. to bring enhanced safety features to our state-of-the-art training academy fleet,” said Harry Vergis, flight safety officer for Bell Training Academy. “Our partnership with Precise Flight, Inc., demonstrates our commitment to innovative products that enhance safety.”

BRISTOW & ERA TO MERGE



Operating as a combined company, Bristow and Era (to be known as Bristow) will have a fleet of more 300 aircraft for offshore transportation and search-and-rescue services. **Ken Swartz/Dan Megna Photos**

✦ BY OLIVER JOHNSON

Bristow Group Inc. and Era Group Inc. have announced plans to merge, creating a new offshore helicopter transportation giant with a fleet of more than 300 aircraft.

The combined company, which will be named Bristow, will instantly become the world's largest operator of Sikorsky S-92, and Leonardo AW189 and AW139 aircraft. Its operations, which include search-and-rescue services as well as offshore transportation, will span throughout the Americas, Nigeria, Norway, the United Kingdom and Australia.

The move follows an ongoing period of uncertainty in the offshore helicopter transportation sector, with a historic downturn and excess capacity causing offshore specialists Bristow, CHC, PHI and leasing company Waypoint to file for Chapter 11 bankruptcy protection over the last few years.

Era was one of the few companies to endure the downturn while avoiding the need to resort to Chapter 11 – a feat Chris Bradshaw, Era's president and CEO, ascribed to being proactive in reducing costs, while maximizing fleet utilization and synergies.

The new company will be headquartered in Houston, Texas, and Bradshaw will become its president and CEO. The rest of its senior management team are yet to be named.

Over the last 12 months, Bradshaw has also become an outspoken proponent of consolidation in the offshore sector. In a letter to Era

shareholders in April last year, he argued that “the current industry structure is not sustainable” and said Era was “well positioned” to take part in consolidation opportunities that would address the issue of excess capacity in the sector.

“We believe this merger will create substantial value for the stakeholders of both companies,” said Bradshaw, in a press release announcing the move. He also highlighted “significant” cost synergies, with more efficient absorption of the fixed costs required to run an air carrier.

And while the three major oilfield services companies (Schlumberger, Baker Hughes and Halliburton) have all recently projected a growth in offshore spending in 2020, in a conference call with investors, Bradshaw stressed that the merger was not based on anticipated growth in the sector.

“Nothing about this merger is counting on a significant recovery in the offshore oil-and-gas market,” he said. “We believe this combination not only works, but is highly compelling, based on the current level of market activity. That being said . . . multiple third-party sources are noting that the offshore oil-and-gas market has stabilized and is showing signs of recovery.”

In disclosing details of the merger, it was also revealed that Bristow is in the process of selling 14 H225s, which would leave the combined entity with just three of the type on its books.

“[The H225 sale] is under firm contract

at the moment, [and] the closing of the assets will be staged as those individual assets close,” said Bradshaw. “Having sold a number of 225s ourselves and having followed that market, we believe Bristow is receiving a very attractive deal.”

The merger was approved unanimously by the board of directors of both companies, and is expected to close in the second half of 2020. Bristow shareholders will own 77 percent of the new company; Era's shareholders will own 23 percent. The companies expect the merged entity to generate revenue of around \$1.5 billion.

“Bristow and Era share complementary cultures built on an unwavering commitment to safety and quality through experienced, well-trained pilots, mechanics, engineers and support staff,” said L. Don Miller, president and CEO of Bristow. “Merging these two companies will further build on that culture to create an even stronger, more integrated industry leader.”

This is not the first major move Bristow has made in recent years. In February 2019, it was forced to terminate a planned acquisition of Columbia Helicopters – the Aurora, Oregon-based heavy lift specialist. Bristow had announced the planned \$560 million acquisition in November 2018, but its stock price plunged over the following weeks, and the two companies ultimately agreed to terminate the transaction at a cost of \$20 million to Bristow.

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ROBINSON REVEALS PRODUCT UPDATES



Skip Robinson Photo

✦ **BY OLIVER JOHNSON**

An impact resistant windshield, slimline aux fuel tank, fuel flow meter, boarding steps, and electric ignition are among the projects in various stages of completion at Robinson Helicopter Company (RHC), as the manufacturer continues to enhance its product line.

And, in response to the growing interest in urban air mobility, the company has also created a helideck outside its Torrance, California, headquarters, which it is inviting customers to view.

During a wide-ranging briefing at HAI Heli-Expo 2020 in Anaheim, California, company president Kurt Robinson also revealed the manufacturer had a “slower year” in terms of sales in 2019. The 196 sales (which included 19 R22s, 54 R66s, and

123 R44s) represented a drop of about 100 over the previous year, he said.

The leading market was Australia, followed by Canada and China.

However, an uptick in sales over the past three months showed more promise for 2020, Robinson noted. “We’ve gotten off to a really strong start,” he said. “Right now, I’m very optimistic.”

Because of that, RHC’s production rates have been set at one R22, two R66s, and three R44s per week for 2020. “At that current rate, we’re actually sold out for the first six months for both the R44 and R66,” said Robinson.

The R66 is performing particularly well, he said, noting that the company will deliver the 1,000th of the type during the next three months. The global R66 fleet has now notched 1.1 million flight hours. “The

aircraft is doing amazingly well all over the world,” said Robinson.

In terms of product updates, the company has just completed work on an impact resistant windshield, designed to protect pilots and passengers from the dangers of a bird strike. The upgraded windshield is made from polyurethane, which replaces the acrylic that’s in the existing windshield.

“The windows were designed in accordance with [Federal Aviation Regulations] part 29, and they were designed to deflect a two-pound bird in the R44 and R66 at 100 knots, and at 90 knots in an R22,” said Robinson.

He illustrated the capability of the windshield by showing a slow-motion video of a 2.2-pound (one kilogram) bird being fired at it from a cannon (simulating a strike at 115 knots). The windshield cushioned the

bird's impact before flexing out again and pushing the bird out. He said a similar strike would go right through the existing windshield.

The enhanced windshield will add about 1.2 pounds (0.55 kilograms) of weight to the aircraft, at a cost of about \$6,800 for the R44 and R66.

The creation of the helideck at RHC's delivery center was in response to the growing urban air mobility sector, following questions the OEM has been fielding about heliports and where people can land.

The prototype design features a 20-by-20-foot (six-by-six-meter) helipad raised 10 feet (three meters) off the ground, surrounded by a six-foot (1.8-meter) perimeter safety area covered by chains. The helipad is accessed by a four-foot (1.2-meter) wide staircase, and there is room underneath for two cars to park.

"We're interested in safety, what we want to try and do [with the design] is, 'How do you get that helicopter up off the ground so people aren't endangering themselves?'" said Robinson.

"It's not something that is completed or approved, we've been getting a lot of comments on it, and we're landing and taking off on it. . . . We're just trying to get a proof of concept."

The helideck is designed with off-the-shelf components to potentially offer customers the ability to create their own from RHC's design, rather than being a product for the company to sell.

Other product updates include the installation of a system to protect against engine overspeed during startup, a slimline aux fuel tank for the R66 that provides an additional hour's worth of fuel, and electronic ignition. The latter is likely to be available within the next six months, Robinson noted.

The company is also working on approving a Shadin fuel flow meter that provides real flow-time data to a Garmin GTN GPS receiver. This allows it to calculate remaining fuel, and present fuel range rings on a moving map display.

Robinson said RHC is "very much still working" on a diesel-powered R44. "We're actually very pleased with the progress," he said, adding that the company is open to other forms of power, including electric.

"We've been working and talking a lot to the different battery manufacturers; certainly we're agnostic as to how our aircraft is powered," he said. "If and when electric becomes viable . . . we would jump over to it fairly quickly."

Finally, he announced that the company's longstanding chief flight instructor, Tim Tucker, is stepping down to enable him to spend more time working with the U.S. Helicopter Safety Team and consulting with the Federal Aviation Administration. While Tucker will continue to teach Robinson's safety course, he will be replaced as the company's chief flight instructor by Bob Muse, who is currently the assistant chief flight instructor.

ROTORBITS ✦



SAFRAN TO STUDY BIOFUELS PRODUCTION

Safran Helicopter Engines is joining several other companies and organizations to study the feasibility of producing aviation biofuels in southwest France. The OEM signed a letter of intent to evaluate local capabilities and skills in the fields of agriculture, chemicals and energy to produce and distribute sustainable aviation biofuels. The company said airports, air bases, and industry will benefit from the proximity of a sustainable, certified and "drop in" fuel source (requiring no engine modification required) for local use.

"Safran is committed to an industry that treats the environment with greater respect," said Safran Helicopter Engines CEO Franck Saudo. "Success in this ecological transition will evolve from expertise in several technologies. Safran Helicopter Engines is exploring several of these including hybrid-electric power, optimized turboshaft designs and alternative fuels."

GENESYS HELISAS CERTIFIED FOR BELL 505

Genesys Aerosystems has received supplemental type certification for the VFR HeliSAS autopilot and stability augmentation system on the Bell 505.

The VFR HeliSAS for the Bell 505 is a lightweight and affordable stability augmentation and autopilot. Features include straight and level flight recovery as well as navigation following through all phases of the flight plan, heading hold, altitude hold, indicated airspeed hold, and vertical navigation, which allows for capture of ILS or GPS approaches. HeliSAS for the Bell 505 also offers a new feature of envelope protection for over speed and under speed, and includes an option for yaw control.

The system is available as a retrofit option in the field or as a forward-fit option from Bell.



Robinson's booth at HAI Heli-Expo 2020. This year's show was held a short distance from the OEM's headquarters in Torrance, California. **Mike Reyno Photo**

ROTORBITS ✈️

START OF OMNI OPERATIONS FOR PGS

Omni Táxi Aéreo recently started another contract with PGS, a reference company in the seismic area, to provide offshore passenger transportation and medevac coverage. This is Omni's sixth contract with PGS, for whom the company has been providing air transportation services in helicopters for over 15 years, reinforcing brand confidence and an excellent relationship between companies.

The first crew change flights started in February with the Leonardo AW139 aircraft, while the aeromedical coverage (medevac) will be made by a Sikorsky S-76 aircraft. The operation is being carried out from Vitória Airport towards the Ramform Titan Seismic Vessel, located in the Espírito Santo Basin. The contract is expected to last eight months.

According to Roberto Coimbra, Omni's CEO, "We are very honored by the trust placed by PGS once again in our company. Over the years we have built a relationship based on professional ethics, mutual respect and the sustainability of the operation. We wish a lot of success in this new project and are committed to continue providing a safe and quality service to PGS."

SPIDER X LAUNCHES WITH BLUE HAWAIIAN

Spidertracks has partnered with Blue Hawaiian Helicopters as the official launch customer for its Spider X. Spidertracks announced the release of Spider X at Heli-Expo 2020 in Anaheim, California, this past January, promising a new horizon of data insights, connectivity, safety, and efficiency for the general aviation industry.

Spider X provides even more capability and insights with the introduction of AHRS data – enabling the most precise picture yet of an aircraft's flight path and movements. It includes WiFi, cellular, Bluetooth, USB-C, and serial port interface capability, and all updates and downloads are over the air.

EUROPEAN ROTORS SHOW LAUNCHING IN GERMANY

✈️ BY THIERRY DUBOIS

The European Helicopter Association (EHA) is joining forces with the European Union Aviation Safety Agency (EASA) to create European Rotors, a show dedicated to rotorcraft and newcomers in the vertical takeoff and landing (VTOL) industry. The first edition of the new annual event will take place in Cologne, Germany, from Nov. 10 to 12. The announcement was made Jan. 21 in Cologne, and received support from major OEMs.

The new show's tagline is "the VTOL show and safety conference." In addition to an exhibition floor and a static display, it will offer panel discussions, seminars and training sessions. The annual EASA Rotorcraft Symposium will be integrated into European Rotors.

Show organizers have secured 160,000 square feet (15,000 square meters) for the event from Koelnmesse, the owner of the exhibition and convention center that will host European Rotors. While they hope to attract would-be manufacturers of electric VTOLs, they are not opening the show to small drones. All of EHA's OEM members - Airbus Helicopters, Bell, Kopter, Leonardo and Safran - have committed to exhibit.

The event will be open to the public, particularly on the third afternoon, when attendance will be free of charge. EHA chairman Peter Möller emphasized the need for the industry to find future talent. The public will get to know what EASA is doing for safety and the environment "so they can trust the system," EASA's head of VTOL David Solar noted.

European Rotors' organizers launched their sales effort and promoted the show at Heli-Expo 2020.

They plan to have their show in Cologne for the next two or three years and are considering moving it around Europe afterwards.

Asked about the date, Möller explained the summer and the winter were ruled out because they are peak seasons for operators. They also looked at the schedule



Industry executives celebrate the launch of European Rotors in Cologne, Germany. **European Rotors Photo**

for other fairs worldwide and concluded November was the best compromise, Möller said. A challenge, though, may be the concomitance with the renowned Cologne Carnival.

The creation of European Rotors is the outcome of a two-year-long process. After EHA parted ways with Reed Exhibitions in 2018, the latter company formed a new show, Vertical Flight Expo, the first edition of which took place in Farnborough last November. However, none among Airbus Helicopters, Bell, Kopter, Leonardo and Safran exhibited.

From 2018, EHA has intended to establish a new show but, under the contractual agreement with Reed, had to wait until 2020 to release details. EHA has long used shows as a source of revenues, in addition to being a relevant place for its members to meet and do business.

In parallel, since the mid-2000s, EASA's annual Rotorcraft Symposium in Cologne has been seen by EHA members and officials as a valuable event and the two organizations have cooperated to an increasing extent. The symposium grew consistently and was fully booked last year, at 400 attendees, prompting its organizers to look for a new way to grow.

European Rotors is thus being organized by EHA with EASA support. Messe Friedrichshafen, the organizer of the Aero annual general aviation show in Germany, was contracted as a service provider. The city of Cologne is also supporting the event and will provide some logistics services.

Frank Liemandt, an industry veteran who has notably worked for the German helicopter lobbying association, is the show director.



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HONEYWELL RELEASES ANNUAL FORECAST



Honeywell forecasts 4,100 civil helicopters delivered through 2024 — a 14 percent increase over the 3,500 civil aircraft delivered between 2014 and 2018. **Dan Megna Photo**

✈ BY DAN PARSONS

More than 4,000 civil helicopter deliveries are expected in the next five years starting in 2020, a slight increase over the previous civil helicopter market outlook prepared annually by Honeywell, though purchase plans for the next five years are slightly down.

Data collected in 2019 show increased deliveries despite slightly lower purchase plans than the previous year, according to the “Turbine-Powered Civil Helicopter Purchase Outlook.” Honeywell forecasts 4,100 civil helicopters delivered through 2024.

That number is about 14 percent higher than the 3,500 civil aircraft delivered between 2014 and 2018. Annual growth rate of deliveries over the next five years is 2.7 percent, or about 800 new helicopters per year, which tracks with global economic growth outlook.

“Comparing this year to last year, I see fairly flat results,” Gaetan Handfield, Honeywell’s senior manager of marketing analysis,

told *Vertical*. “When you start looking at reasons, then you start seeing variations, which are in some cases significant.”

Orders increased in Europe and Latin America – a huge 20-point jump – while slightly lower in North America.

Despite the dip in purchase plans, reported utilization rates are up, meaning operators plan to put more hours on their aircraft over the next year. Growth also is supported by the entry to service and production ramp up for several new models, including the Airbus H160, Kopter SH09 and Bell 525, Handfield told *Vertical*.

“I think it is the main driver of the increase from the previous five years to the next five,” Handfield said. “Even the [Leonardo AW]169, the 189, these helos that were introduced a few years ago, and now they are on the more ‘cruise control’. . . . New-model introduction is a key component of the growth.”

In the longer term, more favorable exchange rates and an expected increase, if modest, in oil prices should also help, he said.

A greater proportion of planned new helicopter purchases is for light twin-engine models, 22 percent of all mentions in this year’s survey compared with 2019 and lower for light single-engine models. Overall, 56 percent of planned purchases are for twin-engine models, eight percentage points higher than last year.

As for usage plans, corporate/VIP transport leads the pack at 25 percent of all planned usage followed by EMS and search-and-rescue with 24 percent, both of which increased from the previous survey. Law enforcement at 14 percent and oil-and-gas at four percent of planned usage both fell from previous years.

With an outlook of five years, the forecast does not yet reflect the impact electric vertical take-off and landing (eVTOL) and urban air mobility (UAM) expanding will have on the civil rotorcraft market.

“The sector that will be most impacted with the introduction of urban air mobility down the road is really the light singles, and the short-cabin ones,” Handfield said. “The long cabin ones should be OK. There are

some missions that urban air mobility will not be able to do because of range or a lack of payload, maybe. The Bell 505, the Robinson [R]44, these segments I'm worried about."

The forecast report compiles data from about 1,000 operators surveyed between mid-October and mid-December. Respondents collectively operate about 3,600 turbine-powered and 282 piston-powered helicopters, which is just over 14 percent of the world fleet. Surveys were distributed according to the percentage of global install base.

"We had to make sure that, even by country, everyone is represented in the survey based on the install base," Handfield said.

REGIONAL OVERVIEW

In North America, purchase plans have declined by six percentage points over a year ago, with 12 percent of respondents saying they would either replace or expand their fleet with a new helicopter over the next five years. North America is home to more than 40 percent of the world's helicopter fleet.

Nearly half of planned North American purchases were identified as light single-engine models, while roughly 32 percent of new planned purchases were for intermediate and medium-twin product classes.

About 38 percent of planned purchases will be used for emergency medical services (EMS) purposes, followed by 20 percent for law enforcement and 17 percent for corporate/VIP usage.

In Europe, purchase plans are higher in this year's survey compared with the 2019 results. More than 18 percent of respondents said they would either replace or expand their fleet with a new helicopter over the next five years. The figure was 15 percent a year ago.

Intermediate and medium twin-engine classes captured roughly 41 percent of total purchase plans for new helicopters. Meanwhile, 37 percent of respondents indicated plans to purchase light single-engine helicopters, up five percentage points from last year.

About 26 percent of planned purchases will be used for utility/aerial work, followed by 23 percent for corporate/VIP and 16 percent for EMS/search-and-rescue (SAR) usage.

In Latin America, 2020 shows significantly

higher fleet replacement and growth expectations compared with 2019. Purchase plans are well above the global average of 14 percent, and the region's purchase plans increased by 20 percentage points from last year.

Latin America had the highest rate of new aircraft purchase plans globally, with close to 29 percent of respondents saying they would either replace or expand their fleet with a new helicopter over the next five years.

Purchase plans in Brazil increased to 26 percent, a jump of 21 percentage points over last year's survey results.

Latin American respondents favored light single-engine models, which represent about 50 percent of their planned purchases. Light twin-engine models are second with 28 percent of all planned purchases, an increase of 23 percentage points compared with 2019 survey results.

The Middle East and Africa has the lowest new purchase rate globally, with only five percent of respondents' fleets expected to get a new helicopter replacement or addition. Purchase plans are 10 percentage points lower compared with 2019 survey results.

Close to 62 percent of planned new helicopter purchases are for light twin-engine models.

Medium twin-engine models are the second-highest mentioned product class in the survey at 23 percent, a decline of 46 percentage points compared with 2019 survey results.

In Asia Pacific, overall buying plans are down six percentage points compared with 2019. Close to seven percent of respondents said they would either replace or expand their fleet with a new helicopter over the next five years.

Intermediate/medium twin-engine and light single-engine helicopters were the most popular classes, capturing 38 percent and 35 percent of all mentions for new helicopters, respectively.

Despite limited inputs, new helicopter purchase plans are lower in China, showing that about 14 percent of the fleet would be replaced or expanded by a new helicopter over the next five years. Purchase plans are down by about seven percentage points compared with 2019 results.

ROTORBITS ✈



Babcock Photo

BABCOCK WINS MAJOR NEW NORTH SEA HELICOPTER CONTRACT

Babcock's Offshore business has secured a new five-year shared contract with three oil-and-gas operators for helicopter transport in the northern North Sea.

The contract will initially see Babcock operate over 100 helicopter flights each month from Sumburgh in Shetland, on behalf of CNR International, EnQuest and TAQA. The flights are expected to begin on July 1, 2020.

Babcock offshore director, Simon Meakins, said: "We are delighted to welcome this new customer group to Babcock Offshore and look forward to working with them. We are committed to delivering the safe and efficient aviation support they require."



Airbus Helicopters Photo

ASCENT ADDS THIRD H125 TO ITS FLEET

Ascent Helicopters will expand its fleet with a new Airbus H125, which will support power line and hydro utility work, as well as forestry and firefighting missions. It is the third H125 Ascent has acquired from Airbus in the past four years.

"At Ascent, our work is ever-evolving, and we need an aircraft that can keep up with a wide range of missions," said Trent Lemke, president of Ascent Helicopters. "The H125 is the right solution, allowing us to meet the diverse needs of our customers, swiftly and effectively."

ROTORBITS ✦



Erickson Photo

ERICKSON DEBUTS COMPOSITE MAIN ROTOR BLADES

Erickson Inc., has announced Federal Aviation Administration (FAA) approval of its next-generation composite main rotor blades.

Erickson began the process of designing the new blades in 2008, working closely with the FAA and various industry partners. In 2013 Erickson collaborated with Helicopter Transport Services (HTS), so the blades could be utilized on CH-54 rotorcraft as well.

To maintain close control of blade manufacture, Erickson built a composite manufacturing facility from scratch in 2015. After thousands of hours of design, testing, and analysis by Erickson's engineers and partners, the new composite main rotor blades are now approved by the FAA for the S-64E with an initial life that will increase as fatigue testing continues. Certification for the CH-54A was expected to follow soon afterwards, with approval for the S-64F and CH-54B expected this summer.

KEYSTONE TURBINE SERVICES RECEIVES ROLLS-ROYCE FIRST NETWORK AWARD

M International subsidiary Keystone Turbine Services (KTS) has received Rolls-Royce's prestigious Trusted to Deliver Excellence Award. The awards program recognizes significant achievements of authorized service centers that have provided world-class support of M250 helicopter engines.

"We are proud to recognize Keystone Turbine Services as this year's 'Trusted to Deliver Excellence' award winner," said Scott Cunningham, Rolls-Royce director - Helicopter Services. "Their longstanding commitment to excellence gives M250 customers the peace of mind to know that they will receive quality service every time."

LEONARDO GROWS REVENUE & PROFIT IN 2019

Leonardo recently delivered its 1,000th AW139. **Leonardo Photo**



Leonardo's helicopter division grew both its revenues and profitability in 2019, thanks to growth in its customer support and training operations and success with military and government programs.

In its newly-released annual results, the company revealed that it recorded €4 billion in revenue last year, which represented a 5.6 percent increase over 2018. While orders dropped from €6.2 billion in 2018 to €4.6 billion in 2019, Leonardo pointed out that the 2018 figure was inflated by a bumper contract for 28 NH90s from Qatar worth €3 billion.

Notable landmarks in the civil sector saw the delivery of the thousandth AW139 in September 2019; while in the military sector, the development of variants for military use (AW169M and AW139M) brought orders from domestic and international markets. Particularly noteworthy was the U.S. Air Force's choice of the MH-139 (named the Grey Wolf) to replace its fleet of UH-1N Hueys. The first of these was delivered in 2019.

In January 2020, Leonardo saw further success with the U.S. Navy awarding the contract for a first lot of 32 TH-73 (AW119) helicopters for training missions.

The year also saw Leonardo continue its work on unmanned aircraft, namely on the

HERO (SD-150) helicopter and the SW-4 Solo prototype.

In January 2020, Leonardo acquired Swiss company Kopter, creator of the upcoming light single SH09, and this type will bring Leonardo into an entirely new market segment.

"Thanks to a further enlarged product range Leonardo can consolidate more its role in the civil sector," the company said in a press release announcing the results. It added that the SH09 will be a "dual-use product" with possible military applications.

Noteworthy orders in 2019 included 23 NH90s from the Spanish Ministry of Defence, four AW101s to the Polish Ministry of Defence, 17 AW139s for the Italian Air Force, five AW139s for the Italian national fire brigades and four AW139s for the fire department in Miami-Dade County.

Growth with military and government programs, and in its customer support and training operations helped offset lower revenues from its civil segment, particularly from the AW109/119 and AW189 lines.

Leonardo said it expected to achieve double-digit profitability and revenue growth in 2020.

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AIRBUS HELICOPTERS ORDERS AND DELIVERIES DROP, BUT REVENUES STABLE

BY THIERRY DUBOIS

Airbus Helicopters recorded a drop in orders and deliveries in 2019, but growth in its support and services division resulted in little revenue change from the previous year.

Speaking Feb. 13 at Airbus's annual press conference in Toulouse, France, Airbus Group CEO Guillaume Faury described the helicopter division's performance as "strong, especially given the weak market." Airbus Helicopters has increased its market share despite adverse conditions, he said. The company delivered 332 rotorcraft in 2019, representing 54 percent of the market in units, Airbus claimed.

The company received a net 310 orders, which was a decline of 19 percent from the previous year. The book-to-bill ratio was above 1:1 in value, despite the weaker orders. In average, higher-value helicopters were ordered, including 25 H225M Super Pumas, 23 NH90s (Airbus is a partner in the program) and 10 of the upcoming medium H160.

The H125 and H145 remain at the top in units ordered, with 130 and 91 orders in 2019, respectively. The H175 super medium twin,

despite being the newest design in Airbus Helicopters' range of certified aircraft, received a mere four orders.

"The increased contribution from support and services and key wins in the military sector in 2019 underline the importance of our robust business model," said Bruno Even, CEO of Airbus Helicopters, in a press release announcing the results. He characterized the civil and parapublic market as "challenging." Faury emphasized "good prospects in defense" and also said he wants to "capture growth in services" in 2020.

In 2019, military revenues were dominant, at 55 percent. Services contributed 43 percent to the company's total revenues. On the civil side, for instance, HCare contracts were signed for an additional 250 helicopters.

As of Dec. 31, 2019, the backlog stood at 695, almost stable from one year before. Revenues slightly improved, at €6 billion (\$6.6 billion). The profit margin, calculated from adjusted earnings before interest and taxes, reached seven percent.

The H125 remained Airbus's bestselling aircraft, with 130 ordered in 2019. **Airbus Photo**



ROTORBITS ✦

Matt Zuccaro served as the president and CEO of HAI for 15 years. **HAI Photo**



MATT ZUCCARO, FORMER HAI PRESIDENT, DIES AT 70

Matt Zuccaro, the immediate past president and CEO of the Helicopter Association International (HAI), has died at the age of 70.

Zuccaro's death came just weeks after he left the role he had occupied at HAI for the past 15 years. As president of the association, he became a prominent figurehead and proponent of the helicopter industry. He was passionate about improving the industry's safety record, and may be best remembered for a column he wrote in *ROTOR* magazine in 2013, encouraging pilots to "land the damn helicopter" in situations where proceeding would endanger themselves and passengers. From that column, HAI's Land & LIVE program was born, saving countless lives around the world

"Matt was one of a kind in our industry," said current HAI president and CEO James Viola. "Helicopters were part of his life, beginning with his U.S. Army service in Vietnam. Throughout his career, he made safe helicopter operations his priority, and we are a better, stronger, and safer industry today because of his efforts on behalf of rotorcraft. Speaking on behalf of our industry, we have lost a good friend who will be missed. We extend our deepest condolences to his wife, Doreen, and his family."

An HAI member since the early 1980s, Zuccaro was elected to the HAI board of directors in 1987, served as chairman in 1991, and was named president in 2005. During HAI Heli-Expo 2020 in Anaheim, California, in January, Zuccaro was honored with the FAA's Wright Brothers Master Pilot Award, recognizing his 50 years of professionalism and skill as a pilot.

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FLIGHTSAFETY ANNOUNCES NEW PRESIDENT & CEO

FlightSafety International announced that Brad Thress has joined the company as president and CEO.

“I am honored to join FlightSafety International and look forward to leading this exceptional company,” said Thress. “FlightSafety is known for enhancing aviation safety around the world by providing the highest quality training programs and products, thanks to its outstanding teammates. Together we will build an even stronger and more successful company.”

Thress joins FlightSafety from Textron Aviation, where he most recently served as senior vice president, global parts, program and flight operations, and the president of Able Aerospace.

During his 27 years with Textron Aviation, Thress held several leadership roles within many business areas including engineering, flight operations and customer service. In addition, he served as Cessna senior vice president of business jets.

KAMAN ADVANCES AUTONOMOUS K-MAX FLIGHT PROGRAMS

Kaman Air Vehicles has announced the advancement of its military and commercial K-Max unmanned aerial systems (UAS) programs.

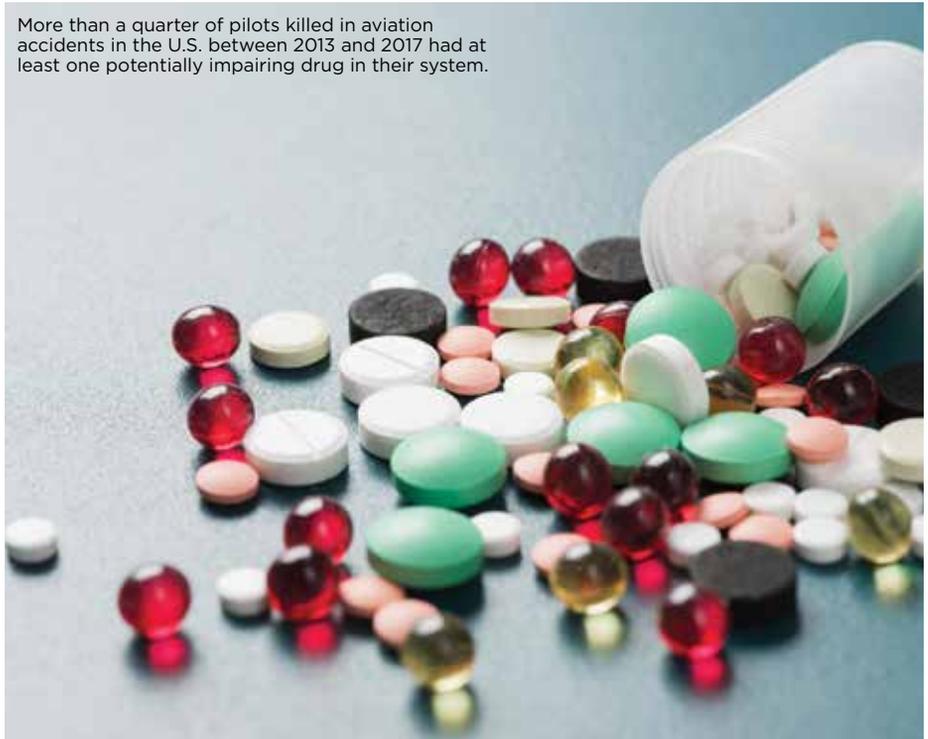
Kaman is developing a new K-Max UAS kit for commercial applications with first flight scheduled in the third quarter of 2020. Helicopter Express Inc. of Chamblee, Georgia, and Swanson Group Aviation of Glendale, Oregon, are the launch customers and have placed orders for unmanned system kits for delivery in 2021.

Kaman has also seen interest from other K-Max operators, such as Rotak of Anchorage, Alaska, which has identified a need for autonomous helicopter operations in the remote regions of Alaska.

The new unmanned kit will be installed on existing aircraft as well as on new production K-Max helicopters.

NTSB: DRUG USE AN INCREASING FACTOR IN CRASHES

More than a quarter of pilots killed in aviation accidents in the U.S. between 2013 and 2017 had at least one potentially impairing drug in their system.



✈️ BY ELAN HEAD

The prevalence of prescription, over-the-counter, and illicit drugs found in the bodies of pilots killed in aviation accidents has continued to trend upwards in recent years, according to a new study from the National Transportation Safety Board (NTSB).

The study is a follow-up to a similar one published in 2014, which examined toxicology results from pilots killed in aviation accidents between 1990 and 2012. For the new study, investigators analyzed results from pilots who died in aviation accidents – including helicopter crashes – between 2013 and 2017, mostly in general aviation operations.

Toxicology test results were available for 952 pilots who were fatally injured in the United States between 2013 and 2017. Of these, more than a quarter – 28 percent – tested positive for at least one potentially impairing drug, up from 23 percent in the 2014 study.

Fifteen percent were positive for at least one drug indicating a potentially impairing condition, i.e., an underlying medical

condition that could affect their performance. That represented an increase of three percentage points from 2014.

Moreover, 10 percent showed evidence of use of at least one controlled substance, compared to about eight percent previously. About five percent tested positive for an illicit drug, a slight increase from the less than four percent in the 2014 study.

In a report published on March 10, the NTSB notes that a positive toxicology finding doesn't necessarily indicate that the pilot was impaired at the time of the crash. However, the analysis included some cases where drug use was explicitly identified as a contributing factor to the accident, such as the June 2015 crash of a cropdusting helicopter whose pilot was found to have been chronically taking high doses of hydrocodone, an opioid pain reliever.

Hydrocodone was one of the three most common drugs in the study indicating a potentially impairing condition. The others were citalopram, an antidepressant; and diazepam, used to treat anxiety and muscle spasms.

Some drugs were classified as potentially impairing without necessarily indicating a

chronic medical condition. Of these, sedating antihistamines were the most common category, found in 11.9 percent of pilots in the study – up from 9.9 percent in 2014.

Just as it had in the previous study, the NTSB found no reliable relationship between evidence of drug use and the circumstances of the fatal accidents.

“Further research may identify increased accident risk associated with some drugs or combinations of drugs, which would support improved guidance or limitations on use of those drugs while flying,” the NTSB’s report states. “Conversely, some drugs believed to be ‘potentially impairing’ may not be correlated with accident risk and concerns about their specific effects may be reduced.”

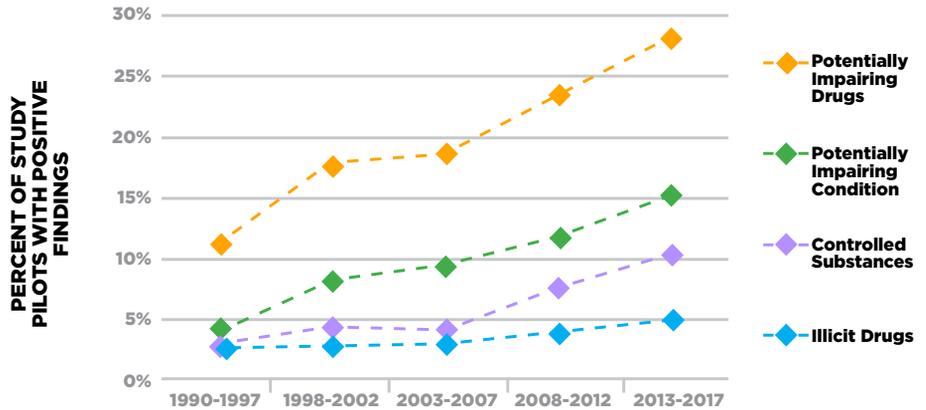
Consequently, the NTSB is recommending that the Federal Aviation Administration (FAA) conduct a study to assess the prevalence of over-the-counter, prescription, and illicit drug use among flying pilots not involved in accidents, and compare those results with findings from pilots who have died in crashes.

Because the most recent study also revealed an increase in the percentage of fatally injured pilots who tested positive for tetrahydrocannabinol (THC) – the psychoactive compound in marijuana – the NTSB also wants the FAA to update its literature to explicitly inform pilots that they are prohibited from using marijuana.

In its previous study, the NTSB found that pilots lacked access to information about potentially impairing drugs and non-impairing alternatives. That led it to recommend that the FAA do more to educate pilots on the subject.

With the release of its latest study, the NTSB applauded the FAA’s recent efforts on this front, including the issuance of guidance for pilots on how to read and understand medication labels, as well as information on how long they should refrain from flying after using a potentially impairing drug.

“The plain language information on potentially impairing over-the-counter drugs that the FAA has made available to pilots can be an extremely valuable safety resource,” stated NTSB Chairman Robert Sumwalt. “Now all pilots can quickly and easily find information on potentially impairing drugs and even find possible alternatives that are safe to use while flying.”



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Safran is working on the Airbus Racer project, which will serve as the demonstrator for the engine manufacturer's start-and-stop capability. **Airbus Image**



SAFRAN FOCUSING ON INNOVATION

✦ BY OLIVER JOHNSON

Safran Helicopter Engines is hoping to build on a landmark 2019 that saw four engines certified with their successful entry into service in 2020.

The 1,300-horsepower Arrano, used in the Airbus H160, was certified in June 2019. According to Safran, compared with similar-sized engines, it has 15 percent less fuel consumption, and requires 40 percent less maintenance time.

The 2,500 to 3,000-horsepower Aneto was certified in December 2019. The engine is used in the Leonardo AW189K, with the first delivery of the variant to launch customer Gulf Helicopters expected in the second quarter of 2020.

Finally, two versions of the 1,400 to 2,000-horsepower Ardiden, the 1U (powering the HAL light utility helicopter) and WZ16 (Avicopter AC352), were certified in November and October, respectively.

"The next step is simply going to be the entry into service of several platforms that will be gains in terms of market share for Safran Helicopter Engines," said Franck Saudo, the manufacturer's chief executive officer, in a press conference held during HAI Heli-Expo 2020 in Anaheim, California. "Simply put, the H160 is a market segment [where] we are not present at the moment . . . [and] the AW189K is [in] another market segment where we were not present. Here again, entry into service will correspond with gains in market share."

In terms of an overall market outlook, Saudo said Safran was remaining cautious. "I see a slow recovery scenario with a flat situation for the market in the short run, meaning one to two years," he said. "We keep being optimistic about the medium- to long-term outlook of the market for a very simple reason, which is the fact that high-growth countries will equip in terms of helicopters in the coming years."

He said the timing and pace of this growth in those countries — primarily China and India — remains to be seen.

To address future challenges, Safran has identified four key areas of focus: additive manufacturing, a desire to further optimize its current engine range, digital monitoring, and reduced carbon emissions.

Additive manufacturing, said Saudo, offered the potential to reduce production cost and improve engine performance through allowing new geometries that were unattainable by traditional manufacturing methods.

"This opens really a new space for our engineering teams, which is 'Think differently simply because you have access to new geometries, and geometry can lead to further performance,'" he said.

Both the Arrano and Aneto have serial parts created through additive manufacturing, and in an engine demonstration test in September 2019, Safran redesigned its longstanding Arrius engine with 30 percent of its parts created by the process.

"We ran the engine on the test bench and it worked perfectly," he said.

Another area of focus for Safran is to enhance the performance of its existing engines. Through optimized aerodynamics and materials, Saudo said he was confident the OEM can reduce fuel consumption in its existing line by 10 to 15 percent by 2030.

Further progress in developing Safran's digital reach will allow the manufacturer to move from being reactive to preventative, said Saudo. The company launched its health monitoring service two years ago, which provided real-time access to its customers' flight data. This data is then analyzed, and Safran provides maintenance recommendations according to the results. The service is now in use by 500 operators (out of a total customer base of 2,500), spanning 3,200 engines.

The final area of focus for Safran is to reduce greenhouse gases, which is a "top priority," said Saudo. To achieve this, the company is working on two fronts: developing hybrid electric technology, and working on alternative fuels (including biofuel).

The engine manufacturer is a partner of Daher and Airbus on EcoPulse, a distributed hybrid propulsion aircraft demonstrator. It is also working on the Airbus Racer, which will serve as the demonstrator for Safran's start-and-stop capability. The twin-engine helicopter will allow one engine to go "super idle" to reduce fuel consumption during cruise. That idle engine will have a hyper-fast restart capability to come back online if needed.

Safran Helicopter Engine's efforts here are part of the wider Safran Group's aim to reduce emissions by 50 percent by 2050.

Earlier this year, Bell announced it was dropping Safran as the propulsion system partner for its Nexus, following the airframer's decision to use entirely electric, rather than a hybrid electric, system for its VTOL design.

Saudo said this was an indication of a variety of markets within the emerging VTOL sector, rather than hybrid not being a suitable approach. "I believe in the power of hybrid electric for VTOL, [but] there is also room for full electric," he said. "Depending on the market segment, there is a natural sweet spot for full electric, but there is also a spot for electric hybrid. And simply put, it all depends on the length of missions in terms of minutes you want to fly or distance you want to fly: the shorter, the more full electric has potential."



Safran's Ardiden 1U engine received EASA certification in November 2019. Safran/Cyril Abad Photo



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Honeywell's Epic 2.0 Phase 8 avionics package will be added to the AW139's type certificate for both new production and retrofit installations. Here, Honeywell's AW139 performs a demo flight at Heli-Expo 2020. **Skip Robinson Photo**



HONEYWELL LAUNCHES PHASE 8 AVIONICS

BY ELAN HEAD

Honeywell is upgrading the Primus Epic cockpit on the Leonardo AW139 with new features, including a track-based synthetic vision system (SVS) that can be used all the way down to the hover.

SVS is part of the Epic 2.0 Phase 8 avionics package that Honeywell launched at HAI Heli-Expo 2020. The company has already received technical standard order approval from the European Union Aviation Safety Agency (EASA) for the package, which will be added to the AW139's type certificate for both new production and retrofit installations. Leonardo expects to obtain EASA certification for Phase 8 avionics by the end of April, with retrofit availability targeted for the second quarter of 2020.

The upgrade builds on Honeywell's extensive history with SVS in the business jet market, where the company was the first to introduce this virtual representation of the outside world. "Over the past 10 years, since we led the industry with the introduction of SVS, we've continued to improve symbology – adding intuitive lead-in to

runway presentations, better landing area highlighting, the best presentation of obstacles, and higher terrain resolution," stated Jason Bialek, product line director for Epic 2.0 and 2.0+ integrated avionics systems.

Those enhancements have even included improvements in how water boundaries are presented, with special algorithms used to minimize discrepancies between the SVS and the real world's constantly changing shorelines. At airports with multiple parallel runways, such as Los Angeles International, Honeywell provides "breadcrumbs" that guide the approach to the centerline on the selected runway. Along with other features, this helps ensure that pilots don't mistakenly land on the wrong runway.

Of course, helicopters often are flying approaches to landing sites other than runways. So, when the time came to add SVS to the AW139, Honeywell knew it would have to optimize the system for rotary-wing operations. While some helicopters already have SVS, heading-based systems can't be used in instrument conditions all the way down to the hover for a variety of reasons, Bialek explained.

"When you have high crab angles, the heading-based SVS is essentially presenting where your nose is pointed instead of displaying where you are actually going," he said. That could be problematic in any number of situations, but particularly in rescue or other low-level operations over challenging terrain.

In the Phase 8 system, Bialek continued, "as you start to crab the helicopter, where you're headed and your flight path vector will remain in view, on your primary flight display, unless certain speed or heading parameters are met and it is better to switch to a heading-based SVS. For very dynamic maneuvering – not typical during instrument, confined, or steep approaches – the Honeywell SVS will present a heading-based view."

He added, "We worked for a very long time with Leonardo to perfect the transitions between heading-based and track-based presentations, ensuring it is comfortable and intuitive for average pilots. The system clearly annunciates when it is switching between the two presentations

and presents the best [option], track- or heading-based, depending on the state of the helicopter.”

Moreover, the primary flight display adjusts to provide a clear view of the flight path even during a steep approach. “The HSI [horizontal situation indicator] will actually move slightly toward the bottom [of the display] to be out of the way so you’ve got an unobstructed view of your landing site on the SVS, even during steep approaches, which in helicopters can be as much as a nine-degree descent angle depending on the approach,” Bialek noted.

Honeywell’s SVS provides pilots with color-coded warnings on the SVS terrain surface that correlate with helicopter terrain awareness and warning system annunciations, as well as flight path vector guidance that makes it easier to avoid controlled flight into terrain events. The company has also upgraded the maps in the Phase 8 flight deck to a cleaner, sharper presentation, with more available symbols and terrain display, while adding a new cursor control device (CCD), which allows pilots to quickly select and program a string of waypoints.

“With the new CCD, which incorporates

significant human factors and ergonomic improvements, you can more comfortably move the cursor around and pick pilot-defined waypoints directly on the map, rapidly building a custom approach path into your chosen landing site,” Bialek said. These custom approach capabilities help stabilize approaches to a variety of challenging landing sites, such as offshore oil rigs, off-airport work sites, and VIP mission destinations.

Additionally, Phase 8 provides the ability to wirelessly transfer flight plans and other data into the flight management system, using iPads or other mobile devices running Honeywell software.

Honeywell and Leonardo exhibited the Phase 8 avionics and provided customer-flight demonstrations in an AW139 during Heli-Expo 2020.

Bialek said operators will be impressed with the extra effort that the design team has put into meeting their specific needs.

“There’s been a lot of money spent, and a lot of really talented people working on the project, to ensure we do an even better job of making AW139 pilots happy,” he said.

ROTORBITS ✦

LEONARDO TO BUILD NEW HELICOPTER SUPPORT CENTER IN BRAZIL

Leonardo has announced that its regional helicopter customer service capabilities in Brazil are being expanded with the building of a new facility in Itapevi, 19 miles (30 kilometers) from São Paulo, Brazil.

Construction of the new facility, run by Leonardo do Brasil, is scheduled to be completed in the fourth quarter of 2020.

The new support center will include: maintenance hangars, bonded warehouse, workshops and other supporting services including a dedicated heliport. There is the possibility of further expansion in the future. Services provided include: spares, maintenance, product support, engineering services for the AW119 single engine, AW109 light twin series, and AW Family including the AW139, AW169 and AW189 types.



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TOPS AIMING FOR STRONGER SAFETY CULTURE



TOPS is changing its membership program to a more inclusive model in an effort to raise the level of safety in the air tour sector. **Heath Moffatt Photo**

 **BY DAYNA FEDY**

Tour Operators Program of Safety (TOPS) is changing its membership program to include a much broader segment of operators than just its traditional part 135 rotorcraft base, in an effort to raise the level of safety among air tour operators.

The expansion of the program has been coined the “Rising Tide Program” as a reflection of its inclusive nature.

“The rising tide raises all ships, which is exactly what TOPS aspires to do for the air tour industry,” said TOPS executive director Stan Rose. “We’re no longer willing to sit back and just say we’re glad it wasn’t one of our members that had an accident. We are taking a proactive role in leading this change and delivering a better outcome for everyone.”

Rose said the general public classifies all air tour operators as one, and the benefits of the TOPS membership have historically been limited to a small subset of part 135 operators.

Standards developed within the TOPS organization are designed to go above and beyond those required by the Federal Aviation Administration (FAA). With the Rising Tide Program, TOPS is creating provisional membership opportunities for part 135 operators who don’t fully meet the TOPS standard, but can demonstrate an equivalent level of safety. Through the program, these operators will receive guidance and mentoring to elevate their operations to the TOPS standard.

The program will also extend provisional membership opportunities to part 91 air tour operators that are prepared to fly to a higher safety standard. Rose added that the company hopes these part 91 operators will eventually work toward part 135 certification.

“We had a secondary goal for the organization, which was to raise the level of safety for the whole industry,” said Rose. “Not all companies can meet the standards, and the standards are high. So we have developed a ladder.” Rose used the example of doors-off operations, which are not against FAA regulations but are not permitted in the TOPS program. “Other companies with good operating standards can show that they have training and equipment or policies and procedures to demonstrate that they have an equivalent level of safety.”

While part 135 operators are required to write an operations manual that demonstrates how they will meet all part 135 requirements, Rose said TOPS is in the process of creating its own manual for part 91 operators that will allow them to demonstrate an acceptable level of safety, eventually to become a TOPS member. “We’re going to do an outline, and it’s going to include what we think are the important parts of part 135, our standard, and good operating practices – a safety management system [SMS],” said Rose.

Under this portion of the program, TOPS will give these part 91 operators 24 months before they will be officially audited. In the first year, the part 91 operators will have a mentor (an existing TOPS member) that they can turn to during the process of writing their own operations manual. At the end of the first year, Rose said an auditor

will look at each operator and their manual, and perform a gap analysis that compares what is written in the manual to what the operator is executing.

He added: “The second year is where you get things going and start practicing what you preach. So at the end of the second year [the part 91 operator] would be audited to their own manual. And no two of those manuals will be exactly the same, but it still gives them a reference [and] a way of implementing safety practices that we consider basic.

“And the goal here . . . is this is a culture change. And culture doesn’t change overnight, it changes over generations. Each pilot that comes in [to a company] changes the culture. So we should start influencing a pilot’s strong safety culture from their first day in flight school.”

Rose believes that for consumers, when it comes to choosing a reputable helicopter company for an air tour, “the TOPS membership is a guarantee that [air tour] operators are doing things the right way; they’re taking the extra step and doing things as safely as possible.”

Current TOPS members include Blue Hawaiian Helicopters, Coastal Helicopters, TEMSCO Helicopters, Sundance Helicopters, Papillon Grand Canyon Helicopters, NorthStar Helicopters, and Hawaii Helicopters.

As part of the Rising Tide Program, TOPS is taking on an initial group of part 91 operators as a beta test group that will help the company write its part 91 operations manual. “We don’t want to make assumptions about part 91 operations,” said Rose. “We need to learn from them, too, so we want

to have them involved in the process. . . . We’re actively doing that now.

“And then we’ve got the list of letters of authorization operators and we’ll reach out to them about membership, [including] the [part] 135 operators,” he added.

Safety is at the forefront of the Rising Tide Program, but on the back end, the program is also affected by the eminent labor shortage that the industry is facing. Pilots who have just received their license typically only have about 250 flight hours under their belt after finishing flight school, Rose said. This creates a gap, since most air tour pilot positions require 1,000 hours.

“And how do you get from 250 hours to 1,000 hours? Frankly, one of the answers is you work for these [part] 91 operators through the tours.”

TOPS hopes to achieve two goals in relation to this issue: “First, we want to create a career ladder, so that when [a student] pays for flight school, they have some idea that they might actually get a job, and a positive ladder moving up,” said Rose. “And the second part for us is that we’re willing to mentor the part 91 operators, and help them with their SMS programs. We want students coming out of flight school to think that SMS is the only way to do business. We want to start that mentoring so we’re helping with their training when they’re moving up the career ladder; this will reduce the training necessary when they join the larger companies. There are benefits for everybody.”

He added: “We’re trying to create this product where we’re all working together for the same reasons – building safety in the industry.”



Blue Hawaiian Helicopters is a member of the Tour Operators Program of Safety (TOPS).
Blue Hawaiian Photo

ROTORBITS ✦



GULF HELICOPTERS SET AS AW189K LAUNCH CUSTOMER

Gulf Helicopters of Qatar, an established Leonardo AW139 and AW189 operator, will introduce the AW189K into service in the second half of 2020.

Powered by a pair of latest generation Safran Helicopter Engines Aneto-1K 2,500 horsepower turboshafts, the AW189K offers the market a further option for efficient long range, high endurance and large capacity operations

Gulf Helicopters also served as the launch customer of the AW189 in the offshore market in 2014.

Leonardo said the new model, currently under development with over 350 flight hours logged, has shown excellent capabilities in a wide range of demanding weight, altitude and temperature conditions.

CADORATH GETS SPECIAL PROCESS APPROVAL ON T55 AND LTS101 ENGINE LINES

Adding to their current special process approval of the T53 engine, Cadorath and Honeywell Aerospace have amended the agreement to include the T55 and LTS101 engine lines. The current agreement extends through the end of 2022.

The primary applications for the T55 are the Boeing CH-47 Chinook and variants, while the LTS101 is used in the Bell 222, Airbus HH-65 Dolphin and the AS350 AStar.

“The approvals are a welcome addition to the service and support that we provide,” said Roy Hartfield, director of business development for Cadorath. “We look forward to being able to support the Channel Partner facilities that provide services for these engine models and to continue working closely with Honeywell Aerospace.”

NEW HAI PRESIDENT AIMS TO EXPAND REACH



✦ BY OLIVER JOHNSON

Helicopter Association International's (HAI's) new president and CEO plans to reach out to the electric vertical take-off and landing (eVTOL) and drone industries as part of an ambitious growth strategy that includes broadening the association's reach internationally.

Jim Viola became the new head of HAI on Jan. 16, and in an exclusive interview with *Vertical*, he said the association could play a key role in providing programs that enhance safety and encourage professionalism across all realms of vertical flight.

"With the quadcopters that are coming out, the electrical propulsion, the tiltrotor [aircraft]... there's so many things that are out there, and I think that everybody is trying to figure out where it fits in [to the existing rotary-wing system]," he said. "It's a prime opportunity to figure out where we, as an association, can reach out – not just to pure helicopters as in the days gone by – but I want to reach out to all [those involved with] these new vehicles."

Viola said he was open for feedback from the association's existing members on how the industry can "open up our arms to all the opportunities that are out there" – with the prospective new generation of vertical lift aircraft offering new ways to achieve the same missions helicopters achieve today.

"Promoting these unique contributions to vertical flight is what's important," he said. "And that's why I think, as an association, we need to open up and go broader than helicopters and really get into all the new type of vertical flight aircraft that are out there and are coming."

Viola took over as CEO and president following the retirement of Matt Zuccaro, who had been at the helm of the association for almost 15 years. (Just weeks after his retirement, on Feb. 25, Zuccaro sadly passed away at the age of 70.)

Viola's aviation career began in the U.S. Army. "I figured I was just going to do a short term in the military to learn how to fly and then come out and do civilian flying," he said. "My rule was that as soon as the Army gave me a desk job and I stopped flying, I was leaving. Somehow I managed to fly a whole bunch of helicopters inside the Army and I never really stopped flying."

He ended up serving for 27 years, the majority of which he spent in Special Operations. During his time in the military, he flew the Hughes TH-55; Bell UH-1 Huey, OH-58 Kiowa, and AH-1 Cobra; MD 530, Boeing CH-47 Chinook; and Sikorsky UH-60 Black Hawk.

Two weeks after retiring in 2008, Viola joined the Federal Aviation Administration. He rose through the regulator's ranks over the following years, with his most recent

post being director of general aviation safety assurance. In this position, he was responsible for maintaining consistency and standardization in safety oversight activities for the general aviation community. He was also responsible for starting the U.S. Helicopter Safety Team (USHST).

"[The USHST] really did some deep dives as to what you can do as a small operator to bring safety [enhancements] to your organization," he said. "The intent of the U.S. Helicopter Safety Team as well as the International Helicopter Safety Foundation is to be able to provide all that information so that you can use it to educate your pilots. The issue now is how do you make sure pilots are using that?"

Viola said he hoped to use some of the contacts he made during his time working with the International Helicopter Safety Team (now known as the International Helicopter Safety Foundation) to engage those working in the industry in countries such as India and China that seem primed for growth.

"One of our sayings with the International Helicopter Safety Foundation is we don't want to see the accident rate grow with the increased use of helicopters and vertical lift," said Viola. "We don't want to be the big dog coming in and taking over, we just want to make sure we all play together and see what can we do to help them."

Viola said it was HAI's focus on safety that held particular appeal to him in deciding to join the organization. "It's all about understanding that you have to enhance safety first or the industry is going to suffer," he said. "Everywhere I looked inside of HAI was safety; it was all about safety and professionalism, so that was something that really motivated me to go after the job."

In terms of potential legislation impacting existing rotary-wing operations, Viola said the major issues of concern were noise issues and airspace segregation at the state level. The former has been an area of focus for the last few years for HAI, which has sought to counter concerns through its "Fly Neighborly" program. In terms of the latter, "one of the things the FAA has done is managed the airspace here so that we do have the safest air transportation system in the world," said Viola. "We really don't want to give up any of that because it is working."

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TRANSFORM YOUR REALITY

TILTON LEAVES MDHI



A 2015 photo of Lynn Tilton at the MDHI facilities in Mesa, Arizona. Famous in the helicopter industry for her theatrical Heli-Expo press conferences and eye-catching outfits, Tilton was never one to shy away from attention. **Patriarch Partners Photo**

✦ BY ELAN HEAD

Lynn Tilton has stepped down as the CEO of MD Helicopters Inc. (MDHI) as of March 23.

An MDHI spokesperson confirmed the surprise development on March 26, telling Vertical that the company is otherwise “status quo” as it continues to fully execute all of its government and commercial contracts.

“Though she has withdrawn from active management of MDHI and other Patriarch Partners portfolio companies, Lynn remains the largest single shareholder and a major creditor of MDHI,” the spokesperson said.

“Going forward, the company is being run and managed by the existing senior leadership team, who will continue to deliver strong and decisive leadership with a cohesive and strategic focus on ensuring excellence across all business operations.”

According to the Wall Street Journal, Tilton “walked away” from her roles at MDHI and other companies after being ordered by a bankruptcy judge to sell them to pay off Zohar funds. These collateralized loan obligation vehicles were established to make loans to failing companies, and now owe investors \$1.7 billion.

Through her private equity firm Patriarch Partners, Tilton has specialized in acquiring and restructuring companies in distress. She also founded and managed the Zohar funds until 2016.

Tilton has been leading MDHI since Patriarch Partners acquired the troubled helicopter manufacturer in 2005. The so-called “Diva of Distressed” promised to apply her expertise in rescuing failing companies to turn MDHI around, which she did with mixed success.

Under her leadership, MDHI continued commercial helicopter production in addition to securing several important military contracts, including sizable MD 530F orders for the Afghan Air Force. Living Legends of Aviation named Tilton “Aviation Entrepreneur of the Year” in 2011 for her work in leading the company to profitability and rebuilding its “shattered” supply chain.

However, the company’s production numbers have generally lagged those of its competitors, and highly touted new helicopter programs such as the MD 6XX have been shelved. MDHI has also struggled to support its commercial customers, as reflected by the company’s relatively poor showing in Vertical’s annual Helicopter Manufacturers Survey in recent years.

Throughout, Tilton has been publicly bullish on the company’s prospects. At this year’s HAI Heli-Expo in Anaheim, California, Tilton promised that 2020 would be “a big year and a big expensive year” for MDHI as it pursued development of the MD 969 combat attack helicopter and glass cockpit upgrades for its single-engine product line.

Even before the COVID-19 crisis struck,

however, the company suffered a serious setback when Boeing won an \$11 million judgment against MDHI over the rights to the AH-6i light attack reconnaissance helicopter, which an arbitration panel found was directly derived from the AH-6M Mission Enhanced Little Bird (MELB). MDHI sold Boeing the intellectual property needed to build the MELB in 2005.

Finding that Boeing has the right to make and sell the AH-6i — a matter that MDHI had disputed — the panel ordered MDHI to pay Boeing’s \$4.2 million arbitration costs (as well as its own \$7.4 million costs) and provide Boeing with all MELB tooling, one set of common tooling, and one set of tooling drawings by April 30.

MDHI’s spokesperson confirmed that the company recently executed “a small reduction in force,” explaining that “through the course of normal business it is often necessary to evaluate staffing levels and adjust to ensure both customer and company objectives are met.”

As to whether MDHI will be put up for sale, the spokesperson said, “There has been no communication to indicate that MD Helicopters is currently for sale.”

Chris Thatcher contributed reporting to this article. ✦

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THREE DAYS IN ANAHEIM

PHOTOS BY DAN MEGNA, ROB REYNO & SKIP ROBINSON

Helicopter Association International (HAI) Heli-Expo touched down in Anaheim, California, at the end of January – about six weeks earlier than its usual slot in early March.

Heli-Expo is the industry's biggest tradeshow, and while HAI hasn't released official attendance figures for the show, vendors and visitors reported a bustling show floor, and a good level of activity – despite the much-earlier-than-usual show date.

This year's event covered 313,000 square feet (29,080 square meters), with 657 exhibiting companies and 62 helicopters on display.

In addition to the trade show, there were over 150 educational courses, training briefings, workshops, forums, meetings and seminars on offer. Nearly 4,000 attendees participated in HAI's free Rotor Safety Challenge sessions, which focused on improving safety.

As ever, *Vertical* brought a large contingent to the show to provide up-to-the-minute coverage of Heli-Expo's breaking news. Thanks to all those who came to visit our booth.

"We're already looking forward to next year's show," said HAI CEO and president Jim Viola in a press release announcing the show's conclusion. "Work is actually well under way for HAI Heli-Expo 2021 in New Orleans, where we expect our attendees to have an extraordinary time!"

Heli-Expo will run from March 23 to 25 next year, and will be held at Ernest N. Morial Convention Center in New Orleans, Louisiana. We hope to see you there!



Tiger Tugs brought a splash of color to the show floor with its distinctive tug.



Airbus showed off its Vahana eVTOL demonstrator.



Lakehorn AG and Skytrac signed a memorandum of understanding to bring AeroWeather's widely adopted aviation weather application to the cockpit with the use of SKYTRAC's intelligent connectivity capabilities.



HAI didn't release attendance figures for this year's Heli-Expo, but vendors reported good traffic and a busy show floor.



Attendees gather around Leonardo's booth, which contained the AW139, AW169, and AW189.



The AW169 arrives in Anaheim in an emergency medical services configuration.



Vertical

WATCH THE VIDEO

Airbus ACH130 Aston Martin Edition

0:01 / 2:18



A Robinson R22 arrives for display at the show.



An Airbus H145 and Sikorsky UH-60 Black Hawk outside the convention center.



Helicopter Express's Scott Runyan accepts an award alongside his company's Kaman K-Max.





The Cabri G2 on the Helicopteres Guimbal booth.



The luxurious interior of the ACH130 Aston Martin edition.



Attendees take a look at a system designed to counter spin on a hoist.



A Bell 412EP arrives in Anaheim.



SEI's booth featured its famous Bambi Bucket.



New HAI president Jim Viola arrives at the convention center. Viola assumed his position just a couple of weeks before the show started.



Airbus Corporate Helicopters had a special ACH130 Aston Martin edition at the show.



Then-president of MD Helicopters, Lynn Tilton, giving her annual address at the OEM's booth.



An attendee takes a flight training device for a spin.



A Sikorsky S70i Firehawk on United Rotorcraft's booth.



One of three S-70i Firehawks on display at this year's Heli-Expo.



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Dynamic Components

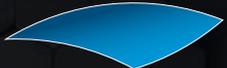
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A look down the tailboom of the largest civil aircraft in Bell's fleet: the 525 Relentless.



A Leonardo AW139 arrives at the convention center in Anaheim.



A Robinson R44 Raven II prepares to depart the show.

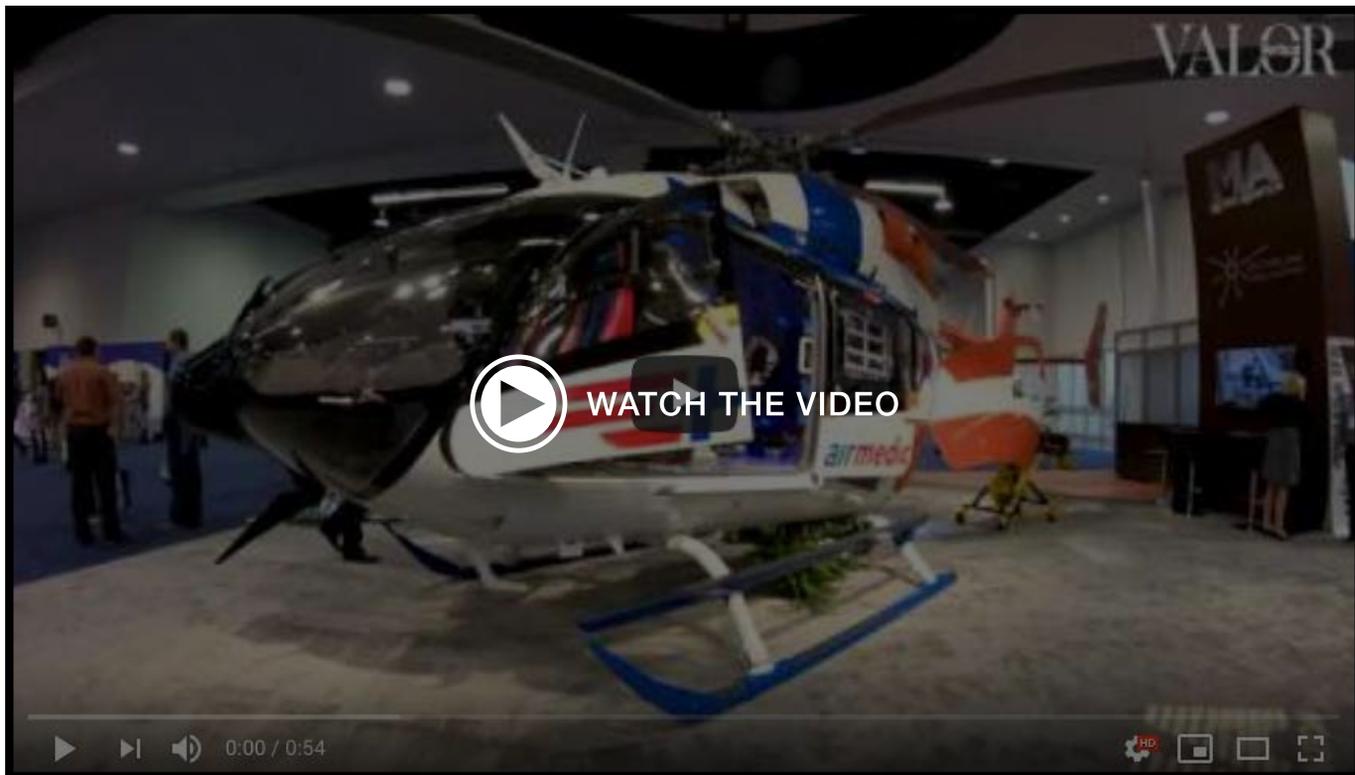


The star of the Sikorsky booth was L.A. County Fire Department's S-70i Firehawk.



A look at the glass cockpit of a Bell 429 on display.





Showgoers take a look at the engines in Safran Helicopter Engines' product range.



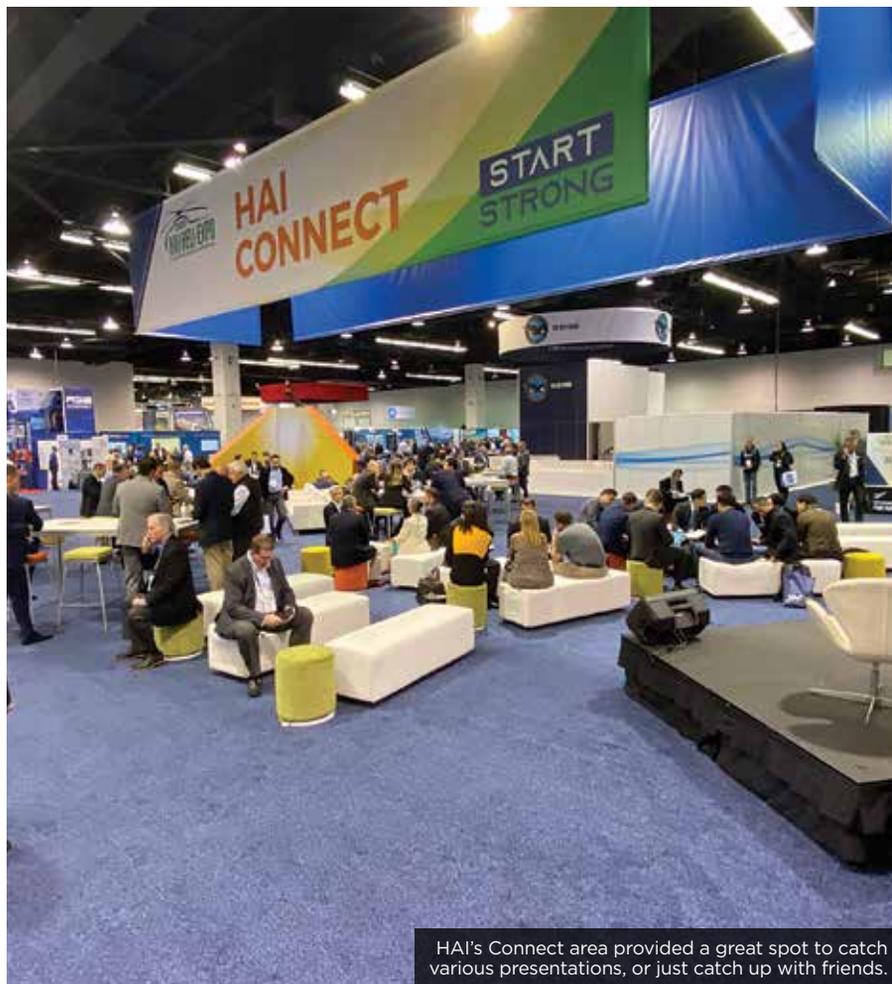
Southern California Edison's new Bell 429 lands outside the convention center.



A look at the EMS interior inside Travis County STAR Flight's AW169.



A presentation alongside the Bell 525 Relentless. Bell anticipates certification of the type later this year.



HAI's Connect area provided a great spot to catch various presentations, or just catch up with friends.





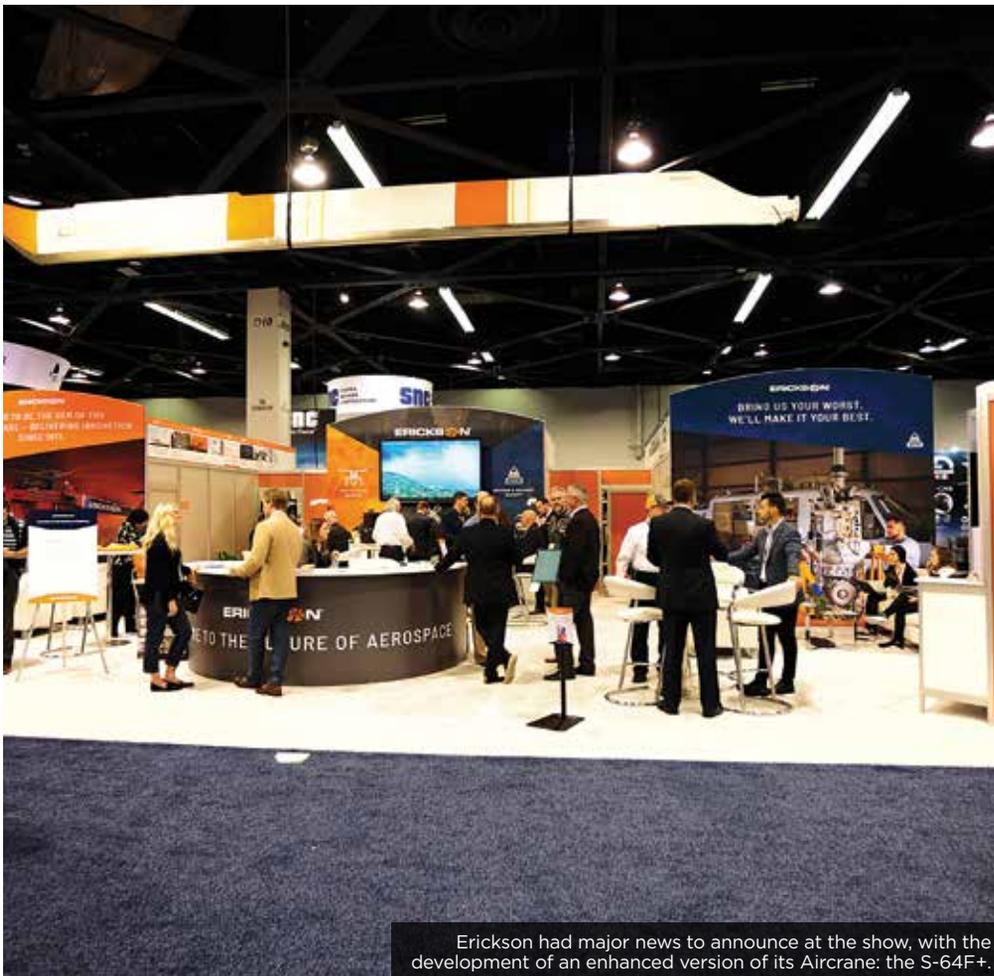
A Bell 505 and 429 sitting on the OEM's bustling booth. The 429 was one of two recently acquired by Southern California Edison.



Inside the cockpit of an Airbus H125 completed by EuroTec Canada.



The Columbia Helicopters team. Corey Brekke, the company's maintenance manager in Afghanistan, was the 2020 recipient of HAI's Excellence in Helicopter Maintenance Award.



Erickson had major news to announce at the show, with the development of an enhanced version of its Aircrane: the S-64F+.



Metro Aviation's booth held an Airmedic EC145e.



The CEOs of Kopter and Leonardo give a press conference on Leonardo's acquisition of the Swiss manufacturer.



Members of San Diego City Fire Department stand in front of the agency's Sikorsky S-70i.



A look inside the AW169 at the aircraft's cutting-edge glass cockpit.



Airbus Helicopters CEO Bruno Even at an event on the OEM's booth to celebrate the company's global fleet passing 100 million flight hours.



The Axnes team celebrates the launch of the PNG Mobile Base Station.



The unique sight of the Bell AH-1 Cobra. Heli-Expo is home to helicopters of all shapes and sizes.





The pilot of High Performance Helicopters' UH-60 Black Hawk peers out the bubble window as he approaches the convention center.



Southern Utah University's Bell 206L-4 LongRanger arrives at the show.





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An Erickson S-64E battles the flames during Australia's record-breaking wildfire season.



WE GO BEHIND THE SCENES WITH THOSE WHO FOUGHT THE DEADLY BUSHFIRES THAT RAVAGED AUSTRALIA EARLIER THIS YEAR.

STORY BY PAUL SADLER // PHOTOS BY NED DAWSON/NSW RURAL FIRE SERVICE

BLACK SUMMER



Australia's bushfires burned through an estimated 18 million hectares of bushland and destroyed 2,900 homes.



Australia's 2019/20 bushfire season was unprecedented. While the country was well prepared, well organized and well resourced, extreme record-breaking temperatures mixed with strong winds to manufacture a relentless bushfire season across a very dry landscape.

Aggressive fires raged through the eastern states of Queensland, New South Wales (NSW), Victoria, and the Australian Capital Territory – in addition to a regular spread of seasonal fires throughout other parts of the country. Tragically, 33 people, including three volunteer firefighters, and three American aircrew of a Coulson Aviation C-130 Hercules large air tanker, were killed while protecting lives and property.

Burning through an estimated 18 million hectares of bushland, the fires destroyed 2,900 homes. The town of Balmoral, about 75 miles (120 kilometers) southwest of Sydney, NSW, was all but wiped off the map. Added to this was the impact on Australia's wildlife: the University of Sydney estimates more than 800 million animals were killed by the fires in New South Wales alone.

While arson was believed to be the cause of some of the fires, most were the result of power lines sparking or by lightning strikes, with the flames then driven along by the constant strong winds. *Vertical* spoke with some of the aircrew who banded together to fight the bushfire assault on the Great Southern Land.



DAY TURNS TO NIGHT

"It was completely unprecedented in my view – I've never seen anything like it in the States," said Evan Wagenaar, assistant chief pilot at Firehawk Helicopters. "The fire activity, the overall size of the fires, and just how fast they moved, I'd never seen anything like it before."

It was Wagenaar's third time fighting fires in Australia. He was flying one of Firehawk's Sikorsky UH-60A/S-70A Black Hawks (on contract to Kestrel Aviation for the season), which carries a 900 US gallon (3,400 liter) Bambi Max bucket. "I was here last March [2019] towards the end of that season, and this was nothing like last year," Wagenaar said. "Over the recent Christmas/New Year period we finally made it down to Merimbula on the far south coast of New South Wales to an apocalyptic time. It was so bad that we weren't even able to fly."

Wagenaar recounts one of the days when he was operating out of Merimbula airport. "They sent us home at 4 p.m. because it started getting dark," he said. "We went back to our hotel, and by 5:30 p.m., when the sun should have been up, it was pitch black. All the street lights were on and there was ash falling from the sky. This was a situation that I have never been in."

The fires were unique because of how aggressive and widespread they became. News coverage of bushfires began to hit the media proper when they started around the urban interface of the seaside areas of Noosa and the Sunshine Coast, about an hour north of Brisbane, Queensland, in early September. The fires then moved into northern New South Wales – an area that was extremely vulnerable after a very long period of little or no rain. The combination of dry, very hot and windy conditions was ripe for the picking, and the fires continued to rapidly spread further south.



At times, smoke clouds were so thick they turned day into night during the middle of the afternoon.

A Coulson Aviation Sikorsky S-61N, on contract to Emergency Management Victoria, lines up for another drop.





EXPLOSIVE ENVIRONMENT

Rapid initial attack was the recipe to keeping fires small and extinguishing them early on. But, once the fires got past a certain size, it became very difficult for the fire agencies, and operators, to find the right amount of equipment to actually make a difference. “You can’t even describe it in terms of being ‘big,’ ‘bigger than usual,’ or ‘huge,’” said Kestrel Aviation managing director Ray Cronin. “The closest word I can think of is massive, and the challenge for everybody was what equipment was available, and what were the engagement arrangements. This was not quite the normal pace at that time of year.”

Cronin said if the same fires had started in the middle of the fire season – when the regularly contracted helicopters were in place and people were at a higher level of readiness – then it may have been a slightly different outcome. “But I think the overriding factor here was the environmental aspects that the conditions were very dry, with very high temperatures early in the season, the winds were strong, and it all made for a very explosive environment,” Cronin said. “You could have that 20/20 vision look at it and say ‘maybe more equipment might have made the difference,’ but I think the environment had set up such a challenge that it was going to be a problem either way.”

Based out of Mangalore, Victoria, Kestrel Aviation’s fleet of five Bell 412s, five 212s, and one Long Ranger – in addition to six Erickson S-64E Air Cranes and two UH-60/S-70As from Firehawk Helicopters – were all on firefighting contracts in various parts of the country. Kestrel also had some call-when-needed capability outside of the contract helicopters.

“In the early period of the fires, the challenge for us was we had contract start dates in Victoria that needed to be respected, and our fleet, plus the remainder of that surge capacity that we were able to offer, had to be brought down into Victoria, which of course was flat out anyway,” Cronin said. “So, this was pretty unusual [in] that there was a period in October and November where there were fires in five states.”

The “usual” pattern across the months of Australia’s fire season would see fires in Queensland first, then in New South Wales/Australian Capital Territory and Victoria, with South Australia and Western Australia towards the back end of the season. But that was far from the case this year. All these states were lighting up early and having events across all their boundaries, resulting in fewer opportunities to share resources.



METEOROLOGICAL MODELLING

Based out of Moorabbin Airport, near Melbourne, Victoria, Erickson Inc.'s Ross McGuigan – a regular for the company fighting fires in Australia since 2008 – compared these fires to his other main theatre of firefighting operations in Greece.

“They have their moments [in Greece] as well, but you don’t get the campaign fires that burn for weeks on end like you do here in Australia,” McGuigan said. “The dryness and the volatility is something relatively new to me. The extremely high temperatures and the strong winds that seemed relentless were different, and the combination meant for some fairly serious fire activity. I’ve been in Western Australia for a few seasons as well, and this fire intensity is comparable. But I think it was just the sheer volume of it.”

On Dec. 30, the coastal Victorian town of Mallacoota in the state’s northeast took a big hit from the fires. McGuigan, flying an S-64E Airplane, was involved in attacking the spotting fire front. “The meteorology modelling and forecasting was extremely accurate, and the fire agency said we would be doing asset protection on that day,” said McGuigan. “And sure enough, when the weather system came through, as they said, the fire grew and became aggressive and uncontrolled. They knew it was it was going to be like that, and I thought that was quite impressive.

“We had everything set up almost two or three days beforehand. And then when it did come, it was an aggressive fire that was spotting several kilometers in front. They said we would be doing asset protection and that’s exactly what we were doing, protecting homes in the path of the fire.”

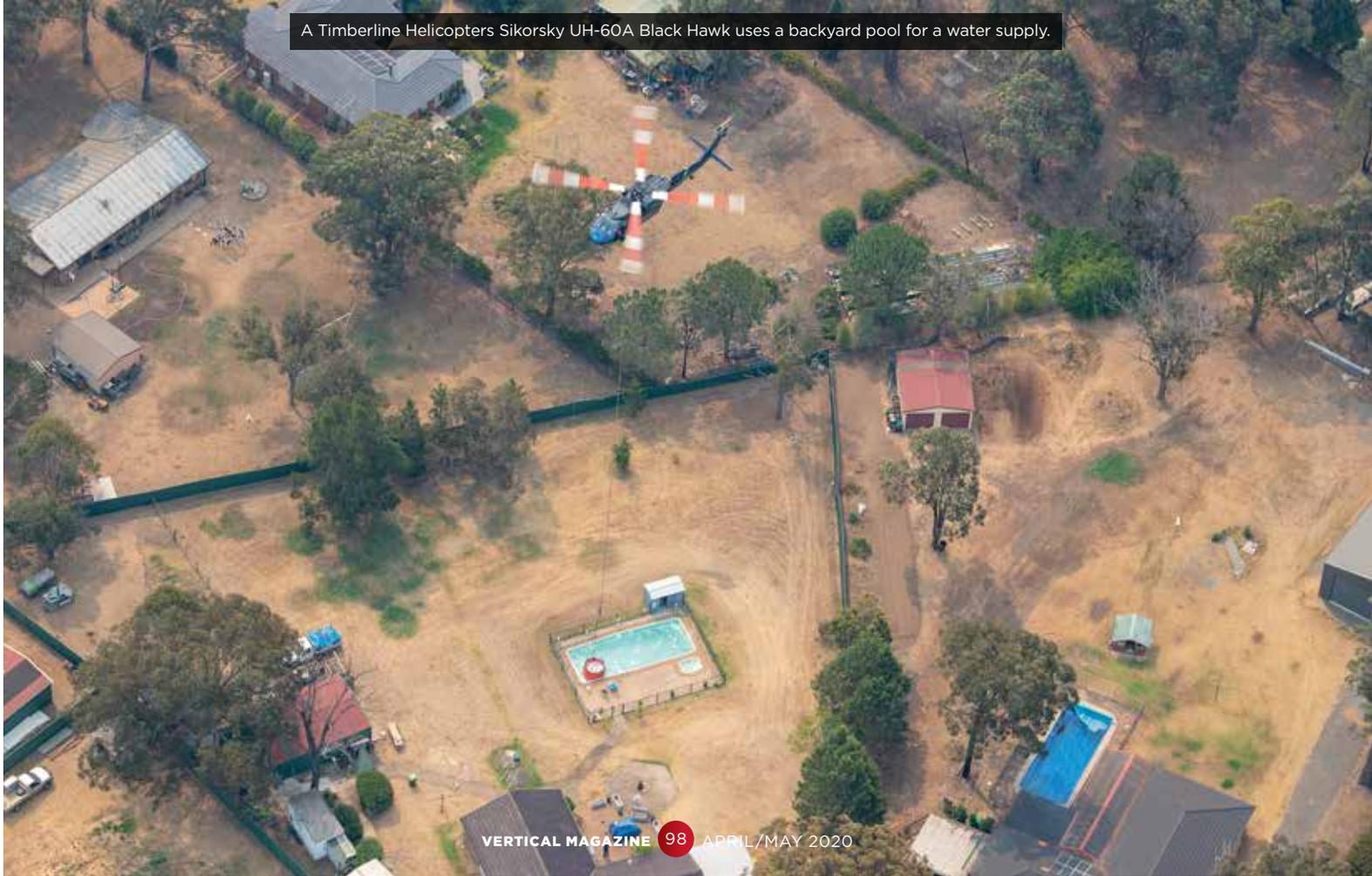
McGuigan said air and ground crews worked together to protect more houses than were lost in the infernos. “Once they get to that scale, it’s a little hard to defend everything – it can seem like an overwhelming task,” McGuigan said. “The trick is not to let that get to you. We stay systematically, we work with what we can. If we lose one, our fallback position is we move on to the next property.



A Conair Avro RJ85 drops a load of Phos-Chek retardant to help control one of the many fire fronts that engulfed Australia's east coast.



The helitacks were always working under the control of the state's or territory's air attack controllers, who provided them with that big picture view.



A Timberline Helicopters Sikorsky UH-60A Black Hawk uses a backyard pool for a water supply.

A Wildcat Helicopters Bell 412SP helicopter is shown in flight, dropping a bucketload of water. The helicopter is positioned in the upper center of the frame, with a long, thin cable extending downwards to a bucket. The bucket is releasing a thick, vertical stream of water that falls towards the ground. The background is filled with dense, billowing white and grey smoke, suggesting a large fire. In the lower portion of the image, there are several green and white industrial buildings, some trees, and a utility pole. The overall scene is one of an active firefighting operation in a rural or industrial area.

A Wildcat Helicopters Bell 412SP drops a bucketload of water during asset protection operations.

That's the only way you can really deal with that: if you get too focused on protecting the one property, you can lose sight of the bigger game."

The helitacks were always working under the control of the state or territory's air attack controllers, who provided them with that big picture view.

"A lot of what we do isn't planned by ourselves," McGuigan said. "We're being led around by the agency. As you can imagine, when there's fire everywhere, all the radios are going off, the smoke comes down and gets thicker, [and] it can be very difficult. [Air attack] have more radios than us. We've got three to four different channels all chirping away when things get very busy as we all figure out what the priority is, [which is challenging] especially when you've got something like 1,500 kilometers (932 miles) of active fire line that's basically unattended and is at the mercy of the weather. It seems chaotic I guess from time to time from the ground, but we are working to a plan, and our air attack controllers direct us and we do what we're told, when we're told – it's very well organized."

Air temperatures hovered around the 104 F (40 C) mark (and sometimes higher) for days on end. On Jan. 4, the suburb of Penrith, just 30 miles (50 kilometers) west of the center of Sydney, recorded a high of 120 F (48.9 C). For a short time, Penrith was listed as the hottest place on Earth.

The extreme heat presented a challenge not only for the helicopters, but also the pilots and the mechanics. "With any helicopter, the hotter the conditions, the more it affects your performance," McGuigan said. "Our mechanics were working in more heat, we were working and flying in more heat. The whole operation is under just a little more stress when it is hot. From a human factors side you have got to keep your water intake up and stay aware. There are checks and balances in place for fatigue and [in] our particular system we have a spare pilot almost all of the time and we were rotating guys through who were fresh. So we had an ability to keep running at full pace, depending on the maintenance."

Continued on p. 102

HOW A HUET COURSE SAVED MY LIFE

PILOT LACHIE ONSLOW TELLS US ABOUT THE DAY HIS HELICOPTER CRASHED INTO A RESERVOIR.

STORY BY DAYNA FEDY

PHOTOS COURTESY OF FLEET HELICOPTERS



Lucy is a 1966 vintage Huey, with a distinctive pink livery for cancer awareness.



The aircraft was assisting with firefighting operations on the Clyde Mountain Fire at the time of the crash.



Lachie Onslow dislocated his shoulder as the helicopter hit the water, but was able to escape thanks to his HUET training.

Lucy the Bell UH-1H Huey is removed from Ben Boyd Reservoir in New South Wales, Australia.

SGT Bill Solomou Photo



"Thinking back on it all, the calmness that I had when [the helicopter] initially hit the water came from thinking that I've done this before; there was no panic in me because I just thought, OK, this is what we're trained for," said Fleet Helicopters chief pilot Lachie Onslow, as he recalled the moment his Huey crashed into a reservoir while firefighting on Jan. 9, 2020.

Just one month before the crash, he had taken a helicopter underwater egress training (HUET) course. To him, there's no doubt that it saved his life that day.

Onslow was flying Fleet Helicopters' iconic 1966 Bell UH-1H Huey known as Lucy, widely recognized for its bright pink livery for cancer awareness. Assisting with firefighting operations on the Clyde Mountain Fire in New South Wales, Australia, he had just refueled and was about to fill the first bucket of his last sortie of the day, when the aircraft made a "growling noise" and suddenly lost power.

"I remember I got two 'maydays' out, but it was probably only three or four seconds," before the helicopter hit the water, said Onslow, who has been a pilot for 25 years.

The jarring impact as the helicopter hit the water dislocated Onslow's left shoulder, and the cabin almost immediately started to fill with water and roll over. The aircraft became lodged in a bank in the Ben Boyd Reservoir, with the skids just barely visible above the water.

"I put my hand on the door handle and undid my belt, and the door wouldn't open," Onslow recalled. "So then I tried the copilot side . . . [and] couldn't get that door open. . . . Then I went back into the rear of the cabin, and there was just a tiny little pocket of air caught on the roof, which was actually the floor of the helicopter. I pushed my head up into this little gap and got a breath of half water, half air."

When he couldn't get either of the helicopter's sliding doors open, he punched one of the windows out, "and I swam through it and popped up."

HUET training for pilots and crew is a requirement with the NSW Rural Fire Service, which Lucy the Huey was operating on contract for.

"The mental state that I was in because of that training . . . it had given me the opportunity not to panic," said Onslow. "Apart from the physical side of how you deal with it, the mental side was pretty important."

While there are numerous companies around the world that offer HUET courses, Onslow said he participated in a one-day course that had students go through multiple scenarios in a fuselage trainer — from a roll-over under water, jammed doors and being blindfolded, to freeing both oneself and an incapacitated passenger.

"It's the best money I've spent on myself," said Onslow. "I'd recommend the training to anybody who operates around any sort of water. And it's really beneficial for any other type of emergency; it just gives you the training to relax and keep a cool head."



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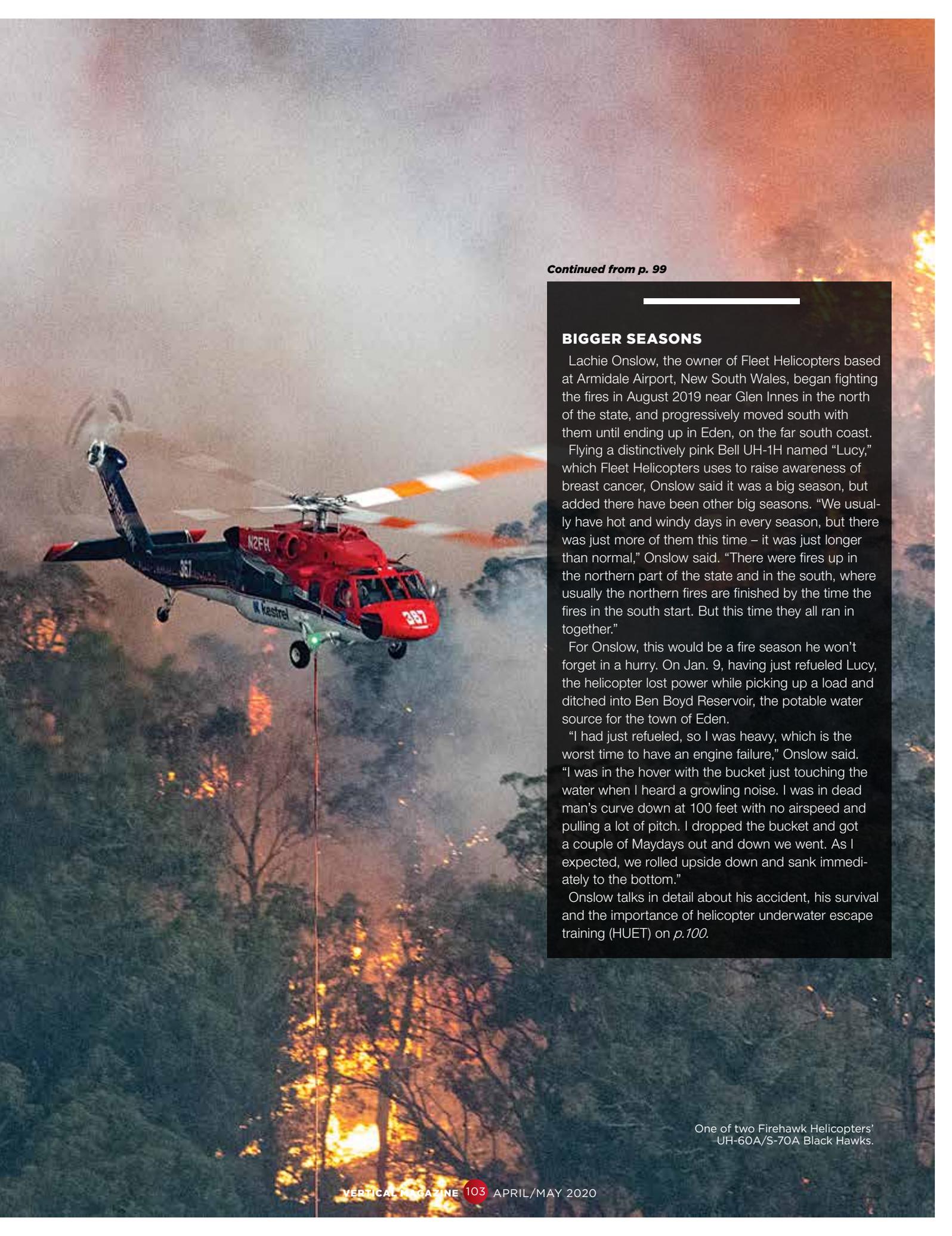
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Fire agency leaders discuss plans to combat the bushfires' spread.



A Wildcat Helicopters Bell 412 joins a Kestrel Aviation Bell 212 to refill from the middle of a racecourse.



Continued from p. 99

BIGGER SEASONS

Lachie Onslow, the owner of Fleet Helicopters based at Armidale Airport, New South Wales, began fighting the fires in August 2019 near Glen Innes in the north of the state, and progressively moved south with them until ending up in Eden, on the far south coast.

Flying a distinctively pink Bell UH-1H named “Lucy,” which Fleet Helicopters uses to raise awareness of breast cancer, Onslow said it was a big season, but added there have been other big seasons. “We usually have hot and windy days in every season, but there was just more of them this time – it was just longer than normal,” Onslow said. “There were fires up in the northern part of the state and in the south, where usually the northern fires are finished by the time the fires in the south start. But this time they all ran in together.”

For Onslow, this would be a fire season he won’t forget in a hurry. On Jan. 9, having just refueled Lucy, the helicopter lost power while picking up a load and ditched into Ben Boyd Reservoir, the potable water source for the town of Eden.

“I had just refueled, so I was heavy, which is the worst time to have an engine failure,” Onslow said. “I was in the hover with the bucket just touching the water when I heard a growling noise. I was in dead man’s curve down at 100 feet with no airspeed and pulling a lot of pitch. I dropped the bucket and got a couple of Maydays out and down we went. As I expected, we rolled upside down and sank immediately to the bottom.”

Onslow talks in detail about his accident, his survival and the importance of helicopter underwater escape training (HUET) on *p. 100*.

One of two Firehawk Helicopters’
UH-60A/S-70A Black Hawks.

A Bell 205A-1 helicopter is shown in flight, dropping a bucket of water on a property. The helicopter is blue and white with red and white striped rotor blades. A red bucket is suspended from the helicopter, and a stream of water is being poured from it onto a building. The background shows a dense forest of trees, some of which are charred and blackened, indicating a bushfire. The scene is captured from an aerial perspective, showing the helicopter's position relative to the property and the surrounding landscape. The overall atmosphere is one of a rescue operation during a crisis.

One of many great saves during the bushfire crisis. Here, a Valhalla Bell 205A-1 saves a property.

ANGRY FIRES

McDermott Aviation operates one of Australia's largest fleets of aerial attack helicopters. With all hands on deck, it needed to make some adjustments to manage fatigue because of the volume of hours its pilots were flying. "The conditions the guys were flying in were pretty horrible," said John McDermott, president of McDermott Aviation. "The visibility was absolutely shit, and it was very hot. That's really an understatement... the conditions were very trying."

McDermott agrees that this was an unseasonably hot summer. "There is no doubt about it, they were pretty angry fires this year. It was the enormity and the size of them. One of the most unusual things was the wet tropics up near Cairns in far north Queensland was burning, which is almost unheard of. It seemed to be going off everywhere and that caught everybody a little bit off guard."

On contract in all states of Australia bar one, with a mixed fleet of 13 Bell 214Bs, a single Bell 214ST, five Airbus AS365 N2/3 Dauphines, and five Airbus AS355F TwinStars, McDermott's whole team were in the thick of it, flying constantly. In a week of scorching hot and windy conditions across southeastern Queensland, one of McDermott's 214Bs collided with terrain on Nov. 13 while working on a blaze at Pechey, west of Brisbane, Queensland. Coming to rest on its left side, the pilot crawled out through an overhead window, walking away with only minor injuries after the accident.

"He was a very, very lucky lad, but he's fine and is back out flying... a little bit the wiser," McDermott said. "You take a lot away from every season and you certainly learn from them. We do a lot of in-house debriefings and we communicate with everybody throughout our organization to make sure we all have the picture of what's going on, what's been going on, and what's potentially going to happen. So good communications was a big part of it all."

A load of water from a Kestrel Aviation Bell 212 hits its target.



A Helitreck MBB BK117 B2 winches in a U.S. Remote Area Firefighting Team (RAFT) firefighter.

As Australia burns more on either side of its winter, the management of assets and logistics, particularly the Type 1 heavy hitting machines such as Erickson's Aircranes, will become more challenging.

TALKING POINTS

As well as his managing director role at Kestrel Aviation, Cronin heads up Australia's key voice in the helicopter community as president of the Australian Helicopter Industry Association (AHIA). "I don't think we have ever seen this amount of activity before," Cronin said. "We've had accidents, we've had incidents, and we've been very fortunate in the helicopter world that most of those accidents didn't result in any serious injuries or fatalities. Unfortunately, with the Coulson C-130 Hercules accident, three lives were lost, and that puts a real shadow over the whole firefight."

Australia is burning more on either side of its winter, and this will make the management of assets and logistics more challenging in future. From an industry perspective, there will be some interesting discussions in the months ahead. The obvious talking point will be about the northern and southern hemisphere seasons overlapping, and the strain on sharing resources – particularly the Type 1 heavy hitting machines.

"This fire season was like having three seasons all rolled into one," Cronin said. "The flight hours of most operators will be well in excess of what they are used to doing. A lot of lessons are going to be learned from this season because it was so compact. The issues are fairly evident and they're very fresh in everyone's minds, so we'll be taking all of those to meetings and forums during the [southern hemisphere] winter months. The AHIA will certainly be encouraging and communicating all of those lessons to the industry."





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LIQUID GOLD

Mother Nature saved her best for late January, with welcoming rains pouring down across the eastern states of Australia, significantly reducing the amount of active fire grounds. However, the liquid gold also caused areas of severe flooding in parts of Queensland and New South Wales, which saw the retasking of some helitacks to conduct flood relief efforts.

These rains were then followed by a week of torrential rain in early February, which saw Sydney record almost 16 inches (400 millimeters) of rainfall in just four days – this was more rain than the city experienced during the entire second half of 2019. February's welcome rain also extinguished the Gospers Mountain "mega-blaze" that had been burning since late October 2019 northwest of Sydney, reported at the time as being "too big to be put out."

The rain was also credited with extinguishing the last of the campaign fires for the season. The 40-day Orroral Valley fire, which burned through 83 percent of the Namadgi National Park to the southwest of the national capital, Canberra, Australian Capital Territory, was officially declared out by the NSW Rural Fire Service on Feb. 27. A week later, for the first time in 240 days, there were no active bush or grass fires in the state of New South Wales or the Australian Capital Territory.

"Every helicopter operator did a great job, as did all the people on the ground, of course," McDermott said. "So many people were involved in the fires and the Australian 'get on and get it done' spirit came out – it was very much that approach this year, which was pretty cool to be a part of. There were a lot of houses lost, and a lot of people lost of course, but I think it would be interesting to know the amount of people that were actually saved, and I think you would find that would be pretty substantial."

McGuigan and the iconic orange Erickson Aircranes are now migrating to the northern hemisphere and will be retuning Down Under later in the year to do it all again. "We're quite a recognized brand here in Australia," McGuigan said. "It's nice to be a part of it, and it's nice to be there and make a difference." 🍷



Paul Sadler | An Australian-based freelance photographer and journalist who has covered the civil and military rotary-wing industries for more than 24 years. Full-time, Paul is a media and communication manager within the Australian aviation industry, having worked for government and private companies.

The Gospers Mountain “megablaze” that had been burning since late October 2019 northwest of Sydney was finally extinguished in February 2020.





BEST IN SHOW

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

BY DAYNA FEDY

BRUNNER/FLIGHTSAFETY

NOVASIM MR flight simulator



The NOVASIM features Varjo Technologies' XR-1 VR goggles, which come standard with eye-tracking technology — quantifying the amount of times the student looks straight ahead or at the controls, for example.

Ackermann said the idea behind the NOVASIM is to make flight training more affordable, efficient and safer for students before getting behind the controls of a helicopter for the first time.

“Whenever you have the possibility to have the first few hours on the [NOVASIM], you learn to hover, you learn to recover, you do takeoffs and landings. And then you reduce the total hours of training quite drastically . . . which saves a lot of money, a lot of time, and it’s safe,” he said.

Unlike full flight simulators, the NOVASIM MR can be reconfigured from rotary-wing to fixed-

wing by simply removing the collective and cyclic and adding fixed-wing controls. Different aircraft models can also be added to the visual system software.

Brunner Elektronik has developed a full motion, portable flight simulator that utilizes a virtual reality/mixed reality (VR/MR) headset integrated with FlightSafety’s VITAL 1150 visual system to bring an immersive training experience to student pilots.

The simulator, called the NOVASIM MR, provides a realistic training experience where students are able to interact in the cockpit, see their hands, and feel the motion/direction in which they are flying — thanks to Brunner’s motion compensation and latency-free motion cueing algorithms.

Brunner and FlightSafety brought the NOVASIM to Heli-Expo 2020, allowing showgoers to experience the immersive and realistic features of the simulator.

While the full-motion aspect of the simulator creates a more immersive training experience, it also helps to combat motion sickness “because what you see is what your body expects to feel,” said Mario Ackermann, sales and marketing manager at Brunner. “And if you don’t give that to your body, you get sick very quickly.”

Being a smaller, mobile platform, the NOVASIM is a fraction of the cost of typical full flight simulators, Ackermann said.



ITT ENIDINE

Lead Lag Damper Silicone

Over the last 18 months, ITT’s Enidine division has been developing improved silicone material for lead lag dampers for helicopter main rotors, to improve the reliability of dampers while reducing noise and vibration.

ITT’s patented Lead Lag Damper Silicone material is used to absorb vibration, which is key to increasing the lifespan of passive helicopter components and making flight more comfortable for pilots and passengers.

Dampers are “flight critical parts,” said Ryan Evans, aerospace product manager at ITT Enidine. “And what’s really important is the damping characteristics of this material. So looking at the standard silicone, which is what is generally used for normal shock

and vibration insulation products, it has a loss factor, or a damping factor of about 0.4. For lead lag dampers you need it to be at least 0.6, and we’ve compounded materials up to about 0.8.”

ITT’s silicone can be custom formulated in different modules and damping ranges to meet various product specifications. The material also has a wide temperature range.

ITT Enidine’s Lead Lag Damper Silicone is currently in production, and Evans said the company is working with OEMs to build the material into components as standard in production aircraft. He added that ITT will be commercializing the silicone over the next six months.

TYLER TECHNOLOGIES

NO•SPIN Litter basket stabilizer

Tyler Technologies, manufacturer and developer of Tyler Special Operations Platform (TSOP), is introducing a new litter basket stabilizer to the rotorcraft market that will help make rescue hoist operations safer. The module, called the Tyler NO•SPIN litter basket stabilizer, uses two powerful gyro-controlled thrusters to counter the rotation of a litter basket, preventing it from spinning during flight.

When switched on, the Tyler NO•SPIN module analyzes where the basket is sitting, and is then able to detect and correct even the smallest movements away from its forward-facing position.

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



WATCH THE VIDEO



stabilizer turns the basket so it follows the ship, instead of dragging the patient along sideways.”

Weighing only 12 pounds (5.5 kilograms), the Tyler NO•SPIN stabilizer can be installed on any litter basket in less than a minute, without the need for tools. The module uses a specially designed clip that can be adjusted to fit any type of basket, and is then secured by a pin.

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

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

FLIGHTCELL INTERNATIONAL

DZMx Plus

At Heli-Expo 2020, Flightcell International showcased the newest addition to its product line, the DZMx Plus. A variant of the Flightcell DZMx that was designed for the cockpit, the DZMx Plus mounts onto the existing tray in the avionics bay of an aircraft — designed to replace aging tray-mounted satcom tracking systems.

“We want to be able to upgrade [customers] to both satellite and cellular communications and tracking,” said Michael Eddy, Flightcell marketing and communications manager. “So DZMx

Plus fits in the avionics bay, and it’s a straight swap out for a lot of legacy existing systems.”

Eddy said the idea behind the DZMx Plus is to simplify installation and reduce the cost of “this latest technology for customers.” The DZMx Plus transceiver unit has the ability to have WiFi and Bluetooth, with the option to add a cellular blade antenna for voice and data capabilities.

The top two gold connectors on the side of the transceiver unit are for WiFi and Bluetooth; the third (bottom) gold connector will, in the future, be used for ADS-B In, which Flightcell hopes to release later this year.

The DZMx Plus transceiver unit is controlled from the cockpit or cabin using the remote head unit, and will have all the features of the original DZMx product, plus additional capabilities in the future thanks to its size.

The transceiver unit weighs just 2.4 pounds (1.1 kilogram), and measures 9.5 inches long by 2.5 inches wide by 6.1 inches high. Being slightly larger than the DZMx, the Plus unit has more room inside it and also “has more potential to add more hardware to it later on,” said Eddy.

While it’s designed as a replacement unit, Flightcell is currently exploring implications for certification. At press time, the DZMx Plus was in beta testing, and was nearly ready to begin production.



SUPRACOR

Stimulite honeycomb

Supracor is bringing its fusion-bonded honeycomb technology to the helicopter seat cushion market, providing long-term comfort for pilots and crew. Introduced at Heli-Expo 2020 as an alternative to conventional foam for helicopter seats, Stimulite is a flexible form of aerospace honeycomb that is made from recyclable thermoplastic material to optimize comfort.

“The honeycomb is anisotropic, meaning it’s got three different degrees of resistance,” said Susan Wilson, Supracor vice president. “And that’s important because when you sit on it and you start to compress it, the cells actually radiate out on an angle and they surround your body; that’s what gives this very unique and comfortable feeling.”

The Stimulite honeycomb structure features perforated cell walls, which allow air to circulate both vertically and horizontally, controlling heat and moisture, Wilson said. “The other advantage of Stimulite honeycomb is that it does help to stimulate blood flow,” she added. “The footprint of the cell edges and the fact that they’re flexing as you’re sitting on them does bring more oxygen to the tissue.”

The Stimulite honeycomb technology has so far been tested for vibration mitigation on medium Bell helicopters by the National Research Council of Canada (NRC).

“The NRC currently has scientific data that proves that this combination hybrid seat cushion for medium Bell [aircraft] actually mitigates vibration,” said Peggy McDonald, founder and owner of Pegasus Aero Solutions, who partnered with Supracor to bring Stimulite to the helicopter market. “In addition to testing the Stimulite cushions in the aircraft, NRC also tested them in the lab on a shaker device, which allowed us to measure and compare the data to determine which combination of materials best mitigated the vibration.”

Stimulite can also be made thinner for pilot seat cushions to provide the additional head clearance that many pilots require. Additionally, the material is sustainable as it can be washed if needed, and can be recycled at the end of its life.

Supracor holds over 90 patents on both the manufacturing process and applications for Stimulite on a global scale. The company is nearing supplemental type certificate approval for Stimulite kits in light Bell helicopters, with plans to expand approval in other airframe types.



PS ENGINEERING

PAC45D dual audio control

At this year’s Heli-Expo, PS Engineering launched the PAC45D digital audio control system, which provides dual audio control capability in a single control head.

The PAC45D supports five com radios and can be configured with the pilot in either the left or right seat. The hub for the PAC45D system “is the controller for the pilot and copilot, while an additional observer control head can be added to the system,” said Mark Scheuer, PS Engineering founder and CEO.



“Because it is an all-digital-system, all of the wires are connected to one central box — being the hub. If an Observer Control Head is required, instead of 50 or 60 wires, only four wires need to be run,” he added. “Typical electrical noise can also be eliminated.” The hub can be mounted remotely or attached to the control head.

“The PAC45D system is pin-compatible with the AMS44, quickly going from an analog to a digital system,” said James Krueger, technical sales at PS Engineering. “Because of this, installation costs are minimal.”

In addition to the PAC45D’s dual control capability, it also includes built-in audio alerts, push-to-talk ICS, Bluetooth, and MultiTalker true dimensional sound, which can uniquely position com radios in a stereo headset like a clock. This makes it easier for pilots to distinguish important radio calls. Krueger said to take advantage of MultiTalker, the headset jacks must be wired to the stereo.

The PAC45D also features the company’s patented IntelliVox, which is “an automatic VOX, so you don’t have to adjust the trip level for the intercom,” explained Scheuer.

At press time, PS Engineering had completed and submitted the certification test for the PAC45D, and was expecting to begin shipping the system in March.

TURTLE-PAC

Bell 505 luggage drum



Turtle-Pac, which produces collapsible aircraft ferry tanks, brought its new Bell 505 Luggage Drum to this year's Heli-Expo. With a capacity of 37 US gallons (140 liters), the ferry tank was

designed to fit into the luggage compartment of the Bell 505.

"Smaller helicopters have a relatively short range, but pilots want to fly further – they may want to fly over water or an area where there is no fuel," said Laszlo Torok, Turtle-Pac founder and owner. "The [ferry tank] allows them to do this and still be able to fly back to the base."

Designed with Turtle-Pac's high-quality, off-the-shelf fabric, the Bell 505 Luggage Drum measures 14.5 inches high when full. The tank also features heavy-duty, brass tie grommets to secure the tank in the aircraft. Torok said the ferry tank does not require ventilation, and there are no vapors in any of its tanks that could cause an explosion in the event of a crash or fire.

Like all Turtle-Pac ferry tanks, the Bell 505 Luggage Drum features an outlet where the hose with a valve can be connected. The hose attaches to the inline transfer pump kit, which is fitted with an auxiliary power outlet for the power source. When a pilot is in need of fuel during flight, Torok said all they need to do is flip a switch in the cockpit and "watch the fuel gauge go up."

The empty weight of the tank is eight pounds (3.5 kilograms), and it can be folded up compactly for easy storage when not in use.

BUCHER

H135 AC67 flex cabin

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

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

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

The AC67 flex kit also includes a detachable equipment wall, oxygen bottle rack, rear stowage unit, modular center cabinet, and Bucher's integral flex floor. The latter allows customers to truly customize the configuration of seats and equipment. As

the AC67 HEMS equipment is modular, Kraus said various elements could be used in the H145.

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

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



SIERRA NEVADA CORPORATION

Tactical Medevac Carry-on Aero Kit

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

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

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

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

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

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

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

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



SPIDERTRACKS

Spider X

Spidertracks has announced the Spider X — a next-generation hardware for aircraft monitoring, communications, and flight safety insights. More than just an aircraft tracking device, Spider X establishes an IoT gateway onto the aircraft and serves as a Virtual Flight Data Recorder (Virtual FDR).

“In addition to our standard high-resolution reporting and notifications, the Spider X samples at very high frequencies a much broader range of flight parameters, including the [aircraft’s] roll, pitch, and the rates of change,” said CEO Dave Blackwell. “So what that enables us to do is deliver a very accurate flight playback capability to the operator — from a safety perspective, a training perspective, this is incredibly valuable.”

This capability is referred to as 3D flight replay, allowing operators to watch their aircraft’s journey and experience their post-flight review with enhanced detail.

Also new on the Spider X is the relocation of the emergency SOS button — which is the only button on the top of the hardware. This provides pilots with easier access to the button in an emergency situation.

In addition to having WiFi, Bluetooth and USB-C capabilities, Spider X uses cellular connectivity to transfer flight data to the Spidertracks platform, eliminating the need for SD cards or cables. “By the time you land the aircraft, go through your post-



flight procedures, shut the aircraft down and walk inside, your flight data will be available for review,” said Blackwell.

He added that a future capability on the Spider X will record “accurate starts, stops, take offs and landings in a rotorcraft. . . . Our goal is to let the pilot fly the aircraft — that’s their core mission — and just leave the rest to us.”

THALES

FlytX avionics suite

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

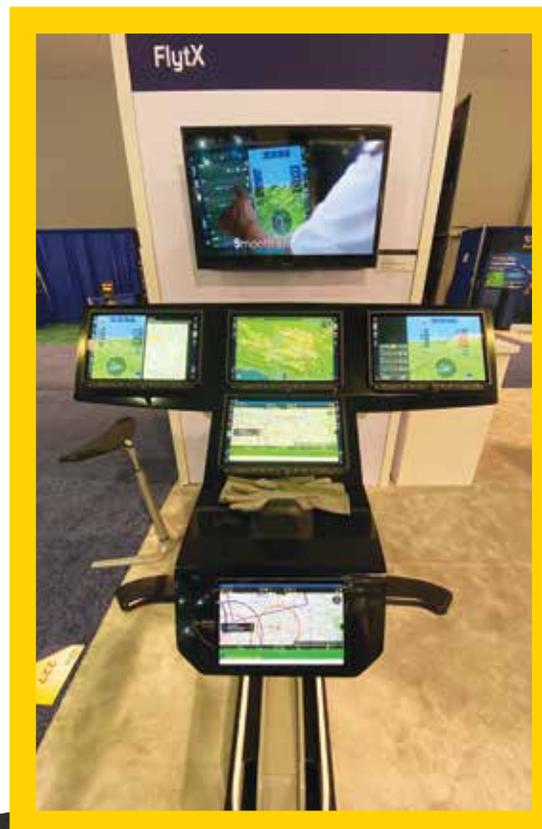
The entire FlytX suite is touchscreen, and features controls similar to a tablet or smart device (two-finger zoom, scrolling, search, etc.). As pilots in many sectors today wear gloves, Thales experimental helicopter test pilot Nicolas Couder said the FlytX touchscreen displays are usable with many glove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

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

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

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

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



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AVSPEEDBOARDS

Strapless aviation kneeboards



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

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

AVSpeedboards come in three different models: first is the Hasty Board, which is the most secure board, designed for rescue hoist crew. "When they get down to the patient, they write down the vitals of the patient, then they get hoisted back up and they have that info right on them," said Ajalat.

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

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

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

AVSpeedboards are currently patent pending.



HANGARBOT

The HangarBot Hub

BY OLIVER JOHNSON

The HangarBot system allows operators and aircraft owners to remotely control, automate and secure their hangars. Operated by a mobile app, the heart of the system is a small central hub that contains a security camera and temperature sensor. The hub wirelessly connects to the rest of the devices in the modular system, providing the capability to preheat an aircraft's engine or cockpit, for example, or open and close a hangar door.



The camera has a motion detection system, and also provides the capability to livestream video. Additional cameras can be added to the system to provide monitoring at remote locations, allowing pilots to check conditions at their destination before departing.

The 4G wireless unit mounts magnetically for straightforward installation, and is available with or without data plans. The system ranges in cost from \$599 to \$1,200, with data subscriptions from \$15 depending on data usage.

The system was launched for the fixed-wing industry in 2015, but the helicopter market is a new target for it.

"In the helicopter market itself, I think people have been very interested in the security and motion detection aspect," said Brandt Allen, HangarBot's chief helicopter pilot. "The ability to look at remote weather conditions on-scene, maybe at a place where they don't even have WiFi, but they have maybe some 4G connectivity right out of the box, is appealing. They'll be able to automatically get that information before they take off, which is great for the helicopter world, on remote pads or hospital pads."

RECOIL SUPPRESSION SYSTEMS

R60-E fire suppression tank

Recoil Suppression Systems, a division of Recoil Aerospace, brought its newest fire suppression tank, the R60-E, to this year's Heli-Expo. Derived from its predecessor, the R60-I (internal) tank, the E-model is a retractable tank built with lightweight carbon-fiber composite material, weighing only 300 pounds (136 kilograms).

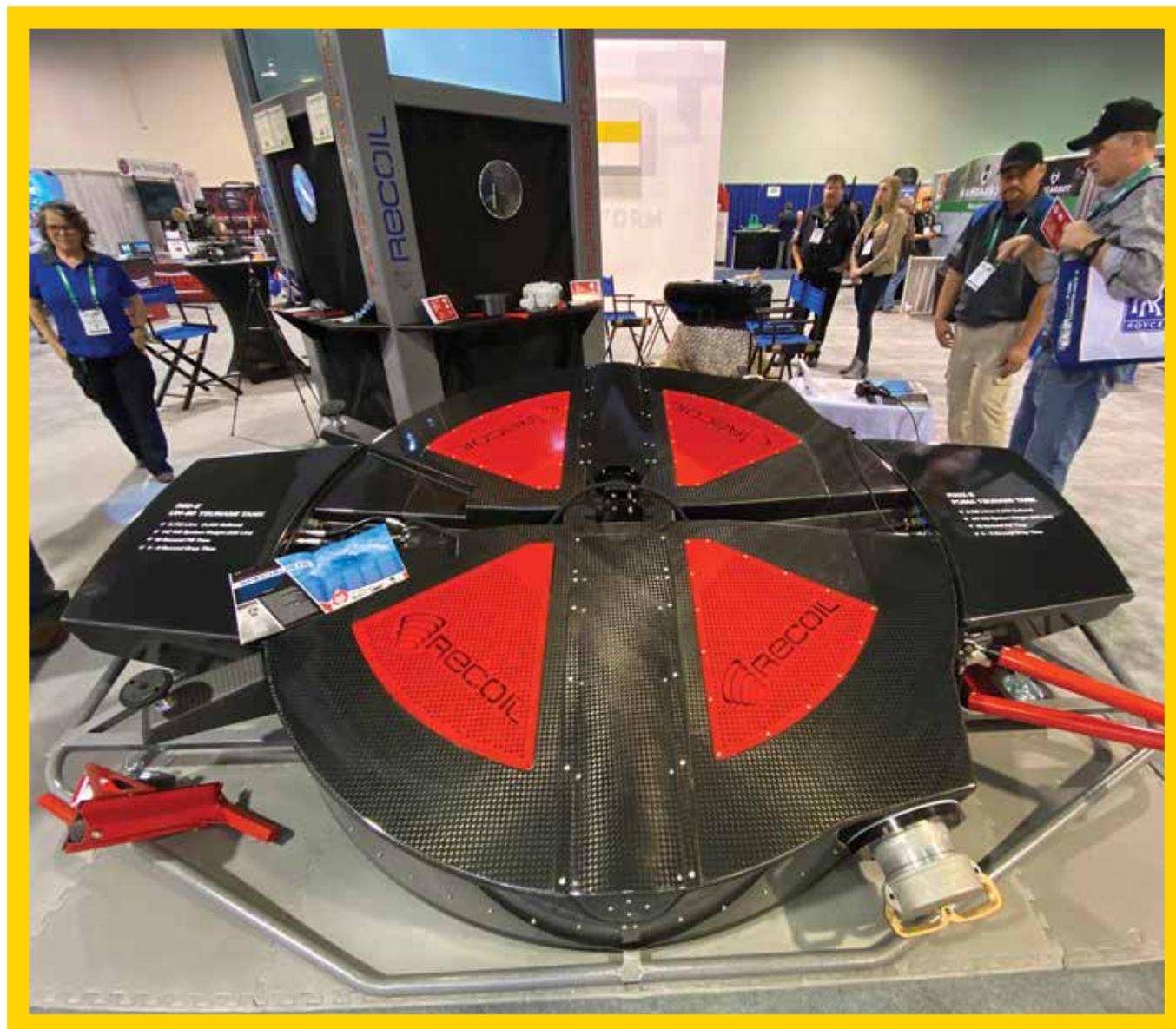
Built in collaboration with Composite Approach, the R60-E has a 1,000 US-gallon (3,785-liter) capacity and can be integrated into standard commercial aircraft without making any structural modifications to the airframe.

The target airframes for the tank are currently heavy helicopters like the Airbus H225 and AS332L1 Super Pumas, Sikorsky UH-60 Black Hawk, and Kamov models. These heavy helicopter types typically have a cargo hook point, which Recoil has taken advantage of to handle the weight of the tank.

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

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

Rice added that Coldstream Helicopters of Kelowna, British Columbia, has been confirmed as the launch customer for Recoil's R60-E tank on the Super Puma. Coldstream is now also a global distributor for the Puma series helicopter with the R60-E tank.



COBHAM AEROSPACE CONNECTIVITY

Titan audio management system

BY DAN PARSONS

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

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

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

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

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

"Titan brings helicopter and turboprop connectivity into the 21st century, providing their crews with the modern functionality that

they are used to outside aviation and reflecting the requirements for multichannel audio management systems to cope with tactical missions," said Mickeal Daw, Cobham's audio and information management product manager. "We have had early expressions of interest from leading OEMs, who have responded positively to the functionality and profile of the system."



EAA TOOLS

Black Hawk tooling solution

BY OLIVER JOHNSON

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

While originally established to develop tooling for the U.S. military, the company has found a flourishing market in the civilian sector, with the availability of hundreds of former military Black Hawks to commercial operators through the military's Black Hawk Exchange and Sales Team (BEST) program.

"A lot of these operators are buying their first Black Hawk,"

said Andrew Goettl, from EAA Tools. "We started off by asking ourselves, 'If I was starting with nothing, what do I need to maintain this machine?'"

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

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

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

The kits costs about \$70,000, but operators can also purchase individual tools.

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



SPECTROLAB

SLL 46-200 landing light

BY DAN PARSONS

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

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

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

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

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

The system takes the aerodynamic and rigid design of the company's legacy XP model a step further by employing additive-

manufactured structures for improved performance and stability.

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

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



IMS NEW ZEALAND LTD.

Cloudburst Fire Bucket

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

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

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

When aircraft bleed air is available to power the bucket, “it’s a closed-loop system, so it

doesn’t take horsepower from the helicopter when it’s needed,” said Richard Lane, managing director.

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

Additionally, “we always say fly with the valve open when [the bucket] is empty,” he added. “That allows air to flow through the bucket, keeping it stable when empty.”

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

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



SGB/CATI TRAINING SYSTEMS

CAPTE-VCS simulator

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

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

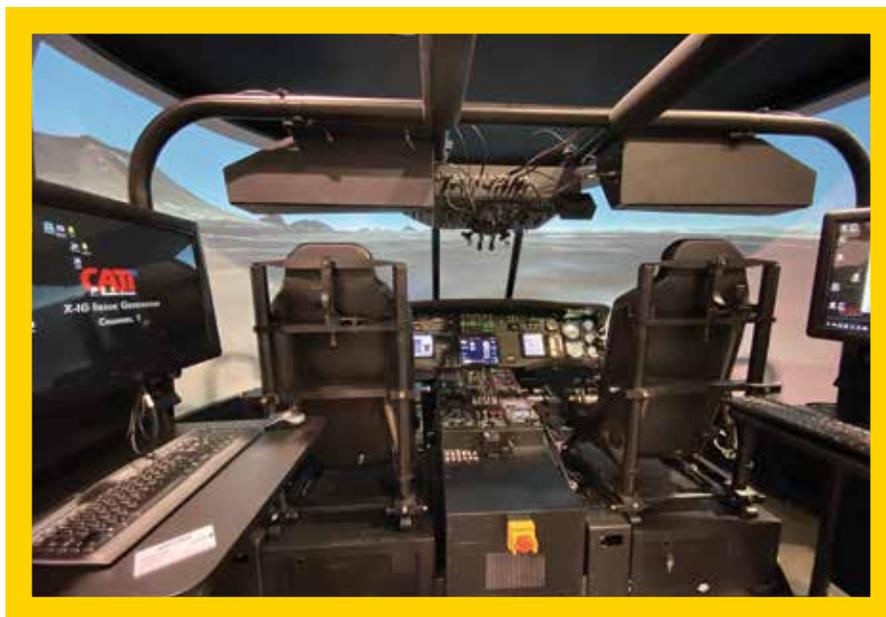
"Right now, the [UH-60L] aircraft is being tested for those weapons, and we have the matching simulator," said Michael Larkin, manager, software engineer at CATI. "So when the helicopter is ready, the simulation will also be ready."

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

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

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

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



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STABILIZING THE SQUIRREL

WE FLY **GARMIN'S**
NEWLY-CERTIFIED
GFC 600H HELICOPTER
FLIGHT CONTROL
SYSTEM IN THE AS350.

STORY BY ROB ERDOS
PHOTOS BY DEBBIE ERDOS

Autopilots aren't new, but there's something new about autopilots. Garmin recently brought to market an autopilot designed for helicopters – the GFC 600H Flight Control System – and it's unlike anything that preceded it.

While autopilots have been a common sight on airplanes since the Second World War, their incorporation into the helicopter world has been slower. Two reasons explain the slow penetration of automation into fling-wing operations.

First, helicopters are simply more difficult to stabilize. Our missions also tend to involve more complex tasks than our fixed-wing brethren's droning in straight lines. Whether hovering, slinging, bucketing, or even just working a tough confined area landing; the helicopter culture still sees its mission as requiring hairy-chested piloting skill, not automation.

Second, integration of a helicopter flight control system (HFCS) into the common mechanical irreversible flight control architecture has typically been complex, owing to the need to mitigate possible failure modes. An autopilot-equipped machine must be safe when everything is working fine, but also safe – or safely recoverable, at least – should the system malfunction. The resulting legacy systems have been complex, heavy and expensive. I'm reminded of the architecture of the Honeywell autopilot in the Bell 412 that I used to fly: redundant limited-authority high-speed series actuators subject to centering by low-speed parallel actuators, incorporating detent springs and clutches. It worked, but nobody would describe the installation as simple. Garmin had a better idea.

Garmin's idea in a nutshell: simpler is better. The GFC 600H installation consists of a Garmin GMC 605H mode controller panel, plus a single GFS 83 "smart servo" for each axis. The servos are installed in parallel, meaning that their activity back-drives the cyclic and is perceptible in the pilot's hand.

An optional, independent yaw axis provides heading hold features in the hover, and this blends into turn coordination in forward flight. The yaw axis uses a clutched variant of the same servo. A potentiometer on the collective provides a calibrated amount of pedal in coordination with power changes; a feedforward strategy that improves performance.

The Garmin GFC 600H helicopter flight control system was granted an FAA supplemental type certificate in the AS350 B2/B2 in February 2020.
Garmin Photo

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DEVORE LIGHTS

WONEI
XPDR 2

PRD
INSTRUMENT



ALT 1200
FLIGHT IS
CAPTURED

ATTN ALT 1200

The author (left) with Jack Loflin, Garmin's flight test team leader and developmental test pilot.



Redundant input data comes from both an attitude/heading reference system (AHRS) integral to the GMC 605H controller, and a remote Garmin AHRS. A Garmin GPS is a prerequisite for installation as a source of position and velocity data, as is a Garmin G500H primary flight display.

In the event of a mechanical jam, the servos incorporate a shear device to allow the pilot to break the controls free. Other system failure modes are anticipated by its “fail passive damping feature,” which disengages the servos into an idle state with some residual damping to minimize “stick jump” upon disengagement.

GETTING STARTED

As Garmin was finalizing the supplemental type certification process for the system in the Airbus AS350 B2/B3 (which was completed in mid-February), *Vertical* was invited to Garmin's facility in Salem, Oregon, to test it out.

Joining me in the cockpit was Jack Loflin, Garmin's flight test team leader and developmental test pilot. Loflin led me out to the helipad where an autopilot awaited us with a shiny AS350 B2 AStar (also known as the Squirrel) attached to it. The machine was Garmin's well-equipped demonstrator, featuring, to no great astonishment, a full suite of Garmin avionics, including the new GTN 750 Xi navigation system.

Once the AS350 was happily whirling, Loflin demonstrated the preflight tests of the autopilot – with one finger. Upon power-up, the system performed its internal built-in test sequence, checking the sensor inputs, processor and actuators. Some status lights flashed, and the cyclic motored through a small range of motion. Loflin needed only press the CONTINUE button, and the FCS disengagement tone signified a happy autopilot.

The interface was simple and conventional. The mode control panel offered pushbutton mode selection, a multifunction control wheel for inputting values such as airspeed or vertical speed, and



GARMIN'S LOGIC IS SIMPLER:
THE AUTOPILOT IS EITHER ENGAGED
OR NOT. THE SOLE AUTOPILOT
MODE APPLICABLE IN THE HOVER
WAS A BLENDED ATTITUDE-AND-
GROUNDSPEED HOLD MODE.

a night vision goggle (NVG)-compatible display for mode annunciations and warnings. Additionally, mode selections were displayed on the primary flight display.

I'm used to the traditional helicopter autopilot architectures where augmented stability is served in layers: an "SAS" mode for additional vehicle damping, then an attitude retention mode, upon which are piled whatever upper modes are installed, such as position or heading hold functions.

Garmin's logic is simpler: the autopilot is either engaged or not. The sole autopilot mode applicable in the hover was a blended attitude-and-airspeed hold mode. The mode, in other words, hovered. The "fly through mode" consisted of grabbing the cyclic and flying the AS350 in the conventional manner. No preliminary steps were required (such as mashing the force trim release) and the presence of the GFC 600H didn't alter the AS350's handling or control feel – a feature that greatly simplifies the process of integration and certification.

GONE HOVERING

It was a gusty day at Garmin's facility in Salem, Oregon, with surface winds reported at 13 gusting to 23 knots. In order to baseline the helicopter in the conditions, I elected to start with the autopilot disengaged. I found an unoccupied compass swing pad on the airfield upon which to play, and my efforts to tame the AS350 resulted in a serviceable precision hover within 1.5 feet laterally, about a foot longitudinally and vertically. The workload wasn't remarkable for a rusty pilot in an unaugmented AS350, typically requiring one's undivided attention, along with a small cyclic and/or pedal input per second, or so. In addition to the precision hover task, I baselined a lateral sidestep maneuver and a turn around the nose.

I then repeated the tasks with the autopilot engaged. Hands-free, and unassisted by my efforts, the autopilot performed a serviceable hover.



The GFC 600H installation consists of a Garmin GMC 605H mode controller panel, plus a single GFS 83 "smart servo" for each axis.



Loflin and Erdos test out the GFC 600H's capabilities in the skies around Garmin's facility in Salem, Oregon.



A "LVL" button is mounted both on the autopilot control panel and on the cyclic. It engages the autopilot and directs it to capture a level flight attitude.



A Garmin GPS is a prerequisite for installation as a source of position and velocity data, as is a Garmin G500H primary flight display.

LOFLIN KINDLY POINTED OUT THE ABSENCE OF A GROUND SPEED INDICATION, HINTING THAT IT WASN'T INTEGRATED, "YET." I LOVE THE WAY GARMIN HINTS THEIR PLANS!

It wasn't quite as accurate as I had been, especially in the yaw axis where the gusty conditions induced a five or six degree heading wander every few seconds.

The point of the HFCS installation, however, wasn't to replace me, but rather to augment me. Were I distracted, disoriented, or unable to see through swirling snow or sand, an unpowered AS350 quickly earns its nickname "Squirrel," as it departs from stabilized flight. With the GFC 600H engaged however, the gusty conditions simply weren't in evidence. The helicopter remained upright and gently responsive to disturbances and gusts by holding a selected groundspeed.

Starting from a hover, a change in groundspeed was commanded through the "beep trim" switch on the cyclic, nicely geared at a rate of two knots per "beep." Loflin kindly pointed out the absence of a groundspeed indication, hinting that it wasn't integrated, "yet." I love the way Garmin hints their plans!

Perhaps the best adjective that I could apply to the experience of flying Garmin's autopilot is "transparent." With the controls released,

The GFC 600H requires the Garmin G500H or G500H TXi flight display and offers integration with compatible instruments and navigation sources.



The GFC 600H performed a serviceable hover, even in gusty conditions.

a pleasant degree of supplemental stability was conferred upon the AS350, yet remarkably, when I displaced the cyclic I was rewarded with the natural and unmodified handling qualities of the AS350. The combination seemed natural and pleasant.

THE PARTICIPATIVE AUTOPILOT

While cruising along in level flight, and with Loflin's concurrence, I simulated a distraction by unwisely checking an incoming text message on my iPhone. Indeed, within a few seconds I had become utterly disoriented – use your imagination! – and the helicopter began to wander from level flight. I decided that the situation was beyond my control, and elected to panic.

Fortunately, Garmin had installed a panic button, in the form of its automatic "Level" function. Depressing the "LVL" button, mounted both on the autopilot control panel and on the cyclic, engaged the autopilot and directed it to capture a nice, sensible level flight attitude. Over the course of multiple trials, the autopilot performed ideally, with a smooth yet decisive intervention. It was an attitude-only response, without air-speed protection, so an alert pilot remains a necessity.

Notwithstanding its merits, the automatic level function still presumes a pilot who is alert and proactive. In my dreams, I want an autopilot

that doesn't just ride along, but will intervene in the interest of our common self-preservation. Garmin apparently thinks so, too, as that describes their Helicopter Electronic Stability & Protection (H-ESP) feature. The autopilot monitors airspeed and bank angle, and like a nervous co-pilot, prompts the pilot in the event of incipient departure from safe conditions.

By way of demonstration, I repeated my earlier simulated distraction, this time with an "inadvertent" nudge of the cyclic. To increase the stakes, I closed my eyes until the autopilot cued a response. Had I been watching, I would have seen the helicopter diverge from level flight. Passing either 45 degrees bank or 13 degrees pitch, I felt the onset of control forces that pushed my hand, and the helicopter, away from further danger.

In addition to monitoring attitude, when the autopilot is engaged it can provide cueing forces in response to incipient underspeed or overspeed conditions.

Force cues are a great idea, but devilishly complicated to implement. Control is imposed by regulating cyclic position, which can be contaminated by transient forces, but I was greatly impressed by the smoothness and proportionality of the force cues. The experience wasn't like hitting a wall, but rather sensing a force that was clearly inhibiting movement in the "wrong" direction. I sampled flying just outside of the H-ESP envelope, and never found that the cueing forces interfered with cyclic displacement precision. Alternatively, the pilot can depress the FCS DISC button to remove the cueing forces. The experience left no doubt that a helicopter so equipped is a safer machine.

COUPLED MODES

Having delivered us from my simulated emergencies, the GFC 600H still had a few tricks to show off. We coupled Heading and Altitude modes, and asked Salem air traffic control for clearance to shoot a few approaches. We were offered approaches to Runway 31, which resulted in an absurd 45 knot tailwind. It proved an ideal test of the system.

Coupled lateral modes include the familiar Heading, Navigation and Approach modes. In the vertical axis, the system would track an airspeed, vertical speed or capture and hold an altitude.

Loflin loaded first the GPS approach procedure and later the ILS procedure, and I watched as the helicopter performed the approaches. The tracking was ideal, even with the flakey winds, and I forgave a slight localizer overshoot during a difficult 110-degree intercept angle. Airspeed management during the approach was within two knots of the commanded value – better than I could have managed under the conditions. More impressive yet, I felt that considering its aggressive striving for precision, the system didn't sacrifice ride quality; indicative of an autopilot that was well-tuned to the helicopter. The GFC 600H will fly the published missed approach procedure, but the airport was busy enough without us overhead. I broke off visually for the Garmin helipad.

There can be no doubt that automation can make a helicopter both safer and more productive, provided that it's well integrated. With the GFC 600H, Garmin has a solution that, quite simply, works. ✈️



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



Through Garmin's Helicopter Electronic Stability & Protection feature, the autopilot monitors airspeed and bank angle, and prompts the pilot in the event of incipient departure from safe conditions.

INSURANCE SHOCK

MANY HELICOPTER OWNERS ARE EXPERIENCING STICKER SHOCK WITH THE ARRIVAL OF THEIR INSURANCE RENEWALS. WHAT'S BEHIND THE RISE, AND WHAT CAN BE DONE ABOUT IT?

BY JEN BOYER

Helicopter insurance rates are quickly on the rise across the entire industry, and according to insurance experts, they'll continue to rise — at least in the near future. However, that's where the simplicity of the issue ends. The factors causing the sudden jump, the fall out across aviation as a whole, and how this affects insurance in the longer term is far more complicated.

Those who have been in the industry for more than two decades will remember the insurance hikes post Sept. 11, 2001. The insurance industry took a massive hit in aviation, casualty, and property payouts after the terrorist attacks that day. Rates and premiums spiked in response, peaking around 2004. In the early 2000s, hull rates in the 10 to 12 percent range were not uncommon.

As the insurance industry became more liquid in response to higher rates, additional insurers entered the market. The increased competition led to reduced insurance rates and premiums that decreased year over year, creating a very soft market. In 2017, hull rates averaged between one to five percent. In fact, the general aviation insurance industry operated in the red for a good portion of that time, relying on other sectors of the insurance market to carry it.

“Going into the softening market, there was room in the ratings structure to go down to compete,” said Jeremy McCaslin, president of aviation insurance practice at McGriff, Seibels & Williams, Inc. “At the same time, safety and losses were trending in the right direction. Losses weren't as frequent, and severity and payout were rather low. The market could sustain the rates and they kept going down.”

Then came the perfect storm.

To temper increases in insurance rates, some operators are resorting to a variety of measures, including selling aircraft, reducing hull value, adjusting deductibles, and getting out of higher risk operations such as heli-skiing and flight instruction.
Mike Reyno Photo



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In 2017, the U.S. saw one of the costliest hurricane seasons on record with the triple punch of Harvey, Irma, and Maria. Together, the storms racked up between \$65 and \$77 billion in insurance claims, according to the Insurance Information Institute. Many claims are still open, accounting for the cost range.

In 2018, several high-profile, high payout helicopter accidents completed the litigation process with high settlements or jury awards, including KOMO TV's 2014 news helicopter fatality in Seattle, and Air Methods' 2015 Flight for Life crash.

"We're seeing a trend of significantly increasing jury settlements, which adds to the issue," said Rick Ross, president of Leading Edge Insurance in Colorado Springs, Colorado. "Most carriers are telling

me, for example, claims that used to settle for \$5 million, are now settling at policy limits, sometimes over \$50 million. Today we are seeing most cases awarded at policy limit. If the operator or owner had a \$100 million liability limit, chances are high it could be awarded. This puts real pressure on the insurer to reduce policy limits and raise premiums."

At the same time, wildfire losses continued to skyrocket, and larger and more damaging fires raged longer. The National Oceanic and Atmospheric Administration (NOAA) reported 2018 was the eighth year in a row that eight or more billion-dollar-loss natural events took place, surpassing the annual average of 6.2.



The type of damage seen following Hurricane Dorian in the Bahamas is sadly becoming more frequent, as more severe weather events become increasingly commonplace. **Kris Grogan Photo**



Insurers are no longer competing for your business; they're in recoup and survival mode. **Mike Reyno Photo**



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NOAA notes 2017 was in fact the costliest year on record, with 2018 coming in as fourth.

Going into 2019, it wasn't just aviation insurance seeing red. The entire insurance industry was under pressure. The overall pot of funds for all insurance was draining in multiple directions. Something had to give.

"General aviation rates and premiums had dropped so significantly, most insurers in the helicopter marketplace were already not making much money," said McCaslin. "We did an analysis that showed rates and premiums dropped in excess of 60 percent between 2008 and 2017. Leaning into 2018, we saw a modest increase of five to 15 percent, but not enough to balance the losses."

What's more, 2019 looks likely to exceed past years, with severe California fires in populated areas as well as several high-profile lawsuits filed against Pacific Gas and Electric Company for the utility's part in the fires.

As if this were not enough, the Federal Aviation Administration (FAA) grounding of the Boeing 737 Max in March 2019 has also hit the insurance industry hard. Grounding insurance payouts alone are estimated to be around \$500 million, with the total payout estimated to be close to \$1.5 billion when including the two fatal accidents in Indonesia and Ethiopia.

CAUSE AND EFFECT

Insurance is publicly traded, and insurers need to bring their portfolios into the black as soon as possible or leave the market. The aviation industry saw them do both. In the last year, several large and prominent insurers in the U.S., London, and abroad left the general aviation insurance market; most notably MS Amlin, Berkley Aviation, and Swiss RE. As a result, the market saw a significant drop in competition for insurance business, putting insurers in a position to increase income to cover anticipated payouts.

"Because the insurance industry restructured capacity in such a short time, losing some large capacity insurers in the process, the market needed to move fast to re-build capital and adequate pricing," said Alex Barker, senior vice president of Marsh Insurance Brokers of Calgary, Alberta. "Rates and premiums experienced significant increases along with restrictions in coverage in 2019."

The need to raise capital is only one issue. Finding enough insurers to get you insured is another. When your broker shops for the best insurance for your operation, rarely will any single insurer cover you entirely. They spread their risk. Typically, the lead insurer will set the terms (hull percentage rate, liability, etc.) and offer to cover a percentage of your policy. Your broker would then "complete the placement" by working with other insurers to fill the remainder of your policy to 100 percent.



The rising insurance rates are particularly affecting smaller operators, several of whom have closed their doors in the past 12 months. **Skip Robinson Photo**

In today's market, some brokers are finding that supporting insurers may not be willing to follow the lead insurer's terms, instead setting their own rates to ensure their desired pricing level. This further complicates and potentially adds to the cost, not to mention taking a lot more time and work to complete a placement, Barker said.

On an owner and operator level, this change in the method of insurance means a complete turn of the tables. Insurers are no longer competing for your business. They're in recoup and survival mode, not only setting rates and premiums, but also deciding who they ultimately insure.

Scott Urschel, president of Pylon Aviation, works with high net worth individuals looking to purchase and fly their own helicopters. "It's exceedingly difficult to find that first insurance for a lower time pilot purchasing a high value helicopter, and if they do receive it, the annual cost is a considerable percentage of the price of the aircraft," he said. "I tell aircraft manufacturers their biggest barrier to entry is no longer the price of the aircraft. It's the cost to insure it."

Shopping around doesn't help. According to a broker that didn't want to be named so as not to hurt relationships with insurers, if an owner or operator decided to shop around to other insurers for a better deal, they could run the risk of losing insurance altogether as this act raises flags.

Some people may be able to afford the helicopter, but not the insurance that follows. Many are resorting to selling their aircraft in the used market.



Some operators are seeing their insurance rates increase by 30 percent or more. **Anthony Pecchi Photo**

THE FALLOUT

While 2019 insurance rates are actually 55 percent less than they were in 2008, they're still taking their toll. Several smaller operators, and operators of Robinsons in particular, have closed their doors in the past 12 months. Others are selling aircraft or choosing to self-insure the hull and only purchase liability insurance.

Jessica Ward owns High Tide Helicopters in Southport, North Carolina. She started the company as a flight school with one Robinson R22 in 2013. She built the company over the next six years, adding an R44, a Cessna 172 for flight instruction, and a King Air C90 for FAA part 135 charter. When she received her 2019 insurance bill, the company had to change.

"I'd experience incremental increases, but this past year it was totally crippling. I was looking at a 35 percent increase," Ward said. "As a direct result of that increase, I've had to sell the R22. I've also dropped hull coverage on the R44 and changed the use of the aircraft. I've discontinued primary training and solo in it just to keep the doors open."

Ward watched helicopter training revenue decline for years as student pilots opted toward less expensive airplane training with higher paying jobs. She pursued her airplane ratings and offers airplane instruction as well, the key to her survival. The fixed-wing side of her business subsidizes her helicopter.

"I actually looked at selling the helicopter and going all

fixed-wing, but when I looked at the market and saw how low the helicopter would have to be sold for, I decided to stick it out," she said. "I took a \$10,000 loss when I sold the R22 because so many aircraft were hitting the used market. In the end, that was still cheaper than paying the insurance. I couldn't afford the loss I'd take selling the R44. If it weren't for my airplanes, I'd be in bankruptcy because of the insurance."

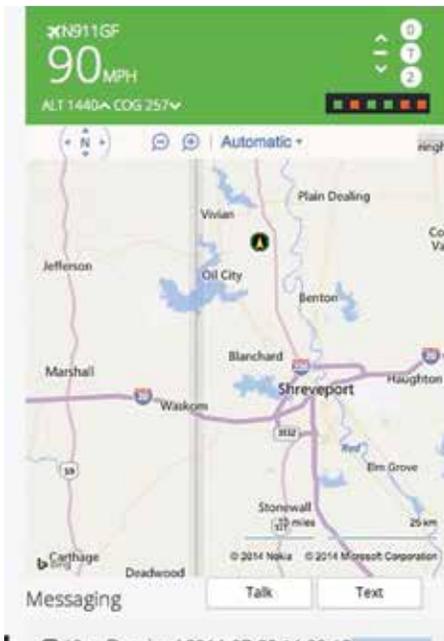
Chris Bull, owner of Orlando, Florida-based Heli Team, is looking at how to restructure his pricing to absorb the increased cost to insure his large aircraft fleet that does everything from charter and long-line to electronic news gathering, agricultural work, and search-and-rescue.

"Ultimately, these increases are going to drive rates up across the industry, regardless of how you fly your aircraft, in order for operators to continue to operate," Bull said. "I've never seen increases like this across the board. We have to raise prices to be sustainable, but no one likes to see their prices go up, so we may see profit decrease."

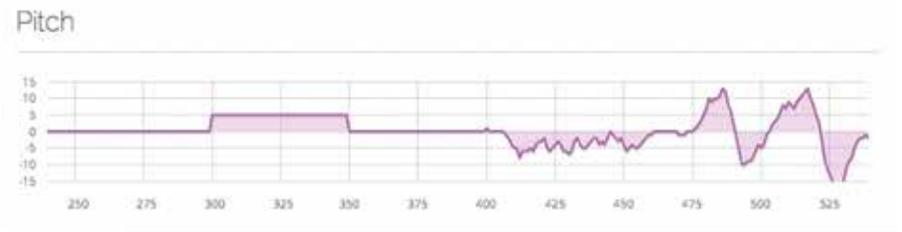
Heli Team also manages a number of aircraft for private owners. Bull said these owners have been quite vocal about their 30 percent or more increases. "I think you're going to see a major effect on the smaller operators and even some private owners," he said. "They're struggling to continue to operate at these increased prices."



The FAA grounding of the Boeing 737 Max in March 2019 hit the insurance industry hard. Grounding insurance payouts alone are estimated to be around \$500 million. **Paul Weatherman Photo**



WOW	#1 GEN	#1 ENG CHIP	#1 ENG OIL P	#1 ENG FUEL FILTER	#1 HYDR PRESS
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#2 ENG OIL P	#2 FUEL FILTER	#2 HOVR PRESS			#2 ENG CHIP





In Canada, Paul Spring, president of Phoenix Heli-Flight in Fort McMurray, Alberta, heard rumblings of U.S. insurance increases before they hit Canada. Not long after, he received his new bill and was relieved it wasn't as high as he'd heard.

"Payouts in the U.S. are much higher than Canada because we have our workers compensation board that puts limits on them," he said. "We fly a lot of workers and that's reflected in my risk analysis. This certainly helped with the overall premium. That said, my hull rate increased by 100 percent for the same amount of coverage. Still, even that was cheaper than what I was paying 14 years ago."

Derek Robinson, president of Eclipse Helicopters in Cranbrook, B.C., agrees with Spring. "We certainly see it here," he said. "From what I'm hearing from other Canadian operators, a 30 percent minimum increase in premiums and a doubling of hull rate coverage seems pretty standard."

WEATHERING THE STORM

While there is nothing helicopter owners and operators can do to reduce increased rates and premiums in the short term, experts recommend taking steps to temper the increases. Some operators are selling aircraft, reducing hull value, adjusting deductibles, self-insuring hull value completely, and getting out of higher risk operations such as heli-skiing and flight instruction. Another big step is communication.

"It's difficult to know how long the hard market will last, but it does swing back," said Marsh's Barker. "It's going to hurt for a bit. You can help by marketing yourself, your operation, your risk, and your safety culture to temper your increases. Sell your story and your business to insurers, via your broker, about what you really do with your aircraft, your important safety investments like flight data monitoring, flight-tracking, factory training, and your safety conscious approach, so they can help negotiate the best terms.



“ONE OPERATOR’S SMS [SAFETY MANAGEMENT SYSTEM] COULD BE A BOOK ON A SHELF WHILE ANOTHER’S IS A DAILY CULTURE, OR ONE OPERATOR COULD USE THEIR FLIGHT DATA MONITORING INFORMATION REGULARLY WHILE ANOTHER RARELY DOWNLOADS IT. OPERATORS HAVE A LOT TO GAIN BY SHARING THEIR SAFETY INVESTMENTS AND HOW THEY’RE USED.”

As fires become larger and more damaging, the resulting cost has skyrocketed. Severe fires around the world, but particularly in California, appeared likely to make 2019 one of the most expensive years in terms of wildfire damage. **Greg Doyle Photo**

In the next 10 years, you're going to see the benefits of this. The period of return on investment in safety is here. Everyone will pay more, but some will pay more than others. The angle of increase will be tempered by sharing this information."

McGriff's McCaslin agrees: "There haven't been a lot of programs that provide significant differentiation," he said regarding discounts and compensations based on operators' safety programs and record. "I think what you will see in 2020 and beyond is a more proactive approach to define safety operations and reward those that meet them. Conversely, someone who has had more accidents will see higher rate increases."

Lindsay Cunningham, Airbus Helicopters North America's head of customer training, has been working with insurers for years in an attempt to encourage incentivizing safety investments. "Underwriters are very reluctant to consider blanket incentives, but I am seeing them work out deals in one-on-one situations," she said. "One operator's SMS [safety management system] could be a book on a shelf while another's is a daily culture, or one operator could use their flight data monitoring information regularly while another rarely downloads it. Operators have a lot to gain by sharing their safety investments and how they're used."

Communication goes further than between operator and broker. There are also opportunities to talk with customers and even government agencies awarding contracts, McCaslin said. As larger customers demand higher liability requirements, prices will increase considerably in reflection of insurers' risk mitigation over higher jury payouts.

"There is no price elasticity in contract rates to pass along, especially for these multi-year contracts," McCaslin said. "Having these conversations now and working together can go a long way toward maintaining sustainability." ❖



Jen Boyer | Long-time communications professional Jen Boyer is a commercial instrument helicopter pilot with flight instructor and instrument instructor certificates. A member of the Whirly-Girls, she runs her own aviation industry strategic communications business.

According to Scott Urschel, president of Pylon Aviation, it's "exceedingly difficult" for low-time pilots to find their first insurance for a high value helicopter. **Dan Megna Photo**



Communication with your insurance broker is key. According to Lindsay Cunningham, Airbus Helicopters North America's head of customer training, operators have a lot to gain by sharing their safety investments and how they're used. **Metro Photo**



RECURRING NIGHTMARE

NOTHING THE HELICOPTER INDUSTRY HAS DONE SINCE 2013 HAS DONE MUCH TO STOP VFR-INTO-IMC ACCIDENTS. IS THERE SOMETHING THAT WOULD?

BY ELAN HEAD

On the morning of Sunday, Jan. 26, I woke up in a hotel room in Camarillo, California. I had been scheduled to do some flight training out of the Camarillo Airport that day, but canceled the night before after coming down with a head cold. When I looked out the window, I saw that I wouldn't have been doing much flying that morning anyway: the fog was so thick I could barely see across the street.

Some time later, at 9:45 a.m., a Sikorsky S-76B helicopter en route to Camarillo from Orange County slammed into a hillside in Calabasas. All nine people on board were killed, including basketball legend Kobe Bryant and his 13-year-old daughter, Gianna.

The circumstances of the accident flight have been exhaustively documented by mainstream media outlets and legions of bloggers, thanks to a wealth of publicly available radar data and air traffic control recordings. The National Transportation Safety Board (NTSB) confirmed that the helicopter departed John Wayne Airport at 9:06 a.m., proceeding northwest toward Burbank Class C airspace, which was under instrument flight rules (IFR) at the time. An air traffic controller there asked pilot Ara Zobayan to hold for IFR traffic for 12 minutes, then granted him a special visual flight rules (VFR) clearance to transit the airspace — which is not an unusual clearance for helicopter pilots to receive.

NTSB investigator Carol Horgan examines the wreckage of the Sikorsky S-76B that crashed near Calabasas, California, on Jan. 26, killing nine people including Kobe Bryant. **NTSB/James Anderson Photo**



Zobayan indicated that he planned to follow Highway 101 westbound and was handed off to a controller at neighboring Van Nuys Airport. As he was passing out of Van Nuys airspace, he reported VFR conditions, and the controller told him to contact Southern California Terminal Radar Approach Control for radar advisory services. But when he checked in with SoCal Approach at 9:39 a.m., he was told that his altitude of 1,500 feet mean sea level (MSL) was too low to maintain radar contact — which is not an unusual thing for helicopter pilots to hear.

Six minutes later, Zobayan again contacted SoCal Approach to advise he was climbing above cloud layers, and requested advisory services. The controller — a different one this time — asked him to identify the flight and state his intentions. In his last radio transmission, Zobayan said he was climbing to 4,000 feet. Indeed, radar data showed the S-76 climbing steadily up to 2,300 feet MSL, which was later revealed to be just 100 feet below the top of a widespread cloud layer.

But then the helicopter started a left turn. Eight seconds later, while continuing to turn, it also began descending, eventually reaching an alarming descent rate of over 4,000 feet per minute. A witness on a misty mountain bike trail below saw the blue-and-white helicopter emerge from the clouds on a forward and descending trajectory, roll to the left, then impact terrain about 50 feet (15 meters) below him, carving out an impact crater two feet (nearly a meter) deep.

That's not an unusual thing for helicopters to do, either.

The fact is, whatever the NTSB's investigation may ultimately reveal about the cause of this crash, no one I know in the helicopter industry is particularly perplexed by it. That's because the broad circumstances of the accident — a VFR helicopter flies into clouds, and crashes into terrain a short time later — are all too familiar.

In 2015, I compiled a spreadsheet of such accidents in the United States for the period from 2001 to 2013. (There are also many of these accidents outside the U.S., but the NTSB provides a uniquely comprehensive and searchable database.) I found that helicopter accidents that fit the classic profile of continued VFR flight into instrument meteorological conditions (IMC) — typically associated with loss of control due to spatial disorientation — occur in the U.S. on average around three or four times a year, and are usually fatal.

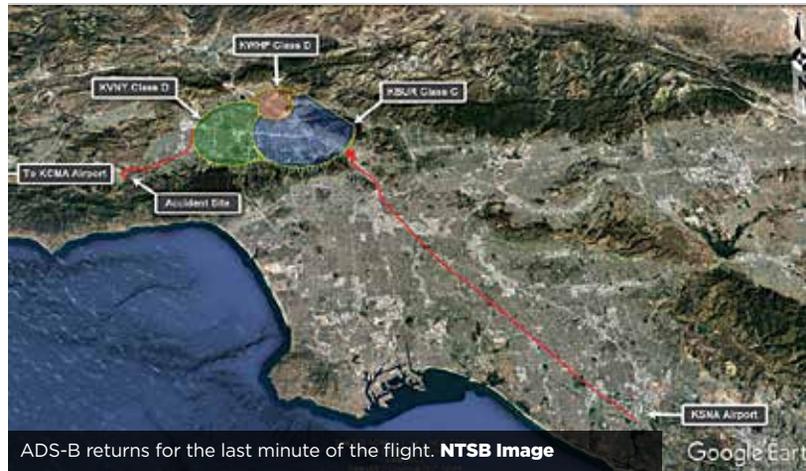
After the Kobe Bryant crash, I went back and updated my spreadsheet, finding that not much has changed. If anything, 2019 may ultimately prove to have been a particularly deadly year for such “inadvertent IMC” events, depending on the outcome of the NTSB's investigations (which are complete for this set of accidents only through early 2018).

That suggests that nothing the Federal Aviation Administration (FAA) and the helicopter industry have done since 2013 has been particularly effective in preventing these accidents from happening. Here's a short list of some of the things we've tried: raising the minimum flight visibility for helicopters to a half mile, requiring air ambulance pilots to hold instrument ratings, requiring air ambulances to have helicopter terrain awareness and warning systems (HTAWS), requiring part 135 helicopters to have radar altimeters and part 135 pilots to be trained for inadvertent IMC recovery, telling pilots to “land the damn helicopter” in deteriorating weather, and, for my own part, writing countless safety-oriented articles like this one.

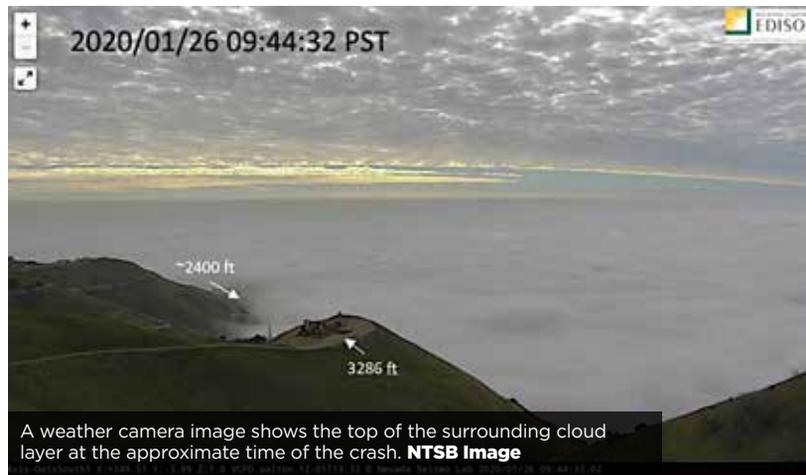
None of these have worked. Is there something that would? Or is the helicopter industry not actually capable of meaningful change?



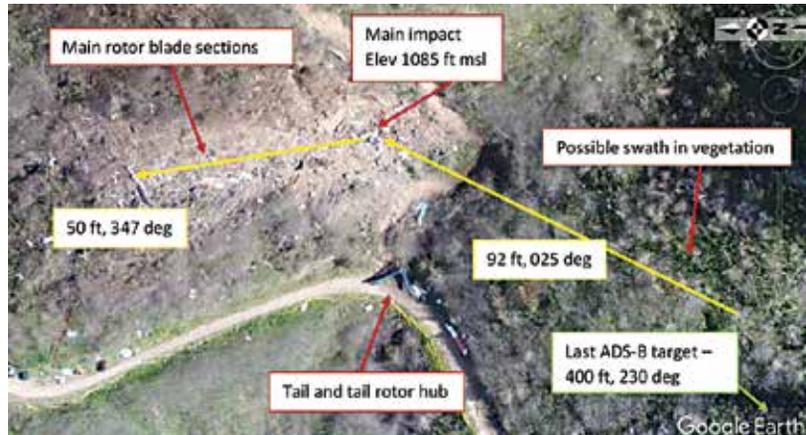
An overview of the flight path and relevant airspace for the Jan. 26 helicopter flight that carried Kobe Bryant. **NTSB Image**



ADS-B returns for the last minute of the flight. **NTSB Image**



A weather camera image shows the top of the surrounding cloud layer at the approximate time of the crash. **NTSB Image**



A map of the wreckage area near Calabasas. **NTSB Image**



NTSB investigators Aaron Sauer and Josh Lindberg prepare a drone for mapping the debris field from the Jan. 26 helicopter crash.
NTSB/James Anderson Photo

INSTRUMENT RATINGS DON'T HELP

The motivation for my original spreadsheet was to determine how often VFR-into-IMC accidents involved pilots who, like Zobayan, held helicopter instrument ratings. Requiring instrument ratings is often held up as one solution to the problem — as is currently the case in Hawaii, where state lawmakers are advocating for all helicopter tour pilots to hold instrument ratings.

As regularly as these accidents occur, they're mercifully still too rare to invite rigorous statistical analysis, so my conclusions were limited. But I observed that fully half of the pilots involved in VFR-into-IMC helicopter crashes in the United States between 2001 and 2013 held helicopter instrument ratings, and the pilots in another six accidents held airplane instrument ratings. Moreover, because these pilots tended to be commercially employed and carrying passengers or crewmembers, they were responsible for 22 more fatalities than non-instrument-rated pilots, who were often private pilots flying personal aircraft.

When I looked at VFR-into-IMC accidents from 2014 through

January 2018, I found that the percentage of these pilots with a helicopter instrument rating was even higher — over 70 percent — and that they were responsible for 23 fatalities, compared to five fatalities for the non-helicopter-instrument-rated pilots. This likely reflects the fact that an instrument rating has become an increasingly common employment requirement for helicopter pilots, as through the FAA's 2014 rule requiring them for helicopter air ambulance pilots.

In the immediate aftermath of the Kobe Bryant crash, many fixed-wing pilots expressed regret that Zobayan, who was flying an IFR-certified helicopter, had not chosen to file IFR (only later did the FAA confirm that his employer, Island Express Helicopters, was certified for VFR operations only). But as I pointed out in the 2015 article for which I compiled my original spreadsheet, a helicopter instrument rating means something very different in the U.S. than an airplane instrument rating does. An instrument-rated airplane pilot has almost certainly flown in actual IMC, and almost certainly has an IFR-certified airplane at their disposal. An instrument-rated helicopter pilot, not so much.



A still image from a drone video duplicating the accident helicopter's flight path. The image captures the position and altitude of the last ADS-B target of the helicopter. **NTSB Image**



Security camera footage captured the S-76B (circled in red) flying into clouds shortly before it impacted terrain. **Photo courtesy of NTSB**



Take my own example. Like Zobayan, I hold not only a helicopter instrument rating, but also an instrument instructor rating. That means I am qualified to train students for helicopter instrument ratings, and have actually done so. But I have exactly zero actual instrument time. Even at my sharpest, I had very little experience in the IFR system and very little familiarity with the autopilots that are typically required for actual IFR flight. At this point, it has been years since I've even done an instrument proficiency check.

The FAA has tolerated this double standard for instrument training because it is the only remotely cost-effective way to introduce pilots to helicopter IFR flight. And this is partly the FAA's fault. Helicopters have always been more difficult than airplanes to manage in the clouds because of their inherent instability: take your hands off an airplane's yoke for a few seconds and it will probably keep flying; take your hands off an unstabilized helicopter's cyclic for the same amount of time and it will probably crash. So helicopter autopilot technology demands a certain baseline level of sophistication, and the weight penalty associated with older automatic flight control systems and gyroscopic instruments made them generally impractical in light, single-engine helicopters.

In 1999 and 2001, however, revisions to FAA policy guidance made IFR certification of single-engine helicopters even more

impractical. First, the FAA incorporated numerical safety analysis methods into its certification policy for normal category rotorcraft, defining the term "extremely improbable" as less than one event in a billion flight hours (1E-9). Then, it required that helicopter manufacturers substantiate loss-of-function or hazardously misleading indication of attitude, airspeed, and barometric altitude in IFR to the "extremely improbable" standard, something that could cost-effectively be done only in multi-engine, transport-category rotorcraft.

Given that instrument flight instruction in an entry-level twin-engine helicopter runs well over \$2,000 per hour — compared to something like \$200 in a Cessna 172 — the FAA got used to letting flight schools do instrument training in VFR-only helicopters. I did my own instrument training and flight instruction in a Robinson R22 equipped with old-fashioned "steam gauges" — an aircraft that has no actual business flying in clouds.

In June 2015, a group of industry associations — including Helicopter Association International (HAI), American Helicopter Society International (now the Vertical Flight Society), General Aviation Manufacturers Association, and Aircraft Electronics Association — published a white paper calling on the FAA to revise its policy guidance to open the door to IFR certification of single-engine helicopters. The white paper cited a staggering



A photo taken the day after the accident occurred shows the extent of the debris field. **NTSB/James Anderson Photo**

number of helicopter accidents related to inadvertent IMC or controlled flight into terrain due to low-level flight to avoid weather: nearly 250 worldwide between 2001 and 2013, responsible for the deaths of hundreds of people. While most of these involved single-engine helicopters, 40 of them involved multi-engine rotorcraft whose pilots, like Zobayan, were attempting to fly under VFR.

“What is not captured in the accident data are the near misses of obstacles and terrain that occurred trying to avoid weather, or the near losses of control that occurred attempting to exit [inadvertent IMC],” the associations wrote. “The erratic year-to-year data is indicative of a broader issue where a high-risk practice of ‘scud running’ is prevalent and what is captured in the data are the aircraft that failed in the gamble.”

The associations argued that permitting IFR certification of single-engine helicopters would make IFR operations

A witness captured this photo of the post-crash fire at the scene of the accident. NTSB investigators have indicated that the crash was likely not survivable. **Photo courtesy of NTSB**



A Bell 407GX arrives for HAI Heli-Expo 2020 in Anaheim, California, on Jan. 24. The single-engine model was certified for IFR operations just last year. **Skip Robinson Photo**

more affordable and therefore widespread, increasing safety in the process. After all, the entire IFR system was invented precisely to avoid accidents like these, with aircraft flying known routes at known safe altitudes, and controllers there to keep them from running into each other.

The associations optimistically predicted that “successful and safe completion of missions under IFR will have a snowball effect throughout the industry,” as “single-engine operators will begin to mandate operations under IFR when conditions do not support safe VFR operations once a practical means-of-compliance for IFR certification is established.”

Two years later, in June 2017, the FAA published a policy statement that eased numerical safety analysis requirements for various classes of part 27 rotorcraft, although it did not address single-engine IFR requirements directly. But helicopter manufacturers weren’t strongly motivated to certify any single-engine helicopters for IFR until last year, when Leonardo Helicopters and Bell certified the TH-119 (a variant of the AW119) and the Bell 407GX, respectively, in order to compete for the U.S. Navy’s lucrative training helicopter contract. Bell didn’t announce the first commercial customers for its IFR-certified 407GX until this year’s HAI Heli-Expo — a couple of days after the Kobe Bryant crash — and Leonardo has yet to confirm any.

Although it took fully four years from the date of the white paper to certify a single-engine helicopter for IFR, the “snowball effect” the associations predicted will likely take even longer, if it happens

at all. That is because, as the white paper acknowledges, affordable and practical IFR-certified helicopters are a necessary but not sufficient element for establishing the type of IFR culture that is prevalent in the fixed-wing world. We also need IFR infrastructure that is useful to helicopters — which often fly to destinations other than airports, and typically have less range and endurance than airplanes do — as well as instrument-rated pilots who are current and proficient in actual IFR flight.

While IFR helicopter operations and proficient instrument helicopter pilots certainly exist, the helicopter industry has largely evolved to take advantage of *not* flying like airplanes. In the U.S., we’re permitted to fly much lower than airplanes, with much less separation from people and structures. Airplanes are never allowed to fly VFR with less than one mile visibility, but until 2014, helicopters could legally operate in uncontrolled airspace with no minimum visibility requirement at all, provided they remained clear of clouds and operated at a speed slow enough to see other aircraft and obstructions in time to avoid a collision. (How do you know if you’re not slow enough? You hit something.)

Helicopter operators have exploited this leeway for the full spectrum of operations: from life-saving search-and-rescue missions to decidedly less critical operations like frost control, which entails hovering over crops on cold nights to prevent them from freezing. When the FAA proposed to raise the minimum visibility requirement for helicopters in uncontrolled airspace to one-half mile — still only half of what is required for airplanes — some helicopter



The cockpit of the Bell 407GX equipped for IFR operations. **Skip Robinson Photo**

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operators were supportive, but others perceived it as an existential threat.

In comments submitted to the FAA during the rulemaking process, numerous operators opposed the minimum visibility change, arguing that helicopter pilots should be the ones to decide whether visibility is adequate. The Experimental Aircraft Association was particularly outspoken in its opposition, arguing that “to impose a visibility limit shows the FAA does not truly understand the entire scope of what commercial and private helicopter missions are and their combined effect on the national economy.”

Only one commenter, Safety and Flight Evaluations International, suggested that a minimum visibility requirement of a half mile was still too low to have much impact on safety, and should actually be raised to something higher. The FAA chose to proceed as planned, stating that “implementing more restrictive visibility minimums than those proposed would be outside of the scope of the proposed rule.”



The cockpit of Leonardo's IFR-certified TH-119, which was selected by the U.S. Navy as its next helicopter trainer. **Leonardo Photo**

BETTER LUCKY THAN GOOD?

In my 15 years of flying helicopters, I've only experienced true spatial disorientation once, while undergoing an instrument proficiency check at night over unlighted Arizona desert. The condition crept up on me: one minute I was fine, and the next minute I felt like I was toppling over the edge of a cliff. The experience bore no resemblance to anything I had previously encountered under a view-limiting hood. This was not losing track of my instrument scan and drifting through a few hundred feet of altitude; it was entering a terrifying new world in which gravity was acting on me from a direction that I didn't recognize as down.

In that case, I was able to claw myself back from the brink, possibly by tilting my head up far enough to see the lights of Phoenix on the horizon. Although I had dutifully memorized and recited all of the aeromedical factors related to spatial disorientation, and indoctrinated my students in the same, not until that evening did I fully appreciate how quickly things could go sideways in an unstabilized helicopter on a dark night or in the clouds.

Since then, I've gone through and written about a number of courses intended to prepare helicopter pilots for recovery from

inadvertent IMC. Some of these have been in simulators, some in real helicopters, and all have been excellent training experiences (far superior, I suspect, to what passes for inadvertent IMC training at most part 135 helicopter operations). But my own brush with spatial disorientation reinforced how infinitely harder it is to trust your instruments when your senses lose their grip on reality. Indeed, I've written about several VFR-into-IMC helicopter accidents in which the pilot's first impulse was to reach up and cage their attitude indicator — convinced it was their instrument, and not their understanding of the world, that was wrong.

In the absence of rigorous, routine practice in instrument flight, recovery from inadvertent IMC is largely a matter of luck. You're lucky if your helicopter is in stable straight-and-level flight when you enter the clouds and you have an extra moment to transition to instruments. You're lucky if you break through a cloud layer before you lose your nerve to keep climbing straight ahead, and attempt to turn around.

Once you surrender to spatial disorientation, I believe, all bets are off, because at that point you are not processing information correctly. An HTAWS screaming "Terrain! Terrain!" will likely



Joby Aviation's S4 eVTOL prototype, which is backed by more than \$720 million in funding from investors including Toyota. The aircraft will initially be piloted but incorporate high levels of automation and envelope protection. **Joby Photo**

AS LONG AS VFR HELICOPTERS ARE PERMITTED AND EVEN EXPECTED TO POKE AROUND AT LOW ALTITUDES IN MARGINAL VISIBILITY, SOME NON-ZERO PERCENTAGE OF THEM WILL STRAY INTO IMC, AND SOME NON-ZERO PERCENTAGE OF THEIR PILOTS WILL BE UNLUCKY.

further confuse you. Your only hope is to recover some sense of a horizon while you still have enough altitude to regain control of the aircraft. An autopilot will help, of course, but only if you retain enough mental processing power to remember how to use it.

Obviously, the best cure for spatial disorientation is to never get into it in the first place. But as long as VFR helicopters are permitted and even expected to poke around at low altitudes in marginal visibility, some non-zero percentage of them will stray into IMC, and some non-zero percentage of their pilots will be unlucky.

Unwise, too, perhaps — but as someone who has actually had to “land the damn helicopter” on multiple occasions to wait out weather, I can attest that the decision point for a precautionary landing is rarely obvious. Are the clouds a little thinner in that direction, or is that just an illusion? Is the front passing, or stalling out? Such judgments are always fraught with uncertainty, and commercial or mission-related pressure to fly can influence those judgments in ways we don’t always recognize.

Over the past year, I’ve spent much of my time writing about the emerging electric vertical takeoff and landing (eVTOL) industry, which is developing novel air taxis that can take off and land



Since 2013, the Sikorsky Autonomy Research Aircraft (SARA) has logged over 300 hours of autonomous flight time. The aircraft is a modified S-76B — the same model that crashed with Kobe Bryant on board. **Sikorsky Photo**

like helicopters, but will ostensibly be clean and quiet enough to deploy in cities by the thousands. Helicopter manufacturers including Bell and Airbus are enthusiastically embracing this “urban air mobility” vision, and some helicopter operators are, too, but others regard the entire enterprise with blistering contempt. Much of this disdain relates to the perceived hubris of companies like Uber, which claims it will launch its first eVTOL air taxi services in 2023. Given that it took several years just to convince the FAA to let an already certified helicopter like the Bell 407 fly in the clouds, some skepticism regarding Uber’s ambitious timeline is understandable.

I suspect, however, that the conventional helicopter industry also resents the high levels of autonomy that are being designed into these aircraft. Uber and other companies plan to employ large numbers of pilots at the outset, but eventually do without pilots altogether as autonomous technologies mature. Even early eVTOL models should be much simpler to fly than conventional helicopters, with much greater envelope protections, making the specialized skillsets of today’s helicopter pilots less relevant. Autonomy is also finding its way into conventional helicopters, as with the Sikorsky Autonomy Research Aircraft — a modified S-76B that can be flown by non-pilots using a tablet — and Sikorsky’s

optionally piloted Black Hawk. These are not simply aircraft that fly a pre-determined route from point A to point B; they are vehicles that can sense their environments and “decide” how to avoid traffic and obstacles.

Autonomous passenger-carrying aircraft still have a long way to go to prove themselves, let alone achieve certification, so some skepticism is warranted here, too. But one thing has been amply proven: that human pilots are terrible at controlling helicopters in the clouds, except for under the regimented conditions of actual IFR flight. Unless the helicopter industry chooses to adapt its business models to fully embrace IFR operations in conditions of marginal weather, a certain number of VFR-into-IMC accidents seems inevitable, at least until technology makes human pilots irrelevant.

Our choice then is, quite literally, to adapt or die. So far, we’ve chosen to die. ✖



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

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The ability to gather increasingly vast amounts of data, and ever-enhancing data analytic capabilities, have been a common theme among the support and services divisions of airframe and engine manufacturers over the past few years. But this trend, combined with the growing number of helicopter operators digitalizing their record-keeping processes and sharing their data, is already resulting in some far-reaching benefits, from reduced maintenance to enhanced safety and invoicing.

HOW DATA ANALYTICS IS HELPING OEMs ENABLE SMOOTHER ROTORCRAFT OPERATIONS.

BY THIERRY DUBOIS

According to Christoph Zammert, executive vice president of customer support and services at Airbus Helicopters, the number of aircraft sharing data with the company is rapidly increasing. From 700 in mid-2019, to over 1,000 by the end of the year. The company hopes to be gathering information from 3,000 aircraft by 2023. The greater the number of “connected” helicopters, the more exhaustive the database and the more accurate the analyses, according to Airbus’s engineers.

In parallel, the number of operators using Flyscan, a data monitoring tool

for dynamic systems, is growing, too. “We have about 25 customers and more than 100 aircraft under Flyscan contracts,” said Zammert. They can be found in the offshore oil-and-gas, emergency medical services and military sectors.

Flyscan uses data from health and usage monitoring systems (HUMS). It covers dynamic components – such as rotors, gearboxes and rotor brakes – and thanks to weak signal analysis, Flyscan works in proactive mode and indicates if a threshold will soon be crossed. This allows an operator to plan maintenance, such as replacing a part within 50 flight hours, and thus avoid unscheduled works or even a mission failure.

Oil-and-gas operator NHV has been one of the early adopters for its fleet of 14 H175 medium twins. Airbus estimates the company has avoided two aircraft-on-ground situations in one year, for a daily cost of \$39,000 (€35,000).

Flyscan is about to expand to other systems. “We are developing it for safety data-generating equipment where we can implement sensors – avionics, for instance,” said Zammert. Stephanie Bonnefoy-Fourie, head of connected services at Airbus, added: “We are migrating unscheduled into scheduled maintenance.”

Sikorsky is also using HUMS data to identify patterns that precede unscheduled removals. “By fusing HUMS data, historical maintenance records and engineering knowledge, we’ve been able to create machine learning classifiers . . . so we can pre-position parts and help our customers plan maintenance opportunistically,” Eric Schnaible, Sikorsky communications manager, told *Vertical*.

Last year, Sikorsky added a new vibration sensor to the S-92’s tail rotor gearbox to detect bearing degradation earlier.

For health monitoring purposes, Safran is collecting data from 500 customers, accounting for 3,200 engines. “Our algorithms transform raw data into health indicators that are directly actionable by health monitoring experts,” said Amanda Martin, head of marketing and services. Local technical support teams can then make recommendations on maintenance and usage.

NHV was one of the early adopters of Airbus’s Flyscan system for its fleet of 14 H175s. The system is now used by more than 25 customers in over 100 aircraft.

Nicolas Gouhier Photo



Operators send engine data manually or automatically, via the HUMS (on some Airbus helicopters) or Safran's Helicom device. "Over a six-month period, one of our major customers avoided one engine removal and two module removals," thanks to Safran's health monitoring services, said Thibault Pentel, health monitoring project manager.

REAL-TIME BENEFITS

Could the holy grail be real-time HUMS data transmission? Sikorsky has developed such a system – dubbed Iris – with Metro Aviation. PHH is currently operating it on 19 S-92s in the Gulf of Mexico, Australia, and Canada, according to Sikorsky.

Airbus appears not to be pressured to follow suit. "Today, we don't have information or feedback from our customers that would encourage us to use real-time HUMS data transmission," said Zammert. "No critical mass is appearing at this time." The average flight lasts 40 minutes and waiting for the next landing to connect makes sense, he said.

Safran is about to unveil an intermediate level of service, featuring daily indicators for health monitoring.

A digital logcard is another way to make the most of data. Each component has a logcard where every installation and removal is described. A paper document, it is most often handwritten.

The digital logcard improves the reliability of information transmission, according to Bonnefoy-Fourie. Airbus has issued 4,500 for 20 customers, covering approximately 100 helicopters, she said.

Sikorsky uses optical character recognition to digitize logcards.

The benefits of data analytics could also translate into longer maintenance intervals or moving to on-condition maintenance – and this is already a trend in North America. "The FAA [Federal Aviation Administration] is open to using analytics; it's the responsibility of

the requester to validate that the checks and balances are in place to protect data integrity and that the analytic results are reliable and repeatable," said the Sikorsky spokesperson. On the S-92, inspection requirements have been recently opened on the high-speed shaft coupling and the tail-pitch-change shaft bearing. Both procedures use HUMS data – presented on Sikorsky's ground-based application – to determine if maintenance is required.

In the past, HUMS data was used at a serial number level to adjust the retirement time of the S-92's main rotor hub.

Progress on maintenance intervals is looking slower in Europe. "We have to provide substantiation to the airworthiness authorities with relevant samples and specific hardware tests to confirm analyses," said Zammert. He said he hoped for a favorable outcome on this in 2020.

"We may extend the interval between engine washings," says Safran's Martin. In the future, operators may benefit from more customized maintenance programs, she added.

In addition to maintenance, digitalization can help daily operations in various ways.

Corail Helicopteres uses Airbus's FleetKeeper, a digital technical logbook, along with an Enterprise Resource Planning software for its



The Iris system allows real-time HUMS data transmission, and has been developed through a partnership between Metro Aviation and Sikorsky. PHI is using it in 19 of its S-92s.
Ted Carlson Photo

fleet of nine helicopters. After a flight, invoicing is automated, which makes a cumbersome and paper-intensive procedure obsolete, said Airbus. Corail calculates it saves 1.5 man-hours per day with FleetKeeper.

In terms of safety, flight data monitoring has been improved by giving context to recorded events. Terrain, weather phenomena, recent maintenance and more data are integrated into Airbus's Flight Analyzer to provide context for the flight phase under analysis. "Helicopter Travel Munich is an early adopter customer of Flight Analyzer, with whom we are co-designing the solution," said Courtney Woo, Airbus media relations manager. ✈️



Thierry Dubois | A freelance writer specializing in aerospace technology, helicopters and business aviation, Thierry also moderates international conferences on aviation technology topics.



Corail Helicopteres uses Airbus's FleetKeeper for its fleet of nine aircraft. The operator says it saves 1.5 man-hours a day by using the automated invoicing software.
Anthony Pecchi Photo

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Starspeed's unique VIP Sikorsky S-92 flying through the heli lanes in London, U.K.



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An aerial photograph of a city, likely London, with a river and various buildings. In the foreground, the tail section of a black helicopter is visible, flying over the city. The helicopter's tail boom has the registration 'G-LAWX' written on it. The background shows a dense urban landscape with a river and several bridges.

HIGH SOCIETY

AS THE SUPER-WEALTHY PRESS THEIR AIRCRAFT INTO USE IN EVER MORE VARIED ROLES, BRITISH COMPANY STARSPEED RELIES ON OVER FOUR DECADES OF GLOBAL VVIP EXPERIENCE TO RISE TO THE CHALLENGE.

BY JON DUKE | PHOTOS BY LLOYD HORGAN

Since its launch as a small helicopter management company in Great Britain in 1978, Starspeed Ltd. has firmly established itself as a leading presence in the global VVIP helicopter market, becoming a household name among those with the means to use its services. Designed to provide its exacting customers with the most suitable, stress-free solution, those services include helicopter management, charter, sales, support and services.

Over more than four decades, Starspeed has flown or managed 22 different aircraft types produced by five different OEMs; transported presidents, princes and a pope; and provided its services to film studios and rock bands. According to Simon Mitchell, the company's managing director, the key to the company's success is being able to provide a fully customizable solution.

"Whether through reputation or recommendation we get approached, and the normal thing is that the owner will define what they want," he said.

A commercial helicopter pilot with a background in finance and safety management, Mitchell has been with the company since 2005. His tenure has spanned a period of significant growth, as well as two buyouts: first by a group of its pilots in 2007, and then in 2017 by Luxaviation. He credits the company's founders – John Dicken and David Voy – as sowing the seeds of this success, having set the conditions by which the company would operate. "No matter the scale or location, the fundamental principles of how we go about our business are the secret of our continued success," he said.

The first type used by the company was the Bell 206, which Starspeed managed on behalf of a bank. The company quickly evolved into multi-engine and instrument flight rules (IFR) operation, added a Bell 222 Spirit, and has subsequently diversified to meet its clients' demands. Bell, Sikorsky, Airbus and Leonardo are all represented in Starspeed's current fleet.

Such a broad fleet presents significant challenges, not only in terms of support and safe operation, but also in the delivery and deployment of aircraft that may lack sufficient range to self-position to the required location. Its U.K. basing brings a benefit here, being on the periphery of the world's largest continental mass, but also with a relatively short sea transit to North America.

"Most places in Europe can be self-positioned," explained Mitchell. "Aircraft can be positioned to Athens in two days."

Aircraft destined for the Continental U.S. or the Caribbean are stripped of their rotor blades, which are packaged separately for the trip across the Atlantic in a roll-on/roll-off car transport vessel. "Once the blades are off, we take up the floor space of about four or five SUVs," said Mitchell.

MAKING CONNECTIONS

Getting the aircraft to the end user is only the beginning, and once it is put into use the focus of the company changes to safe operation and support. Although they may be used to facilitate recreational activities, to their ultra-wealthy owners the aircraft are not in themselves a leisure pursuit, and must provide value. In doing so, they must dovetail with many other aspects of the client's life.

"The aircraft has to fulfil a purpose," explained Mitchell. "We make the connection between properties, places of work and the means of wider transport. They may need a helicopter in order to make these other assets work together."

These other assets may include property, whether private or business-related, and in many cases other means of transport, such as yachts or business jets.

"One of the key skills of helicopter management is working out how we fit in the bigger picture of asset management and how to make that asset management work," said Mitchell.

There can be few more efficient ways of connecting a yacht owner with the wider world than providing a direct conduit between the vessel and their private jet. But operating helicopters to ships demands particular attention to the risks involved and their effective mitigation. Anybody who has spent any time flying at sea will attest that this is often more a matter of experience than legislation or regulation, but ultra-high net worth clients can literally afford to be demanding, so striking the balance between cautiousness and versatility is an essential skill.

"Although we want to engage with the water for leisure, it's a big hazard to the helicopter, the crew and the passengers," explained Mitchell. "We want to provide the advantages of the helicopter without introducing any new hazards."

This delicate balance, and the equally delicate interface between the service provider and the client, clearly occupies a great deal of Starspeed's attention. But as is the case whether the aircraft is on board a yacht, or thousands of miles from the company headquarters in Fairoaks, it is the pilots who will need to manage this relationship, and it is this interpersonal dynamic that most influences Starspeed's approach to recruitment.





With its clientele expecting support for ever more adventurous undertakings, the company has found its operation being pushed well outside the typical corporate and VIP mission set. **Starspeed Photo**

“WE MAKE THE CONNECTION BETWEEN PROPERTIES, PLACES OF WORK AND THE MEANS OF WIDER TRANSPORT. THEY MAY NEED A HELICOPTER IN ORDER TO MAKE THESE OTHER ASSETS WORK TOGETHER.”





Flying back over London as the crew returns to Stansted from London Heliport.



Simon Mitchell, managing director of Starspeed Ltd.

"We are looking not just for pilots but experienced aviation managers. The pilot doesn't just deliver the skill to fly the aircraft, they are responsible for understanding the asset in its whole," said Mitchell. "We are looking for adept diplomats, good decision managers, logistical managers, finance managers. For the right person, it adds so many elements to the job that they will enjoy."

Finding the right people is something that Starspeed has invested in, offering training since 2011 that focuses on advanced flying techniques for those that already hold a commercial license. At its Kemble facility it has a flight navigation and procedures trainer (FNTP) II simulator that replicates an Airbus Helicopters AS355 TwinStar.

"As aviators, we don't only believe in the company, we believe in the activity," Mitchell explained. "Aviation is the heart of why we are in this business, so we like to create opportunities for other aviators."

As well as creating opportunities, the training facility also doubtless provides a means of identifying and vetting potential candidates for vacancies and ensuring that the company's values are inculcated from an early stage. With the emphasis on operating at long distances from the headquarters, often as a single pilot, it is no coincidence that many of Starspeed's pilots are former military aircrew.

Mitchell himself was a Fleet Air Arm Sea King pilot, but explained that trust is the most important characteristic of any potential candidate. "There are huge amounts of trust involved in this business," he said. "We are selecting the pilot on behalf of the customer. They will be trusted with the safety of the operation, the customer and their family. There is also trust that you will look after the aircraft; they are hugely expensive assets. The customer may be very wealthy, but that wealth mustn't be taken for granted, and there must also be trust with security and privacy."

AN EVER-EVOLVING FLEET

Starspeed's fleet currently spans 11 different types and the variety is stark. The smallest type on its books is the Bell 429; the largest aircraft is a Sikorsky S-92. The latter is based at Stansted airport, where it is maintained by Harrods Aviation. It is equipped with 16 leather-upholstered seats and its own toilet. Mitchell explained that the aircraft owner had a specific purpose for which he had purchased the aircraft, and the S-92 was the only helicopter that could fulfil the task. That said, it remains affordable – a relative term in these circumstances – for charter operations.

"A lot of people would love to have a '92 and all the capability that it brings, but the costs are significantly more than most other aircraft," said Mitchell. "There are not many owners who have a need and an appetite that fits this aircraft's capabilities and requirements. But on a charter basis, the costs actually aren't that bad."

There are, apparently, a few customers for whom the space available is reason alone to pay the costs, and at least one that finds the physical size of the machine more reassuring than smaller helicopters. It's the size that raises the most questions about the aircraft's suitability for ad-hoc charter operations, though. As Mitchell pointed out, with approximately 12 tonnes (more than 26,500 pounds) of helicopter in the hover, downwash is an issue. "On the whole, we can find a space big enough to put the helicopter, but we end up having to think about what we might blow over," he said. However, he pointed out that once in the air, the S-92 was not

vastly different to other types to pilot. "It's a nice aircraft to operate," he said. "You don't find yourself conscious that you're in a big helicopter, although in the cockpit it's quite nice to have the space."

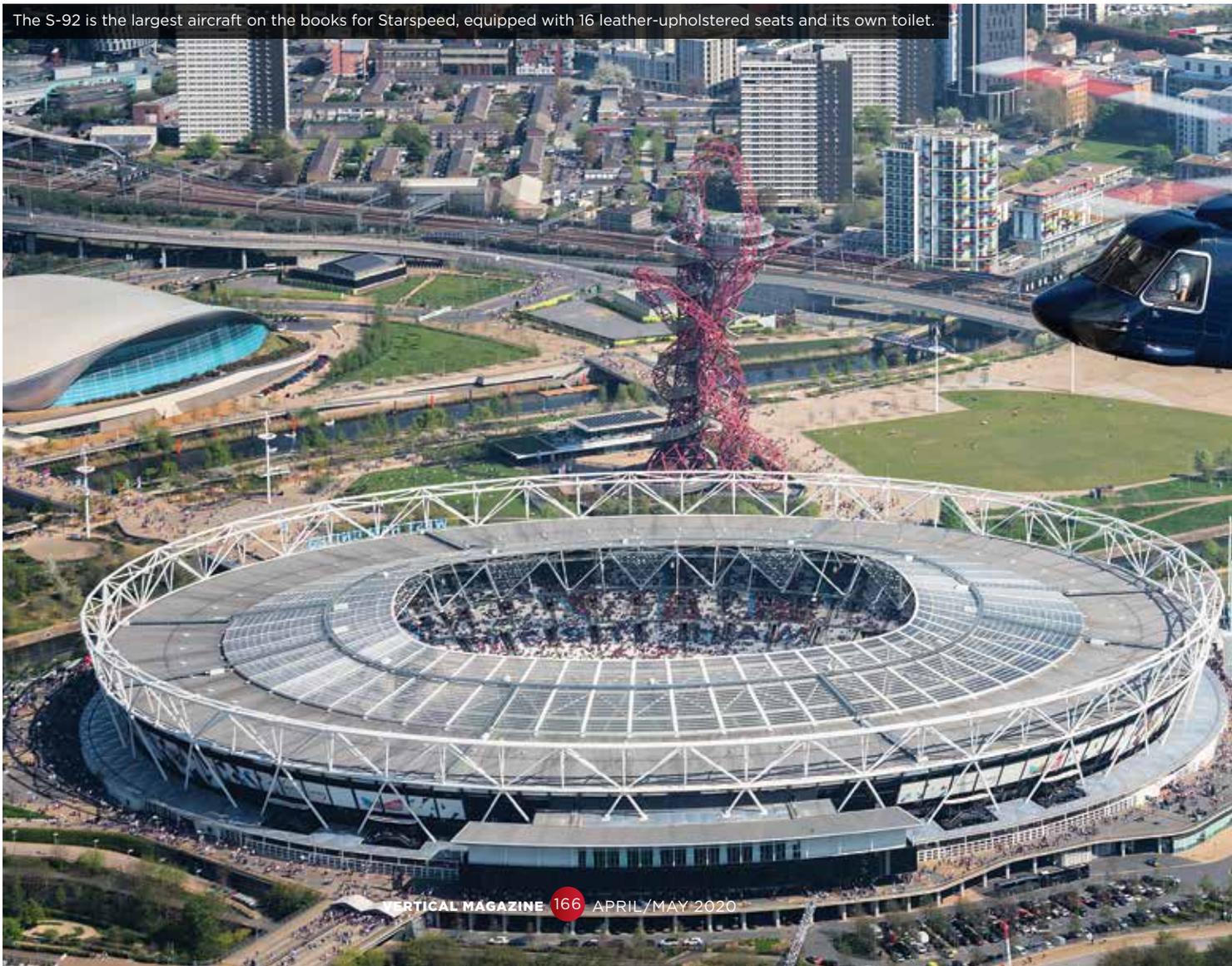
To those able to afford it though, it is emphatically not like any other helicopter, and that is part of the appeal. "The aircraft attracts quite a lot of attention and that can be a plus for some people," explained Mitchell. "Sometimes you want to arrive and make a bit of a statement, and there's nothing like arriving in an S-92 to make a statement."

One of the more interesting challenges for Starspeed is having to adapt to a fleet composition that is dependent on the whim of its customers.

"When someone brings a new type to us, that is obviously a change management exercise and we have to think very hard about how we are going to operate that aircraft," explained Mitchell. "We don't choose what we operate. We can accept or not accept a contract, but the inclination is generally to find a way that we can do the job."

This brings challenges beyond keeping pilots available with the correct ratings and qualifications. "It's also important that the manufacturer can support it in terms of sales," Mitchell added. "VVIPs tend to want things that are deliverable immediately, whereas the manufacturers will announce their latest marvelous product, but it won't be available for two or three years and that can sometimes be a problem."

The S-92 is the largest aircraft on the books for Starspeed, equipped with 16 leather-upholstered seats and its own toilet.





“WHEN SOMEONE BRINGS A NEW TYPE TO US, THAT IS OBVIOUSLY A CHANGE MANAGEMENT EXERCISE AND WE HAVE TO THINK VERY HARD ABOUT HOW WE ARE GOING TO OPERATE THAT AIRCRAFT. WE DON’T CHOOSE WHAT WE OPERATE. WE CAN ACCEPT OR NOT ACCEPT A CONTRACT, BUT THE INCLINATION IS GENERALLY TO FIND A WAY THAT WE CAN DO THE JOB.”

A GLOBAL PERSPECTIVE

With the likes of the Bell 429 at one end of the spectrum and the S-92 at the other, Starspeed has proven adept at the most elusive of skills in aviation: turning Jet-A into profit rather than vice versa. That it has been able to do this across such a broad range of aircraft types is perhaps largely a function of its customer demographic, but it is nonetheless an impressive feat. However, that fact in itself might appear to be rather limiting. There are, after all, few people in the world that can afford to have a medium twin helicopter on hand to whisk them from their beachside villa to a yacht offshore, let alone run the same type of helicopter that will soon be used to transport the President of the United States of America.

But Mitchell is positive about the company's future, seeing the expanding scope of its operation as key to its continued success. "Twenty years ago, the likely operating environment was fairly narrowly defined [around the Mediterranean]," he said. "VIPs now want to expand their experiences, and we now consider Patagonia, Alaska and the Maldives a core part of our operation."

But with a global operation come global challenges, and the two don't always scale together. Flying from a yacht in the mid-Pacific is quite literally a world away from the same operation off the coast of Monaco. The absence of well-established infrastructure can present unforeseen issues and without deployed engineering support, even a minor unserviceability presents huge logistical challenges. Recent examples include having to arrange hangarage for an aircraft in Patagonia after un-forecast weather left it facing 80-knot winds, and organizing some very exotic heavy-lift air freight capability at short notice.

"The secret to being able to operate all around the world as we do, is being able to call on friends when the need arises, be they maintainers, manufacturers, regulators or even other operators," said Mitchell.

With its clientele expecting support for ever more adventurous undertakings, the company has found its operation being pushed well outside the typical corporate and VIP mission set. "All of a sudden we are doing [slung] loads, which might come as a surprise in the VIP context," said Mitchell. "Thankfully, most of our pilots have something in their background that has given them a starting point for these types of operations so that they are not completely unfamiliar."

And sling-loads aren't the only skill that Starspeed is undertaking in an effort to further improve the utility and meet the demands of its customers, as Mitchell explained. "We are also considering the value of NVIS [night vision imaging systems] capabilities, to see whether that would increase our utility. It's not to push the boundaries, but we will consider anything that might give us a safety benefit."

That Starspeed is able to meet these diverse demands and continue to satisfy what must be some of the most demanding customers, is testament not only to its corporate experience but perhaps even more so to the people that operate its aircraft. Clearly, a great deal of effort goes into selecting the right personality for the task. Not everybody is suited to long periods away from home, managing not only the safe operation of the aircraft, but all of the supporting activity.

Alongside this, they will be expected to interface directly with a client who, while they determine the task, are likely to have little understanding of aviation and its associated complexities.

A brief look into the world of superyacht ownership demonstrates that on board these vessels, the toys proliferate. But even a helicopter configured internally with only luxury in mind is capable of transporting them ashore with the simple addition of a cargo hook. Having used them for years purely as a means of personal transport, it seems that those with the means to own a helicopter as a lifestyle accessory are now beginning to understand their true utility. ✈️



Jon Duke & Lloyd 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.

VortexAeromedia.com.



Starspeed selects its pilots on behalf of its customers. Many are former military aircrew.



Starspeed's smallest aircraft, the Bell 429, in the hangar at its home base in Fair Oaks.



The VIP seating/layout inside the S-92, different to that of the head of state VVIP machines.



Landing at London Heliport during a charter flight to and from Silverstone for the 2019 Grand Prix.



Starspeed's fleet currently spans 11 different types and the variety is huge. **Starspeed Photo**

Operating from a yacht traveling across the Pacific is quite a different challenge to doing the same operation in the Mediterranean. **Starspeed Photo**



The key to the company's success is being able to provide a fully customizable solution. **Starspeed Photo**



“THERE’S NOTHING LIKE
ARRIVING IN AN S-92 TO
MAKE A STATEMENT.”





NO STEP

NO STEP

NO STEP

EXIT



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The Airbus H160 is powered by the 1,300 horsepower Safran Arrano, which promises 15 percent less fuel consumption compared with similar-sized engines. **Lloyd Horgan Photo**

CLIMATE CHALLENGE

WHAT IMPACT WILL THE CHANGING CLIMATE HAVE ON HELICOPTER DESIGN, PERFORMANCE, AND OPERATIONS?

BY ED BROTAK

It seems like every day, there is new data describing the climate change our planet is experiencing. The latest five-year period, 2015-2019, will almost certainly be the warmest on record (records go back into the late 1800s). According to figures from the World Meteorological Organization, the global average temperature has increased by 1.1C since the start of the Industrial Revolution, with nearly 20 percent of the increase in the past five years. Scientists started using the term “climate change” rather than “global warming” recently. This was to warn people that, yes, the Earth is getting warmer — but there are many other environmental events occurring that must be acknowledged.

Although the Earth’s climate has continuously changed throughout the planet’s history, the changes we are seeing today are, for the first time, the result of human activities. These changes are also occurring at a speed we have never seen before — an estimated 10 to 20 times faster than previously observed.

Much of the attention has been focused on efforts to reduce greenhouse gas emissions, which contribute to the warming and resultant environmental impacts. As witnessed with the Paris Accord, political and economic concerns have resulted in a less-than-maximum effort in this area.

The aviation industry has faced significant pressure to reduce emissions from aircraft engines. It takes a considerable amount of power and fuel to defy gravity and travel at great speeds. Consequently, aircraft produce a disproportionate amount of carbon dioxide compared to land-based vehicles.



A Heli-Austria Airbus H130 with a unique livery. The H130 is the quietest helicopter in Airbus's light single engine range and offers low fuel consumption.
Lloyd Horgan Photo



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The helicopter industry has joined with other branches of the aviation business in taking steps to reduce carbon dioxide emissions. More fuel-efficient engines have been developed and will have an increasing effect as older helicopters are replaced with newer models. The aerodynamics of the airframe can be improved to reduce drag. The efficiency of the rotor blades can be improved. Internally, the electric and heating systems can be designed to run more efficiently, decreasing power consumption. More efficient operations in terms of scheduling will also help. An overall reduction in passenger air travel would certainly reduce emissions, but this would go against recent trends and would have serious economic effects on the industry.

One of the most anticipated advances is alternative propulsion. This would encompass entirely electric powered or hybrid models. The major challenge to date has been how to generate enough power to attain the lift and speeds necessary for flight. Still in the developmental stage, electric helicopters have proven the concept, but there is still the problem of providing such power over extended time periods. For example, a Robinson R44 converted into a purely electric helicopter set a world record in December 2018 when it flew for 22 minutes, covering 34.5 miles at a speed of 80 knots. Battery power and capacity will have to be increased — without requiring prohibitive extra weight — for electric helicopters to become a viable proposition.

ADAPTING TO THE CHANGE

The push to reduce the emissions that are fueling climate change is just one aspect of the problem. The aviation industry is also having to adapt to the significant environmental changes that are impacting operations in a number of ways. And these changes will only become greater over time.

So, how has and how will climate change directly affect helicopter operations?

The most direct impact of the rise in temperatures is on helicopter flight performance. Warmer air is less dense, causing rotor blades to produce less lift and engine power output to be reduced. In more extreme situations, both passenger and cargo loads will have to be lessened, while the hottest times of the day may become unusable for work. The risk of high-density altitude incidents will increase.

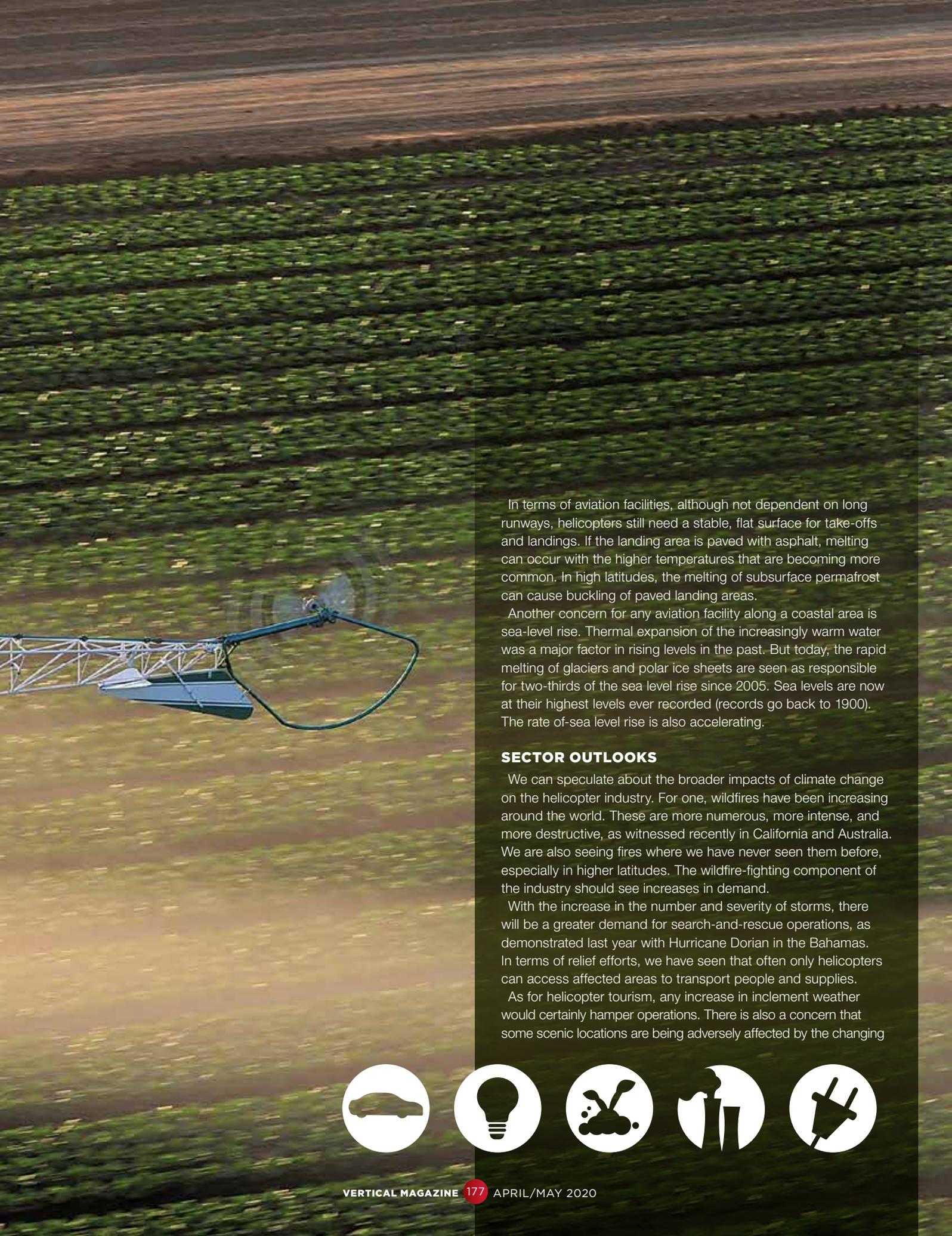
Warmer air can also hold more moisture, and moist air is less dense than dry air. Although not as important as air temperature, this can magnify the effects described above. Warmer temperatures and more moisture in the air mean that when precipitation does occur, rainfall and snowfall rates will be greater, with subsequent reductions in visibility.

With more energy, storms will become more numerous and stronger. There will be more and stronger thunderstorms with all their attendant hazards; while winter storms will be more intense, with higher winds and heavier precipitation. Tropical cyclones will become more numerous and stronger, and we could see more dust and sandstorms in the subtropics. In a previous article (*Vertical*, April/May 2018), I discussed how turbulence may increase.



Agricultural spraying operations are extremely dependent on temperature, and as the seasons change, so will this work. Even the type of crops grown in certain areas could be altered to fit new climate norms. **Skip Robinson Photo**





In terms of aviation facilities, although not dependent on long runways, helicopters still need a stable, flat surface for take-offs and landings. If the landing area is paved with asphalt, melting can occur with the higher temperatures that are becoming more common. In high latitudes, the melting of subsurface permafrost can cause buckling of paved landing areas.

Another concern for any aviation facility along a coastal area is sea-level rise. Thermal expansion of the increasingly warm water was a major factor in rising levels in the past. But today, the rapid melting of glaciers and polar ice sheets are seen as responsible for two-thirds of the sea level rise since 2005. Sea levels are now at their highest levels ever recorded (records go back to 1900). The rate-of-sea level rise is also accelerating.

SECTOR OUTLOOKS

We can speculate about the broader impacts of climate change on the helicopter industry. For one, wildfires have been increasing around the world. These are more numerous, more intense, and more destructive, as witnessed recently in California and Australia. We are also seeing fires where we have never seen them before, especially in higher latitudes. The wildfire-fighting component of the industry should see increases in demand.

With the increase in the number and severity of storms, there will be a greater demand for search-and-rescue operations, as demonstrated last year with Hurricane Dorian in the Bahamas. In terms of relief efforts, we have seen that often only helicopters can access affected areas to transport people and supplies.

As for helicopter tourism, any increase in inclement weather would certainly hamper operations. There is also a concern that some scenic locations are being adversely affected by the changing



climate. In lower latitudes, coral reefs are struggling to survive in increasingly warmer waters, while coastal flooding is occurring more frequently, even without storms, in such diverse locations as Florida and Venice, Italy. Further poleward, snowpacks are diminishing and glaciers are melting, impacting winter sports and tourist attractions.

The fossil fuel industry is, of course, directly tied to the climate change issue. If there was a major push to replace fossil fuels with renewable energy sources, the supporting industry would suffer. Currently, there is little indication that this will happen on a large scale. Although offshore operations have been reduced in recent years, they remain a significant part of the helicopter industry. This could well be “ground zero” for climate change effects. Energy infrastructure, including offshore drilling sites and coastal refineries, will be at risk. The relentless and accelerating rise in sea level will bring flooding concerns to the refineries and various problems to the drilling rigs. More frequent and stronger storms will add to these risks.

In researching a previous article on agricultural operations (*Vertical*, August/September 2017) I spoke to several operators who told me they have already noted the effects of climate change. Growing seasons have begun earlier, some by a month or more; frost prevention assignments have had to change accordingly. Aerial applications (spraying of chemicals) was noted to be extremely dependent on temperature, which is changing constantly. Even the type of crops grown may have been or will be altered to fit new climate norms.

What about the future? The Earth’s temperature is rapidly approaching what it was over 100,000 years ago, when there were no permanent ice caps and the sea level was eight meters higher than today. Historical data indicates that recently measured CO₂ levels of 400 ppm last occurred three million years ago. Not only was it much warmer, but the world itself was not as we know it today — the sea level was estimated to be 32 to 130 feet (10 to 40 meters) higher than now. If this occurred today, every coastal city on the planet would be flooded.

“A multi-disciplinary research effort by scientists, meteorologists, climatologists, engineers, biologists, and epidemiologists is needed to understand better the impacts of the changing climate on

the entire aviation system, including aircraft and infrastructure,” the International Civil Aviation Organization (ICAO) concluded in its 2016 Environmental Report. “Thereafter, dedicated guidance material by ICAO could target climate adaptation correlated issues, based on models of best practice. It will be important for that guidance material to be regularly revised and updated, to keep it in sync with the evolving and non-stationary climate statistics.”

The aviation community, including the helicopter component, has been slow to address the issue of climate change’s effects on operations. But the reality is that, no matter what steps are taken now to reduce global warming, the effects of this climate change are already occurring and will only get more pronounced. ❖



Ed Brotak | Ed Brotak, Ph.D., is a retired professor of atmospheric sciences at the University of North Carolina, Asheville. His specialties include weather effects on aviation, marine operations, and ground transportation.

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

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

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

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



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Aerotech has evolved from just three employees in the beginning to now having 150 staff across three facilities in British Columbia.

MRO MASTE

Maintenance, repair and overhaul (MRO) shops are an essential part of the aviation industry, but how does any given shop ensure its services and name resonate with operators?

It was a humble beginning for West Kelowna, British Columbia-based Alpine Aerotech, which opened its doors in 1990 with just three employees. What started out as an aircraft structure support shop for local operators in the Kelowna area quickly grew far beyond what was originally imagined. Within its first four years of operation alone, the company massively expanded its service capabilities list and added a new department dedicated to manufacturing.

Thirty years later, Alpine Aerotech now has a team of 150 employees across its three facilities in West Kelowna and Abbotsford, with a list of capabilities that checks off almost every type of helicopter service.





RS

CELEBRATING 30 YEARS OF BUSINESS IN 2020, **ALPINE AEROTECH** EVOLVED FROM A SMALL SHOP TO A BOOMING MRO THAT PROVIDES ALMOST EVERY TYPE OF HELICOPTER SERVICE.

STORY BY DAYNA FEDY ✦ PHOTOS BY HEATH MOFFATT

"It's a great success story, one that I'm very proud to be part of," said Aerotech president Jeff Denomme. "The growth and the success are really based on partnerships with customers [and] the OEMs, a truly dedicated staff, and understanding industry requirements.

"It's gone from a shop with structures capability, to now paint, avionics, part sales, heavy maintenance, components, and specialized repairs . . . a true one-stop-shop."

Aerotech has come a long way since its modest beginning in the early '90s, and is now one of the largest MRO providers in the industry.

IN CAPABLE HANDS

A major area of focus for Aerotech in recent years has been performing legacy aircraft upgrades and enhancements, which

Denomme said is an important part of an operator's fleet succession plan.

"We're seeing more and more customers being proactive for the longevity of their aircraft," he added. "Many operators are looking for options to extend and upgrade legacy aircraft."

This type of work can include performance enhancements, avionics upgrades, safety enhancement upgrades, and complete refurbishments — all drawing on the expertise from the company's numerous departments.

The technicians in each department have specialized skills — each one receiving the specific OEM training they need, Denomme said. While Aerotech's technicians are capable of performing on-site services/repairs at a customer's facility, the majority of the work is done in-house at either of the company's MRO facilities to keep up with the demand.

The Abbotsford facility became part of the Aerotech family in 2013, when the company acquired an existing MRO shop in the area — which is now fully integrated into the business and operates under the Aerotech name. “Adding that facility is a great part of our success story,” said Denomme. “We have a large capacity with the two MRO facilities in Kelowna and Abbotsford, [as well as] a manufacturing facility here in West Kelowna.”

In addition to having both the capacity and a large team of skilled technicians to fulfill customer needs, the company’s broad inventory provides customers real-time access to parts in stock (new, overhauled, and repaired) to shorten lead times and minimize downtime of aircraft.

“Forecasting maintenance and parts requirements for operators is a service we provide to ensure that downtime is minimized and turn-around time is low,” said Denomme.

A BROAD SCOPE

Aerotech has been a Bell service center since 2000, and recently became a recognized maintenance center for Leonardo Helicopters. The company also performs heavy maintenance on Airbus aircraft.



Aerotech president Jeff Denomme at the company’s facility in West Kelowna.

Aerotech senior management, from left: Alfonso Garcia, George Foster, Dirk Van Ulden, Taylor Wilson, Greg Foyle, Dave Siddon, Jeff Denomme, Tod Lansing, and Neil Baycroft.



An Aerotech technician sand blasts an aircraft part in preparation for paint. The company has the capabilities to provide almost every type of helicopter service.



Denomme said thousands of aircraft have gone through the company's facilities over the last three decades. Today, roughly 50 percent of Aerotech's work comes from the Canadian market, with the rest coming from a global customer base.

"Our list of capabilities, OEM approvals, and global credentials are all part of our best-in-class service," he added. "Our global credentials are a requirement for providing our international customers with options and support, which also helps with the seasonality in our business."

Denomme said given Aerotech's many years of operation, the company is able to use past and current data to provide accurate and competitive quoting. Aerotech has a dedicated planning department to ensure project scope and deadlines are adhered to.

It's one of the ways Aerotech goes above and beyond for its customers, and something the company celebrates in addition to its 30-year mark — with skilled staff who have played a major role in each of Aerotech's achievements.

"The employees and management are certainly a huge part of the success here," said Denomme. "It's all reflected in our mission statement that experience has no substitute."



ALL ABOUT THE SERVICE

One approach that Aerotech has stayed true to since the beginning is its commitment to supporting and listening to its customers. Over the years, the company has developed over 50 supplemental type certificates (STCs) ranging from specialized repairs to mission-specific equipment derived from customer requirements.

Intended to completely revitalize unserviceable parts, Aerotech's portfolio of specialized repairs incorporates unique design features to supplement limited OEM-defined repair procedures. Mission-specific equipment like the company's Bell 505 Bearpaw

A look at the shop floor of the company's West Kelowna facility. Aerotech also has a facility in Abbotsford, which has all the same capabilities as the West Kelowna shop.



“WE REALLY HAVE A RELATIONSHIP WITH OUR CUSTOMERS; WHEN THERE ARE CHALLENGES THAT THEY’RE HAVING DURING THEIR OPERATING SEASONS THEY CAN COME TO US, AND WE MIGHT BE ABLE TO HELP SOME OF THOSE CHALLENGES WITH OUR STCs.”

Aerotech NDT technician Travis Todevic examines various parts on a magnetic particle bench inspection under black light.



Aerotech welder Kyle Labelle Hastelloy welds a Bell 212 exhaust duct. The company has developed over 50 STCs ranging from specialized repairs to mission-specific equipment.

Here, Todevic is shown removing parts from a fluorescent penetrating bath for examination for cracks under black light.



increases safety, while its comprehensive list of panel protection products shields aircraft from expensive repairs.

“Those STCs are all customer driven, and all have a sense of efficiency, safety, reliability, and cost savings behind them,” said Denomme.

The strong relationship the company has built with its customers is truly demonstrated through the down-to-earth approach that Denomme and the Aerotech management team have instilled in their staff. When a customer needs support, it’s never farther than a phone call away.

“We’re a very personable company,” said Denomme. “You can pick up the phone and talk to anybody that has experience in the industry. We’re very proud of that. And we want to provide that level of service that customers would expect.”

From the initial work scope discussion to getting the aircraft



Aerotech painter Landon Houde preps and cleans a Bell 412 for paint at the West Kelowna facility.



The technicians in each department have specialized skills — each one receiving the specific OEM training they need.



Aerotech offers a diverse combination of commercial and Department of National Defence work for various operators.



Aerotech AME/components technician Dave Cutler applies a torque wrench to the main rotor assembly on a Bell 412.



Aerotech CNC machinist Vitali Martens working on a small parts volume project.



Avionics technicians Mark Jensen and Andre Forget work on an avionics upgrade for a customer's Bell 212.



Aerotech AME Crystal Bruce finishes working on a Pratt & Whitney PT6T3D powerplant from a Bell 412.



Lately, Aerotech has been performing a lot of legacy aircraft upgrades and enhancements, which can include avionics upgrades, safety enhancement upgrades, and complete refurbishments.

The company has a broad inventory to provide customers with real-time access to parts in stock (new, overhauled, and repaired) to shorten lead times and minimize downtime of aircraft.



operational, Aerotech takes care of the service recommendations, tailored requests, completions, and even the shipment of the aircraft.

"We're very adept at handling the logistics side of shipping aircraft around the world. . . . It's seamless for [the customer] if they want to send their aircraft here from across the world."

And according to Denomme, Aerotech's business approach and standards won't change any time soon.

"We're continually looking for opportunities, but we still want to provide the same level of service we've been providing for the past 30 years," he said. "We really are spending a lot of time with our customers and understanding their requirements, and looking forward and being proactive with them to ensure that we support them throughout the year and for many years to come.

"I'm very proud to be here, and it's very encouraging to see how our employee base is proud to be part of a great company, and a great industry." ❖



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



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A U.S. Army XH-26 sits next to a military jeep, giving a good illustration of its small size. **Jeff Evans Collection Photo**





THE JET JEEP

AT THE END OF THE 1940s, THE AMERICAN HELICOPTER COMPANY, A SMALL CALIFORNIAN MANUFACTURER, DEVELOPED A COLLAPSIBLE PULSE-JET ENGINE HELICOPTER THAT CAUGHT THE MILITARY'S EYE.

BY BOB PETITE

As the Second World War was coming to an end in 1945, many small helicopter companies were attempting to design and perfect a rotary-wing aircraft. Their goal was to compete with the established companies already producing workable flying rotorcraft, such as Sikorsky, Piasecki, Hiller and Bell in the U.S.

One small enterprise was the American Helicopter Company in California. Started by Corwin D. Denny during 1947, the company's main plant was in Manhattan Beach, near the Los Angeles Airport, which contained its airframe and manufacturing facilities. Its powerplant division, in Mesa, Arizona, looked after engineering and testing on engines. The company's general manager was William C. Jordan, formerly with the Curtiss-Wright Corp., and Gene Gore its first test pilot.

American Helicopter was initially launched to develop a pulse-jet powered rotary-wing aircraft, which it hoped would interest the U.S. military. Pulse-jet engines had powered German V-1 buzz bomb "vengeance weapons" in the 1940s, and were used to bomb England during the Blitz.

The company's first experimental two-place helicopter, packed with instrumentation gear, was called the XA-5 Top Sergeant. Powered by two AJ 8.75 rotor-tip pulse-jet engines, and using the lower fuselage and undercarriage from a surplus Sikorsky R-6 helicopter, the XA-5 proved the practicability of the pulse-jet rotor system.

It took American Helicopter just two months to manufacture the XA-5, and it completed its first flight in January 1949 at Manhattan Beach. Denny, the company president, said it would sell for about \$5,000 in its initial form. He could see no competition with the existing reciprocating engine-powered helicopters, as the pulse-jet XA-5 aircraft promised excellent short haul flights with high payloads. It had a gross weight of 1,200 pounds (544 kilograms), cruised at 55 miles (88.5 kilometers) per hour and had an endurance of 3.5 hours. In 1950, the U.S. Army joined American Helicopter as a sponsor on the pulse-jet helicopter development. It was interested in a light, collapsible helicopter that could be used for observation as an air-droppable rescue aircraft for downed pilots.

The Army XH-26 shown on skids rather than wheels. **Jeff Evans Collection Photo**



Also in 1950, Eugene M. Gluhareff, a former Sikorsky Aircraft design and project engineer, joined American Helicopter and began working on the XA-5. Gluhareff had developed a pulse-jet engine while employed at Sikorsky. He later became American Helicopter's chief of preliminary design.

EVOLVING THE PRODUCT

American Helicopter's second successful experimental pulse-jet rotary-wing aircraft was the single-seat XA-6 Buck Private. Its initial flight was in February 1951. It had the same pulse-jet propulsion system on a simple open airframe constructed of aluminum tubing. Each pulse-jet engine produced 35 pounds (15.9 kilograms) of thrust. The XA-6 helicopter originally had tricycle-wheeled landing gear. The powerplants, rotor blades, hub mechanism, and landing gear could all be removed, and all other maintenance could be done using an ordinary crescent wrench and screwdriver.

In 1951, the Army asked the U.S. Air Force to initiate a contract for the development of a one-man helicopter which could be collapsible, capable of aerial delivery and able to be quickly assembled for use in observation operations. The Army and Air Force closely supervised all phases of development. American

Helicopter won the design competition with a new XA-8 that was dubbed the XH-26 "Jet Jeep" helicopter.

One mock-up of the XH-26 was manufactured and examined by all branches of the U.S. military. It had a conventional floor-mounted cyclic control, which eliminated the overhead azimuth stick from the previous experimental XA-5 and XA-6 helicopters. The mission of the XH-26 Jet Jeep was to provide front-line aerial reconnaissance, liaison and observation for Army units during the early phase of an airborne operation or during armored combat.

"One of the most important features is its mechanical simplicity as compared with conventional helicopter configurations," a company brochure boasted.

The plexiglass cockpit arrangement boosted pilot comfort, while allowing visibility in all directions and promoting general ease of flying.

The pulse jet engines could use any fuel (gasoline, kerosene, and diesel). The fuel tank on the XH-26 carried 50 gallons (189 liters). Pulse jet engines use about one-third the fuel of a ram jet engine, but the pulse jet helicopter used three times the fuel of conventional engines.

The XH-26 was designed so that it could be folded and packed into a small container for aerial delivery, or loaded aboard a quarter-ton standard Jeep trailer and towed to a desired location.

Only two American Helicopter XH-26s survived. This one is in the Museum of the U.S. Air Force in Dayton, Ohio. The only other example is in storage at the Army Museum in Fort Rucker, Alabama. **Jeff Evans Collection Photo**



was turned off. It could take off in only 30 seconds, since the engines did not need to be warmed up.

Flight controls consisted of a cyclic and collective rotor-pitch controls, rudder pedals for changing the helicopter's yaw direction and a spring-loaded manual throttle. A small, belt-driven tail rotor at the back was there only to improve directional control. There were no gears or transmissions on the helicopter.

The engines could operate for at least 50 hours with no maintenance. The XH-26 could even hover and fly on just one engine.

The single-place helicopter was 12 feet (3.73 meters) long, 6 feet, 2 inches (1.88 meters) high, with a rotor diameter of 27 feet (3.73 meters). Maximum speed was 84 miles (135 kilometers) per hour with a range of only about 104 miles (168 kilometers). Its service ceiling was 7,000 feet (2,134 meters).

The Air Force and Army carefully evaluated the five prototype XH-26s and put them through all kinds of maneuvers. Vertical climbs and descents were reportedly outstanding. However, the military found the XH-26 had its disadvantages — a loud noise problem, very high fuel consumption, and speed and altitude limitations. The armed forces were also very concerned about safe autorotation in the event of a power loss and the drag of the pulse-jet engines.

The military continued XH-26 flight tests until 1954. In the end, no aircraft were ordered and the helicopter program was eventually cancelled.

At least two American Helicopter XH-26 rotary-wing aircraft survive. There is one on display at the National Museum of the U.S. Air Force in Dayton, Ohio. There is a second XH-26 in storage at the U.S. Army Museum in Fort Rucker, Alabama.

No commercial versions of the XA-8/XH-26 helicopters were ever built by the American Helicopter Company. It had plans to develop commercial helicopters, but was fully occupied with its defense work. Its failure to obtain future sales from the military finished the little helicopter company, and it eventually disappeared. ✦

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Bob Petite | Bob is a member of the Twirly Birds, The Vertical Flight Society, the Canadian Aviation Historical Society, the American Aviation Historical Society and the Bell 47 Helicopter Association, Inc. He is the author of *The Bell 47 Helicopter Story*.

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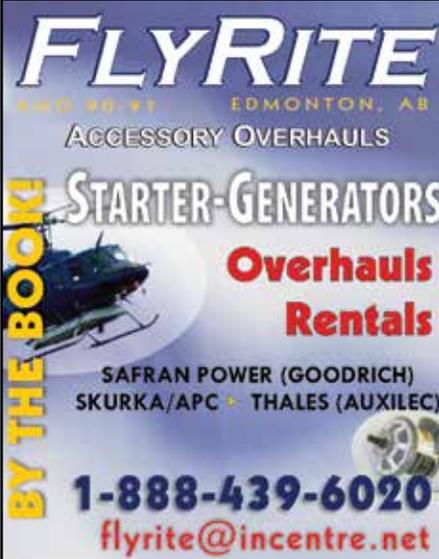
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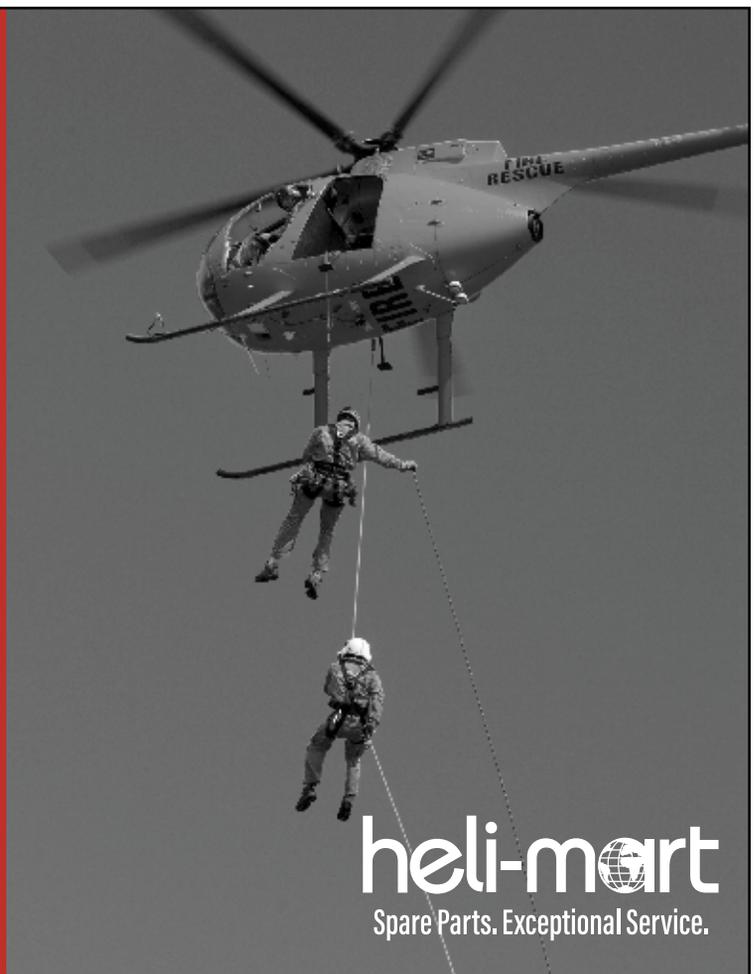
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THIRTY BELOW, AND FEELING IT!

I should have known that my first flying assignment to Wenatchee, Washington's Icicle Creek would come in the dead of winter. "Fine," I said. "The Huey loves cold air." It didn't matter about me.

Cold air is just what you need when you're long lining big, fat (burnt) logs off steep terrain running the length of the canyon. Density altitude? Forget about it! Not a factor. Fill the bag with go-juice and load up the log trucks. That's how we rolled at Icicle Creek. And logging was good.

The hookers were celebrating the fact that most of their logs were flying without the usual fussing over weights. It seemed like anything they hooked up would fly, there were tons of torque available in this atmosphere and engine temps were in the green.

Visitors were stopping at the log landing, watching from a safe distance as my sister ship and I brought in turn after turn, pumpkin after pumpkin. The landing rat radioed that a former Vietnam Huey pilot had watched for an hour, saying he'd never seen a Huey do such awesome work. My helmet grew tighter.

So many helicopter-harvested logs plugged the log landing that the loader operator was taxed to stack them into decks, creating towering monuments of wood on either side of the road. Log trucks struggled to keep up, the mills were sawing a glut of cellulose and everyone seemed happy. And then it happened.

Racing out of Canada, Arctic air blew into Wenatchee Valley and froze everything in sight. Oh, the helicopters survived OK – we had our precious Hueys wrapped up in weather tarps overnight. Getting our gasoline generator to start at -30 F (-35 C) was another thing. Until the generator starts, the space heater won't ignite, and a work crew's shivering (and swearing) begins in earnest.

Fortunately for me, my better half was aware of me freezing my butt off every winter. Lourdes had zeroed-in on a winter clothing sale at a massive sporting goods outlet in a distant metropolis. The big box store was packed with shoppers when we got there, but to our amazement, there were two fine-looking snowmobile suits available in my size. "Buy one, get one

FREE," the sign said. So we did.

Ergo, I feared not the Arctic blast when it came, and was pleased as punch to fly logs from the rays of dawn until the arrival of dusk. Or at least until something broke, which happens all too frequently in the heli-logging business. Only this time, it would be the danged loader, and it didn't exactly break. It simply wouldn't start. Diesel #2 stops flowing at thirty below, wouldn't you know?

Snug as a bug in my new outfit, I drove over to the log landing along with my frozen mechanic to observe firsthand what was transpiring with the frosty loader – maybe we could help and get back to work sooner? Driving through a stark valley of logs, we spotted the yellow loader with its grapple frozen to the ground.

The loader operator was directing his glowing space heater's heat signature into the open engine compartment in an effort to thaw the slushy diesel fuel enough to start the massive machine's miserable motor. The stench of diesel and heater exhaust permeated the air. An hour went by and nothing moved.

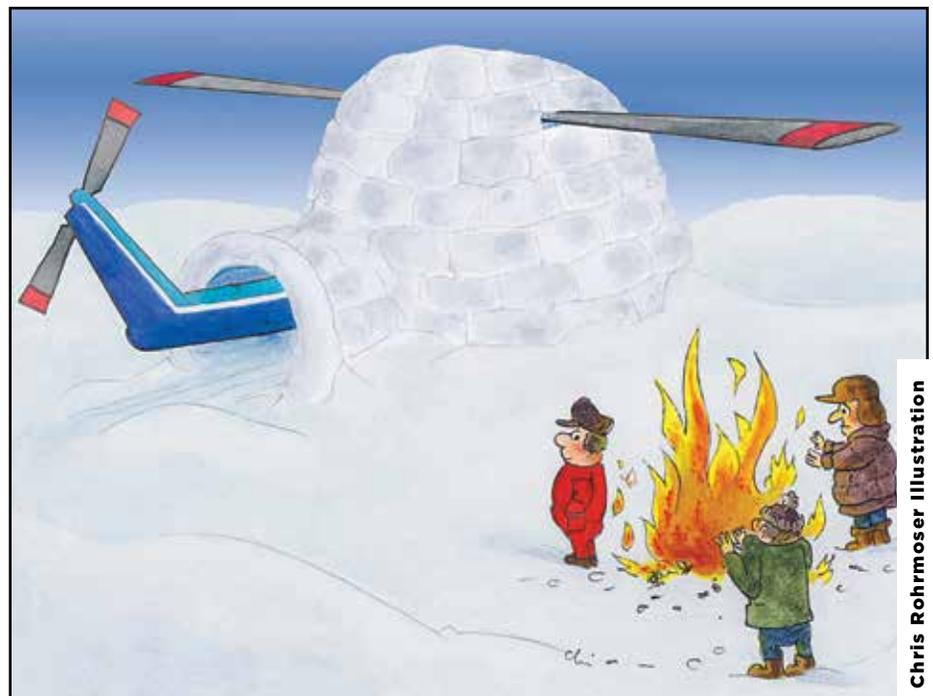
One can only sit so long in a crew-cab pickup listening to Top 40 radio and/or a disenchanting workmate, so I soon joined those gathered around a lively fire many

meters from the yellow steel. The cold was intense once we transitioned outside, so the fire the chasers built really hit the spot. We got close to it.

As the warmth soaked into our bones, tongues loosened up and soon we were telling tall tales and swapping lies as if there was no truth to be found anywhere around Wenatchee. We felt free to bury our boots in all the bullshit. Finally warm, I decided to go visit the loader operator, still thawing away.

"Whoa, Wingo, your ass is on fire!" I heard someone shout from behind me. Spinning my head around, my wide-open eyes were rewarded with the sorry sight of melting rip-stop nylon, dripping off what was left of the backside of my new snowmobile outfit – from my rosy cheeks down to my bulky boots!

Suddenly I was reminded that it was thirty degrees below zero. My tightie-whities were doing very little to keep my backside from turning into twin cakes of ice. A chorus of manly jeers and whistles arose as I retreated to the toasty crew-cab, trailing smoke. The seat bottom was too cold for my bare butt! I had but one thought in mind: getting back to my camper and climbing into that free snowsuit of mine. ✦



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