APRIL//MAY 2018 ISSUE

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## MIDDLEWEIGHT CONTENDER

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### **ON THE COVER**

The second Airbus H160 prototype flies near the Red Rock Canyon area west of Las Vegas during a flight evaluation by *Vertical* writer Jon Bourke. The aircraft is now completing a demonstration tour of North America. **MIKE REYNO PHOTO** 

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### Publishers

GROUP PUBLISHER | Mike Reyno, mike@mhmpub.com GROUP PUBLISHER | Linda Reyno, linda@mhmpub.com ASSOCIATE PUBLISHER Derek Kast, derek@mhmpub.com

### Editors

SPECIAL PROJECTS EDITOR Elan Head, elan@mhmpub.com

EDITOR-IN-CHIEF | Oliver Johnson, oliver@mhmpub.com ASSISTANT EDITOR Ben Forrest, ben@mhmpub.com JR. EDITOR Dayna Fedy, dayna@mhmpub.com COPY EDITOR Amitav Dash, amitav@mhmpub.com

### Sales

SALES & MARKETING DIRECTOR | Tim Muise, tim@mhmpub.com MARKETPLACE SALES MANAGER Carla McKay, carla@mhmpub.com

CIRCULATION MANAGER Leanne Willis, leanne@mhmpub.com

### Design & Web

PRODUCTION MANAGER | Jen Colven, jen@mhmpub.com GRAPHIC DESIGNER Kaytlyn Wismayer, kaytlyn@mhmpub.com WEB DEVELOPER Shawn Pieters, shawn@mhmpub.com

### **Contributing Writers**

Jon Bourke, John Carinha, Thierry Dubois, Jon Duke, Geoff Goodyear, Lisa Gordon, Kim Hutchings, Mike Muench, Bob Petite, Andy Roe, Chris Thatcher

### **Contributing Photographers**

Will Graham, Lloyd Horgan, Heath Moffatt, Anthony Pecchi. Bob Petite, Mike Reyno, Skip Robinson, Charlie Vowles

## **Our Publications**







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In Canada: 500 Trillium Dr. Unit 23 Kitchener ON N2B 1E5 In the United States:



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

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

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International Serial Number ISSN 1703-8812

Canadian Publication Mail Agreement Number: 40741549 Postmaster: If undeliverable, return mailing label only.

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Stop Talking About Safety. Start Listening.



While the managers of helicopter companies may genuinely believe they're committed to safety, too often they're not actually listening to the safety concerns being voiced by their employees. On March 16, Helicopter Association International (HAI) announced it would be forming a working group to learn from the results of recent helicopter accidents.

There is certainly plenty to learn. Between Jan. 1 and the time this issue went to press, 21 people died in civil helicopter accidents in the United States alone. That's far more than the 14 people who died during the same time period in 2013, a year in which U.S. civil helicopter accidents spiked to concerning levels. That year, a total of 62 people died in fatal helicopter accidents, according to the U.S. Helicopter Safety Team (USHST). Contrast that to 2015 — when the U.S. civil helicopter industry recorded a total of just 28

fatalities for the entire year — and it's clear that recent trends are cause for alarm.

HAI's intentions are laudable, as is its willingness to open the working group to any interested party, not just member operators. Still, a look at the overlapping membership of the many helicopter safety organizations that are already in existence — including the USHST and the International Helicopter Safety Team (IHST) — suggests that we're missing some key perspectives in understanding our industry's safety problems.

Organizations like the USHST and IHST can provide a valuable framework for grappling with safety issues. And, sometimes there's no substitute for the type of face-to-face meeting that HAI is planning for its working group in Washington, D.C.

However, the membership of these groups is necessarily biased toward the same small handful of professionals with the time and financial backing to be involved with them. While most of these people are tremendously committed individuals with a true passion for safety, many of them also represent operators, original equipment manufacturers (OEMs), and government agencies with a vested interest in the status quo. It is probably not a coincidence that many of the recommendations that have come out of these organi-

zations in the past have shifted the responsibility for preventing accidents almost entirely onto line pilots and mechanics.

For example, by 2010, the IHST had established that accidents with post-crash fires account for a disproportionate share of helicopter fatalities. Yet wider adoption of crash resistant fuel systems (CRFS) didn't figure anywhere on the Top 20 list of safety recommendations that the organization released in 2011, which emphasized pilot training and decision-making.

The U.S. helicopter industry as a whole didn't start looking seriously at crash safety enhancements until late 2015, when public pressure forced the Federal Aviation Administration (FAA) to create a Rotorcraft Occupant Protection Working Group to study the issue (see *p.38, Vertical 911, HAI 2018*).

Actions like installing CRFS are costly for both operators and OEMs. It's certainly much easier for them to simply tell pilots not to crash, which is essentially what the IHST did when, in its original Top 20 list of safety recommendations, it urged pilots to follow an "I'M SAFE" checklist for personal risk management. In my research, however, I've found that line pilots and mechanics are often the ones with the greatest insight into the flawed systems and incentives that make accidents inevitable. While the managers of helicopter companies may genuinely believe they're committed to safety, too often they're not actually listening to the safety concerns being voiced by their employees — whether those employees are doing so through a formal safety management system, or simply by speaking up.

In other cases, pilots and mechanics may be too intimidated to voice those concerns, because management has made it clear that doing so will put their livelihoods at risk. Pilots and mechanics who are fearful for their jobs and can't afford to lose them certainly won't be paying their own way to D.C. to speak publicly on the subject.

As long as these and other perspectives are missing from our discourse, it's doubtful that one more working group will solve our safety issues. With its latest working group, HAI is focused specifically on examining the applicability and appropriateness of existing regulations as they relate to certain mission profiles.

However, the industry's experience with CRFS — in which a regulatory loophole has allowed many newly manufactured helicopters to avoid complying with fuel system crash resistance standards enacted in 1994 — shows that operators and OEMs have strong incentives to preserve loopholes that are financially advantageous to them.

Moreover, operators and OEMs who have a vested interest in maintaining cordial relations with their regulator won't necessarily be the first to call out that regulator for lacking the resources or expertise to adequately surveil unsafe operators.

In the case of CRFS, it took horrific video footage and public outrage to make the helicopter industry reconsider attitudes that were rooted almost entirely in short-term financial calculations. Yet the problem of post-crash fires is not a new one. For decades, there have been scores of crash survivors and surviving family members who could have pointed out the consequences of our indifference to crash safety, yet we ignored them.

Any of these survivors could have predicted the many preventable post-crash fires that would occur in helicopters without CRFS. With other recent accidents, too, there were people close to the operations who might have predicted them - just as there are now plenty of people in our industry with the power to predict the next accident.

As an industry, let's look for new ways to help these people make their voices heard. Then, let's actually listen to them.

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## Column

Safety // Geoff Goodvear



Let's Talk **About the** Weather



Understanding the weather is of empirical importance to us VFR scud runners, a breed mostly incapable of flying around or over but destined to constantly fly "through" the weather.

A TV commentator admonishes his listeners for frequently tuning into the weather channel. "Don't do it!" he pleads. "The music is terrible and the news is all bad!"

So, your survey is finished and your passengers have abandoned you. All that's left is to check the weather and take the aircraft on the two-hour ferry flight home. You have bags of fuel, the aircraft is light and the forecast calls for 2,000-foot overcast with occasional showers. We'll squeak in under that.

You are blasting across the countryside having more fun than humans should be allowed to have. You notice the ceiling starting to come down a bit just ahead of you but not to worry, you are only a gunshot away from the valley that takes you right back to the base.

Now the horizon is obscured and you are pushing to get into that valley. You feel an increasing frustration at not only the weather, but the unenlightened individuals who forecasted it. The ceiling settles a little further. Now the showers turn to fog and within minutes you are hovering from treetop to treetop trying to maintain visual reference with the ground.

A nervous energy begins to steep your thoughts as surely as tea colors water. You have so much to do when you get home, the aircraft has to leave early the next morning and there are a million other reasons why you should keep going. Mercifully, years of experience and those hairs standing up on the nape of your neck convince you that it is time to land and take a breath.

Our industry is comprised of predominantly visual flight rules (VFR) operations, and at one time or another we have all been confounded by two great flight planning challenges: erroneous forecasts and huge geographical gaps in actual weather reporting.

The weather and its variations are always primary topics of conversation of the general population. Discussing the weather comes as naturally as our shared genetic code or that unexplainable desire to watch multiple re-runs of Star Trek. Understanding the weather is of empirical importance to us VFR scud runners, a breed mostly incapable of flying around or over but destined to constantly fly "through" the weather. Its effects on helicopter flight safety are immediate and pervasive.

Pilot decision-making issues notwithstanding, dealing safely with weather is something all pilots must contend with, especially in the VFR world. Obviously good weather information is critical to good flight planning. Some of us are blessed with working in a less meteorologically challenged place, but others of us are destined to live out our days in parts of the country where there are nine months of winter and three months of bad skiing and CAVU stands not for "ceiling and visibility unlimited" but for clouds all the vay up!

Here in the far east, we have a lot of real estate between reporting stations and weather forecasting is more of a black art than a science. Indeed, the term "forecasting" can be a bit of a misnomer and when special weather observations start chasing forecast amendments, "nowcasting" is sometimes more accurate.

But one must admit that the accuracy and resolution of the computer modeling they use to generate forecasts these days is a far cry from the forecast I was given many years ago when planning a flight to Hopedale on Labrador's north coast. The weather briefer inquired if I had "one mitt." Taken aback, I asked why that would make any difference to the forecast. He replied, "On one hand it could be cold... on the other hand it could be warm!"

In many respects, technology has come to the rescue and the dart boards and roulette wheels used to write forecasts of the past have been replaced with some pretty fancy computers and algorithms. These digital tools, along with a proliferation of web-based cameras, have taken a lot of the guesswork and excitement out of our remote area flights. Access to all this valuable information has also greatly improved over the years and access to the Internet and Wi-Fi in far-flung remote camps is now quite common.

But the one common thing we want to make sure stays in the equation is a pilot's common sense. Yes, the technology is pervasive, the graphics are stunning and the forecasts are becoming more accurate, but we need to maintain a healthy respect for the occasional meteorological curve ball and not be intimidated by the possibility of landing and waiting it out.

So, when the forecast calls for CAVU conditions with onshore flow and temperature and dew point the same... be suspicious. Despite all the cool technology and improved access to it, your weather decisions are still paramount for a safe flight.  $\succ$ 

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## Column

Focus on Training // Andy Roe



Pilots Who Lose Control

## "

Yes, pilots with horseshoes in the right places have managed somehow to regain visual reference and control after VFR flight into instrument meteorological conditions, but this is a rarity and can't be relied on. Helicopters are unwieldy and unstable, and difficult to learn how to fly and control — and not just anyone can do it. For example, the great engineer Soichiro Honda, who built an automotive empire and started an aviation company, was fascinated with helicopter flight. Though he tried many times to learn helicopter control, he eventually gave up. He might have had too many other things on his mind.

The airplane pilots who first brought the early Bell 47 helicopters up into the hover had great difficulty controlling the ungainly aircraft. They were convinced there was a design flaw in the rotor system, and to correct this, engineers installed a stabilizer bar between the two blades hoping to give better control and stability. In fact, there was nothing wrong with the original design; the instability was just typical of helicopter flight. The subsequent Bell 206 had no stabilizer bar installed.

These days, automation technology relieves helicopter pilots from much of the hands-on control needed to fly. But even instrument flight rules (IFR) helicopter pilots need good hands-on hover control at slow speeds, because present day helicopter automation may be ineffective below 40 knots (check your IFR flight manual/pilot operating handbook for the exact speed).

Instructors know the frustration students experience when learning helicopter control, because after all, they went through the same process themselves. Because students lose control so often in the early stages of training, instructors have a stressful job just keeping training flights safe in the air. Once student pilots master the delicate balance of helicopter hover control with both hands and feet constantly in motion, control and stability at slow speeds becomes much more autonomic. Students can then move on to learn important concepts such as single pilot resource management, good decision-making, and situational control.

Newly licenced commercial pilots have found a way to make a living by flying, but they can still lose control on the job if they don't fully understand the aerodynamic intricacies of the two rotor systems; if they are slow to react and unsure of what to do when things go wrong; or if they lose sight of the ground. All of these issues should have been covered in basic training, but many pilots are weak in these areas of potential control loss. It's tough facing a serious onboard challenge or malfunction, but it's part of the job. Is it possible that some pilots flying with paying passengers onboard become hopelessly mired in difficulty and then give in to that situation? I cannot point to any studies showing this to be true, but I know in my instructor's heart of hearts that it is.

Pilots are at risk of major issues if they don't understand the inherent dangers of slow speed flight, and all-up descending weight on approach. Faced with a difficult landing area, they slow down to a complete stop short of it, and then try and walk the helicopter slowly in to the landing. If the helicopter is heavy and starts to fall with no lift from forward flight, the helicopter could easily start descending rapidly in its own downwash, or the tail rotor could suddenly become ineffective — and when the pilot panics and pulls collective, control is then completely lost.

Pilots with a command of helicopter aerodynamics know how to descend down an approach slope at high power and slow speed into a tight area with the vortex ring state just ahead of them. They know how to play with lift from translation and use slow forward motion to stay just ahead of the shuddering airframe vibration from the onset of the dangerous blade tip vortex. With small fore and aft cyclic movements to control translational lift, they are able to approach safely. Pilots who approach like this fully understand the vortex ring state as a threat. Pilots who constantly keep their speed up to be safe on approach do not.

The interconnection between slow speed, translation, weight, rate of descent and vortex ring is bewildering to many students so desirous to become pilots, but the stakes are high and a helicopter is dangerously unforgiving in the wrong hands.

Visual flight rules (VFR) helicopter pilots use wide peripheral vision to maintain stability in flight. Visual cues from across the horizon ahead are necessary to smoothly and accurately control turns, climbs, and descents. If the weather deteriorates, the wide visual cues begin to narrow affecting overall stability. If the pilot loses all outside visual reference, control of the helicopter is easily lost. Yes, pilots with horseshoes in the right places have managed somehow to regain visual reference and control after VFR flight into instrument meteorological conditions (IMC), but this is a rarity and can't be relied on. If you have an instrument rating then you should know better than to get mixed up in IMC in a basic VFR helicopter.

Helicopter crashes resulting from theory of flight illiteracy, lack of emergency procedure preparedness, or inadvertent IMC entry are inexcusable. Loss of control accidents attributable to inadequate training must be reduced. Pilots maximize their safety in flight by fully understanding helicopter control at low speeds. They are well rehearsed at managing a mechanically crippled helicopter to a safe landing, and they have had thorough training in how to manage or stay away from all forms of adverse weather. With good instruction and better pilot preparedness, control loss accidents can be greatly reduced — and the public perception of the safety of helicopters will improve. Insist on good training; it'll keep you in control.



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### Column Focus on Maintenance // John Carinha



**Connections** 



As a client, I had the right to request any and all certification standards, procedures and/or relative data pertaining to any said repair. Connect, develop and build. These three words are synonymous with the benefits of attending HAI Heli-Expo. Hosted in Las Vegas, Nevada, this past March, it didn't fail to deliver on those attributes. Vegas on its own provides opportunities, experiences and moments, and I was fortunate to be front and center with many. However, despite the venue city being a place where shirts are lost, slapstick weddings are many and sins are a plenty, business was still the order of the day.

As a small company, we lean heavily on our vendors and original equipment manufacturers to supplement our business. They afford us product sales opportunities as certified dealers – something that is very much a privilege for both parties – and equally become an extension of our business model by at times providing third-party services that parallel what we might already offer in house. Suffice to say, I find myself trolling online aviation marketplaces not only in search of various parts but also the companies that may supply or repair them.

A few years back we got involved with a California-based company. Their specialty was both military and commercial avionics instrument repair services, and they seemed a great match to support our newly added contracts to provide full airframe support on some older aircraft types. Initially, purchase orders and shipments were rampant. Price points were within reason, where everyone stood to gain and deliveries were being met.

However, like all new things, this got old. Soon lead times were stretched, quotes were continually getting revised and worse still, parts were received with missing hardware and or loose parts within their formal casings. To add insult to injury, certification standards and relative paperwork was either missing altogether, or incomplete at best.

Their website is quick to advertise their certifications: Federal Aviation Administration (FAA), European Aviation Safety Agency, and International Organization for Standardization (ISO). Really? Interesting. In a quality document obtained directly from their website (which has since been removed) I opted to exercise my rights as a client to request what they clearly advertised as policy. As a client, I had the right to request any and all certification standards, procedures and/or relative data pertaining to any said repair.

Upon submitting this request based on the suspect parts I had received, unbeknownst to me, I had taken the first step in what would eventually be the termination of our working relationship. I later learned that the company had been federally charged with four counts of violating the Arms Export Control Act and paid a \$250,000 fine as a result of their VP of international sales fleeing the country. Suffice it to say, I never got my documentation.

All this said, imagine my surprise to see said company a few aisles from my booth at Heli-Expo this year. After a couple days of drowning thoughts with sake bombs and overpriced sushi, I decided to walk over and bury the hatchet. To my dismay, company brass had already left the show a day early. In their place was a locally hired temp who kindly took down my information and relayed my desire to reconcile. This was after all business, nothing personal.

Upon returning home I submitted a request for quote (RFQ) on a variety of instruments we needed repaired. I was willing to afford them a second chance despite the shady past. Within an hour of submitting my RFQ, my office line rang. On the other end was the company quality manager — my proverbial nemesis from years prior. The conversation was swift and pointed. I explained my desires and needs, reflected a bit on the past for context and made clear it was time to move forward. His response? "Yeah, I looked you guys up and I see that you're on our unapproved client list. Sorry, but we can't help you." Click.

Did I just hear right? Unapproved CLIENT list? How does one say that with a straight face and still manage to make a nickel? If audacity had a face and name, this fellow's was it. Pound for pound, comparing both companies would be a little like comparing David and Goliath. At the time of the relationship's inception, I was the small squeaky wheel asking for grease. Why was there such aversion to answering my questions and requests pertaining to suspect workmanship? What was there to hide and avoid disclosing? I'll never have that answer; but more importantly, they'll never have my or my client's business, either.

Like David, I too had a sling, except mine didn't contain a rock but rather, the FAA. The lesson? Do your homework and screen your vendors. It's never wrong or inappropriate to raise questions. When your conscience is clear, the answers should flow.

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## **Column**

Focus on Leadership // Kim Hutchings





Before working on creating a better safety culture with the people in the organization, the safety leaders or manager must ensure they have the qualities it takes to lead by example. Most jobs in aviation require a level of safety awareness. We are constantly reminded of the underlying threat of "human error." Coming to work tired, stressed, or becoming distracted can lead to mistakes in any profession, but in ours those mistakes can have catastrophic results.

The helicopter community works hard to create a strong safety culture, but for those that have the word "safety" attached to their role or job title, they work that much harder to decrease the chances of human error in themselves and others.

Unfortunately, I think safety in aviation often misses the mark. The system is created to find fault in a person and not nearly enough time (actually no time) is spent on *developing* a person. Extensive safety management system (SMS) programs are created to include countless risk matrices to assist in the decision-making process. But at what point do we stop plugging in numbers to charts and graphs in an effort to control for every "predictable" outcome so that a decision can be made? When do we start focusing more on the *individual*? Wouldn't we be better off providing people with the skills they need to manage themselves?

Policy and procedures are absolutely important to maintain safety in aviation operations, but safety managers need to spend more time assessing their team and the organization as a whole. Each person is there to perform a job in order to create the big picture. If one piece is missing from the puzzle, the picture is not complete. If one person is not onboard with safety, it can mess up the whole system. It doesn't matter how much risk assessment you do, how thorough your SMS program is, or what you perceive your safety culture to be; if one person is having a bad day or does not feel part of the team, the whole operation is at risk.

Newly promoted safety managers are eager to create and promote the perfect safety culture — after all, that is what the job is about. They review policy and procedures and safety models, and they perform risk assessments, but are they looking at each individual for who they are, and what they contribute to the operation in regard to talents that go beyond their given job description? For example, is there someone that is good at promoting teamwork? Is there someone who lives by the rules, or is there someone who tends to bend the rules? Each personal quality can play an integral part in the safety puzzle aside from just their job role.

Focusing too much on producing a textbook SMS program without clearly understanding the unique and individual players is going to stall your progress in achieving the safety culture that you're setting out to create. Perfecting the safety manual and making more policies do not truly address the safety issues. The most important thing is the people.

Safety is not "one size fits all." A truly just culture in safety requires the development of each individual's personal self-awareness. However, before working on creating a better safety culture with the people in the organization, the safety leaders or manager must ensure they have the qualities it takes to lead by example. A good way for a safety professional to improve safety is to work on improving his or her own skills in leadership and emotional and social intelligence.

In his book *Working With Emotional Intelligence*, Daniel Goleman identifies some key skills for working with people that we can adapt to help safety managers be effective in their role.

The first is to have influence. According to Goleman, people adept at influence are able to sense or even anticipate their audience's reaction to their message and can effectively carry everyone along toward an intended goal. A safety manager must get a sense of the level of the safety culture by who responds and who doesn't.

Next is open communication, a lack of which is the biggest single complaint of American workers, according to Goleman. Safety managers should be aware that too many policies, procedures, and checklists without communication between teams, individuals, and management can leave a person feeling like a cog in a machine — and less like someone who is contributing to the organization.

Communication is not only about listening to others, it's about controlling your own moods and emotions. Maintaining control of your mood during an emergency or in the face of someone else's panic or distress, will help you and others remain calm and effectively involved in the resolution. According to Goleman, a study of middle and upper managers found that those rated as the best communicators shared the ability to adopt a calm, composed and patient manner, no matter what emotional state they were in. For a safety manager, it is extremely important for them to be able to do the same.

Conflict management is another key skill. Those skilled at conflict resolution can spot trouble as it is brewing and take steps to calm those involved. Diplomacy and tact are essential qualities for success in jobs where people depend on each other under pressure. Safety managers need to be able to respond quickly and accordingly to any conflict between groups or individuals.

The last quality is leadership. "The art of leadership is *how* a person implements change, not just in the change itself," writes Goleman. This is probably the most important skill a safety manager needs when creating a safety culture within an organization.

3

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## **RotorBeat**

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The second prototype of the H160 appeared on Airbus Helicopters' booth — the first time an H160 prototype has been displayed at a tradeshow. At the show, Babcock signed a five-year frame agreement for the purchase of "a fleet" of H160s for critical services missions, becoming the global launch customer for the type.

## Returns to Las Vegas

Over 17,000 helicopter industry professionals flocked to Las Vegas, Nevada, at the end of February for Helicopter Association International's Heli-Expo 2018.

More than 700 companies exhibited at the show, with 51 aircraft displayed on the show floor.

Among these were the medium twin Airbus H160 and light single Kopter SH09, with the second prototype of both aircraft on display for the first time. The two programs had noteworthy shows, with the H160 recording a launch customer in Babcock International, and the SH09 taking 40 orders and commitments.

Airbus also announced the launch of a strategic partnership with Fly Blade to develop new premium on-demand helicopter flight experiences, revealed the launch of a new helicopter pilot and maintenance crew training center in Grand Prairie, Texas, and announced the order of 25 EC145es from Metro Aviation.

Leonardo recorded almost \$170 million

of orders during the show, but its major news was the signing of a landmark agreement with Era Group to launch the AW609 tiltrotor in the U.S. commercial market. It also announced a new medium utility helicopter reconfiguration program, with Waypoint Leasing, that aims to introduce more AW139s into the utility market.

Bell — with a new name and brand — unveiled the 407GXi (an upgraded version of the 407 GXP) and brought the mockup of the urban Air Taxi it is developing with Uber to Las Vegas.

Sikorsky announced the delivery of the 300<sup>th</sup> S-92 helicopter (to Era Group) and celebrated the achievements of the Los Angeles County Fire Department during the recent wildfire season.

Pratt & Whitney Canada launched six new aftermarket services, while Safran Helicopter engines previewed the upcoming certification of four new engines in 2018.

Next year's show will be in Atlanta, Georgia, March 4 to 7 (the exhibition hall will be open March 5 to 7), 2019.

#### Photos by Anthony Pecchi & Skip Robinson

Vertical Magazine (far left) had a large presence at the show with a team of 14 people — and co-hosted two beer parties with Precision Heliparts Inc. Thanks to all those who stopped by our booth to say hello!



Leonardo recorded an order from Sino-US Intercontinental Helicopter Investment of China for 26 helicopters worth more than \$145 million, and orders from other customers totaling almost \$170 million at the show.



Airbus Helicopters, Thales and Helisim announced they will join forces to construct a new, state-of-the-art helicopter pilot and maintenance crew training center in Grand Prairie, Texas. The Airbus Helicopters Training Center will include the first H145 and H175 Level D simulators in North America.





Kopter recorded 40 orders and engagements for the SH09 at Heli-Expo. The company exhibited the second prototype of the type together with a mock-up fitted with a state-of-the art EMS interior by Metro Aviation.



### RotorBeat ② Industry // Operator // OEM // UAS // International





Robinson Helicopter Company reported increased sales in 2017, a larger proportion of international deals, and growth in its global sales and support network.



A Firehawk Helicopters Sikorsky S-70 arrives in Las Vegas. At Heli-Expo, Sikorsky announced the sale of an S-70i to the City of San Diego for firefighting work.



A popular attraction at the show was Bell's mock-up of the cabin for the Air Taxi it is developing with Uber.



Airbus announced that the H135 has received FAA certification for the Helionix avionics suite.





Metro Aviation placed an order for 25 Airbus EC145e helicopters, which will be manufactured at Airbus's facility in Columbus, Mississippi.

### **RotorBits**

### Elbit Systems to acquire Universal Avionics

Elbit Systems Ltd. is to acquire Universal Avionics Systems Corporation after the two companies received government approvals for the transaction. In announcing the move on March 22, Elbit said it expected to conclude the acquisition "in the coming weeks."

Papillon Helicopters has a fleet of over 40 aircraft, largely consisting of Airbus EC130 B4s and AS350 B3s. Papillon Helicopters Photo

### StandardAero & Papillon sign MOU for 40 CRFTs

StandardAero and Papillon Airways have signed a memorandum of understanding for 40 retrofittable crash-resistant fuel tanks (CRFTs) in support of Papillon Grand Canyon Helicopters' fleet of Airbus AS350 B3 and EC130 B4 tour aircraft. Installation of the first CRFT will take place in April.

The CRFT has been developed by StandardAero (formerly Vector Aerospace) and Robertson Fuel Systems as a direct replacement for all AS350 models, including the AS350 C, AS350 D/D1, AS350 B/B1/B2/BA/B3 and AS350 B3e (H125), as well as for the EC130 B4.

### Airbus Helicopters & Safran appoint new CEOs

Airbus SE has appointed Bruno Even as chief executive officer of Airbus Helicopters, effective April 1, 2018. He will report to Airbus CEO Tom Enders and join the company's executive committee.

Even comes to Airbus from Safran where he had been CEO of the helicopter engines business since 2015. He succeeds Guillaume Faury, who is now president of Airbus Commercial Aircraft.

Even has been replaced as CEO of Safran Helicopter Engines by Franck Saudo, who was previously CEO of Safran Transmission Systems.



Bell unveiled the 407GXi, an upgraded 407GXP featuring new avionics and an upgraded engine.



Sikorsky recognized the L.A. County Fire Department for its search-and-rescue and maintenance achievements during last year's devastating wildfire season.

#### RotorBeat 😵 Industry // Operator // OEM // UAS // International





Waypoint Leasing and Leonardo announced a new Medium Utility Helicopter reconfiguration program, which aims to introduce more AW139s into the utility market.



Pratt & Whitney Canada launched six new aftermarket services at Heli-Expo 2018, including a certified pre-owned engine program for some of its most popular engines, timed to coincide with an expected wave of lease returns.





A matte black S-76D from Canadian operator Fig Air was on display on Sikorsky's booth.



Sikorsky celebrated the delivery of the  $300^{\text{th}}$  S-92 — to Era Helicopters — at the show.



Eagle Copters displayed its overhaul capabilities by bringing a recently-customized Bell 212 to the show.





**25** APRIL/MAY 2018

Bell's new 407GXi offers operators new avionics an upgraded engine. **Bell Image** 

## Bell unveils the 407GXi

#### **BY CHRIS THATCHER**

At HAI Heli-Expo 2018 in Las Vegas, Nevada, Bell unveiled the 407GXi — a converted 407GXP featuring new avionics and an upgraded engine.

The helicopter, which received certification from Transport Canada on Jan. 19, features two major changes from its GXP predecessor, as well as flight plan and health monitoring systems that capitalize on onboard connectivity.

"We are always looking at ways to innovate our current product line to provide our customers with the most capable, dependable, and technologically advanced aircraft in the market," Susan Griffin, executive vice president of Bell's commercial business, said in a statement. "The Bell GXi delivers improved pilot awareness, higher precision navigation, enhanced engine controls, and improved connectivity."

The engine was upgraded from the Rolls-Royce M250-C47B/8 to the M250-C47E/4. The high and hot performance introduced with the GXP in 2015 has been retained, but the engine control system is now a dual channel FADEC.

"We added three layers of redundancy with this new engine while keeping the same performance for high and hot," said Michael Nault, Bell Helicopter Textron Canada's program director for light helicopters, during a pre-Heli-Expo briefing at the company's production facility in Mirabel, Quebec.

He said that the previous engine had one computer controlling the engine, with a manual backup. "If your engine would fail, you could control it with the twist grip [on the throttle] and go in manual mode," he said, adding while that might be benign for an experienced pilot, it created challenges for newer pilots. "[Now] if you have a failure, you go from your primary channel of FADEC 1 to your primary channel on FADEC 2. If that fails, you go to your secondary channels."

The new engine also offers a four per cent improvement in range and fuel consumption, he said, while providing the aircraft with a cruising speed of 133 knots (246 kilometers per hour).

As part of the conversion package, the GXi also features Garmin's G1000H NXi integrated flight deck, which was first introduced on the Textron Beechcraft King Air series of fixed-wing aircraft.

"It's a complete change. Every box of the system changes, the screens, all the computers in the back, processing, all the conversion boxes going from the engine to the cockpit," Nault explained. "It is basically changing a 1980s computer with a 2020s computer. It is five times faster, with a crisper screen, crisper display, and faster boot up time. It is an LED backdrop display, so it doesn't emit as much heat as the older ones."

Other upgrades include the Garmin FlightStream 510, a WiFi and Bluetoothenabled multimedia card that allows pilots to upload flight plans from a smart device. Step into or walk near the helicopter and, with the tap of a button, "the flight plan gets transferred into the aircraft," Nault said. The same technology allows transfer of maintenance and health usage monitoring data from the aircraft to maintainance devices.

The GXi also features the Garmin SurfaceWatch, an enhanced runway monitoring technology that can help prevent pilots from taking off or landing on a taxiway or the wrong runway and provides alerts when a runway is too short. Finally, the aircraft will be fully automatic dependent surveillance – broadcast (ADS-B) in and out compliant.

Bell is still delivering a few GXPs but expects to be in full production of the GXi by April, with first deliveries to follow late in the month.

While a GXP customer might admire the improved features in the GXi, Nault said the company would not retrofit the older model because significant wiring and structural changes were made to accommodate the new engine and avionics boxes.





![](_page_26_Picture_4.jpeg)

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### Study warns of personnel shortage

The U.S. is expected to see a cumulative shortage of 40,613 certified aviation mechanics between now and 2036. Skip Robinson Photo

![](_page_27_Picture_3.jpeg)

### **BY LISA GORDON**

The results of a new study confirm that the helicopter industry is expected to face a serious shortage of qualified pilots and maintenance personnel over the next 18 years.

The study, performed by the University of North Dakota (UND) in collaboration with Helicopter Association International (HAI) and Helicopter Foundation International (HFI), predicts there will be a shortage of 7,649 pilots in the United States alone between 2018 and 2036. That deficit will be driven largely by an expected 1.5 percent increase in the country's total number of airframes over the next two decades.

While this number is concerning, it's the results of the maintenance personnel forecast that are most alarming. In a presentation at Heli-Expo 2018, Dr. Elizabeth Bjerke of UND revealed that the U.S. is expected to see a cumulative shortage of 40,613 certified aviation mechanics between now and 2036.

"Industry as a whole has been talking about it, but I've seen a lot less being done than on the pilot side," said Bjerke. "However, we do believe the mechanic shortage will be much more pronounced [than the pilot shortage] if something drastic isn't done soon."

A survey of more than 250 HAI operator members, three quarters of them from North America, shows that 67 percent are already finding it more difficult to locate and hire qualified mechanics.

The shortage of helicopter pilots and aviation maintenance personnel is also being felt internationally.

Bjerke said one of the biggest threats to the personnel supply is the growing helicopter industry in China. In 2017, there were only one thousand helicopters operating there; but as the country's population and infrastructure continue to expand, China will need to import industry expertise. As its industry grows, it will siphon off pilots and maintainers from the rest of the world.

Closer to home, regional air carriers in the U.S. also represent a threat to the supply of helicopter pilots. As they scramble to fill their own cockpit seats, these operators are offering candidates rotary to fixed-wing pilot transition programs.

The UND reached out to three regional airlines to find out if helicopter pilots are

showing interest in these conversions.

"Lo and behold, the interest in these transition programs is very high," said Bjerke. "In 2017 alone, 500 [rotary] pilots transitioned through their programs with a 95 percent completion rate. That was at just three of these airlines. Many more are offering these programs."

While operators reported hiring pilots from the traditional streams – the military and civilian training schools, for example – poaching within the industry is also prevalent as larger companies with better incentive packages draw employees away from smaller operators.

In fact, 64 percent of survey respondents reported that when pilots leave, they are going to fly for other companies.

### **OPERATOR INPUT**

"There were a lot of thoughts out there from the membership on the shortage," noted Bjerke. "We put comments together to try to get a more in-depth perspective."

She said one common theme is that while the fixed-wing industry has well defined pilot career paths, those don't really exist in the helicopter industry. "There are lot of pilots with 250 hours, but the industry really needs people with high time and experience. So how do we take someone with lower experience and bridge them all the way through?"

On the maintenance side, some people felt efforts should be made to recruit and re-train qualified military mechanics to help mitigate the experience gap.

"There is a lack of preparation and knowledge needed when it comes to maintaining rotorcraft," said Bjerke. "The fear here is there are a lot of seasoned, experienced mechanics retiring soon, and there isn't that level of experience coming up through the ranks."

### YOUTH CONNECTION

Attracting the next wave of helicopter pilots and aviation mechanics is a big priority for HAI and HFI.

"Our industry needs to take a hard look at how we do things," said Matt Zuccaro, HAI president and CEO. "We really don't have a choice. These numbers show a future where the growth of our industry will be curtailed because operators won't have the workforce they need. But we have the option to change that future by acting proactively now to recruit the next generation of pilots and maintainers."

Bierke made several recommendations to address the looming shortage, including harnessing the power and creativity of young people themselves.

"We work day in and day out with this new generation, Generation Z," she said. "They are very different. They are digital natives. We need to embrace current technologies to communicate with this generation."

She suggested ideas such as creating and posting more helicopter pilot and maintenance videos on YouTube, Instagram and other social media sites, as well as designing helicopter filters for Snapchat and harnessing the power of virtual reality (VR).

"There are so many VR opportunities; it's already being used in maintenance training. How do we support this technology to get it down into the K-12 education system?"

Bjerke also encouraged industry members to create internships so students can help them identify the best ways to communicate with their generation.

The creation of defined career pathways for helicopter pilots and maintainers will also

go a long way to attracting Generation Z, which Bjerke said enjoys structure and job security.

As an example, she pointed to a recent partnership between UND and U.S. Customs and Border Protection. Concerned about its future supply of pilots, the government agency is working with the university to give student trainees the skills they need to join its ranks.

Bjerke also said industry must invest in things like recurrency training programs, financial assistance and more rotary scholarships for both flying and maintenance.

The impending labor shortage has the potential to severely cripple the helicopter industry. As Bjerke indicated, "drastic" action is needed.

Implementing solutions will require a united effort from all stakeholders - including government, industry, military, finance, insurance and education - to ensure there are enough young recruits to keep both rotors and wrenches turning.

![](_page_28_Picture_19.jpeg)

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# CityAirbus eVTOL presses ahead

Airbus Helicopters is hoping to complete the first flight of CityAirbus — its self-piloted eVTOL urban air mobility aircraft — by the end of 2018. Airbus Helicopters Image

### **BY OLIVER JOHNSON**

Airbus Helicopters has revealed new details of its CityAirbus electric vertical takeoff and landing (eVTOL) program, with a first flight of its demonstrator aircraft still firmly in its sights for the end of this year.

Airbus hopes the aircraft is a vision of the future of "urban air mobility," and its striking multirotor design and stylized aerodynamic appearance certainly make it look like something taken from the set of a science fiction movie.

But the manufacturer believes it's the most practical attempt yet to develop a viable product for the next evolution of aviation transportation.

The aircraft's propulsion is provided by four pairs of propellers: the lower propellers sit towards the bottom of four large ducts on the fuselage's corners, while the counter-rotating upper rotors sit exposed slightly above the ducts.

"This kind of multicopter architecture

allows you to completely redesign the aircraft from scratch," said Marius Bebesel, head of urban air mobility at Airbus Helicopters, during a recent presentation for aviation media at the company's facility in Donauwörth, Germany — where the project will be based until it has completed its first flight.

Despite representing something of a technological leap forward, simplicity is at the core of the aircraft's design. Four 140-kw lithium-ion batteries power the eight Siemens SP200D electric motors, which directly drive the eight fixed-pitch propellers. Instead of pitch control, the aircraft will adjust the revolutions per minute (RPM) of the propellers to move the aircraft forwards.

"The only real mechanical part on this aircraft is the propeller shaft," said Bebesel. "Of course, this simplicity has a big impact on operational cost, and this simplicity has an impact on maintenance costs."

The aircraft is also relatively compact at

just eight meters wide by eight meters long — a necessary consideration given its ultimate goal to operate in built-up urban environments.

"We want to keep this vehicle very efficient and compact at the same time," said Bebesel, highlighting the "three-dimensional ducts" as one of the key elements of CityAirbus's design. "This three-dimensional duct is making this concept really viable, because the ducted propeller allows you to increase the lift capability, while keeping the vehicle very compact."

This is important to reduce drag during cruise flight, he said, during which the ducts function as "a bit of wing."

And it's because of this that the aircraft will be able to meet one of the team's key performance targets — being able to achieve cruise speed in forward flight without having to pitch its nose down to any large degree. Bebesel claimed it will even be able to fly at a more neutral attitude than a traditional helicopter.

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### PERFORMANCE CHARACTERISTICS

At the start of the development process, Airbus performed a market study to establish popular requirements for an urban air transport vehicle — and it is these targets for size, speed and range that CityAirbus is being developed to meet.

"The [market study] has proven that you don't need to fly too fast for this mission, so for us it's 120 km/h [75 miles per hour]," said Bebesel. "But, as we're improving the vehicle, I think we we'll go beyond [that speed]."

The team is aiming for a maximum takeoff weight (MTOW) of 2.2 tonnes (4,850 pounds) for the demonstrator; the airframe represents just 10 to 15 percent of that total, but the four batteries alone weigh about 500 kilograms (1,100 pounds). Bebesel emphasized that the team is constantly improving the aircraft's weight and that there is plenty of room for optimization due to an oversized motor for the demonstrator, but still, the aircraft will clearly have plenty of room to carry the weight of the final fittings of a production model, as well as the four passengers it is designed to carry.

CityAirbus is currently targeting a range of about 60 miles (96 kilometers), which Bebesel said "will be enough to cover all the megacities of the world."

The cabin will be accessed through a door in the fuselage underneath the rear of the fore ducts. The clearance to the bottom of the ducts from the ground is just 1.95 meters (6 feet and four inches), so the propellers will need to be completely stopped before passengers embark or disembark. However, this is unlikely to be too much of an issue with the aircraft's ability to bring the propellers to a complete stop in "a few seconds" if required, said Bebesel.

The inside of the cabin will feel spacious "like in a British taxi" he said. Behind the cabin, the batteries will hang on a rail in the rear of the aircraft's fuselage, allowing them to be moved fore or aft to adjust the aircraft's center of gravity according to its payload.

The batteries present one of the main challenges facing the program team. "We need to get the batteries at a point that they have enough energy on board, they are lightweight, you can allow a big recharge, and then lifetime will be an issue as well," said Bebesel.

For the first few years of the aircraft's life as a production model, it's likely to need to have its batteries replaced once or twice per year, and those batteries would probably require a recharge time of 30 to 60 minutes between flights. But as battery technology improves, Airbus hopes to lengthen their lifetime and reduce charging time to around 15 minutes.

Airbus is using a mix of metal and composite for the demonstrator's airframe, with metal providing the team greater flexibility to quickly and cheaply adjust the design as it changes during the development.

Any production model would also use a mix of materials, said Bebesel, with composite used "where it is really needed" for its stiffness and weight.

The design is being kept as simple as possible to allow for high volume production if the project proves a success.

Single failure tolerance is built into CityAirbus's design, with Airbus claiming the aircraft will be capable of losing one propeller, motor, or battery, and still be able to safely land.

#### **DEMONSTRATOR DEVELOPMENT**

The program reached a major milestone last December with the completion and powering-on of the "iron bird" ground test facility, which has the capability to operate CityAirbus's propulsion system chain from flight controls to the dynamic loads of the propellers.

Once the electric, mechanical and thermal dynamics of the aircraft's propulsion system have been matured and verified on the test bench, it will be embedded on the demonstrator.

The first flight — scheduled for December 2018 — will be piloted, albeit remotely, through the use of a joystick in a ground control system. However, as Airbus is designing and developing the aircraft to be self-piloting, the flight tests will plan to use manual control as little as possible.

"We will start automatically, we will land automatically, [and] we will fly around a given route and waypoints," said Bebesel.

The eventual certification of the aircraft will be another challenge, largely because it will again be breaking new ground. Bebesel said his team has "a concept of how to certify" CityAirbus, but that the certification of the batteries and the aircraft's complex electrical architecture would present the largest challenge.

While using CityAirbus as a personal air

vehicle "could be an option," Bebesel said the ultimate plan for the type is as a mass form of transit between established hubs within cities — similar to existing car-share programs — which could be ordered through the use of an app on a phone.

It's here that the program is most ambitious — given that it requires large-scale infrastructure development and buy-in from cities and the general public.

"The number of hubs we need are equivalent to the number of metro stations/underground stations [in a city]," said Bebesel. For cities such as London, New York, and Paris, this would equate to over 200 hubs.

Such a proliferation would mean fleets of aircraft in the skies — and the prospect of the noise this would bring. Because of this, Airbus knows it is crucial to keep CityAirbus as quiet as possible.

Airbus is aiming for around 70 A-weighted decibels — less than the noise of cars on a highway at a distance of 100 meters, and much quieter than a helicopter.

"It's just the beginning, so we are experimenting a lot," said Bebesel. "There are a lot of [options] in terms of noise, you can really design to get the acoustic [element] very silent."

The speed of the propellers is one such element. Compared to a helicopter's rotor tip speed of 210 meters per second, the propellers in CityAirbus have a rotor tip speed of around 120 meters per second.

The program is one of several initiatives Airbus is undertaking to stake a claim of the future urban air mobility market. It also has the Skyways project in Singapore for autonomous drone parcel delivery, and its A^3 Silicon Valley outpost is developing the self-piloted Vahana eVTOL aircraft, as well as the Altiscope project to shape future regulations and air traffic control requirements to safely integrate eVTOL aircraft into urban skies.

Finally, Voom — the on-demand helicopter booking platform that launched in São Paulo, Brazil, in April 2017 — recently joined Airbus Helicopters after having been incubated at A^3.

"[Voom] is showing pretty clearly there is a need for urban air transportation in cities," said Bebesel. "Even with a conventional helicopter — which is a bit more noisy and higher in costs than a CityAirbus will be — even with this concept and the right approach you can deliver an opportunity for cities." Safran's Arrano, slated for certification this year, powers the Airbus H160. Remy Bertrand Photo

![](_page_31_Picture_2.jpeg)

#### **BY THIERRY DUBOIS**

Safran is planning on four engine certifications this year and has reported signs of a recovery in the helicopter market.

The first nod in a series from the European Aviation Safety Agency (EASA) is expected for the Ardiden 3C in the coming weeks. The 1,800-shaft-horsepower-class turboshaft is also hoped to be certified by China's CAAC, under the WZ16 designation, in September 2019. The Ardiden 3C powers the Avicopter AC352, the Chinese version of the jointly developed Airbus H175.

In April, the Arriel 2H is expected to be certified by EASA. It powers the indevelopment Avicopter AC312E, a medium twin similar to the Airbus AS365 Dauphin. Both the AC352 and the AC312E are in flight tests.

The Aneto 1K and the Arrano 1A will conclude the year, as far as EASA certification work is concerned. So far, the 2,500-shaft-horsepower Aneto 1K has accumulated more than 450 test hours, including more than 70 in flight. It powers a beefed-up version of the Leonardo AW189 super-medium twin.

The 1,100- to 1,300-shaft-horsepower Arrano 1A can be found on the in-development

Airbus H160 medium twin.

"We have accumulated more than 5,000 test hours, including more than 1,000 in flight," a spokesperson said.

The global market for civil rotorcraft, which has been suffering from simultaneous downturns in several segments, is showing signs of recovery, according to Bruno Bellanger, Safran Helicopter Engines' executive VP, programs. "The lowest point in offshore oil-and-gas is behind us," he said. Flight hours are on an upward trend, including those of the Airbus H225. The type has been affected by a lack of confidence from operators after the 2016 accident. Lighter helicopters are recovering, too, which Safran sees via the increasing utilization of Arriel and Arrius engines.

Bellanger predicts the super-medium segment will grow in oil-and-gas, thanks to the current level of oil prices. But the offshore industry "has learned how to do without heavy helicopters," putting a question mark on the future of civil heavies.

Geographically speaking, Safran maintains its forecast for emerging countries – India, China and Russia are expected to start growing fast from 2020. Brazil, however, still has to recover from a major economic crisis – "our crystal ball [on Brazil] is a bit smudgy," Bellanger said. Western countries are described as "mature," meaning their growth will be in the two- to three-percent range.

Last year, Safran produced 732 engines. This marked a minor rebound from 2016, after years of decline. Bellanger characterized his company as "resilient," as its market share is estimated to have increased last year. He would give no figure for 2017, but the market share in 2016 was measured at 32 percent (comprising civil and military deliveries).

The Arrius family was a driver of the relative stability. Safran handed over 110 Arrius engines for the H135. The Bell 505 light single is contributing to Arrius sales, as 20 are in service and a three- to four-year ramp-up will lead to the manufacturing of 110 Arrius engines per year for Bell's newest product.

Safran heavily relies on Airbus Helicopters as its main customer. Nevertheless, Bellanger asserted Airbus's decisions to terminate the H120 light single program and put studies for the heavy X6 on the backburner have had virtually no influence on his company's plans. The Arriuspowered H120 had long been a slow-seller. Moreover, "other Airbus light programs are doing well," Bellanger said.

Meanwhile, the X6 was widely expected to be an application for a greater-power variant of the Aneto, in the 3,000 shaft-horsepower class. But the selection had not been announced and "we are carrying on with our Tech 3000 demonstrator [in the 3,000 shaft-horsepower class]," Bellanger said. And the selection of the Aneto on the AW189 is seen as having already validated Safran's strategy in high-power engines.

In customer support, the company is making the most of newly available digital technologies. At Heli-Expo, Safran launched Expert link, a new video assistance service. It allows the customer to connect with Safran Helicopter Engines experts through a live video feed. The goal is to facilitate technical diagnosis and guide them through a maintenance task.

"This is the first mobile application we [have] launched for helicopter operators," said Olivier Le Merrer, Safran Helicopter Engines EVP support and services. Expert link features a secure datalink and is compatible with most smartphones, tablets, borescopes and smart glasses.

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![](_page_32_Picture_9.jpeg)

### Bell rebrands with new name

The new Bell logo reflects the company's rebranding. No longer just a helicopter manufacturer, it sees its future as a "technology company redefining flight," said CEO Mitch Snyder.

![](_page_33_Picture_3.jpeg)

#### **BY OLIVER JOHNSON**

Bell Helicopter has rebranded itself as simply "Bell," officially dropping the "Helicopter" part of the name it had held for almost 60 years.

The new brand, announced on Feb. 22, is joined by a new logo, tagline and company values.

In a conference call with media, Mitch Snyder, Bell's president and CEO, said the changes better reflected the broad scope of the company's work in aviation, which has recently included the development of an urban air taxi in partnership with Uber, the V-280 Valor tiltrotor achieving first flight, and the testing of new propulsion systems with its HYDRA demonstrator.

"The word helicopter within our name was very confining, and the fact is we're not a helicopter company, and we're not a tiltrotor company — we're a technology company redefining flight," he said.

"The first thing we did is we dropped the word 'helicopter,' so we're simply 'Bell.' That was powerful in [that] it allows us to be open and creative [with] all the kinds of things that we can innovate in terms of flight."

Bell's new logo, which utilizes the same red color used by the company previously, is set within a shield shape — to represent Bell's reputation for safe, reliable and rugged products, said Snyder. "The shield protects you and makes you feel safe, and so that is why the foundational element of the logo is the shield," he said. Below the word "Bell" is a silhouette of a dragonfly (which also looks like a four-bladed vertical-facing propeller), which Synder said was a great symbol for the company.

"It is the most amazing flying creature on earth — it can take off and land anywhere, it can fly very quickly and efficiently, it can fly forwards, backwards, sideways, up and down, it can hover, it can see 360-degrees from above, and it catches 95 percent of its prey," said Snyder. "It has mastered flight, and that's what we're trying to do."

Bell claims the name change reflects something of a return to its legacy with a focus on innovation in flight, but it also echoes the company's roots with a broader focus on aviation. The manufacturer was founded as Bell Aircraft Corporation by Larry Bell in Buffalo, New York, in 1935, before evolving into three divisions (of which the helicopter business was one) under Bell Aerospace. Following Textron's purchase of Bell Aerospace in 1960, the helicopter division was renamed the Bell Helicopter Company.

However, despite the name change, Snyder said the company has no plans to stop designing helicopters.

"We can design new helicopters, [and] we can design tiltrotors," he said. "By dropping 'helicopter,' [it] doesn't mean we're not building or designing new helicopters, it just means we don't want to be confined to it."

Going forward, the company's website will be found at bellflight.com, and its social media handles are @bellflight.

### **RotorBits**

### Era Group to launch AW609 in U.S.

Leonardo and Era Group signed a landmark agreement during HAI Heli-Expo 2018 in Las Vegas, Nevada, that will launch the AW609 into service in the U.S. commercial market and demonstrate its capabilities on a wider scale.

Building upon their previous efforts in helping to mature the design, development and supportability of the AW609, Era will take delivery of two aircraft in 2020, plus a dedicated training package.

These aircraft, in a nine-passenger utility configuration, will be used for numerous applications, including offshore/utility, VIP, emergency medical services, and search-and-rescue missions in the U.S.

Also at Heli-Expo, Era signed a major 10-year maintenance and repair agreement with Pratt & Whitney Canada covering 180 P&WC helicopter engines across ERA's global fleet.

The engines power a number of Era aircraft including AW139s, AW119 Koalas and AW109 Power helicopters all from Leonardo Helicopters, H135s from Airbus Helicopters, and 212s from Bell.

### HAI applauds withdrawal of ATC privatization bill

Helicopter Association International (HAI) has applauded the U.S. Congress's determination to move forward with a reauthorization bill to provide long-term stability for the Federal Aviation Administration (FAA), following House Transportation and Infrastructure Committee Chairman Bill Schuster's (R-Pa.) decision to withdraw his proposal to privatize U.S. air traffic control services from the bill.

"The voice of the entire general aviation (GA) community was heard," said Matt Zuccaro, president and CEO of HAI. "I want to thank our members for their commitment and passion to engage their elected officials. I also want to express our community's gratitude to our representatives for listening."

![](_page_34_Picture_0.jpeg)

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![](_page_34_Picture_7.jpeg)

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### Robinson reports growth & progress

#### **BY LISA GORDON**

The last year was a good one for Robinson Helicopter Company, according to company president Kurt Robinson. The Torrance, California-based civil helicopter manufacturer saw increased sales in 2017, a larger proportion of international deals, and growth in its global sales and support network.

At a Heli-Expo 2018 press conference, Robinson reported that a total of 305 aircraft were produced in 2017, including 77 R66s, 194 R44s, and 34 R22s – numbers that reflect increases for each model type.

Approximately 80 per cent of the company's deliveries were outside the United States, indicating that global economies are strengthening. Customers came from China, Australia, South Africa and Russia, in addition to the United States.

Robinson also said the five-seat R66 turbine-powered helicopter – first announced in 2007 and certified by the Federal Aviation Administration in 2010 – is proving its reliability in the field.

"We have delivered well over 800 R66s, and we're not seeing any issues on it. People are flying them all over the world and really doing well with them."

According to Rolls-Royce, which manufactures the R66's RR300 turbine engine and monitors its performance electronically, the R66 fleet flew a total of 185,000 hours last year. That's up from 150,000 in 2016, with the grand total hours on the R66 fleet now exceeding 735,000 as reported by the engine manufacturer.

### **PROJECTS AND PRODUCTION**

Robinson also reported that the company's weekly production rate climbed in 2017. Currently, the manufacturer builds one R22, two R66s, and five R44s every seven days.

"My forecast is that this year will be similar to last year, perhaps a little bit better," he said. "So far, we're ahead a bit in sales this year, but not a whole lot."

Numerous R66 projects have been completed or are in the final stages.

"Last July, we certified the R66 HD Newscopter, and we certified the lithium battery from Mid-Continent Instruments. That reduced the gross weight by an astounding 26 pounds. We argue about ounces, so when you talk about that kind of weight, it's pretty amazing. And, it provides a more reliable start."

Robinson Helicopter is displaying its R66 cargo hook ship at Heli-Expo 2018. Rated for 1,200 pounds, final certification is expected by the end of March.

"We have a second set of engine gauges with torque and gas temperature and load hook meter located by the collective, so the pilot can just look down," said Robinson. "That makes it easier for them to do cargo lift work."

Also announced in February 2018, the OEM has added optional wire strike protection to the R66. Certified in the U.S. and Canada, the process involves bolting on a kit supplied by Magellan Aerospace of Winnipeg, Manitoba,

"We worked with Magellan on it," said Robinson. "On either strut you have a cutter so you don't have to hit the wire perfectly straight; if you're on an angle, it does the job."

A simple but popular addition to the R66 is heated seats in the front and rear.

"It's something people really like. I'm pretty certain the only crashworthy heated seats you can find right now are on the R66, which is kind of fun."

Robinson also reported that Garmin touchscreen upgrades are available in the cockpit, while all three of the helicopters displayed at Heli-Expo featured the company's Genesys autopilot system.

"You can see the price points and the various ways it can be equipped. I think autopilots and SAS systems are the wave of the future," he said. "They are getting better and more accurate, and I do think they enhance the safety of the aircraft."

### SUPPORT AND INNOVATION

Robinson Helicopter has increased its worldwide fleet of service centres and dealerships from 460 to 480 over the past year.

Kurt Robinson said service is a priority.

"One of the things about having your

name on the side of the building is that it matters and I care. If people can't make revenue with their aircraft, we want to work with them to get them up in the air."

The OEM is also focused on a number of innovations, including participation in the Piston Aviation Fuels Initiative (PAFI), which aims to develop an approved unleaded fuel for piston engines.

The company is also working to design a cockpit video recorder (CVR) for all three of its aircraft models. Fitted with a removable flash drive, the device will record the view from behind the two pilots, including the outside scenery and the instrument panel.

"It will be an excellent tool for training and also for people that are doing tours, or for owners who want to make sure everyone on board is doing what they're supposed to do," said Robinson. "In the event of an accident, it will be a great help to determine what happened."

The CVR is expected to be completed in the second half of this year.

Another big project is the development of a data recorder for the R22 and R44.

"This is similar to the electronic monitoring unit on the R66 and will include the rotor and engine RPM, cylinder heat and oil temperature," explained Robinson. "We are hoping to have it done and standard in the aircraft by mid-year."

Finally, the manufacturer has been supplying ADS-B field upgrades as optional equipment for the last couple of years. Robinson said this package is becoming more popular as owners move to meet the FAA's ADS-B implementation deadline of Jan. 1, 2020.

As for competition, specifically from Bell's new 505 Jet Ranger X, Robinson said an operator's mission, requirements and budget will determine which helicopter ultimately meets their needs.

"If [the 505] is right for them, they'll get it. If the R66 is right for them, they'll buy it," he concluded. "Now at least you don't have that doubt and uncertainty about what is coming. We have a project, we're working hard on it, and we're going forward."


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## Blade completes financing round, enters alliance with Airbus

#### **BY ELAN HEAD**

Fly Blade Inc. announced in late March that it has completed its Series B financing, raising approximately \$38 million to further its business of arranging shortdistance aviation transportation, including on-demand helicopter flights in urban areas.

Lead investors Colony NorthStar and Lerer Hippeau were joined by Airbus Helicopters and LionTree Ventures in the financing round. Blade said it will use the proceeds from the financing to expand the depth of schedule for its core routes, accelerate the rollout of new markets, and to continue to fortify the Blade brand.

Concurrent with the financing, Blade has also formalized its strategic alliance with Airbus, first announced at HAI Heli-Expo 2018. Blade will provide customer and helicopter operator technology solutions and on-the-ground customer experience management for the Airbus Ride helicopter service in the Dallas market.

Additionally, Blade and Airbus plan to explore launching an intra-city helicopter service in an international market to be determined this year. This jointly owned service would be Blade's first new market launch overseas.

"Airbus Helicopters continues to develop the future of the urban air mobility market, and our alliance with Blade is the next logical step in our quest to offer customers the full spectrum of urban air travel solutions," stated Matthieu Louvot, executive vice president of Customer Support and Services for Airbus Helicopters, in a press release.

Louvot said that the partnership with Blade is "setting a strong foundation for the future," envisioned as the successful deployment of electric vertical takeoff and landing (eVTOL) aircraft.

As Blade CEO Rob Wiesenthal explained at Heli-Expo, "there's an entire stack of what we're working on with Airbus and our operators that is completely relevant to eVTOL," including consumer messaging and interfaces; operator dashboard and accounting software; and on-the-ground logistics management. The many thousands of passenger movements envisioned for eVTOL networks will require sophisticated coordination behind the scenes, which is something that Blade is already doing well. "We can have 350 missions in a 24-hour period on one heliport," said Wiesenthal. "That requires a lot of movement and a lot of coordination."

Since launching in 2014, Blade has expanded to encompass 22 core routes in seven states, and a network of seven lounges in four states. Key routes include the New York City area, Eastern Long Island, the New Jersey Coast, Connecticut, the Cape (Nantucket and Martha's Vineyard), Los Angeles, Palm Springs, and Orange County.

The company's Blade Bounce airport transfer product has enabled Blade to become the largest arranger of helicopter flights between Manhattan and all New York area airports. Additionally, the company is now in its third year offering seasonal scheduled jet service between New York and Miami, Florida.

"Blade has created a very desirable and highly recognized brand by offering a compelling aviation experience to a new generation of fliers," stated Eric Hippeau, managing partner of Lerer Hippeau. "We look forward to the team continuing to build upon their success in new markets both in the U.S. and abroad."

## FAA increases scrutiny of human external cargo operations

The U.S. Federal Aviation Administration (FAA) is increasing its scrutiny of equipment used by helicopter operators conducting human external cargo (HEC) operations.

HEC operations are common in the power utility industry as a method of transporting personnel to transmission lines and towers that would otherwise be difficult to reach. In the U.S., many power utility operators carry personnel at the end of a helicopter's long line as Class B loads under 14 Code of Federal Regulations (CFR) part 133.

According to a statement provided to *Vertical* by the FAA, during a recent accident investigation, the agency became aware of non-HEC-certified external cargo hook kits being used to carry people. The agency is reminding operators that attaching means such as cargo hooks that are approved for external occupants require documentation in the supplemental type certificate (STC) and/or rotorcraft flight manual supplement (RFMS) that those attaching means meet 14 CFR part 27 or part 29 certification requirements for HEC. and/or RFMS, the attaching means may not be used for an external occupant during an operation, unless there is other documentation indicating approval for HEC.

"The FAA must ensure that all HEC operations are conducted with properly certified and approved attaching means," the statement reads. "The HEC design requirements were created to ensure that when a person is carried external to a rotorcraft, the attaching means will not inadvertently release the external occupant. This goal is achieved by increasing the reliability of the static strength and fatigue testing. Operators are strongly encouraged not to conduct HEC operations with attaching means not certificated to the part 27/29 HEC requirements."

The FAA said that it expects to issue further guidance in the near future that will explain in detail the HEC concern, including paths to compliance.

Chris Martino, vice president of operations for Helicopter Association International (HAI), recently told *Vertical*, "HAI is currently working with the FAA to resolve this issue. As always, our strongest concern is for safe and legal flight operations."

When there is no mention of HEC certification in the STC

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## Kamatics improves UH-1H safety with drive shaft rebuild program

#### **BY ELAN HEAD**

Kamatics is offering public and restricted category Bell UH-1H operators an opportunity to enhance the safety of their fleets with new and rebuilt KAflex drive shafts.

Kamatics has now obtained Parts Manufacturer Approval (PMA) from the U.S. Federal Aviation Administration to manufacture new UH-1H KAflex drive shafts, as well as to rebuild existing drive shafts and convert them to the most recent U.S. Army-configured flight safety part. Rebuilt shafts are returned to the operator with a historical hard card, airworthiness certificate, and instructions for continued airworthiness, including a 5,000-hour time before overhaul (TBO).

According to Chris Prain, a Kamatics business development manager, "The Army had intended to release a 5,000-hour TBO mandate for these shafts, but it was never



## IS IT GETTING HARDER TO FIND PARTS?

NEW FOR 2018: PMA ELASTOMERICS FOR BELL 407 HELICOPTERS. Shear Bearings, Dampers, Lead Lag Bearings



RWORK TEROSPACE formally published before liquidation of the [Army's] UH-1H fleets. This means that this shaft remains the only shaft Kamatics manufactures without a [type certificate] holder prescribed TBO or retirement life."

Kamatics asserts that if both the engine and transmission connected by a flexible drive shaft have formal TBO requirements, the flexible drive shaft should also have a regular TBO interval to ensure safe flight.

"There are a lot of aircraft still in operation," Prain said. "They're flying old shafts, some of which are 40 years old with 25,000 hours on them. We wanted people to be safe, and the latest flight safety part configuration with the KAflex integrated failsafe is the safest shaft we [can] offer this fleet."

UH-1H operators can choose to have their existing drive shafts rebuilt to the flight safety part configuration, or buy new. Kamatics' rebuild of the shaft includes a tear-down inspection; stripping of the corrosion prevention coating and a recoat; magnetic particle inspection of the end fitting curvic adapters (with integrated failsafe feature) and interconnect shaft; new hardware and frames; and reassembly of the shaft, including new anti-fretting washers between frames, balancing, and high-visibility torque stripes on bolted joints.

Prain said the rebuild process typically takes around three to four weeks, but can be expedited at customer request. Kamatics can also provide operators with an exchange shaft while theirs is being rebuilt.

In addition to interest from restricted category operators, Kamatics is also seeing interest in the drive shafts from foreign military sales (FMS) operators of the UH-1H. Because Kamatics' KAflex driveshaft is a commercial-off-the-shelf part that requires no government approval for export, "it's an easy sell for the FMS operators," Prain said.

While UH-1H helicopters have already been flying for decades, Kamatics expects demand for its drive shafts to continue well into the future.

"The aircraft's great — it's like an old reliable pickup truck," Prain said. "I don't think it's going away anytime soon."

## Safran Aneto to power Racer

#### **BY THIERRY DUBOIS**

Safran Helicopter Engines, which had initially planned on supplying a pair of RTM322 engines for the Airbus Helicopters Racer compound demonstrator, has seen its more modern Aneto selected by the airframer. The move goes along with an increase in the target cruise speed, at 215 knots. Moreover, the 2,500-shaft-horsepower turboshafts will benefit from an innovative architecture, allowing one engine to be throttled back to idle in cruise to save fuel.

The Racer, which benefits from the experience gained during the earlier X3 program, is slated to fly in 2020. It features a main rotor, a box wing, and two side-mounted pusher propellers. Such a design makes it easier to fly at high speeds. The main rotor has to provide less lift, thus needing less power. Its rotating speed becomes aerodynamically easier to handle.

The Aneto, already selected for use in the Leonardo AW189K, is exceptionally compact, Safran emphasized. The manufacturer claims it delivers 25 percent more power than existing engines of the same volume. The engine "will play a key role in supporting the wider Racer demonstrator project, which brings together technologies from a wide network of more than 25 industrial, academic and research partners from across the European Union in order to make a significant and durable contribution to the competitiveness of the European aerospace industry," said Tomasz Krysinski, Airbus Helicopters vice-president for research and innovation.

The specification for cruise speed, which was standing at 220 knots on the X3, was downgraded to 190 knots on the RTM 322-powered Racer, and is now referred to as "400 kilometers per hour [215 knots]."

Developed by Safran Electrical & Power, the Aneto's Power Pack Eco Mode configuration will allow the crew to "pause" an engine in cruise. In that phase of flight, it is more fuel efficient to use one engine at high power than two engines at medium power. The fuel saving is estimated at 15 percent for a given mission. In just 10 seconds, the idling engine can rapidly and automatically be restored to full power using a specially-designed electric motor. This feature can be used in case the engine running at full power fails.

Safran has conducted extensive ground testing and the system will fly for the first time on the Racer.

For the engine manufacturer, this will be a first step towards a hybrid engine architecture. The second step is planned to be "transient assistance," in which an electric motor complements the turboshaft when high power is needed. It allows engineers to size the engine for cruise flight, as opposed to takeoff. The engine's fuel consumption is thus optimized for the longest phase of flight. Ground testing is underway.

The third step will be a multi-rotor system. Electric motors will drive the rotors but a turboshaft will supply electric power via a generator. Such a system, rated at 100 kW (135 shaft-horsepower), is planned to be tested this year. Safran is working with an unnamed designer of futuristic vertical takeoff and landing vehicles.

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HAI Heli-Expo 2018 in Las Vegas, Nevada, had a wealth of new products on display. Here's a look at some of the most interesting offerings designed to make your operations easier, safer and more efficient.

**BY DAYNA FEDY** 

## **INTRODUCING OBIQ.IO**



**For decades, pilots have** spent time manually calculating passenger and cargo weight before taking off — a task that is time-consuming and susceptible to error.

OBIQ.IO has come up with a solution that eliminates these problems, which it showcased at Heli-Expo 2018. The company has launched the world's first wearable device that facilities automated electronic manifest and load calculations, sending the information in real time to dispatch via an existing flight following system.

"Our system turns passenger and load reporting from a time-consuming, manual task into a safety and operational advantage by increasing the accuracy of information and enabling crews to realize greater operational efficiency," said Vincent Hoog, CEO of OBIQ.IO.

The OBIQ device is also beneficial in the firefighting field, as the company created the world's first firefighter and equipment tracking device, which also calculates total cargo payload and displays this to the pilot.

OBIQ is a beacon that can hold operationally important information about the wearer such as their title, Incident Command or name, their weight, and their special skills, and transmit it via Bluetooth to an existing OBIQ satellite-tracking device on the aircraft.

While OBIQ was originally created with the goal of reducing unnecessary radio chatter during a forest fire incident, Hoog said it can also be used for a variety of industries, including helicopter tourism.

OBIQ is said to reduce the workload of pilots, dispatch, and operations managers while increasing aircraft usage.

"It's an industry game-changer," added Hoog.

## THE ROTOR TOTER & MINI TOTER DEBUT AT HELI-EXPO

As a newly launched business, the Rotor Toter came to Heli-Expo 2018 as a first time exhibitor to unveil its towing products designed specifically for Robinson helicopters — the Rotor Toter and the Mini Toter.

Both products will get any Robinson helicopter where it needs to go. Operated with a wireless remote control, the Rotor Toter and the Mini Toter feature Robinson's factory lift points to pick up the aircraft.

"We have the only powered [tow product] that picks by the Robinson pick points, and that is also wireless," said the Rotor Toter creator, Jim Salyer, adding that other companies will use other pick points that are not specific to the Robinson helicopter design.



The Mini Toter was designed as a compact and efficient means to tow an aircraft. Salyer noted that the Mini Toter's compact feature was a key element in the design of the product, so it can be easily stored in a shop without taking up much-needed space.

The Rotor Toter, which is a larger version of the Mini Toter, helps move aircraft over tough terrain and gradients. "The larger Roter Toter has the power ability to go up inclines and drive over two by fours, gravel, rough terrain or lifts in the shops," said Salyer. It even has the power to maneuver through the snow.

Not only is the Rotor Toter useful for moving helicopters from point A to point B, it was built to help Robinson aircraft owners and operators clean their helicopters. With a 2,400-pound (1,090-kilogram) capacity, the Rotor Toter can lift the helicopter high and lower the tail boom to the ground — making it easy to clean and inspect the aircraft.

Since Robinson helicopters sit low to the ground, Salyer explained the Toter products were designed with a low profile on the front, allowing them to drive under the aircraft with ease.

The Rotor Toter currently only has towing products for Robinson helicopters, but Salyer told *Vertical* that due to high interest, the company plans to soon adapt its products for other helicopters on the market. "We are going to be working on that readily," he said.

## **AKV TAKES ON BLUETOOTH**

**AKV Inc. showcased an** industry-first, Bluetooth-connected iPad app at Heli-Expo 2018 for external load operators, as an option for the AKV ETM1000 Exceedance and Trend Monitor. "With some of the smaller aircraft that don't have actual analog instruments mounted in the door, the [pilot] has to look at the instrument panel as well as putting their head outside to look at the

A brand new feature from AKV, the Bluetooth iPad option was launched just weeks before the show.

The design of this engine data acquisition unit (EDAU) allows the pilot to remote mount

the engine indicators for vertical reference work wherever they need it. Having the iPad near the door keeps the external load and the engine instruments in the same line of sight for pilots, eliminating the need to look both around the cockpit and outside the aircraft.



external load," said Jonathan Gunn, president at AKV Inc. "It can be quite difficult depending on how precise the flying is they need to do for a given load."

The ETM1000 is STC-approved for aircraft such as the Airbus AS350; Bell UH-1, 205, and

214; and Bell 206B/L and 407 - with other model approvals on the way.

Gunn said the company offers a multitude of different optional interfaces with the ETM1000. "It's quite a powerful system," he added.

## DART SPLASHES INTO AERIAL FIREFIGHTING

**DART Aerospace** revealed it is expanding into the aerial firefighting market, with the launch of the DART Bucket at Heli-Expo 2018.

While the bucket is compatible with accessories that already exist on the market, it's a new option for aircraft operators at a reasonable price.

"We have a lot of customers interested," said Emmanuel Paillier, vice president of product strategy and business development at DART. "They are very intrigued about us getting into the firefighting market."

DART has aimed to create a plug-and-play product that can be easily installed on existing bucket infrastructure on aircraft.

Offering different bucket sizes, the DART Bucket will be manufactured in Vista, California, at the same facility its well-known floats are made. "For us, it's a very natural way to use this site for the bucket because [our floats] use similar material in terms of manufacturing — they have the same processes," explained Paillier. "And of course, California is a key region for firefighting." When Vertical visited the DART booth and spoke with Paillier, he said that because the company already makes a few products for the firefighting field — including the DART basket, long lines and remote hooks — and it deals with firefighting companies often, the bucket is "a good complement to [the company's] product offering."

While the goal is to sell the bucket around the globe, DART will focus primarily on the U.S. market before moving on to international regions.



#### NO EXHAUST DUCT UNREPAIRED



**Two weeks prior** to Heli-Expo 2018, Alpine Aerotech LP unveiled its Bell 407 exhaust duct repair. *Vertical* spoke with Alpine at the show to learn more about the service.

The repair (which has been approved by a Transport Canada designated airworthiness representative) was developed by Alpine outside of the Bell maintenance manual, specifically for the 407 exhaust duct, in order to create a cost-efficient solution for its customers.

"We are constantly looking for innovative ways to save operators time and money," said Taylor Wilson, manufacturing operations manager at Alpine Aerotech.

When a customer sent a Bell 407 exhaust duct into Alpine's facility for repair, the duct had two cracks in it that were extremely close together. There was no repair solution in the Bell maintenance manual, and as a result, the repair was unserviceable.

"We really wanted to do something for this customer," explained Wilson. "We ended up going down the road of developing this repair, so we didn't have to buy a new duct altogether."

Alpine discovered cracks were often occurring in the duct fillet. As a solution, the company decided to cut off the fillet and install a formed flange — which adds increased strength and rigidity in the area prone to cracking, Wilson said.

While Alpine is now offering the repair to anyone in need of it, the company said its 407 exhaust duct repair has been well received by the initial customer. "He was really impressed with the quality of the work," Wilson said. "We have an amazing welder in our facility; his work is top notch. I've never seen welding like his."

# SEI RELEASES TWO NEW DRAGONS

**SEI Industries is expanding** its line of fire ignition products, as it launched its latest Dragon innovations at Heli-Expo 2018. SEI's Sling Dragon and Dragon Tracker are new to the helicopter industry, offering improvements on the company's back burning solutions to prepare for fire seasons.

An upgrade from the Red Dragon, the Sling Dragon offers safer fire



mission sphere dispenser is slung below the aircraft by steel cables rather than being mounted inside. All ignitions can now occur outside the helicopter, keeping the aircraft and the ignition entirely separate.

> The Sling Dragon can be operated (and released from the aircraft, if necessary) by the

pilot with a hand control or a trigger, creating ease and eliminating the need for an additional crewmember on board.

"This machine is built to operate with just the pilot," said Alex Wutschnik, product engineer at SEI, "whereas other machines you would have to have an equipment operator there tending to it and refilling it."

With an increased 5,000-sphere capacity and seven speed settings, the Sling Dragon injects the spheres (Dragon Eggs) with glycol, which has a delayed chemical reaction, and releases them through a rotating motor when triggered by the pilot. Wutschnik said it's virtually impossible to start a reaction in a sphere and not have it leave the machine, as even in a power outage the motor will continue to rotate and release the ignited sphere.

The Sling Dragon comes equipped with the Dragon Tracker - a GPS tracker that records the coordinates on a MicroSD card of each ignition sphere that is released. The SD card allows users to view a map of their burn area on Google Earth.

"You can review your operation and try to improve your effectiveness and say, "We burned over here, but it wasn't that effective. Next time we'll change it up and do something different," Wutschnik said.

The Sling Dragon has been tested in flight up to 90 knots, and it has had no issues with spinning around - thanks to the steel cables attached to four anchor points on the machine, and spreader bars.

## **TOWCARTS TO MEET ALL NEEDS**

Helitowcart brought two new products to this year's Heli-Expo that will continue to improve ease of operations for its customers - the V614 wireless remote control unit and the Bell 505-compatible Heli-Carrier. While the V614 is known as the company's universal towcart, it has until now operated through a remote control attached by a wire.

"We now have a full remote control unit for people who don't want to have any wires," said Maxime Perron Caissy, vice president of

operational support at Helitowcart. "They want to have freedom when using the towcart."

While this new product has just launched into the market. Perron Caissy said the company will continue to offer the original V614 model with the wired remote control, as many people are still hesitant to adjust to the new wireless technology; operators must



have good geospatial knowledge of their position versus the towcart when operating wirelessly.

"It all depends on each customer," he said. "But now we're able to provide solutions for all requests."

The Heli-Carrier has also been on the market for several years, but

Helitowcart has introduced a modified version of the towcart that is compatible with Bell's new 505 aircraft.

Helitowcart noticed the skid for the 505 is different from other helicopters, so the company narrowed the machine and adapted the brackets specifically for the 505 to provide operators of that aircraft with a solution that was not yet available on the market.

But the Heli-Carrier is still compatible with other helicopter models, including the Airbus AS350/AS355, the Bell 206, the BK117, MD500/600, the Robinson R44/R66, and more.

When Vertical visited the Helitowcart booth, Perron Caissy noted the company had sold a Heli-Carrier during the show. "We're very happy," he said. "There's been a good response."

## **ROTOR REPLACEMENT**

**On display at** Dakota Air Parts' booth at Heli-Expo this year was its new composite tail rotor blade for the Bell 206A and 206B series JetRanger helicopter. Collaborating with Airwork Helicopters, Dakota Air Parts has created the AMT-206-1 — a tail rotor blade that is a direct replacement for 206A and 206B original equipment manufacturer (OEM) blades.

Featuring a 5,000-hour time life, 30 percent lower hourly operating costs, and corrosion and saltwater resistance, the



AMT-206-1 is a cost-effective option for Bell 206 operators.

The blade surfaces that are exposed during flight are entirely protected by a nickel abrasion strip, which stops the blade structure from eroding. Manufactured with carbon fiber and Kevlar, Dakota Air Parts said the blade has increased strength, which leads to a higher margin of safety.

The company also said its new composite tail rotor blade is capable of achieving a higher thrust for an equivalent power setting.

And for operators who are required to fly in areas with noise restrictions, the AMT-206-1 will be a valuable solution; the blade is compliant with the Federal Aviation Administration's (FAA's) Stage 3 noise requirements, reducing the overflight noise level to 80.0 decibels. According to Dakota Air Parts, this is a 68 percent noise reduction when compared to OEM blades.

The AMT-206-1 has been tested for over 51 million cycles.

## **TORQUEING A TOTAL SOLUTION**

**Available for viewing** at Advanced Torque Products' booth at Heli-Expo 2018 was its custom tooling kit that solves numerous problems with torqueing methods. The ATP761 tooling kit was created in collaboration with Enstrom Helicopters' director of product support, Bayard Dupont, to improve the torqueing method of the mast nut on the F-28F piston, 480B turbine, and 280FX piston helicopters.

Available to any maintenance professional who works on these aircraft, the ATP761 custom tooling kit features reduced weight and size, improved accuracy, and increased safety for operators.

In response to customer needs, Advanced Torque Products created the ATP761 tooling to solve numerous problems maintenance professionals have been facing, including working with large torque wrenches and multiplier adapters that require two operators, substantial physical force, and cause hazardous balance issues during application.

These problems are no longer a concern with the ATP761 tooling. The kit reduces application time to

less than five minutes, labor down to one person, improves accuracy to within +1/-1 percent, increases the overall safety of operators, and more.

"It took less than five minutes for me to install the torque multiplier and torque the main rotor hub nut on an Enstrom," said Dupont. "It was so simple that I had to take a minute to verify that I had actually completed the procedure."

The ATP761 tooling is 100 percent mechanical, as it utilizes stacked planetary gear systems. Operators can also rely on the tooling kit to operate with complete accuracy in some of the harshest environments — from extreme cold to extreme



#### AERO DESIGN UNVEILS MEGA PROFILE BASKET PROTOTYPE



Aero Design Ltd. showed off the newest addition to its line of cargo baskets at this year's Heli-Expo. The prototype Mega Profile Basket has been designed and developed for use on the Airbus AS350 and AS355 aircraft, with support from the industry, fire bucket manufacturers and Environment Canada.

Aero Design said it works to frequently expand its list of products in order to meet the evolving needs of helicopter operators and the industry.

"This is one of many things we have on the go," said Aero Design president and Canadian M1/M2 aircraft maintenance engineer Jason Rekve.

With the goal of assisting operators in the utility helicopter industry, Aero Design said the Mega Profile Basket will allow helicopter operators to safely load, unload and transport large valve fire buckets, water survey equipment and other oversized items that are often difficult to fit in a regular basket.

The Mega Profile Basket will feature Aero Design's well-known quick release system. It will also allow for the installation of Aero Design's entire line of quick release fixtures, including any cargo basket model, bicycle rack, step, or a mix of any of these products — in less time than it takes to perform a weight and balance amendment.

## **BEAR PAWS FOR THE 505**

**New to Alpine Aerotech LP's** roster of products is the Bell 505 Bear Paw kit. The company received a supplemental type certificate (STC) for the kit from Transport Canada Civil Aviation a few weeks prior to Heli-Expo 2018.

Made from 100 percent recyclable materials, Alpine has tested its Bear Paw on the Bell 505 to guarantee the landing gear will retain its shape through continuous use. The company said the high-grade, robust polymer construction of the Bear Paws enhance the overall strength.

"We are consistently looking for new product ideas," said Jeff Denomme, president at Alpine Aerotech. "And developing a Bear Paw kit for the 505 made sense."

The Bear Paws allow the weight of the 505 aircraft to be dispensed over a larger surface area, giving pilots the confidence to land safely on soft or uneven terrain.

Alpine said the Bear Paws also incorporate intelligent, corrosion-resistant retention systems that enhance the overall safety of the product and simplify the installation and removal process.

> The company is expecting STC approvals for its 505 Bear Paw kit from the Federal Aviation Administration and the European Aviation Safety Agency, and will then begin providing the kit to customers in the U.S. and Europe. "We are very excited to be able to deliver the 505 Bear Paw kits directly to the operators," said Denomme. "We can coordinate shipments with new aircraft."



## **GROWING THE BUBBLE**

A few days prior to this year's Heli-Expo, BHI Squared received a supplemental type certificate (STC) for the new Firehawk bubble window with a viewport, developed by sister company Firehawk Helicopters. On display at the show was the new bubble window installed on Sikorsky UH-60/S-70 Firehawk aircraft.

Based on previous products, the new bubble window is a product improvement that comes with numerous beneficial features. "It's deeper, it has thicker material, but more than anything, it has the viewport, which offers a great improvement on our visibility of the load," said Alex Anduze, director of experimental flight test at BHI.

The company also simplified the installation process of the bubble. Due to the improved material, BHI was able to eliminate the complex frame that was used to install bubbles in the past.

"There are multi levels of product improvement," said Anduze.



The new bubble window required a flight test to ensure the design did not affect the Firehawk's speed or handling. Flight tests indicated the bubble window's maximum speed is 175 knots, which Anduze said is the fastest in the industry. And there were no issues with how the Firehawk handled during flight.

"What we're trying to do is minimize the limitations based on the modification," he explained. "We try not to make any modifications that would limit our aircraft to 100 knots or 80 knots."

With knowledge of how previous bubble windows behaved on aircraft, BHI kept the good characteristics of the earlier bubble, and improved it further.

When *Vertical* asked how the response to the STC had been at the show, Anduze said one of the company's competitors has already bought the first set of windows. "We do have great relationships with the competitors in our field," he said. "It's a great sign when your competitor comes over and says, 'I want your product.' "

### SHOW-STOPPING SIMULATION



**Frasca Flight Simulation** had its new Frasca Helicopter Training Device (HTD) on display at this year's Heli-Expo. The HTD comes standard with one aircraft configuration kit for either the Bell 206, Bell 407, Robinson R44 or Airbus AS350.

Randy Gawenda, business development manager at Frasca, gave *Vertical* an intro to the HTD, and also the opportunity to fly the Bell 206 configuration — equipped with the Garmin G500H instrument panel (customers can choose an analog instrument panel, if preferred).

Offered at an affordable price-point, the Frasca HTD also features the Garmin GTN 650, a collective grip based on the aircraft configuration kit, annunciator panel and circuit breakers as required in rotorcraft flight manual procedures, Frasca's Helicopter Mission Training Database, Frasca's Simplicity Touch-Screen Instructor Station, and more.

The HTD was engineered using aerodynamic technology, inspired by Frasca's well-known full-flight simulators and flight training devices, with the goal of providing training value with a no-nonsense approach, particularly for avoiding or coping with inadvertent entry into instrument meteorological conditions (IMC).

The launch customer for the HTD is Air Evac Lifeteam, which placed an initial order for seven units last year. Air Evac's units incorporate the Cobham HeliSAS/Autopilot system installed on the company's helicopters.

"One of the goals of our customer on this was to help teach their flight crews how to combat inadvertent IMC procedures, a little bit differently than what we've seen in the past," explained Gawenda. "What we've seen in the past hasn't met with particularly great results.

"What they're trying to get their pilots to do is learn to trust the [HeliSAS] system and how to utilize it - and this becomes a very, very effective platform to do so," he added.

#### FERRY TANK TAKES FLIGHT

**Turtle-Pac brought its new** collapsible aircraft ferry tank to this year's Heli-Expo — a 58-gallon version of its Heli Ramp tank series. This ferry tank was designed specifically to fit in the Airbus Bo.105, as the helicopter has a uniquely low ramp.

"We responded to customer needs," said Laszlo Torok, Turtle-Pac founder. "The other product was too high for the Bo.105 ramp, and the only option for use would be to not fill it up all the way."

Bo.105 operators will no longer have this problem with the Heli Ramp 58-gallon ferry tank.

It allows pilots to fly their shortest possible routes while saving miles and cutting costs, as there is no need to divert for refueling stops. With the ferry tank, landing in alternate, remote areas with no fuel source also becomes an option for pilots.

Holding 58 gallons (220 liters) of fuel, this ferry tank can extend an aircraft's range up to 45 minutes, which Torok said can be crucial when flying over water.

Safety is also improved with the tank, as there is no air space inside — meaning no condensation, no water to contaminate fuel, and no vapor space — reducing the chances of engine failure or explosion in the event of a fire.

With its collapsible, fabric build, the tank is designed to fold up compactly when it's not in use, allowing for easy storage. Bo.105 operators also have the option to carry the folded tank as luggage on commercial flights, as its weighs in at 11.7 pounds (5.3 kilograms) when empty.



## LATITUDE CONNECTS WITH PUSH-TO-TALK

**With a focus on** innovative communications, Latitude Technologies was at Heli-Expo 2018 showcasing its new aircraft satellite push-to-talk service.

Latitude's S200-012P Iridium satellite push-to-talk system (also known as SkyNode) allows instant communication between air medical and first responder organizations with

easy-to-use equipment.

PHN SCAN OPT

This will enable new capabilities for SkyNode users, explained David Thomas, director of helicopter/general aviation sales at Latitude. "An ambulance attendant can be speaking with a pilot, or a law enforcement officer can be speaking to an ambulance attendant, and so on."



With the SkyNode S200-012P, private talk groups can

be made without any geographic limitations between pilots, first responders, etc., and each member within a talk group is able to

DIM A

RCA 1510-3

NO GPS



communicate through the interoperable platform at the push of a button. "It's just like talking on a radio," explained Thomas. "You key in, and no one else can key in while you are. Then everybody in that talk group can hear it."

Thomas said the goal for Latitude's S200-012P is for it to be a culmination for entire regions; it's a transformation in which "every helicopter, airplane, police car, ambulance, and firetruck" in a specific region can be connected to the push-to-talk system to achieve seamless communication.

Latitude has made the technology adoption process easier for customers by partnering with Technisonic. The S200-012P features a familiar interface for radio operations via Technisonic's well-known TDFM-9100 airborne FM transceiver. The two systems work together, allowing SkyNode to function seamlessly between air and ground.

Crews can take action quicker with this efficient communications technology, without worry of losing connection — even in the most remote regions.

#### DIGITAL DIRECTIONAL GYRO GOES VERTICAL

**For the last eight years,** RC Allen Instruments, a Kelly Manufacturing Company, has been providing digital attitude indicators for visual flight rules (VFR) aircraft, replacing older, more labor-intensive mechanical units. With no moving parts,

the digital attitude indicator uses a gyro to run the screen. But the company found it was missing a digital directional gyro in its product lineup.

At this year's Heli-Expo, RC Allen unveiled the RCA1510-3 digital heading indicator, which is a direct replacement for older mechanical directional gyros. The RCA1510 marries up with the company's existing RCA2610 unit to give pilots a VFR panel that is both digital and low maintenance.

"We're trying to make it less expensive for [VFR helicopter pilots] to put the unit in and still be able to do the job that they're doing," said RC Allen's general manager, Jim Turner.

This plug-and-play unit is easy to install in the place of existing units in aircraft. When *Vertical* visited the RC Allen booth, Turner explained that a unique quality of the RCA1510 is it does not require a remote magnetometer — the magnetometer is built into the unit.

"Our unit has the ability to go into 'mag-gathering mode.' You fly around for about 10 minutes with it on, and underneath it will say 'mag data gathered.' At that point, you pop the circuit breaker and push it back in, and now it knows the magnetism that's in the panel, and it disregards it," he said, adding that the unit loses one degree at the most at any time during flight.

Having installed units on aircraft such as the Robinson R22, R44, and the Airbus AS350, RC Allen Instruments said it has the industry knowledge to meet customer needs.

"We're a small company and we've been in business forever, but we're still low cost and high performance," Turner said.

# A NEW Chapter

Erickson Inc. became one of the most high profile casualties of the commercial helicopter industry's global downturn, but after emerging from a six-month-long bankruptcy process, it appointed a new CEO with a fresh outlook. So what's in store for the company affectionately known as "Big Orange"?

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#### BY OLIVER JOHNSON // PHOTOS BY HEATH MOFFATT

It's been an eventful 12 months at Erickson Inc. — the famed manufacturer of the S-64 Aircrane, operator of the largest S-64 feet in the world, and vastly experienced maintenance, repair, and overhaul provider. In April 2017, the Portland, Oregon-based company drew a line under the most traumatic period in its almost 50-year history, as it formally exited a Chapter 11 bankruptcy process. Within a week, it then lost its president and CEO. Yet today, restructured and with a new CEO at the helm, the future looks a lot brighter for the company — and its enormous variety of customers around the world.

When Vertical last visited Erickson Inc. in October 2014, it was a very different company. At the time, it appeared to be riding high on a wave of growth, following its acquisitions of Evergreen Helicopters and Air Amazonia in 2013. These moves essentially transformed Erickson overnight, taking it from about 700 employees and a fleet o 20 Aircranes, to 1,150 staff and a mixed fleet of 86 rotary- and fixed-wing aircraft, and moving it into new markets, such as disaster relief and military logistics, as well as onshore and offshore oil-and-gas. However, the acquisitions also saddled the company with a huge debt burden — and this became a major problem as the industry entered a period of unprecedented operational headwinds. The Evergreen purchase also drew close scrutiny from regulatory agencies — and the company's shareholders. It ultimately became the subject of a shareholders' class-action lawsuit, alleging a breach of fiduciary duty, which was settled in June 2016 with an \$18.5 million payment from Erickson and the private equity



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A unique company with a unique fleet. An Erickson S-64E Aircrane (center) is flanked by the two other mainstays of Erickson Inc's fleet — a Bell 214ST (foreground) and an Airbus AS332L1 Super Puma (background).

ERICKSON AIR CRANE







1 // Erickson has 20 S-64s in its fleet, with the aircraft performing various heavy-lift jobs — from firefighting to aerial construction — around the world. 2 // From left: Chief pilot and assistant director of operations Ray Touzeau; air quality compliance Alicia Douglas; senior training captain Eric Van De Walker; pilot and sales manager Alba Castellanos; crew chief Richard Foote; check airman Duncan Motte; director of operations and pilot Erick Nodland; fixed-wing pilot Maria Heins; and fixed-wing pilot Dustin Smock. 3 // Erickson's president of commercial aviation, Andrew Mills, stands with an S-64 at Medford airport in Oregon. 4 // From left: senior training captain Eric Van De Walker; mechanic Jason Hampton; crew chief Richard Foote; and pilot and sales manager Alba Castellanos.



The reverberations of the expansion continued, and on Nov. 8, 2016, citing "numerous business challenges" impacting its operating results and asset values, Erickson Inc. filed for relief under Chapter 11 of the U.S. Bankruptcy Code. At the helm during this transitional period for the company was Jeff Roberts, who took over as president and CEO after Udo Rieder retired in March 2015.

While the company's leadership scrambled to restructure the company and confirm its plan of reorganization with the bankruptcy court, business on Erickson's various front lines continued as normally as possible.

Within six months of beginning the process, and under new ownership comprised of a diverse shareholder group, Erickson exited bankruptcy. Roberts then resigned as president and CEO, leaving Andrew Mills, the company's president of commercial aviation, as its interim president and CEO. On Aug. 31, 2017, the appointment of government services veteran Doug Kitani as CEO allowed it to firmly establish a course for a more positive future.

Kitani, who started his career as a U.S. Army helicopter pilot flying the Bell UH-1, OH-58, and Sikorsky UH-60, arrived at Erickson from IAP Worldwide Services — where he led the company from a similar position.

"It was a distressed company and out of court restructuring, and

we turned it around successfully and had a great several-year run," he said.

So committed was Kitani to continuing the path of growth with IAP, he turned Erickson down when first approached for the position in early 2017. However, one of his mentors convinced him to have a conversation with the company and the new owners to learn more about the opportunity. It turned out to be the perfect fit.

"I'm an aviator, so that was a big part of me getting involved in this," he said. "And I think we have an opportunity at Erickson to build a diversified aerospace and defense company. It has some great crown jewels inside the portfolio and great people, great assets. I'm looking forward to doing what we can organically to get us growing."

#### THREE KEY SEGMENTS

Today, Erickson has about 750 employees, and three clear business segments: commercial aviation services (firefighting, powerline and construction); defense and national security (providing aviation support to government services/military); and manufacturing and maintenance, repair, and overhaul (MRO).

"What excites me about the company is this notion that we are incredibly vertically integrated; perhaps the most vertically

integrated aerospace company that I've seen, in terms of our legacy of manufacturing and maintaining the S-64, and how that plays out in terms of how we operate the airframe globally in a variety of mission sets and austere environments that are very demanding," said Kitani. "That's also [the case] with our defense and national security business which, likewise, we're typically operating legacy airframes — whether it's [AS332] Pumas or Beechcraft [1900s], or even the Bell 214s — and doing it in pretty challenging environments for our customers."

While Erickson's commercial work (and firefighting in particular) is a key part of its business, Kitani has high hopes for development in its other two business segments.

"What we've been endeavoring to do is move into military markets, and I believe this company has a significant right to play in those markets — particularly on the rotary-wing side, but potentially other airframes and platforms, as well," said Kitani. "As the global threat environment changes, we're seeing interest from customers within DoD [U.S. Department of Defense] that require air-ops support. It could be anywhere around the world, and we happen to have the kinds of airframes and capabilities that they like, so we're pursuing that."

But it's the company's MRO capabilities that he believes offer the largest potential for growth. With its experience in providing OEM-level support to legacy airframes such as the S-64 Aircrane and the Bell 214, he said it has developed the experience and expertise to come up with creative solutions to unique engineering problems.

One such example is the company's work on the H-53E Maintenance Program. Initially established to support the reconstitution of two MH-53Es for the U.S. Navy, the workload on this project subsequently expanded to an MRO services product line.

"We view the MRO segment as being one that, in terms of value added, engineering and specialty MRO - and almost non-standard MRO - that's the area we think we can really grow," said Kitani.

#### **VARIED OPERATIONS**

There are 20 S-64s (E and F models) in the Erickson fleet, along with Bell 214s and Airbus AS330/AS332s. On the fixed-wing side, it has Beechcraft 1900Ds and CASA 212s.

The iconic Aircrane is at the core of Erickson's identity, and its continued success. With the E model's ability to lift 20,000 pounds (9,000 kilograms) and the F model able to carry 25,000 pounds (11,340 kilograms), the aircraft offers unique capabilities in both fire-fighting and aerial construction.

Almost a third of the Aircrane fleet is occupied year-round on long-term firefighting contracts, cycling between the Northern and Southern Hemisphere fire seasons in Greece and Turkey, and Australia. Other major ongoing contracts include logging operations in Canada, and power transmission line construction in Scotland, India, and Canada.

Indeed, Kitani highlighted transmission line work as an area of great opportunity for the company.

"That's an interesting growth market; it's still relatively small in terms of its contribution to our revenue, but it's very fast-growing and we expect the growth to accelerate for us," he said.

The Bell 214s are currently exclusively used on DoD contracts, and, together with the AS330s/AS332s, provide transport and logistical support for the military and government agencies. Three such contracts see the Pumas flying vertical replenishment (VERTREP) operations for the U.S. Navy in the Pacific and Middle East.

"Our ships give them fuel supplies, food, and water," said Chris Callahan, Erickson's VERTREP program manager and Airbus fleet









manager. "We resupply any of the coalition forces, so we could be resupplying the U.S. to the Japanese, to the Koreans, to Australia, New Zealand — whenever there's joint operations or exercises, we're always in the mix."

The vast majority of the pilots and engineers assigned to these contracts are ex-military. "We do have a few that have never been in the military — they come from the [part] 133 world, where they're used to logging and doing construction work," said Callahan.

He said the Puma is well suited to VERTREP operations, with the ability to carry up to 7,700 pounds (3,500 kilograms) on the hook.

"It's a great performer — it's a really good lifting machine, it's a very nimble machine," said Callahan. "We have seating for eight plus one in the jump seat, which works out just fine. It gives us plenty of room for additional cargo in the aircraft, so that we can carry passengers plus other baggage internally."

Erick Nodland, Erickson's director of operations, said there was a clear opportunity for the company to develop its defense and national security work.

"It's a new fiscal year for the military, we have a CEO that has a

huge background in defense and the defense service industry, and we have a new [U.S.] president," he said. "The military is shifting their focus and we're just finding that we're part of that. We're part of that directly in some ways, and we're part of that indirectly in bidding."

#### **MANUFACTURING GROWTH**

Erickson purchased the type certificate for the S-64 from Sikorsky in 1992, and has produced 35 of the type since then. During *Vertical's* recent visit to the company's manufacturing and MRO facilities in Central Point, Oregon, it was busily working on the sixth S-64E to be built for the Korea Forest Service (KFS), which is set to be delivered later this year. In February, the KFS announced an order for two more S-64Es, which will eventually bring its Aircrane fleet to eight aircraft. The new aircraft will be delivered with firefighting tanks, sea snorkels, foam cannons, glass cockpits, composite main rotor blades, and will be fully night vision compatible. Kitani said the success of the KFS program is a great example to

show to other agencies and operators.

1 // John Chergosky connects test leads to one of the S-64's P&WC JFTD12A turboshaft engines in Erickson's engine test cell. 2 // Aviation mechanics Melvin Soloranzo, Mingan Kijika, Mike Patz, and Charles Ayala work on a Bell 214 ST. 3 // Tory Grussling checks fittings on the main rotor gear box and mast assembly of an S-64. 4 // Wiring avionics and manufacturing technician Jonathan Pritchard checks wiring assembly in front of the cockpit of an overhauled S-64. 5 // From left: composite blade shop technicians Tilman Bjellland, Nathen Robbins and Anthony Salazar remove excess material during the manufacture of S-64 composite main rotor blades. 6 // Erickson has now built 35 Aircranes since purchasing the type certificate from Sikorsky in 1992. 7 // Avionics/airframe maintenance engineer Mingan Kijika conducts a wiring test on an Airbus AS330 Puma.



An S-64 Aircrane and Bell 214ST hold a hover in front of Mount McLoughlin near Medford, Oregon.

"The Korean order really helps to legitimize this notion of buying and owning, and buying and operating the Aircrane," he said. "Since the Napa [Valley] fires and the horrific fire season in California, there's been a lot more interest from customers about potentially building and buying new Aircranes from us for aerial firefighting."

The S-64s Erickson produces are converted from CH-54 Tarhe airframes, which are stripped down and built up in three parts: the cockpit, central fuselage, and tail boom. The latter is built from scratch.

The lead time for a new Aircrane is 18 to 24 months, but Kitani said Erickson is looking to speed this up, and offer other options for those looking to operate an aircraft in the near future.

"We've got a couple of customers who we're in active dialogue with where . . . they're very focused on how they can get the capacity sooner rather than later," he said. "So we've talked to them about other permutations like potentially selling one of our Aircranes that's in our existing fleet and then building a new one — and we could either keep the new one as part of our fleet, or even potentially swap it out with the one they'd been operating."

In addition to building new airframes, Erickson also supports the global fleet of S-64s, making the likes of Siller Brothers and Helicopter Transport Services (HTS) both customers and competitors. From the latter, Erickson recently received an order for two of its in-house 2,650-gallon (10,000-liter) firefighting tanks, which were being painted in HTS colors at the time of *Vertical's* visit in November.

Erickson also serves as a third party manufacturer for the OEMs, producing parts for aircraft including the Bell V-22 and 525 Relentless.

One of the most exciting developments for Erickson's manufacturing unit is the upcoming certification of composite main rotor blades for the S-64, slated for the second quarter of 2018. After initially looking to outsource the program, Erickson, in collaboration with Aircrane operator HTS, has spent seven years taking the blades from the drawing board to the edge of certification.



Erickson signed an agreement with Bell in February 2015 to assume product support responsibility for the Bell 214 B and ST models.



The company now supports around a dozen 214 operators around the world, and has been working hard to develop new repairs for parts to keep the global fleet flying.

Erickson's success with the Bell 214 is one of the reasons its maintenance, repair, and overhaul division has seen such dramatic growth over the last few years. The company hopes to grow the unit's revenue by 30 to 40 percent in 2019.

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- Airbus AS350/EC130 series and AS332/H225 Super Puma
- Sikorsky S-92, S-76 and S-61

**Dynamic Components** 

Fuel Systems

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STCs



www.standardaero.com/heli helicopters@standardaero.com +1.204.318.7544 The existing metal rotor blades for the E and F model Aircrane are specific to those types, but the new composite blades will be essentially identical — the difference between them is in the the cuff that attaches to the rotorhead and the counterweights at the tip. Still, the blades need to be certified separately on each type. Erickson completed high altitude performance testing over the winter for the F model's blades in Cusco, Peru, while the E model's high altitude testing will likely be done in Leadville, Colorado, this summer. Once both are certified, the blades can go to market.

Until the performance testing is complete, the full benefits of the new blades will not be disclosed, but anecdotal reports from pilots indicate a greatly improved torque value and fuel efficiency, and a huge reduction in vibration within the aircraft — which would likely have knock-on benefit to other components, as well as reducing pilot fatigue. According to Amanda Hammerschmith, composite main rotor blade program manager, the composite blades have shown incredible durability during testing.

While physically very similar in size and weight to the metal blades, the composite blades are easy to spot, with a striking swept tip and bright white finish. The tips of the blades are painted matte black after early testing found the shiny white paint resulted in a glare in the cockpit.

#### **AN MRO FOCUS**

While there are certainly promising signs in its manufacturing department, it's on the MRO side of the house that the company has seen the most dramatic growth. In February 2015, it signed an agreement with Bell that saw Erickson assume product support responsibility for the Bell 214 B and ST models, including spare parts supply, technical assistance, maintenance training, and MRO services.

"With that, we inherited [support for] around 10 to 12 operators," said Justin Saxbury, global customer service manager at Erickson. "We were uniquely positioned to not only offer our manufacturing capabilities, but also our engineering and overhaul expertise."

The company's engineers quickly worked to develop new repairs that would allow parts previously determined to be unsalvageable to return to service. "It's been a challenge, but the guys have embraced it and enjoyed it," said Kevin Haataja, component repair and overhaul manager. "The manuals were difficult to follow — a total 180 from what you've learned with the Sikorsky product — so we've had to really gather the data and use our engineering to figure things out." With the realization that there was going to be continued support for the type, operators who had previously been looking to sell the aircraft began putting them back into service.

"It's a really wide footprint for such a small community, but we've done our best to support each and every one of them," said Saxbury. Similarly, Erickson has been working hard to develop new repairs and support capabilities for operators of the 4,800-shaft-horsepower JFTD12 engine (which powers the S-64), having bought the type certificate for it from Pratt & Whitney in 2013.

"We've started exploring doing rotating parts, discs, so we're starting that machining process," said Haataja. "It's nice to be in control of your own destiny and we have enough rotational inventory for now. As years go by, we'll need to keep expanding that."

During the bankruptcy process, the MRO unit faced a considerable challenge to maintain its relationships with vendors within a very different paradigm — facing new pricing, new terms, and new lead times for parts.

"It really is a testament to the entire team," said Saxbury. "It was a challenge for the MRO as well as the sales team to maintain relationships and to make sure we were meeting our commitments with our customers — because obviously, we were looking past when you emerge from the bankruptcy, those relationships are imperative to you to continue to grow and have success."

Despite these challenges, the MRO unit grew its revenue by 15 percent, and is anticipating 30 to 40 percent growth in 2019.

Thanks to this success, the overall company managed to not only sustain its business, but grow during the bankruptcy process. "We didn't lose any customers, and the fact that we were able to continue growing the business through that is a testimony to the strength and value proposition of the platform, as well as the strength of the team," said Kitani. "We have been working hard to maintain a good rapport with our key partners and vendors. It's been improving every week and month since I've been here — but we still have a lot of work to do."

Looking ahead, Erickson has been busy building its leadership team under Kitani, with several key appointments in the last few months. With the right people in the right positions, and a line drawn under the previous era, Kitani is clear that the future is bright for one of the helicopter industry's most iconic names.

"This is about leadership and having the right culture, values and vision," said Kitani. "I'm excited by this team that is now largely in place. There are so many great people at Erickson, and I think with their capabilities, anything is possible."



Oliver Johnson | Editor-in-Chief of Vertical Magazine, Oliver has been covering the helicopter industry since joining MHM Publishing in 2012.

He can be reached at at oliver@mhmpub.com Follow him on Twitter @orjohnson\_



Erickson Inc. senior training captain Eric Van De Walker at the controls of an S-64 near the manufacturer's facility in Medford, Oregon.

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The second Airbus H160 prototype flies near the Red Rock Canyon area west of Las Vegas in late February, prior to launching on its North American demo tour.

TI (S) (O)

Vertical got behind the controls of Airbus Helicopters' new H160, discovering a nimble, capable aircraft that embodies a generational leap in technology.

ana

BY JON BOURKE PHOTOS BY MIKE REYNO & SKIP ROBINSON





I was beginning to think this wasn't going to happen. Our camera ship was stuck a 15-minute flight away at the Henderson (Nevada) Executive Airport, engulfed in a winter snow shower that had brought visibility below one mile.

"This is Vegas!" I thought. "Where the hell did this come from?! Isn't it supposed to be sunny and warm here in the winter?" Normally... but a strong Pacific trough had moved in the day before, and was now pouring cold moisture over Mount Charleston and the foothills west of Las Vegas. Our very limited opportunity seemed to be slipping away.

Airbus Helicopters had offered us a chance for a demo flight and photo shoot with the H160 — the next-generation replacement for the venerable AS365/EC155 family of helicopters — out of the North Las Vegas Airport (KVGT) on Feb. 23. The aircraft was scheduled to fly into the Las Vegas Convention Center for HAI Heli-Expo 2018 early the next morning, and there wasn't going to be any wiggle room for rescheduling.

Test pilot Olivier Gensse and chief engineer Laurent Maruejols had been on a precise timeline since arriving in the U.S. with the second H160 prototype, F-WWPL. We were scheduled to do a briefing at KVGT at 2 p.m. before departing for the flight evaluation and photo shoot in Red Rock Canyon, but the weather was having none of that. Not only was our primary photographer, *Vertical* publisher Mike Reyno, stuck with the camera ship in Henderson, cloud cover was spoiling the light and the wind in the mountains where we planned to fly was gusting 25 to 35 knots alee.

Finally, a little before 3 p.m., Reyno called to say there was a break in the weather and they would be there shortly. I would get a chance to fly the H160 after all.

#### **STYLISH AND FUNCTIONAL**

I had arrived at KVGT early, along with *Vertical* photographer Skip Robinson, who would be riding along with me in the H160 to take in-cockpit and other shots as the flight progressed. Not only did we want to make sure we weren't late, I was hoping to get more saturation time with this new, intriguing aircraft. There are enough novel things about the H160 that I needed to explore them not just in the formal flight test, but in the kind of informal hangar atmosphere where detailed techno-speak flows more freely.

The airport manager drove us to the rented hangar where Airbus's technical and engineering staff were holed up with the aircraft. At the rear of the hangar, in a dingy work room that appeared to have once served as a battery reconditioning station, an old steel table served as the workspace for a number of engineers and technicians, with their laptops and other modern tools of the trade packed on top.

1 // Cruising the Las Vegas Strip in style. The H160's slow-flight deck angle is comfortable with plenty of visibility. 2 // While high up in the Spring Mountains, holding a direct 25- to 30-knot crosswind was not an issue for the H160.

These were the flight test and development team members assigned to the H160 project, who had been traveling different parts of the globe expanding the envelope of the aircraft in the harshest of conditions — from cold to hot, low to high — wherever those conditions could be had. Slightly embarrassed with the accommodations my country was leasing to them, I asked, "Are you OK here?" They collectively brushed it off as no big deal; they had seen plenty worse.

Gensse and I slipped right into conversation like pilots do when talking about the things they are most passionate about: common experiences and acquaintances; been-there, seen-that's; the failures and successes of new and old technologies. I could have spent another week talking to him, but then we got the call about the break in the weather.

Half an hour later, the photo crew was gathered around the table with the Airbus team to brief the aerial shoot, which would start with a pass through downtown Las Vegas. By the time we were ready to go, it was 4:30 p.m., and the only sunlight visible was beyond the high overcast, peeking through the mountains somewhere to the west as the sun lowered to the horizon.

Getting into the cockpit was easy through very large, automotive-style doors, which felt solid and were easy to use thanks to handles similar in design to those used on most cars. The devil is in the details, they say, and Airbus seems to have put a great deal of effort into making this new airframe devilishly functional.

One of those details is a visual indicator on each door, visible from both inside and outside at a good distance, which shows red when the door is open or not fully latched, and solid green when it is secure. A quick glance over the shoulder from the cockpit allows pilots to confirm whether the doors are latched and ready for lift-off. The cabin window design also provides a wide area of visibility from the cockpit to check outside surroundings easily.

The starting sequence was similar to that of the older EC155 that my company operates, with a few notable differences. In the H160, there is no manual autopilot test (it's completely automated, including the cyclic centering function) and no fuel boost/transfer switch management or tests (as the fuel system is also fully automatic and transparent to the pilot). And two separate batteries allow the two Safran Arrano engines to be started simultaneously, if the need arises.

For flight test, the aircraft had been outfitted with a non-standard cabin interior: a lightweight fabric blanket with Velcro attachments, to accommodate easy access to all of the test and measurement equipment placed throughout the airframe. With both engines running and main rotor RPM at 100 percent, the cockpit noise level was low enough to talk comfortably without headsets, thanks in part to the quieter Blue Edge main rotor blades and the design of the transmission and all-composite



airframe. Gensse said the decibel level in the production aircraft with standard interior will be lower still.

Immediately, as I began taxiing out to where the photo ship was waiting for us, I noticed how much more stable the H160 felt on the wheels compared to the 155. We were rolling with a calculated gross weight of around 12,200 pounds (5,535 kilograms), just 300 lb. (135 kg) shy of the maximum takeoff weight of 12,500 lb. (5,670 kg) that Airbus is targeting for initial certification. Airbus said it also plans to have a supplemental type certificate at entry into service for an extended gross weight of 13,338 lb. (6,050 kg), with some limitations that are not expected to impact most customers.

Gensse had briefed me on the design and function of the Safran electric brake system before the flight, so I was eager to try it out. Up to that point, the only electric brake system I had used was the emergency brake system on my own car, so I was somewhat skeptical about giving up the feel and control of the old hydraulic



brake system in favor of pure electric.

I'm a believer now. Not only were the brakes more easily actuated than the old-style hydraulic brakes in the 155, the feel and power was linear, precise and controllable. The pedals in the H160 have also been redesigned to make it easier to toe the brakes without having to slide your feet up, which makes braking while taxiing a simple and seamless task — something that could come in handy in tight places like platform and shipboard helidecks.

As a bonus, the carbon-matrix rotor disc pack and electric calipers also lighten and simplify the brake system. Though the aircraft we were in had not yet been equipped with it, the production landing gear system on the H160 will be all electric as well, simplifying and lightening the system by eliminating hydraulic reservoirs, lines and actuators. Gensse said the cycle time for the landing gear system, from fully up to down and locked, will be four to six seconds.

I'm all for these types of improvements. Earlier in my conversation with Gensse and Maruejols, they used the term "spirit" a lot. With the H160, Airbus aims to make real-world advancements in simplifying systems not only for the obvious benefits of cost and weight savings, but also to streamline manufacturing processes for quality control and efficiency, enhance reliability and reduce pilot workload. So the "spirit" of the H160 is really an inclusive package of many forward-looking improvements.

#### **SMOOTH CONTROL**

Once we were in position and ready to go, the camera ship took off and headed southeast for the Las Vegas Strip. I lifted into an eight-foot hover, scanned the first limit indicator (FLI) on the Helionix avionics suite, and pulled enough power to keep pace with the Airbus H125. Not even near a max continuous limit, the



1 // Here, the display from the wide-angle camera on the vertical fin of the H160 is shown on the second screen from the right. 2 // Airbus's quiet Blue Edge main rotor blades are among the new technology on the H160.

aircraft felt light and solid, easily maneuverable.

As we got close to the photo ship, Gensse took over the controls to tuck in close and low on the H125's left aft side. As Gensse remained visually glued to the camera ship, I assumed radio duties and kept a lookout for traffic and obstructions. With Reyno directing us using hand signals and relayed radio commands as he shot through a special camera window, we slow-cruised southward down the Strip until abeam McCarran International Airport. Then we made a coordinated right turn westward toward the Red Rock Canyon area and the only direct sunlight around.

Red Rock Canyon itself was still in shadow, so we continued west up in to the higher snow-covered hills of the Spring Mountains, where the sun had just broached the westernmost edge of the overcast. Quick plan changes and adapting to the

conditions allowed us to capture still shots and video with the aircraft contrasting against the dusted boulders

and trees in the high country, and the sun striking us at a dramatic, low angle. The dark overcast behind us made the photos pop. The wind coming across the ridge to the northwest of us remained at 25 knots with gusts to 30, and being on the lee side of the main range made for some not-so-smooth conditions in which to work. By the time we reached the first location in the Spring Mountains, our gross weight was down to around 11,800 lb. (5,350 kg), and we were hovering stationary while Reyno worked the angles around us in the photo ship. The pressure altitude was 6,700 feet, and the temperature 2 C (35 F).

During some of this time, Gensse wanted to demonstrate the capabilities of the four-axis auto flight system to make pedal turns, and perform slow climbs and descents per Reyno's instructions. The auto-flight system handled all of the commands and held headings/altitudes well during the gusts and downdrafts. I was able to select a display page of engine parameters and watch the



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margins. Most of the time in the hover, our power setting showed a comfortable margin available with the occasional use of a time-limited range, as we held a direct 25-knot gusty crosswind.

I was impressed by the authority of the new Fenestron tail rotor, which has a canted design to deliver an additional 176 lb. (80 kg) of lifting ability. Gensse said it is the most powerful Fenestron yet produced, and its performance actually exceeded design expectations. He said it has been tested to 50 knots of crosswind at gross weight.

Eventually the sun crept low enough that Red Rock Canyon

began to get good light, so we headed back east and concluded the photo shoot there. It was now "my" time with the H160, and I headed to a nearby landing zone (LZ) on a flat ridge that I had visited during a previous HAI Heli-Expo demo flight. As I began my eye-level recon, I saw that a windsock had been added to the site, and it looked quite suitable for a landing.

Slopes and unprepared surfaces present a challenge to pilots when the exact placement of the gear is critical to keep from setting down on unforgiving objects and causing damage. But the visibility from the H160's pilot seats takes most of the guesswork

// Orange cabling installed on F-WWPL's Spheriflex rotorhead gathers in-flight data from an array of strain gauges, accelerometers and other measurement sensors.
 // F-WWPL has been used to experiment with different angles for the biplane horizontal stabilizer, but it will have a fixed position in the production aircraft.
 // Airbus says that canting the Fenestron on the H160 adds 176 lb. of additional useful load.
 // The Safran Arrano uses two centrifugal compressor stages without any bleed valves. To maintain optimum combustion temperatures, flow is instead controlled through a VIGV system.
 // Practical safety improvements like visual door status indicators reflect the H160 designers' attention to detail.



out of picking the right spot, and the smooth control response makes it easy to put it there and hold it, even under the windy conditions we had. Being able to so clearly see detail below your feet and out to the sides without having to contort yourself in the seat is uncommon in a helicopter of this weight class.

We dropped Robinson off at the LZ, and I did some "sporty" maneuvers to get into good positions for his shots. This is where I got to really feel out the control margins and responsiveness of the main rotor and Fenestron. Low airspeed maneuvering using pedal, slips and skids to a hover, crosswind pedal turns: easy. No special technique, no surprises. Those kinds of maneuvers would have had the stability augmentation system (SAS) and auto-pilot kicking off line in the EC155, but the 160 took it all in stride.

After receiving the thumbs-up signal from Robinson, I landed back at the spot where we let him out; he boarded, took his seat



and belted in. We were ready to head back to KVGT. By now it was getting late, so I asked Gensse if we could use the remainder of our time to do some pattern work including single-engine landings and SAS failures.

Gensse agreed, so while en route to the airport, in addition to demonstrating the auto-flight unusual attitude recovery mode, we went over the procedure for single-engine training mode. Training mode is fairly straightforward: you don't need to select any engine to "fail," since the aircraft doesn't respond any differently whether the right or left engine is failed. With the training mode selected, power limits are recreated on the display, calculating available single-engine power. No engines are rolled back or reduced, so there is no re-engagement of freewheeling sprag clutches between training mode and operating mode that could do damage to drivetrain components.



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Once in the pattern at KVGT for runway 30R, Gensse let me fly with SAS off to a landing and then demonstrated a unique feature of the new auto-flight system: auto-land from a CAT A takeoff profile before the takeoff decision point (TDP). That sounds like a handful, but it wasn't. With the autopilot engaged, we initiated a vertical takeoff profile and simulated an engine failure before reaching the TDP in the profile. The system took the aircraft back down to the runway using "simulated" available power with no manual intervention. action to take.

#02 DEMOTOR

Another pattern and another demonstration on downwind: full authority digital engine control (FADEC) authority over rotor RPM. With a quick upward pull of the collective, followed by a sharp thrust downward, the RPM held steady. I'm glad Gensse did this one, not me; I could only envision myself making such radical control movements in some kind of certification test flight, or in a crazy life-or-death maneuver to avoid another aircraft. Nonetheless, the 160 shrugged it off as no big deal: no exceed-

#### IF THE CLAIMS OF REDUCED ACQUISITION AND OPERATING COSTS PROVE TO BE TRUE, AIRBUS WILL HAVE A REAL CONTENDER IN THE MEDIUM WEIGHT CLASS AIRCRAFT FOR THE OFFSHORE, SEARCH-AND-RESCUE, EMERGENCY MEDICAL SERVICES, AND CORPORATE CHARTER MARKETS.

If we had selected the failure after the TDP, the system would have flown the profile for continued takeoff to safe single-engine speed (Vsse), with the only difference being that the pilot needs to tell the system with the press of a button when the aircraft is at the TDP, in order for the autopilot to determine what course of ances or out-of-limits indications.

After readjusting my seat belt, I performed a rolling landing from a single-engine approach, although I didn't need to; the aircraft had enough simulated single-engine power for the whole series of patterns. Oh, and those electric brakes? To demonstrate their safety benefit, Gensse told me to keep the speed up on landing, then grabbed

the parking brake knob and set it to "on." In the EC155, I would be purchasing new main tires at this point, but in the H160, the system firmly applied the brakes to bring the aircraft to a rapid stop without the slightest squeal of rubber as if it had an anti-lock braking system! Cool.

Landing off airport is easy in the H160, thanks to its excellent cockpit visibility and smooth control response.



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#### **A TRUE LEAP IN TECHNOLOGY**

My time was up, and the sun was beginning to set behind the Spring Mountains. I requested an air taxi over to the ramp near Airbus's rented hangar, accelerated to 80 knots, leveled at 100 feet, then did a controlled quick-stop to a slight roll-on landing. Gensse laughed and said there was no such thing as an "air taxi" in Europe; such things aren't recognized by air traffic control there. "Oh?" I said. "You are missing out on some good practice, then. Too bad ... "

We completed a simplified checklist for shutdown. As the main rotor blades came to a stop, I was reminded by the sight of the five highly contoured Blue Edge blades that we had been flying with a lot of new technology - all designed to make the H160 stronger, lighter, quieter, faster and more efficient than any previous helicopter in its weight class.

The main rotor blades alone allow the H160 to maintain the 170-knot sea-level never-exceed speed up to 5,000 feet pressure altitude, and the new Safran Arrano engines claim to burn 10 to 15 percent less fuel for the equivalent horsepower output of similar engines in the same class (1,110 to 1,300 shaft horsepower).

According to Airbus, that will give the H160 an advantage over competing aircraft, such as the Leonardo AW139.

Behind the controls of the H160, I didn't get the feeling that I was flying such a large aircraft. Between the visibility and the ease with which it handles, it seems much smaller from the cockpit. In comparing it to the aircraft it was designed to replace, the EC 155/AS365, I have to say that its new technology represents a much greater overall improvement than in past model upgrades.

From the two hours I got to spend in the cockpit of this new, "clean-sheet" aircraft, I'm impressed. If the claims of reduced acquisition and operating costs prove to be true, Airbus will have a real contender in the medium weight class aircraft for the offshore, search-and-rescue, emergency medical services, and corporate charter markets. Time will tell.



Jon Bourke | Jon Bourke is the director of quality assurance and quality control for Atlanta, Georgia-based Helicopter Express. He has served as chief pilot (parts 135/133/137), company instructor, and check airman for three different companies, in addition to owning his own helicopter company.

The bi-plane horizontal stabilizer design reduces the exposed surface area in the rotor downwash. Airbus claims another 110 lb. of useful load and a flatter hover attitude because of this property.
# **HELICOPTERS**

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With a large and hugely varied fleet, Heli-Austria spans the Alps to provide an almost limitless range of services.

### STORY BY HOWARD SLUTSKEN PHOTOS BY ANTHONY PECCHI

It's important to have the right tool for the job.

Looking at Heli-Austria's large and diverse fleet of helicopters, it's clear that CEO and chief pilot Roy Knaus has a big toolbox to draw from, packed with the right machines for a wide range of missions.

With over two dozen helicopters in the fleet, from the Airbus H125 to the Super Puma, Heli-Austria can handle virtually any kind of assignment. "Basically, we're doing everything but offshore, and now we're also into heavy lift," Knaus told *Vertical*.

Heli-Austria is based in St. Johann im Pongau, about 40 miles (65 kilometers) south of Salzburg, in the Austrian Alps. The company also operates Heli-Tirol, based in that Austrian state, and Martin Flugrettung – or Martin Air Rescue – which is the country's helicopter emergency medical service (HEMS) provider.

There are 150 people working at the company's headquarters and bases, including 30 pilots, and HEMS doctors and paramedic crews.

"We have a very broad coverage of the Alps because we have aircraft at nine bases in Austria, Switzerland, and Northern Italy, flying a mix of EMS, sightseeing flights and heli-skiing," said Knaus.

The company has recently added an H130, a helicopter well-suited to sightseeing operations. The aircraft is the first H130 in Austria and Germany, and a second will be added later this year. It joins Heli-Austria's remarkably varied fleet of MD 902, H125/AS350 B3e, and H135 helicopters, and for medium and heavy-lift missions, it has the Bell 212 and 412, and AS332 L and AS332 L1 Super Pumas.







Heli-Austria has a fleet of more than two-dozen helicopters and a staff of 150.

Three more H135s will be added to the fleet this year, and two will be equipped with Airbus' innovative and advanced Helionix avionics system, including a 4-D autopilot.

### **A RACING START**

Heli-Austria began operations in 1984, flying a used Hughes now MD Helicopters - 530F. Launched by Knaus's father, the company initially didn't have its own Air Operator's Certificate (AOC).

"But my father knew Niki Lauda, the Formula One driver, so he operated under Lauda's AOC, and the company was called Lauda Air for a couple of years," said Knaus.

The fleet grew quickly to three MD 500s and diversified with the addition of an SA316 B Alouette. Tragically, in 1997, Knaus's father was killed in an Alouette crash, an accident attributed to a third-party maintenance issue.

"My brother was also in the helicopter, and he survived, but with severe injuries that led to long-term physical challenges," said Knaus. "He still works for the company as a ground operations manager, but he could not fulfill his dream to become a pilot."

### **NOTAR OR NOT**

Heli-Austria flew about 7,700 hours in 2017, up an impressive 30 percent from the previous year. HEMS missions account for about a third of the flight time and generate about half of the company's revenue.

The Martin Flugrettung EMS workhorse has been the NOTAR-

equipped twin-engine MD 902. The NOTAR system replaces the anti-torque control provided by a helicopter's tail rotor with a high volume of air ejected through slots in the tail boom, aided by a directional jet thruster. It's quieter than a conventional tail rotor and gives pilots an increased safety margin when operating in confined areas.

Knaus acknowledged that the 902 is a favorite with pilots and medical crews. "The 902s are guiet with the NOTAR and they have a roomy and spacious cabin. The NOTAR system is very good, but the aircraft is a little underpowered for single-engine performance." But as ideal as the 902 might be, the company is transitioning to the H135.

"Airbus has improved the twin-engine performance and the single-engine performance of the 135," said Knaus. "The little bit of a downside is the smaller cabin. Although we like the flight characteristics of the 902 - it's even smoother than the 135 - the 135 is very good as well."

He explained that the decision to move to the H135 was driven by his assessment that MD Helicopters "is no longer developing the 902. The costs are just increasing, and over the next 10 years, operating the 902 will get more and more expensive."

Getting parts for the 902 can also be a challenge, according to Christian Zirngast, Heli-Austria's head of design, who is also responsible for the airworthiness of the fleet.

"Here in Europe, we don't have overhaul shops for some of the parts," he explained. "So, for example, for the main gearbox, there

The company's medium-lift capabilities are provided by two Bell 212HPs and four Bell 412s.



Switzerland, and Italy.



MD 902s. The aircraft is favorite among pilots and crews, but the opera-tor is finding the aircraft's costs are increasing.





An H135 belonging to Heli-Austria flies in front of a peak in the Austrian Alps. The operator has been in existence for almost 35 years, but has seen rapid growth in the last 10.

is one overhaul shop in the U.K. But if they don't have time, you don't get a main gearbox."

And although parts can be sourced from Federal Aviation Administration- (FAA)-approved shops, those facilities also need approval from the European Aviation Safety Agency (EASA). "If a repair shop is only FAA-approved, then we are not allowed to put in a repaired part," said Zirngast.

### LIGHT AND POWERFUL

Heli-Austria operates from mountain bases as high as 7,000 feet (2,130 meters) above sea level, with missions up to 13,000 feet (3,960 meters). In this challenging environment, flying a powerful, light helicopter can both enhance safety and make a pilot's mission easier to accomplish.

ELI-AUSTRIA FLEET

Recognizing this, Heli-Austria has developed in-house engi-

neering solutions that improve the operational capabilities of the machines in its fleet, holding supplemental type certificates (STCs) for many of its helicopters.

"The standard [AS]355 is not a twin-engine for the mountains. It's just not delivering enough engine power," said Knaus. "While I consider the aircraft very good, we have a lot of enhancements that we have incorporated in the aircraft."

Heli-Austria developed an STC that replaces the machine's original engines with the Rolls-Royce M250-C20R that develops about 20 percent more thermodynamic power. The aircraft also has a larger tail rotor for improved control authority.

"We once had an engine failure at 7,000 feet, and the pilot saved the crew and the aircraft," said Knaus. "If you would have an engine failure at 7,000 feet with the standard 20F engine, you're going to go down."



By reconfiguring, updating, and redesigning systems, avionics and other components, the company has developed programs to both enhance the capabilities and reduce the weight of its other helicopters, including the Bell 412 and the Super Puma.

Knaus explained that with an STC to move the 412's autopilot system into the nose, and new ADS-B compliant Garmin avionics, "our 412s are the lightest 412s in the world, and more user-friendly for the pilot."

But even this particularly useful tool in the Heli-Austria toolbox has its limitations. "The 412 is a great aircraft — it's multirole," said Knaus. "We can use it for EMS, and it has a good cabin. But it's more noise, more fuel consumption, and it has more downwash."

For the Super Pumas, the company has developed "baby-sponsons" that reduce the empty weight of the machine by 300 pounds (135 kilograms).

### THE BIG CAT

In May 2016, Heli-Austria added its first Airbus AS332 L Super Puma, bringing a heavy-lift capability to its clients in Europe.

"We didn't have a single job when we bought the aircraft, but we knew we were going to make it work," said Knaus. "We know our customers, and if we advanced to heavy-lift, we knew they would give us jobs."

Over the past two years, Heli-Austria's Super Pumas have flown varied missions, including firefighting in Italy and Sardinia, construction projects in the Austrian Alps, and long line flights in the German cities of Frankfurt and Cologne.

According to Knaus, the big machine holds it own against other heavy-lift contenders. "We were firefighting in Sardinia, and the government compared the performance of the Super Puma to the [Erickson] Aircrane. In a four-hour timeframe, they found out the Super Puma burns less fuel, it can stay on the fire longer, can put as much water onto the fire as the much bigger Aircrane, and the availability of the Super Puma was much better."

Heli-Austria's AS332s were not subject to the EASA Emergency Airworthiness Directive (AD) and temporary flight suspension that resulted from the tragic crash of a Super Puma off the coast of Norway in April 2016.

"We are not concerned because the issue is with the main gearbox on the newer version, which is the Super Puma EC225 [H225)," explained Zirngast. "We have the older version. This is a time when an older aircraft is better than a new one."

Heli-Austria's Super Pumas are a favorite of deputy chief pilot Jürgen Köll, who has been with the company since 2004 and has flown most every helicopter in the fleet.

"It's a really neat machine — it's just different," said Köll. "It's really impressive, and you can move four tonnes on the hook and bring it accurately to your position. When I'm out there, doing construction and really precise work like that and it goes perfectly, that's what I love."

### **GIVING PILOTS THE BEST**

Having a current 9,500-hour pilot as CEO – and one who's as knowledgeable about technology and industry advancements as Roy Knaus – has put Heli-Austria high on the list for pilots seeking new opportunities.

"We have pilots applying for jobs because they like the innovation of the company and they like the pilot-minded equipped aircraft," said Knaus. "I want to give the pilots the best aircraft, so they can do the job perfectly.



Heli-Austria remains a family affair. Its CEO and chief pilot is Roy Knaus (left), and it was his father that established the company in 1984. His brother also works at the company.



The company is transitioning from the MD 902 to the H135 for its EMS work with Martin Flugrettung.



The company's Super Pumas have flown a variety of missions since joining the Heli-Austria fleet, including firefighting, construction, and long line operations.



When Heli-Austria bought its first Super Puma in May 2016, it didn't have work lined up for the aircraft. But it knew heavy-lift jobs existed for the type in the Alps and surrounding areas.



The company flew about 7,700 hours last year, which represented a 30-percent increase from 2016.



Heli-Austria holds STCs for improvements on many of the types in its fleet, such as replacing the engines in its AS355s for improved power at high altitude; and reconfigured avionics in the Bell 412s.



Three more H135s will join the Heli-Austria fleet in 2018, two of which will be equipped with the Helionix avionics system.

Heli-Austria has an STC for "baby sponsons" for the Super Puma, which reduce the aircraft's empty weight by 300 pounds.



"We have so many applications, but for us it's still important to grow people within our organization. Long term, it's the best. From our point of view, the best is to grow your own people, because then they understand the culture."

And part of that culture is ensuring that new pilots have the opportunity to learn from more seasoned and experienced crew.

"Low-time pilots start at the ground floor in our company," explained Köll, who said that new hires start as ground crew, and then move on to the H125 to fly ferry legs.

"In our experience, ferry flights are the most important thing for those new pilots, because they get a lot of training, flying for a couple of years under supervision," he added. "When they are done, these pilots are really good, because they've learned from the pros."

Being a good neighbor is important to Heli-Austria and can make training flights a challenge in the noise-sensitive communities around the company's bases. To reduce the number of flights, Heli-Austria is using simulators for Super Puma training and is hoping to add sims for the H125 and H135.

"That's our advantage, because we have such a big fleet of helicopters and pilots," said Knaus. "If you're an operator with just two aircraft, you can't move like we do. The biggest hurdle at the moment is getting qualified engineers."

He also believes that the regulatory environment has become a hurdle to growth.

"EASA has been pushing for too many rules too fast for the industry to adopt," he said. "No pilot will be able to follow 2,000 pages of paperwork - it does not make aviation safer."

### NIMBLE AND INNOVATIVE

Heli-Austria has seen rapid growth over the past 10 years, thanks in large part to a quick-decision-making process that exploits new opportunities. Over the next five to 10 years, Knaus sees Heli-Austria becoming an even more integrated Approved Training Organization (ATO), with increased simulator training, and more bases throughout the European Alps.

"We have a very flat hierarchy, and when we make a decision, we're fully committed to it," said Knaus. "Sometimes our competitors don't even understand why we are moving in a certain direction. But if the decision was wrong or poor, you also have to be able to change it. When I make a decision, I don't have to talk to anyone else."

While Knaus is laser-focused on the future of his company, he's still a passionate helicopter pilot who loves to go flying in his incredibly beautiful backyard. And yes, he has a favorite helicopter, too.

"If it's not about work, and you just have a blue day to go flying, I think the nicest is the H130. It's really perfectly made for the pilot to enjoy the flight.



Howard Slutsken | Howard Slutsken's lifelong passion for aviation began when he was a kid, watching TCA Super Connies, Viscounts, and early jets at Montreal's Dorval Airport. He's a pilot who loves to fly gliders and pretty much anything else with wings. Howard is based in Vancouver. B.C.

Two classic but modified Bell 47s. In the foreground is a 1964 Bell 47G3B1 that was converted to a Soloy turbine in the late 1970s. The other is a Texas Aircraft M74 Wasp, which started life as a 1959 Bell 47G2A.



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### **STORY & PHOTOS BY SKIP ROBINSON**

### AN ENGLISH CLASSIC

ENGLISH AIR SERVICES HAS BEEN A FAMILIAR PRESENCE IN THE SKIES ABOVE THE FARMS OF CENTRAL CALIFORNIA FOR OVER 30 YEARS — AND REMAINS COMMITTED TO THE BELL 47 AS THE IDEAL AERIAL APPLICATOR.



If you're a resident of the Santa Maria Valley in central California — or have spent any degree of time in the area — you'll have most certainly heard the whirl of one of English Air Service's Bell 47 helicopters in the sky above you in the early morning. Owned by Mark and Tracy English and located at Santa Maria Airport, English Air is an agricultural operations specialist that uses several versions of the classic Bell 47 to provide year-round service to the farmers of the region's fertile coastal plains. While the company has broadened its operations over the years, offering lidar aerial surveys around the country and then moving into the utility market with the use of an MD 500, agricultural operations are still the heart of English Air.

Mark always dreamed of making a career in the aviation industry. His love of flying started at a very young age, and, in 1981, he gained his fixed-wing pilot's certificate. Rotary-wing qualification soon followed, and in 1986, Mark and Tracy started English Air as newlyweds. A loan from a local bank helped the pair purchase their first helicopter, and with the support of the local farming community, Mark's dream job took flight.

"With little money, we rented a space in an open field where we kept the first helicopter — a Hiller 12E — while Mark's desk was outside by a barn," said Tracy. "Eventually, more and more farmers started giving Mark more work, and we were able to move to a hangar at the airport, which had a desk inside!"





As the workload increased, the couple purchased a second helicopter — a Bell 47G-5 — which marked the start of a lifelong loyalty to the type. Dean Tuck, a friend of Mark's from high school, worked with the company in a support role, and took flying lessons with Mark. Once he became a qualified pilot, he joined the company to become its second pilot, and is still with English Air today.

From a fleet of just one helicopter in 1986, English Air now has 10 — including five Bell 47s, one Bell 47 "Soloy", two Bell 206 Bs, and two MD 500s. To support the fleet, it has three large agricultural support trucks, each with their own landing pads. With eight hired or contracted employees, English Air now operates in all of the contiguous 48 states and has Federal Aviation Administration (FAA) part 133, 135, and 137 operating certificates.

### A WONDERFUL WORKHORSE

The Bell 47 remains the core of the English Air fleet. It has three Bell 47G-2As powered by Lycoming VO435AIF piston engines, two Wasp-style single seat Bell 47 variants equipped with the same Lycoming engine, and a Bell 47 Soloy powered by a turbine Rolls-Royce M250 420-shaft-horsepower engine.





"Our Bell 47 Soloy has quickly become the workhorse of our ag aircraft fleet, giving us the opportunity to work in all areas especially at higher altitudes and on hot days," said Mark, adding that he would like to expand the turbine-powered Soloy fleet and keep flying it as long as possible.

"They are very reliable, fuel is cheaper, and they have much longer overhaul times [than the piston-powered aircraft]," he said. "They are also very quiet and this lowers the fatigue factor."

On the downside, the turbine engine costs more to overhaul, he said, but lasts much longer than a piston engine if taken care of. With that in mind, he would like to add at least one more turbine aircraft to the fleet, while using the piston-powered 47s as back-ups or when the company has a higher-than-average workload. Mark said the Bell 47G has remained a great aircraft for the work the company performs in the low altitude cooler coastal California plain. The downside is the support for the engine. "Lycoming isn't supporting the piston engines any longer, so we are seeing rising prices and delays for overhauls," he said. "We plan on flying them as long as we can and it helps there are still people supporting the Bell 47 series with PMA [parts manufacturer approval] parts."

 <sup>//</sup> After over 30 years of continuous use, Bell 47 variants have been very good to English Air. The company plans to keep them flying as long as possible.
// Tracy and Mark English have worked hard since founding the company. Today, the company has been sold, but the Englishes are still as involved as ever.
// English Air's two Bell 206B JetRangers are economical workhorses, and stay busy doing lidar jobs for the power industry.
// A recent addition to English Air's fleet are two MD 500Ds, which are used in the power/utility sector.

1 // The company's work trucks follow the helicopters to supply fuel and chemicals. 2 // The unique M74 Wasp is an optimal design for agricultural work; it is lighter than a normal Bell 47 so it can lift more, and the visibility is superb. Surprisingly, parts are still available to operators.

As for the Wasps, Mark said these aircraft are used for everyday row crop applications. "The awesome unobstructed visibility is perfect for what we do and also reduces the weight, allowing for additional payload," he said. "This version is inexpensive to operate and we can still get parts, so it will stay with us into the future."

All of English Air's agricultural operations aircraft are equipped with either TracMap or Trimble mapping systems, and use Isolair spraying equipment. The piston aircraft carry 100-US gallon (380-liter) loads of chemicals, while the turbine carries 110 US gallons (415 liters).

### **MEETING THE REGULATIONS**

In the Santa Maria Valley, agricultural aerial application is a year-round business, but English Air is busiest in the summer, when it can routinely spray over 800 acres a day. The helicopters spray vegetables including broccoli, cauliflower, celery, various types of lettuce, and cabbage. During the winter, the spraying work slows down a little, but broccoli, cabbage, cauliflower, kale, and other seasonal crops still need protecting. During rainy winters, English Air will be out spraying the large and sweet strawberries that Santa Maria Valley is known for around the world. Having been in the crop-spraying business for so many years, English Air is well versed in the chemicals it uses. "We have to abide by the many local, county, state, and federal laws on chemical usage," explained Taylor English Air. "Our people know the products well, and know how to apply them in a safe manner."

In the summer, organic applications are becoming more frequent, as most growers move to farming both traditional and organic produce. While organic food is produced free of chemicals, it's not uncommon for organic crops to still be sprayed with organic pesticides and/or fungicides. This requires more frequent application, as the organic pesticides are not as strong as the chemical pesticides.



Most of the chemical pesticides English Air uses have a re-entry level of 24 hours, which means that it is safe to re-enter the field 24 hours after an application. Since most spraying is done early in the morning, this makes it convenient for the ground crew to come in and harvest the crops when they are ready.

Both chemical and organic applications are monitored by the state, the Agricultural Commissioner, the U.S. Food and Drug Administration, and a local pesticide residue testing facility. English Air said none of the chemicals it applies to crops produce any risk to the health of consumers or the applicators and their ground crew — as long as the pesticides are properly applied according to the label. To keep up with English Air's licensing, it performs monthly tests of its pilots' and ground crews' Cholinesterase levels to make sure they are properly using the company's personal protective equipment and are not in direct contact with the pesticides.

"These growers feed their families with the crops they grow – they would never add any pesticides to it that they wouldn't feed their own family," said Mark. "The chemicals being put on our produce here through English Air Service are as safe as can be. We follow all guidelines and regulations brought to us."

### **A COMMUNITY BUSINESS**

The agricultural industry is big business in the Santa Maria Valley, but Mark and Tracy are proud to say that they are still servicing the same customers/farmers/ friends that took a chance on a young couple back in 1986.

"Everyone knows everyone in the area and we worked hard, kept our word, and did what we needed to do to make our clients and friends happy with our services," said Mark. "When we said we would be there, we were there."

English Air's operational area for agricultural spraying has kept largely within the Santa Maria Valley, but it ventures south into Santa Barbara and north into San Luis Obispo for certain jobs. And during cold winter nights, English Air is hired by farmers to help prevent frost by using the helicopters' downwash to move air so that plants do not freeze. "Frost control is a bit boring, and we stay up all night and into the morning flying, but in the end it keeps the ledgers full and helps the farmer and their crops," said Mark.

In 2004, English Air expanded its business by moving into lidar (light detection ranging) aerial surveying, for which it utilizes two Bell 206B JetRangers equipped with specialized electronic gear. The helicopters map the distance from a powerline to vegetation, as well as the distance from other lines. In addition to the vegetation clearing, lidar mapping makes sure the powerlines are upgraded and in the correct placement. These jobs take the helicopters around the country.

During the last couple of years, English Air has expanded into powerline construction and maintenance, as well as powerline vegetation management and mapping. For these operations, English Air operates two MD 500s. "The [MD] 500 series is the standard in this type of utility work," said Mark. "It's a fun aircraft with plenty of maneuverability, reliability and safety features that make it the premier aircraft for the job. I was a little rusty on flying it, but my skills are back and I enjoy the machine."

Most maintenance at English Air is done in-house, although engine and transmission overhauls are sent to outside vendors. The company has a good supply of Bell 47 parts, and after operating it for 30 years, knows the aircraft's faults and how to repair them.

"We don't fly the aircraft hard, and we have found the Bell 47 to be a 'sorted-out'



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1 // Here, another angle of the M74 Wasp, with its subdued but attractive green and white paint scheme. 2 // Mark English and his bright orange helmet are legendary in Santa Maria. Almost anyone who lives there has seen his helicopter fly over in either the early morning or late afternoon.



machine without many surprises," said English Air mechanic Richie Seward. "The turbine Soloy runs well, while the pistons need a bit more servicing. Overall the dynamic systems on all versions are very reliable. Other than the piston engine, parts are still readily available and relatively easy to come by."

In June 2017, after a few years of being pursued by outside investors, Mark and Tracy decided to sell English Air. However, they are both still extremely active in the company's everyday operations and are enjoying watching the company they built from the ground up continue to grow at the hands of Byron Wimmer and Steve Bell.

Thirty-seven years after gaining his licence, Mark is as passionate about flying as ever, and with Tracy's support has no plans on retiring anytime soon. In late 2017, EAS moved across the airport to a much larger hangar, where it gained more office space and a separate storage area for its substantial spare parts inventory. Mark highlighted the longevity of service of many of the company's employees, who include agricultural pilot Dean Tuck, chief pilot Mike Zemlock, director of maintenance Mike Wilson,



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field mechanics Wade Hartman and Richie Seward, ground crewmen Luis Valdez and Fernando Enciso, contract mechanic Mike Wyatt, and Bell 206 pilots Adam Pyles, Alex Lugo, and JP Robinson. "These people make it all happen and having been with us for so many years they know exactly what to do every day," said Mark.

Thinking back on over 30 years in business, Tracy said there have been a lot of ups and downs — but mostly ups. "Mark and I are so blessed that no one was ever hurt during the time we owned English Air," she said. "We are so thankful for everything and everyone that has touched our lives, helped us along the way, and supported Mark's dream."



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



TALAL PLATER



LILILIA

If English Air's Soloy Turbine Bell 47G3B1 has been completely overhauled and now presents in near-new condition.
If English Air's chief pilot, Mike Zemlock, here flies a JetRanger during lidar work.
If Landing on top of the work truck is routine, allowing workers to load and fuel the helicopter.
If Mike Wilson, English Air's director of maintenance and a rated pilot, transits over Santa Maria.
If The Santa Maria Valley can have stunningly clear days, but also foggy conditions during parts of the year.



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## TAKING MRO TO NEW HEIGHTS

Aeromni Aerospace has succeeded in offering a remarkably broad scope of MRO services for 10 years, and it only hopes to grow its capabilities list from here.

### STORY BY DAYNA FEDY // PHOTOS BY CHARLIE VOWLES

Now entering its 10<sup>th</sup> year of operation, maintenance, repair and overhaul (MRO) provider Aeromni Aerospace offers an unusually broad range of services. Located near the Langley Regional Airport in British Columbia, the facility is a one-stop-shop that handles almost every MRO need for fixed- and rotary-wing operators.

The company works on airframes, instruments, avionics and accessories across a spectrum of manufacturers including Bell, Sikorsky and Airbus Helicopters, and also offers parts/helicopter sales across the globe.

"We can basically take an aircraft and refinish the whole thing from top to bottom. . . . We can overhaul and repair almost





everything," said Rikkert Vos, Aeromni Aerospace's vice president, adding that the only thing the company has not yet tapped into is the business of engine and dynamic component overhauls. "I believe in Canada we're the only [MRO facility] that has this range of scope."

The company was founded by Wei Lin (who today serves as Aeromni's president), having 23 years in the aviation industry and a degree in electronics engineering.

Aeromni didn't expand into the maintenance side of the business until Vos, with 21 years in aviation, joined the company in 2013. Together, Lin and Vos opened a facility in Langley, and Aeromni Aerospace grew.

Starting out as a one-man operation in 2008, the company now has over 10 employees who allow the business to smoothly cover its broad workload.

While it has a wide Canadian customer base, the company has expanded into the overseas market and recently opened a location in Australia serving Asia-Pacific.



### **COVERING THE BASES**

Aeromni has the ability to overhaul and perform instrument and avionics maintenance on almost any helicopter, but Vos said the recent demand has been primarily on Airbus products — particularly the AS350, AS355, H130, and H120.

"Brian Carandang [Aeromni's chief engineer] and I have been working on the AStar for 16 years," said Vos. "We both have extensive knowledge of the aircraft."

And when it comes to avionics, installations and upgrades are common jobs for Aeromni's licensed avionics specialists. Andy Pang, Aeromni's installation manager, and his team perform anything from radio upgrades to full aircraft re-wires, offering helicopter operators a fresh start with their aircraft. The company has performed complete aircraft re-wires on two Bell 206 LongRangers within the last year.

The level of expertise of the company's avionics technicians mean it is able to build an operator's "dream" dashboard for a helicopter. Aeromni uses supplemental type certificates (STCs) to create customized installations that allow different equipment to be installed on any airframe. The company takes the necessary steps to deliver the breathtaking cockpit that helicopter operators envision.

"We engineered a new instrument panel with precise fit and alignment of all the flight instruments," explained Vos. "The new instrument panel was also powder-coated and laser-engraved for maximum durability and clarity."

To elevate the level of customer service, Aeromni also has technicians who will work offsite at an operator's facility when requested. "The avionics technician will fly to Whitehorse [Yukon] for example, and install a Geneva Panel or display. . . . We work offsite quite often," he said. "We're lucky to have a good team supporting us in maintenance and bench repair."



// Aeromni Aerospace started out as a one-man operation in 2008. With more than 10 employees today, the company hopes to continue growing.
// From left, Aeromni's president Wei Lin, avionics installation manager Andy Pang, vice president Rikkert Vos, and quality assurance manager Brian Carandang stand in front of the company's facility in Langley, British Columbia. 3 // Chief engineer Edi Schneider is shown overhauling an AS350 series fuel quantity transmitter in Aeromni's shop. 4 // Vice president Vos said Aeromni Aerospace has the ability to repair and overhaul almost everything.

1 // Here, one of Aeromni's technicians overhauls an AS350 series blower motor. The company has a wide range of MRO capabilities, including repairing airframes, instruments, avionics and accessories. 2 // Aeromni's quality assurance manager, Brian Carandang, performs maintenance on an Airbus AS350 B2 operated by Vancouver-based Vision Helicopters. 3 // Vos said while the company performs maintenance, repair and overhauls for aircraft products across a spectrum of manufacturers, the demand for services has recently been with Airbus products. 4 // Over the last 10 years, the company's employees have developed specializations with their individual areas of service. Here, Aeromni's instrument/bench technician Tony Derilo repairs a variety of instruments for aircraft with expert know-how. 5 // Avionics/bench technician Michael Guo repairs a Kannad emergency location transmitter (ELT). Aeromni Aerospace is the only authorized repair center in Western Canada for Kannad ELTs.



The company also offers 12-year aircraft inspections, performing seven on Airbus AS350s and EC130s in the last three years alone. Out of the many services Aeromni offers, its largest market is selling and exchanging aircraft parts — and this is a sector that the company has migrated into within the last few years.

Vos said the company will purchase aircraft to part out — taking various helicopter parts from aircraft and repairing/overhauling them to sell or exchange to operators. But Aeromni doesn't solely offer overhauled parts for sale; it provides new surplus parts to its customers, as well.

Keeping a large inventory, Aeromni also stores spare parts to be able to provide them to customers if they need them at short notice. "Our inventory is quite large," said Vos. "Our capabilities list is... pages and pages long."

#### **MAKING FLIGHT AFFORDABLE**

Because of its ability to perform such a wide variety of services in-house, Aeromni is able to keep repair costs low - an advantage any operator would appreciate.

"We're not farming anything out except for paint, major dynamic component overhauls and engine work; the rest of it is all done here," said Vos.

One of Aeromni's major recent projects involved converting an Airbus AS350 B into a B2 and replacing the aircraft's conventional push-button switch console with the reliable and modern Geneva switch console. Partnering with Vector Aerospace for aircraft paint and Turbomeca (now Safran Helicopter Engines) Canada for the addition of an Arriel 1D1 engine, the entire helicopter was dismantled, painted and cost-efficiently converted into a B2 in just four months. The transformed AS350 B2 is once again being used for mining purposes in Northern British Columbia.

Indeed, the majority of Aeromni's business comes from within Canada — much of which is local to the British Columbia-based company. While it mainly focuses on the helicopter industry, a small percentage of its business comes from the fixed-wing industry.

Aeromni provides instruments and avionics to independent airlines in British Columbia like Richmond-based Harbour Air Seaplanes. But Vos said the company typically only provides maintenance on helicopters.

One of Aeromni's most frequent customers for helicopter maintenance is the Canadian Traffic Network (CTN) in British Columbia (a division of the Global Traffic Network). CTN flies











Robinson R44 Raven IIs for traffic and newsgathering purposes. In order for news operations to run smoothly, the aircraft must be regularly maintained — and Aeromni is the MRO for the job. "They're coming in here probably once a week and we do maintenance for them," said Vos.

Currently, Aeromni's maintenance and repair technicians see roughly 12 aircraft go through the shop in a year, Vos said. And with optimism for growth, the company is aiming to expand to other overseas locations beyond its current range.

After 10 years of success, the sky is the limit for this cost-efficient and multi-disciplined MRO facility. "Every employee is a sales person for our business, and it's important they are happy and engaged," Vos concluded. "A satisfied employee results in a satisfied customer. And because of our culture, I'm confident we are only going to grow from here."



**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.

Castle Air is one of the biggest onshore helicopter operators in the U.K. Running charter, sales and maintenance operations from three sites, it also has experience in aerial filming that goes back to the '80s. And it all started with a speeding ticket. Story by Jon Duke Photos by Lloyd Horgan

In 1979, the U.K. boasted very few private helicopters, and in the rural southwest, the Royal Duchy of Cornwall was home to just one. Roy Flood's business in used car sales was doing so well that when his driving license was suspended following a misinterpretation of the speed limit, his only sensible means of getting around was to learn to fly helicopters, and buy a new Bell 206 LongRanger.

Meanwhile, Cornwall-based Royal Navy pilots Jerry Grayson and Keith Thompson were leaving the service with the dream of starting a local helicopter charter business. After a few rejections, their letter to Roy Flood's Castle Motors was met with curiosity, and the three formed Castle Air soon thereafter. Grayson flew a charter flight on the same day he left the Navy, and the business has grown ever since.

Operating from the car sales business outside the small town of Liskeard, the three not only flew the aircraft, but built the facilities that they would use to house and maintain them. In his book *Rescue Pilot*, Grayson describes Flood's approach as being very hands-on. "It was a jigsaw puzzle where you had to make all the pieces yourself and then put them together with a crane."

Cornwall's rugged coastline and spectacular undulating countryside made helicopter sightseeing popular with tourists, and by 1982 the company was able to add two new JetRangers to its fleet. The same year, high winds battered southwest Britain, knocking trees across narrow roads and causing power outages across a county in which, without any motorways, getting around to assess the damage was already hard enough.

Answering a contract for aerial survey of the infrastructure, Castle Air's pilots had an intimate knowledge of the landscape, and as the only charter business within a few hundred miles, the saving in transit costs alone was significant. It was valuable experience, and the realization dawned that the skills used to follow downed power lines at low level could be well employed for producers keen to introduce a new perspective to entertainment television.

The company's TV debut came on the 1982 gameshow *Treasure Hunt*, which ran for seven seasons and developed a cult following in the U.K. More work in the industry followed as the pilots developed an understanding of the unique demands of maneuvering the camera to the right position, regardless of the orientation of the aircraft. While most of this work had been

One of Castle Air's A109S Grand models flies past the iconic Tower Bridge in London.

Grand



carried out from the company's trusty JetRangers, Castle Air began to reach the limit of the aircraft's potential and in 1984, bought its first Agusta [now Leonardo] A109.

With the transition to two engines came new capabilities, and Castle Air was able to go further, faster and in poor weather. Its ex-Navy pilots even found themselves out over the sea again. Equipped with loudhailers, they chased errant leisure craft that had wandered into maritime ranges, as the Admiralty Underwater Weapons Establishment tested its newest torpedoes — which were then recovered by the company's helicopters.

The A109 proved a good camera platform too, and with a reputation for understanding the needs of the film industry, Castle Air still films all over the country. The costs of the transit more than makes up for the cost of finding a local pilot with the requisite skill and experience.

In 2010, the company was awarded a leasing contract to provide aircraft to train the Algerian military. Bell 206 and AW109E

helicopters were bought and then leased to companies that delivered the training on behalf of AgustaWestland (now Leonardo Helicopters).

While lucrative, the completion of these contracts towards the end of 2012 left the company with 13 helicopters that needed work or new owners. It turned to its old business model, putting the aircraft to work under lease or charter while courting potential buyers. "We've put a lot of A109s out there," explained Declan Lehane, the operations manager at Castle Air's Biggin Hill site in southeast London. "Our charter customers get used to the 109, and they'll tell us they really like it. When we say it's for sale then often they will ask how they could buy it, and our job is to make that as simple as possible."

With a proven capability to deliver aircraft internationally well beyond the range of its charter operation, not all aircraft sales are to charter customers. Here too, reputation is all-important, and word-of-mouth a powerful driver of custom. Again, the key priority







according to Lehane, is the ease with which Castle Air is able to offer solutions to its clients — both in through-life and extemporary support.

"We're one of very few, if not the only people in the U.K. who can acquire the right aircraft for you, customize the paint and interior, train you or your pilot, manage it and maintain it, all in-house," said Lehane.

### **BRANCHING OUT**

While the company built its success in Cornwall, there was no way the county would sustain or enable the lease, charter and sale of the surplus aircraft from the Algerian contract. The helicopter market around London was generally buoyant and competition was on the rise, but Castle Air felt that without leasing costs it was a market it could enter from a position of strength, using the purchase of another established London charter operator as its springboard and acquiring several more AW109s in the process.

Commensurate with the do-it-yourself ethos of the company's founder, Castle Air bought a hangar at London's Biggin Hill airport and set about turning it into a viable charter hub. A European Aviation Safety Agency (EASA) part 145 maintenance facility was established on-site, primarily for the company's Bell 206s and AW109s.

Having started its London operation with a single aircraft in May 2013, Castle Air's hangar space during *Vertical's* visit earlier this year was occupied by 10 helicopters from three manufacturers, albeit six being AW109s. While almost any type of helicopter can now be accommodated for maintenance, management or sale, the company's enduring preference for the Leonardo light twin is clear.

"WE'RE ONE OF VERY FEW, IF NOT THE ONLY PEOPLE IN THE U.K. WHO CAN ACQUIRE THE RIGHT AIRCRAFT FOR YOU, CUSTOMIZE THE PAINT AND INTERIOR, TRAIN YOU OR YOUR PILOT, MANAGE IT AND MAINTAIN IT, ALL IN-HOUSE." – CASTLE AIR OPERATIONS MANAGER DECLAN LEHANE

Castle Air has flown almost every civilian type of the aircraft, and, as *Vertical* went to press, was set to soon take delivery of the latest model, the AW109 SP Grand New, which includes a modern glass cockpit with an integrated four-axis autopilot.

The 109 series have always been popular in the U.K., and while Castle Air would probably be happy to take credit for that as early adopters, it is more likely because the aircraft is almost an exact fit for the U.K.'s peculiar corporate charter requirements.

The country has relatively little infrastructure designed to suit corporate helicopter aviation, and so operators find themselves making frequent use of larger airfields, most of which have hard prepared surfaces. Having wheeled undercarriage means not only greater comfort for the passengers rather than wobbling along in a hover-taxi, but also reduces the logged airframe hours on

1 // A109 series helicopters have always been popular in the U.K., most likely because the models are a precise fit for corporate charter requirements. 2 // Two of Castle Air's pilots prepare to depart Biggin Hill on a currency flight in the local area.





1 // Engineers work on an A109 at Castle Air's Biggin Hill facility. 2 // Castle Air's EASA part 145 maintenance facility at the Biggin Hill site. Almost any type of helicopter can now be accommodated for maintenance, management or sale. 3 // The company purchased Bristow Academy's site in Gloucester in 2016, relocating an AW109E simulator there from Castle Air's Liskeard headquarters.







the lengthy taxis necessary at some major airports that are nervous about departing traffic from the apron. Furthermore, snowcapped peaks are a rarity in the U.K., which does away with the need for the skids necessary for VIP access to many European ski slopes. The AW109E's wider undercarriage is more than a match for the shooting grounds of Dartmoor and the Highlands; about as close to the wilderness as these aircraft will be expected to get. Aside from the utility, having retractable undercarriage lends a

Aside from the utility, having retractable undercarriage lends a sense of speed and finesse to the aircraft's aesthetic that can't be overlooked in terms of appeal to Castle Air's clientele. "I don't think the looks are the reason clients choose the aircraft, but it's certainly a factor," explained Lehane. "Sleek, fast, Italian design. It just looks the way people expect a corporate aircraft to look and that definitely improves its salability."

### **SPREADING ITS WINGS**

Having an aircraft well-suited to its mission is certainly an advantage, but in its Liskeard headquarters, Castle Air was used to having an operating site customized to its requirements — and expanding into London would cost it that control. When searching for a suitable site in the capital, it needed a base whose operators not only understood the corporate game as well as Castle Air did, but was also flexible enough to allow helicopters freedom of



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maneuver — and grant access to onward connections. Of all the airfields serving London, Biggin Hill was the natural choice. Formerly a Royal Air Force fighter command base that was home to some of "The Few" during the Battle of Britain, in the free-market boom of the 1990s, Biggin Hill underwent a transformation into a hub for business aviation. Prohibited by law from operating ticketed flights, it has staked its survival on catering exclusively to private aviation. This was an arrangement that suited Castle Air just fine. It can have its customers delivered from London's only civil certified helicopter landing site — London Heliport at Battersea — to a private jet at Biggin Hill in

Away from the capital city, many of the sites that Castle Air flies to are field landing areas at private residences, for which the relatively compact size of the AW109 is ideal. Off-airfield sites are surveyed prior, and where night approaches are necessary, Castle Air's partners Puma Aviation must be in attendance with landing site lighting, and the pilot must have flown there in daytime. "If done incorrectly it can be unsafe," said Lehane. "But if you get the right procedures in place and do it properly, with the proper lighting, you can do it safely."

With aircraft containing ever-more capable technology (and marketed as such), will customers who are used to the height of convenience continue to accept being flown to the nearest licensed airfield when a field landing is imprudent?

"We make the capabilities and limitation of the aircraft very clear during the sale," said Barry Chalmers, Castle Air's manager at Biggin Hill. "If they need to do more then it's quite simple, they need a different aircraft. The vast majority [of customers] understand that perfectly well and we rarely encounter that kind of pressure." It is reassuring to hear a safety culture being reinforced from the perspectives of both sales and operations personnel. Keeping the customer happy must sometimes take second place to keeping the customer safe, and so Castle Air's pilots are expected to also be skilled diplomats. Even when risks are low, Lehane is very specific about why the selection of their pilots is so important.

"The team on the ground will work tirelessly to get a client on-side, but the first person that customer will meet from Castle Air will most likely be a pilot," he explained. "Of course they've got to be good at what they do, but they've got to be nice people [too]."

It is doubtless a challenge to find people who can maintain professional focus on a cognitively demanding task, with the easy charm and ready solutions of a concierge. Castle Air prides itself on providing a pathway into the role for early-hour helicopter pilots, building their experience through its continued use of Bell 206 aircraft for seasonal pleasure flying.

Allied to this is the company's 2016 purchase of the Bristow Academy site at Gloucester airport in the west of England. In a break with tradition, much of the infrastructure was already in place, although their AW109E simulator was transplanted from the Liskeard headquarters, adding to the two Airbus AS355 and single AW109 FNTPII trainers already in-situ.

Gloucester is also being developed into a full maintenance and charter facility, enabling Castle Air to reach further north and into Wales — another popular retreat for the wealthy.

The team at Castle Air certainly has a solid ethos of high standards and a strong link with their entrepreneurial do-it-yourself heritage. That kind of self-motivation has likely been valuable in standing up two new operations with barely a break in step. It also lends

around six minutes.

 // Certification of the stretched AW109S Grand model in 2005 followed Agusta's millennium merger with the U.K.'s Westland Helicopters, and added a little over eight inches (21 centimeters) to the design.
// Allison 250s, like this one installed in an A109MkII, made way for more powerful engines in later versions of the aircraft. 3 // One of Castle Air's base engineers works on a A109 at the EASA part 145 facility.





itself well to a world where the company must work around complications in order to deliver the client a trouble-free experience.

Whether in the shape of a regulatory barrier or inclement weather, obstacles encountered in aviation tend to be complex, and while operating a helicopter represents good value for those that can afford it, extracting that value demands the coordination of several interdependent or otherwise seemingly irreconcilable factors to safely deliver the expected service.

Summing up the company's approach, Lahane said: "Our clients have a department that looks after all of that, and it's Castle Air."



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Volo Mission's full course is designed to take pilots with no vertical reference experience to a point where they can safely go to work with a long line. A growing number of utility helicopter operators are turning to Volo Mission for help in training their new hires, but the course is also open to individual pilots who want to enhance their resumes.

P

The author lifts off the ground with a line during her own training in November last year.



Learning how to long line can make a beginner out of even a high-time pilot. We dedicated nearly two weeks to the process at Volo Mission, where there are no excuses and no shortcuts.

### BY ELAN HEAD PHOTOS BY WILL GRAHAM

For most helicopter pilots, learning how to fly a helicopter is one of the hardest things we've ever done. Few accomplishments are as satisfying as mastering the art of hovering, and once we've done that, the world becomes forever divided into those who can hover and those who cannot, with ourselves among the privileged few who can. The ability to fly a helicopter is not just a skill set it is, for many of us, our identity.

And then, after one or five or 15 years of feeling comfortable in that identity, some of us will fly our first long line. After hundreds or thousands of hours in the air with our head up, looking forward, we now try leaning out the side of the aircraft, looking down. Our heading drifts. The aircraft wobbles. Suddenly our identity falls to pieces, because any casual observer would doubt that we know how to fly at all.

This is the frustrating, ego-bruising, addictively challenging experience that awaits any pilot who seeks a career in the utility helicopter industry. And it was the experience that awaited me last year, when I signed up for an 11-day vertical reference long line course at Volo Mission in Campbell, Texas.

I already had a few hours of long line training here and there (see *p.64, Vertical, June-July 2012)*, although never enough to feel even close to proficient at it. Yet proficiency is what Volo Mission founders Kim and Andre Hutchings promise to students who complete their full course in a Robinson R44 (and to the employers who might be sponsoring their training).

The 20-flight-hour course is designed to bring helicopter pilots with zero vertical reference time to a point where they can safely go to work with a long line — maybe not with the speed or finesse of more experienced pilots, but with the ability to place any basic load exactly where they need to.

When three of us showed up for orientation on a cold, windy morning in mid-November, Hutchings assured us that by the end of the course, we would be using a 150-foot (45-meter) long line to place an air conditioning unit in the bed of a pickup truck (without knocking out any windows or errant bystanders, in case you're imagining what I was).

Hard as it was then to believe, he wasn't wrong. But getting to that point was an excruciating process: physically draining, psychologically taxing and, ultimately, richly gratifying. It was, in fact, like learning to fly all over again.

### TRAINING PROFESSIONALS

Going into the Volo Mission course, I already knew from first-hand experience that Hutchings was qualified to teach it. Hutchings is a long-time pilot for Columbia Helicopters; currently, when he's not teaching pilots how to long line, he's managing Columbia's contract operations in Afghanistan.

Back in 2010, I signed on with Columbia to write about the experience of flying the Model 234 Chinook as a co-pilot. That summer, I spent a week working with Hutchings in Kearney, Nebraska, watching gauges and making notes on a clipboard as Hutchings leaned out the left-side bubble window, setting 12,000-pound (5,400-kilogram) transmission towers to rebuild a power line that had been knocked down in a windstorm.

The Chinook is comparable in length to a Greyhound bus, but in Hutchings' hands, it seemed as nimble as an MD 500. Not that the construction workers on the ground were particularly impressed — they took it for granted that *every* helicopter pilot has such exceptional vertical reference skills. I had to explain to them that well, no, actually we don't.

Back then, Hutchings was already teaching a long line course at Los Angeles Helicopters in Long Beach, California. He and his wife, Kim, launched Volo Mission in 2014 in order to take that training to the next level. They purchased a rural property in Campbell, about 60 miles (100 kilometers) northeast of Dallas, and set about creating the ultimate long line obstacle course.

Students at the Volo Mission "ranch" progress through a series of increasingly difficult challenges: from placing loads within spacious rings in wide-open fields, to threading them through narrow gaps in between 50-foot (15-meter) mesquite trees. A wide variety of props allow students to practice realistic mission scenarios, including setting an AC unit on bolts, and lifting a Stokes litter out of a confined area. And simple log helipads are everywhere, because students perform a vertical reference landing on logs at the end of every flight.

While Volo Mission training is designed to impart a high level of technical skill, Kim and Andre have placed just as much emphasis on developing their students' mental games. Volo Mission aims to create not just long line pilots, but long line *professionals*: pilots who don't take shortcuts, who strive for perfection, and who are diligent about managing the risks associated with these uniquely unforgiving operations.

Here, the company has benefitted from Kim's extensive academic background in psychology and human factors. Volo Mission takes a conscious, methodical approach to teaching good habits and decision-making, both on the ground and in the air. It's a far cry from how many pilots in the industry learned how to long line: by just throwing a line on their helicopter, and struggling to figure it out.

### **NO EXCUSES**

Volo Mission's official motto is "Prepare. Execute. Succeed." But its unofficial motto has to be "Dig deep!"

Are you pouring sweat as you attempt to extricate your long line from the evil thorny branches of a mesquite tree? *"Dig deep!"* comes the voice of Andre Hutchings in your ear.

1 // Students must lay their lines down neatly at the end of each flight, part of the professional discipline the course aims to instill. 2 // Volo Mission starts students with a 200-foot line, working down to a 150-foot line for the second part of the course. 3 // Having several students in each course allows flight time to be broken up into manageable chunks, while still making for long, productive days.




Or perhaps you're exhausted after a particularly punishing flight, and struggling to align your skids with the orange paint marks on your landing pad's heel log. *"Dig deep!"* Hutchings helpfully advises.

My introduction to the "dig deep" concept started on Day 1, with our first lesson at Majors Field in Greenville, Texas, a 15-minute drive west of the Volo Mission ranch. Hutchings starts all of his courses here, not only because it's easier for out-of-town students to find on Google Maps, but also because its large paved ramp area provides a safe place for students to practice vertical reference landings before moving on to the log helipads.

On that first morning, I was feeling pretty good about my prospects, since I already had

a bit of long line time under my belt. But I had never done a vertical reference landing before; even with a line on, I had always just shifted my gaze forward prior to touching down.

That wasn't going to work for what Hutchings wanted us to do, which was hover the aircraft around a square marked in orange chalk, and touch our skids on the corner of each square at the point of the rear crosstube. To see when the crosstube was over the chalk, we had to be looking down and back — and that was hard. Really hard.

Sitting in the left seat of the R44 with the doors removed, my head craned around and down, I quickly lost all sense of a horizon. The helicopter would begin to wobble and I'd have to look up to regain control. Then I would slowly try again... and lose it



all over again. It was exactly like learning how to hover for the first time, except that the instructor who would take the controls and steady the aircraft was my forward-facing self.

"But I know how to hover!" I wanted to exclaim. "It must be the wind! Or this T-bar cyclic!"

"We've heard all of the excuses," Hutchings told us, as he and instructor pilot Jordan Wilson took turns riding along on these agonizing short flights. "You don't have to make excuses. It's just hard." To learn how to do a vertical reference landing, we would need to keep our frustration in check, keep our focus, and keep trying. We would need, in other words, to "*Dig deep.*"

Once we made it out to the ranch, the practical benefit of this orange square exercise became clear. All of the helipads at the



ranch consist of two flat, parallel log beams, either buried in the ground or elevated with cross beams. To make a stable landing on these platforms, it's essential to align the heel of the skids just so.

"The whole idea of vertical reference using this kind of system is to be able to land the aircraft in a tight spot with a solid heading," Hutchings explained. While many pilots use mirrors to accomplish the same thing, practicing vertical reference landings on the ground also helps develop your seating position and scan in the air.

"We know that not everyone's going to land on a log helipad in their careers, more than likely, but this just reinforces the vertical reference techniques," Hutchings said. "We make you look aft [at the skid], so it forces you to look down."

### JUMPING INTO THE DEEP END

We spent a lot of time during the course looking down — way, way down. Most pilots learn how to long line on a 100-foot (30meter) line, which is challenging enough for beginners. When they're comfortable with that, maybe they'll move on to a 150-foot line. Some pilots never encounter a need for anything more. Hutchings takes a radically different approach to long line training: he starts everyone out on a 200-foot line and works down from there. His rationale is that if you start out with a very long line, you'll never be intimidated by the prospect of flying one; you'll never try to get away with a shorter one when a 200-foot line would keep you safely clear of trees. And if it means a little more frustration at the front end, well, "*Dig deep!*"

Before we flew the line, we spent time on the ground learning how to preflight it, how to conduct hook checks, and the basic hand signals and procedures we would use while acting as ground crew. With three of us in the course, each of us spent twice as much time performing ground crew duties as we did flying the aircraft — an arrangement that was extremely helpful in understanding the big picture of long line operations.

From the ground, we could see what it looked like when our classmates came in too fast or slow, too high or low, giving us ideas for how to refine our own approaches on our next flights. And in the air, working with inexperienced crews revealed any number of ways in which ground crews can help or hinder an operation, driving home the importance of thorough briefings and clear communication on any job involving ground personnel. Having three of us in the course also allowed us to rotate through the aircraft and break up our flight time into manageable

1 // Exercises become increasingly difficult as the course progresses, including delivering loads into deep confined areas. 2 // The emphasis at Volo Mission is on precision, but students also use barrels in a net to practice operating at an efficient commercial pace. 3 // Students work as ground crew when they're not flying, which helps give them well-rounded insight into long line operations.



chunks, while still completing long, productive days. That was essential, because early in the process of learning how to long line, even 30 minutes in the air can be utterly draining, with every muscle in your body tightly clenched, no matter how much you tell yourself to relax.

When I got out of the helicopter after my first short flight with a 200-foot line, I felt like I had just spent two hours at the gym, doing leg and bench presses. It was exactly how I had felt after my very first helicopter lessons, back when I was working toward my first 10 hours of flight time.

We started our long line training with simple approaches and hook shots to our classmates on the ground. We also practiced "walking the line," in which one of us on the ground would hold onto the hook and walk it from one location to another, while using hand signals to tell the pilot flying whether it was too high or too low. This was not a particularly relaxing exercise, but great for developing line control and depth perception.





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Once we got the hang of hook shots, we started flying basic loads: a logging choker, three empty barrels on a sling, three empty barrels in a net. By the fourth day of our course, our approaches weren't stellar, but we could all manage to place our loads within a 10-foot (three-meter) ring. Hutchings then swapped us over to a 150-foot line, which we used for the rest of the course.

We also began flying loads into confined areas, beginning with fairly open areas surrounded by friendly juniper trees. Friendly, because if you happened to brush your barrels against them, the trees would respond with a light springiness, often nudging the barrels in the direction they needed to go. Not so with the mesquite trees that surrounded the more challengingly confined areas. Brush your barrels against these, and the load would begin spinning uncontrollably, usually tangling your line in the trees in the process.

This was the stage of the course in which expletives began flowing more freely.

### **GETTING OVER THE HUMP**

Hutchings is well aware that 20 hours of flight time can seem excessive, when most initial long line training is accomplished in closer to 10 (and Volo Mission does, in fact, offer a 10-hour "Fundamentals" course for those without the time or budget for the full curriculum). For me, the halfway point of the course was the most frustrating time,

**1** // Setting this replica power pole is one of the final exercises of the course. **2** // Students learn how to pre-flight and test all of the equipment associated with long line operations.

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1 // Graduation day involves a number of challenging exercises, including setting this AC unit on bolts and in the bed of a pickup. 2 // Success! The author in the bed of the pickup, along with (from left) pilot Jim McCourt, instructor pilot Jordan Wilson, Volo Mission co-founder Andre Hutchings, and pilot Greg Bettis.



because I was acutely aware that in a normal training program, I would already be signed off. In a normal training program, placing your load within a 10-foot circle is good enough.

In a normal training program, brushing your hook on the ground is not cause for a go-around.

In a normal training program, you can pile your synthetic line in a heap at the end of each flight, rather than having to lay it out in neat parallel lines. In a normal training program, you can land on a flat

surface, looking straight ahead. After 10 hours of flight time, I could do most of the things that beginning long line pilots are expected to be able to do. But I had to admit that I wasn't totally confident in these maneuvers - and I certainly wasn't meeting Volo Mission's standards. The prospect of long-lining an AC unit into the bed of a pickup truck still seemed very far away.

Over the next few days, it didn't really seem like I was making progress, because Hutchings kept dialing up the pressure. We started flying loads into exceptionally confined areas. We flew a more complex two-part load — consisting of a heavy log beam slung underneath a barrel - which we had to pick up and set down slowly, while holding just the right amount of tension in the line. We flew a Stokes litter with the same care we would take if there were a patient inside (well, we tried to).

We learned what it was like to fly in flat light and gusty winds. We flew late into each day, and learned the limits of relying on shadows for depth cues as the sun sank below the treeline.

Every day of the course brought new challenges and new frustrations, and yet somehow things started to click. By the 11th and final day of the course, all three of us could do everything Hutchings asked us to do: set an AC unit on bolts and in the bed of that pickup truck; place a replica power pole into a hole just large enough to accommodate it; long line a four-wheeler into and out of a confined area; and place barrels into "The Hole," an impossibly small opening in a thick grove of mesquite trees.

None of us did these things with ease, but by that point we had come to realize that long lining never really gets "easy" - there's no level of experience at which you can afford to let your attention drift with a load at the end of the line. And while we still had a lot to learn, we were no longer intimidated by the prospect of learning it, because we now had a basic toolkit of skills and concepts to fall back on when the going got tough.

That felt good, really good. It felt, in fact, like becoming a pilot all over again.



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.



### VerticalRewind

Doman written by Bob Petite // photos courtesy of the Jeff Evans Collection

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The second Doman LZ-5 helicopter for the U.S. Army running up at Danbury, Connecticut, during an early test flight.

Glidden S. Doman was the last of the first generation of helicopter innovators, and was breaking new ground in a second industry — wind turbines — up into his 90s.

### **By Bob Petite**

When Glidden S. Doman passed away June 6, 2016, at the age of 95, the world lost the last of the pioneers of the original six U.S. helicopter companies. Doman, of Granby, Connecticut, was a renowned aeronautical engineer, and through his company Doman Helicopters Inc., he played a significant role establishing the U.S. helicopter industry alongside industry legends Igor Sikorsky (Sikorsky Aircraft), Arthur Young (Bell Aircraft), Stanley Hiller (United Helicopters – later Hiller Helicopters), Charles Kaman (Kaman Aircraft), and Frank Piasecki (Piasecki Helicopter Corp.).

Doman was born on Jan. 28, 1921 in Syracuse, New York, and grew up in nearby Elbridge, gaining his first exposure to rotary-wing flight through a ride in a Pitcairn autogiro when he was about 12 years old.

After graduating from the University of Michigan in 1942, he found work with Ranger Aircraft Engine, a division of Fairchild Aviation in Farmingdale, New York. Doman's interest in rotary-wing technology was piqued after the publicity of Sikorsky's early flight of the VS-300 helicopter, and he attended Society of Automotive Engineers meetings in New York where Sikorsky spoke on helicopter development.

Doman had gained experience in strain gauge technology while at Ranger, and could see that the vibration stresses in helicopter rotors was an area that needed attention. In 1943, Doman approached Sikorsky about a job possibility, and was hired. His work at Sikorsky was deemed so important, he was not drafted into the U.S. military during World War II.

At the time, Sikorsky YR-4 helicopters were coming off the production line, but they were having problems with rotor blade fractures. The fatigue life of a blade was only about 40 hours.

Doman placed strain gauges on the blades and the rotor hub, and soon discovered major stresses in the fabric-covered blades and hub. He accompanied a Sikorsky production test pilot on an R-4 strain gauge flight evaluation. After flying at different speeds Doman had the pilot slow the helicopter down to 20 miles per hour (32 kilometers per hour). The R-4's engine immediately quit and for a time the helicopter was uncontrollable. The pilot was only able to gain cyclic control after increasing the speed to about 30 m.p.h. (48 km/h) and flying backwards. Doman adjusted the three blades, and the result allowed the aircraft to fly smoothly with low control. Sikorsky personnel were enthralled, and Doman was put in charge of matching and balancing the rotor blades of the R-4s prior to delivery.

### MOVING OUT ON HIS OWN

He continued to gain valuable experience in rotor dynamics while at Sikorsky, but left in the fall of 1945 to form a new



1 // Glidden Doman next to a Doman LZ-5 helicopter in the early 1950s. Doman Helicopters Photo 2 // The Doman LZ-5 on display at the New England Air and Space Museum in Winsor Locks, Connecticut. Bob Petite Photo 3 // The first Doman LZ-5 for the U.S. Army on display at an air show. 4 // The Doman LZ-5 originally manufactured in Canada during a flight demonstration in the U.S. 5 // A drawing of the Doman LZ-1 Little Zipper concept. This helicopter was never built. Doman Helicopters Photo



company that would develop a new and better hingeless rotorhead. He was originally accompanied by Clint Frazier, a friend and mathematician from Sikorsky, and the two established Doman-Frazier Helicopters, Inc. in New York in 1946.

Doman managed to obtain a war-surplus Sikorsky R-6 to test his new hingeless gimbaled self-lubricating rotorhead with four blades, and raised \$30,000 to convert it. Engineering test pilot Robert Nields flew the R-6/LZ-2 "Little Zipper" in August 1946 in Bridgeport, Connecticut. The rotor system was a complete success, resulting in much smoother flight. Doman provided the flight test data to the military at Wright Field for free, and the following year he was given a flight test research contract from the now U.S. Air Force at Wright-Patterson Field.

With Frazier's departure and a move to Danbury, Connecticut, in 1948, the company name changed to Doman Helicopters, Inc. Alan Bott, an ex U.S. Navy helicopter pilot and an engineering class friend of Doman's, joined the company as a test pilot.

Construction of the first Doman ship — the LZ-3 — began in January 1949. Further market evaluation led to the LZ-3 going from 250 to 400 horsepower, and its rotor blades being lengthened from 45 feet to 48 feet. As a result, the helicopter was given a new number: the LZ-4. It was an experimental prototype designed and hand-built in only 10 months.

The Curtiss-Wright Corp. approached Doman about a joint venture and licensing of the LZ-4, which was called the CW-40 by Curtiss-Wright. The eight-place LZ-4/CW-40 first flew in 1950, piquing the interest of the U.S. Army. The Army had the chance to fly the aircraft, and were interested in purchasing several









DOMAN-FRASIER—The LZ-1, or "Little Zipper," is a two-place helicopter designed for research activities. The rotor will be further forward in the finished craft so that variable loads are directly beneath it and the center of gravity will not be affected by load changes.

production versions. Curtiss-Wright had no interest in dealing with the Army, and moved the LZ-4/CW-40 to Caldwell, New Jersey, after terminating the agreement with Doman.

#### **THE DOMAN LZ-5**

Design features of the LZ-4 were incorporated into Doman's LZ-5 — a general-purpose utility helicopter capable of carrying eight passengers. The supercharged Lycoming 580-D 400-horsepower engine was located beneath the pilot's compartment. Engine cooling was accomplished by a Doman-developed exhaust ejector system, and the engine was coupled to the rotor transmission by a fluid starting clutch.

The unique Doman gimbal-mounted rotor system allowed the rotors to retain dynamic balance in all flight attitudes with minimum vibration. All moving parts were contained within a common housing and no blade flapping hinges, drag hinges, or hinge dampers were required. The Doman rotor was always in balance. This same mechanical feature was incorporated in the tail rotor.

The rotor blades were made from plastic bonded birchwood laminates with an armor sheath of solid nylon over the leading edge. The rotor diameter was 48 feet (14.63 meters).

The fuselage was composed of tubular construction with a metal skin, and contained a large main cabin for passengers and cargo with doors on both sides. A compartment in the back carried additional baggage.

The helicopter's length was 38 feet (11.58 meters), and it had a gross weight of 5,200 pounds (2,359 kilograms), an empty weight of 2,860 lb. (1,297 kg), and a useful load of 1,950 lb. (884 kg).

The LZ-5's cruising speed was 86 m.p.h. (138 km/h), its maximum

speed was 105 m.p.h. (169 km/h), its range was 245 miles (394 kilometers), and it had an absolute ceiling of 18,000 feet (5,486 meters).

A quadricycle wheeled undercarriage provided high stability for landing in rough terrain.

In 1952, the military signed a contract for two LZ-5s (designated the YH-31 by the military). The first flight, performed by test pilot Turpen Girrard, took place on April 27, 1953, and was deemed a success. By the end of the year, Doman delivered two aircraft to Fort Rucker, Alabama, for test and evaluation. Despite interest in the aircraft from both the Army and the Air Force, no additional orders for the military LZ-5 were forthcoming, and the two YH-31s were used for passenger transportation in Washington until the Army disposed of them in 1958.

In 1954 Doman and Fleet Manufacturing Ltd. in Fort Erie, Ontario, formed a jointly-owned subsidiary — Doman-Fleet Helicopters Ltd. — to build the LZ-5 in Canada. One LZ-5 was produced the following year, flown by pilot Denis Bryan on June 4. It was the second helicopter to be designed and built in Canada after the post-war Sznycer SG-VI.

The LZ-5 received Civil Aeronautics Authority certification in the U.S. in 1955, and a Canadian certificate of airworthiness in 1956. Over the next two years, the helicopter was demonstrated in Ontario and Quebec to the military and commercially, but there was little interest in it. The helicopter was returned to Doman in 1957, and continued to fly on commercial demonstrations — including at the Paris Air Show in 1960. Doman later upgraded it with instrumentation for blind flight training and demonstrated it as a helicopter trainer.

Doman's efforts to obtain financial assistance to get into commercial production seemed to be bearing little fruit. He traveled to Puerto Rico, Italy, and France with the LZ-5 in search of financial support, but no production agreements ever came to be.

The Twin Coach Aircraft Division Company in Buffalo, New York, worked with Doman on a proposal for an upgraded LZ-8 for the Army XH-40 turbine helicopter, but nothing came of it.

#### **MOVING ONTO NEW PASTURES**

As he struggled to get his LZ-5 into production, Doman set his sights on new helicopter programs. The helicopter industry was rapidly changing as new larger turbine helicopters entered the market, and Doman looked at new models such as the D-10B with a Lycoming 0-720 engine, and later with a turbine engine. The Doman Model D-10C was a 10-place stretched version, evolved from the LZ-5. A Pratt & Whitney PT-6 turbine-engined D-10C variant was another option.

Over the years, Doman submitted proposals for the U.S. Navy antisubmarine competition, the USAF rescue helicopter competition, the Light Observation Helicopter turbine joint competition with Kaiser Fleetwings and Doman (KD-161), and a Canadian Navy antisubmarine helicopter competition among others. None of the submissions were successful.

By December 1969, Doman Helicopters was finished. Being unable to secure financial backing, Doman was forced to close its doors after 24 years of pioneering helicopter development. William Gallagher from Winchester, Connecticut, purchased the company's assets, including its patents.

Today, two helicopters survive from the company's work -a

Sikorsky R-6 with a Doman rotorhead and a Doman LZ-5. Both are on display at the New England Air Museum in Windsor Locks, Connecticut.

Following his company's closure, Doman joined Boeing Vertol's helicopter research department. While there, he helped design rotors for heavy-lift helicopters. Doman got involved in wind energy research in the early 1970s, beginning a second career. His experience in helicopter rotor dynamics was used in the new wind turbine technology, where he designed two-bladed wind turbines with a teeter-hinge hub.

In 1978, Doman moved to Hamilton Standard, a division of United Technologies, where he continued his work on wind turbine technology. In 1987, Doman moved to Italy to oversee the company's wind energy program. He formed a company in the 2000s (when he was in his 80s) to market the Gamma wind turbines that he had helped to design in Italy, and he remained active in wind turbine research and development right up to his death in 2016.

A select few have the distinction of reflecting on a career in which they've been a pioneer in an industry. Even fewer can claim to have done so in two industries. Having played such a key role in the early development of both helicopters and wind turbines, Glidden Doman will always be remembered as a remarkably talented figure among both communities.



**Bob Petite** Bob is a member of the Twirly Birds, AHS International, 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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### There I Was...

written by Mike Muenc

Bushwhacked!



There I was, a 17-year-old U.S. Army Private stationed in Hawaii and working on military helicopters. I was able to finagle a little stick time in the  $M^*A^*S^*H$ -type Bell H-13 Sioux helicopter — the military version of the Bell-47 — and I liked it!

One night flight that the pilot and I went out on ended up being something that we used to call "Bushwhacking." For those unfamiliar with the teenage version of the term, it's when kids would go out with flashlights and surprise dating couples looking for a little alone time behind steamed up car windows. It was never malicious — just something teenagers did for the most part out of boredom. Well, the pilot on this night flight must have been one of those teenagers at an earlier time, but never got it out of his system.

As we flew over sugar cane fields, chosen for their ability to obscure a parked car from nearby roadways, this pilot would search for reflective tail lights or the errant brake light caused by the driver's nervous foot inside of a steamed up car. The pilot would have me try to hover maybe 50 feet up and train the landing light on the car's back window. Sometimes you could see a shadowy figure inside scrambling to get the car started and out of the sugar cane field. What a guy won't do for a little stick time.

I could never snag any stick time in our tandem rotor, banana-shaped Piasecki CH-21 Shawnee helicopters, but that was because our company commander required two pilots at the controls at all times. Still, from the passenger cabin, feet dangling out of the forward cargo door, I always enjoyed watching the numerous humpback whales

doing aquabatics in the channel between the islands. Yup, I could see myself flying helicopters for a living. It really looked like fun.

An applicant had to be 19 to get into Army flight school, so that was out of the question for the time being. The hangar next to ours housed a military aero club with a fleet of Cessna 150 two-place airplanes and a 10-passenger twin Beech 18... but no helicopters. The Beech 18 was a donated Air Force Beechcraft C-45 and re-registered as civilian. Since the Army was phasing out the H-13s, I asked our commanding officer if one of our company's Siouxs could be donated to the aero club. Long story short: "No." Well, OK then.

After borrowing the funds needed at the base Credit Union, I obtained my commercial single and multi-engine ratings at the aero club. I finished up my hitch and decided to get out of the Army and pursue my helicopter add-on rating using the G.I. Bill.

Fast forward a couple of years to the Hollywood-Burbank airport where the Veterans Affairs-approved helicopter flight school there was churning out celebrities, their kin and ex-G.I.s alike. I shared an instructor and ground school class with a major Hollywood actor's son. He used the helicopter to observe from above exactly where the cops were hiding, just waiting to ticket his Ferrari on the way home.

My instructor never demonstrated a hovering autorotation nor would he let me try one, despite my constant encouragement to do so. He kept saying, "We'll get to it." Then one day we flew to Santa Monica airport to meet the Federal Aviation Administration (FAA) for my check ride. When we landed, my instructor said,

"Keep it running, I'll go get the examiner." "What about the hovering autos?"

"Don't worry," he replied. "He won't ask you to do them. We'll do them on the way back to Hollywood."

Wait. What?!

The examiner came out and had me do some approaches, departures and hover patterns, and then asked me, "How are your hovering autorotations?"

My teeth were clenched so tight all I could muster was to shrug my shoulders. So, at a three-foot hover, he said, "Let me know when you are ready and I'll chop the throttle."

The "urge-to-kill" expression on my face must have been interpreted to mean I was ready. The examiner said, "OK, here goes." and then chopped the throttle on the Hughes 269... and I totally froze. The helicopter gently settled to the ground and the next thing I felt was the collective being pushed down. That was my last flight at the school, or I surely would have requested another instructor.

In the ensuing years, aspiring helicopter pilots would often ask me: "Is it better to learn to fly airplanes first, or go straight into helicopter training?" My answer and the reasons for it are almost always the same. I favor getting your navigation, communications, long cross country, pattern work and all the other basic learning that is common to both fixed- and rotary-wing flight done in the most economical way available: fixedwing. Get that rating first. Then, when it's time to learn helicopters, you can concentrate on just flying the beast. And besides, if you have only flown rotorcraft, you will forever walk the earth with eyes turned skyward wondering how airplanes could possibly fly without the benefit of rotor blades.



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