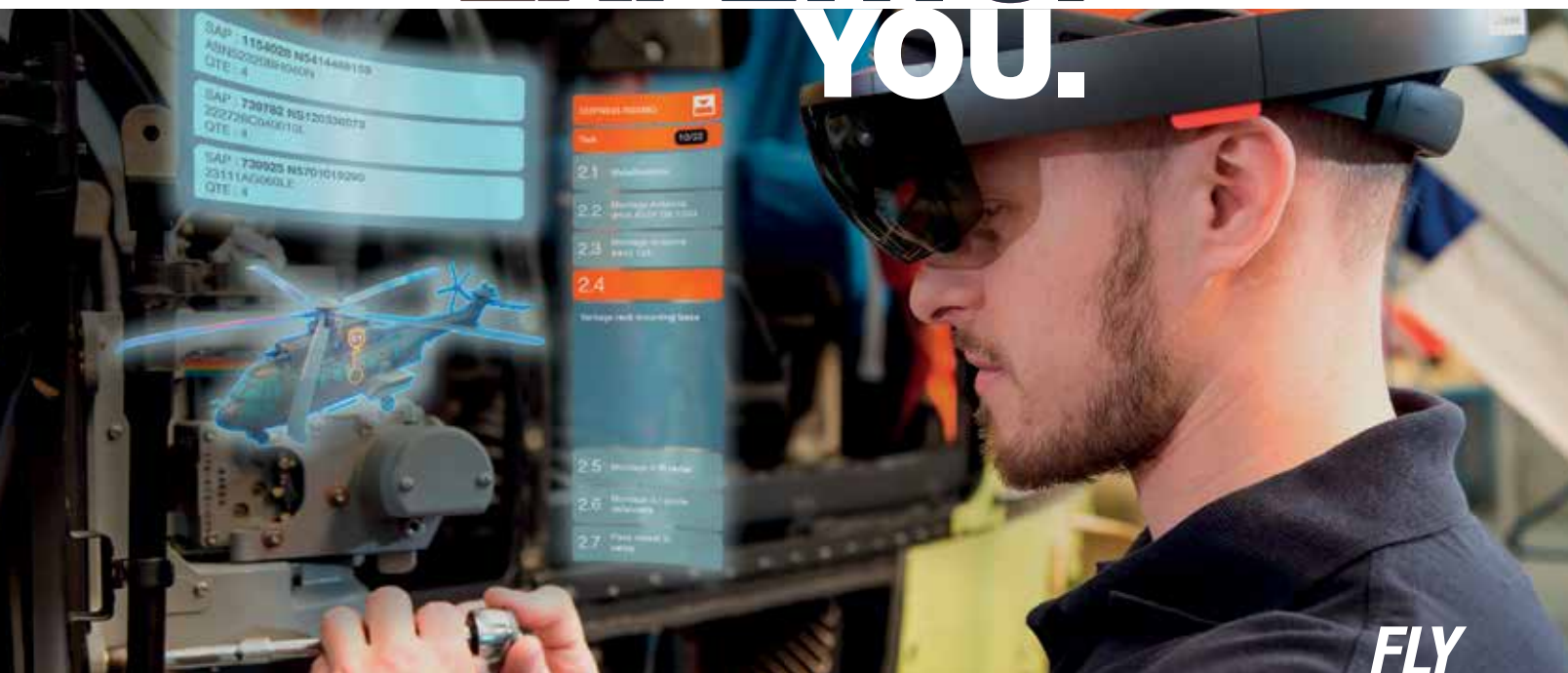


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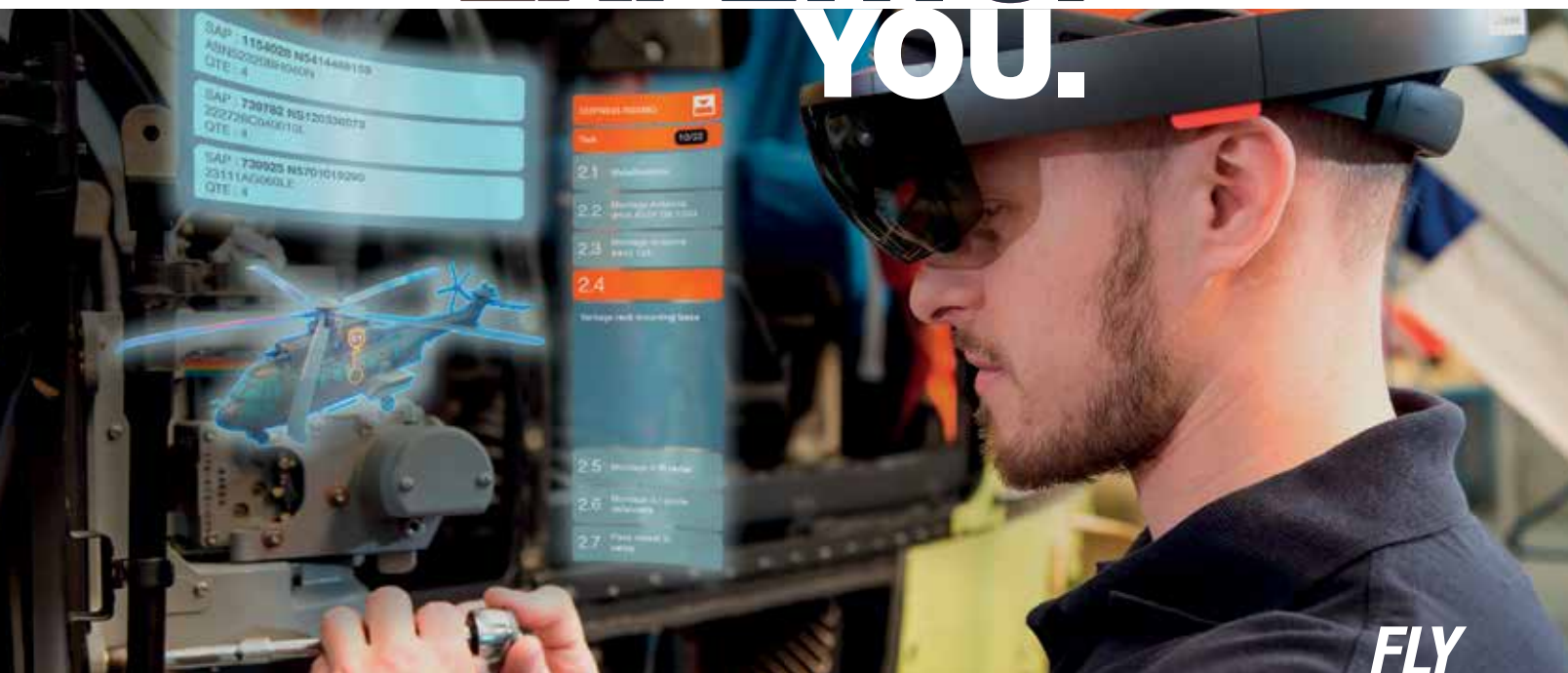
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ON THE COVER

A Bell 407 operated by Wisk Air Helicopters holds a hover in front of the Kakabeka Falls near Thunder Bay, Ontario. The aircraft is one of three 407s in an all-Bell fleet.

MIKE REYNO PHOTO



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Contents



BRINGING THE THUNDER

How Wisk Air Helicopters is gaining traction in the utility sector.

BY OLIVER JOHNSON | PHOTOS BY MIKE REYNO

44 AERIAL FIREFIGHTING IN 2018

How is the aerial firefighting industry placed to meet the challenges of the upcoming wildfire season?

BY PAUL SADLER, ED BROTA & OLIVER JOHNSON

64 AGAINST ALL ODDS

Flight nurse and post-crash fire victim Dave Repsher shares his story of survival and recovery.

BY ELAN HEAD

72 SPACE ROTORS

We visit Kennedy Space Center's helicopter unit.

BY KENNETH I. SWARTZ

78 2018 HELICOPTER & ENGINE MANUFACTURERS SURVEY

Nearly 1,000 members of the helicopter industry took part in our fourth annual industry survey. Here's what they told us.

BY ELAN HEAD

DATA ANALYSIS BY PMG INTELLIGENCE

106 THE HELITRADES WAY

Helitrades tells us about the secrets to its success in MRO as it approaches its 40th year.

STORY BY DAYNA FEDY

PHOTOS BY PETER HANDLEY

110 BRAND LOYALTY

SKY Helicopters on why Robinsons are the perfect fit for its operations.

STORY & PHOTOS BY SKIP ROBINSON

Columns

- 8** Talking Point
- 10** Focus On Safety
- 12** Focus On Training
- 14** Focus On Maintenance
- 16** Focus On Leadership
- 18** Focus On Operations

In Every Issue

- 20** Field Ops Photos
- 22** RotorBeat
- 42** Q&A
- 122** Vertical Rewind
- 129** Marketplace
- 144** There I Was...



The Team

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Column

Talking Point // **By Trevor McIntyre,**
CEO of TracPlus Global Ltd.



Collaboration is key for aerial firefighting

“

No single company will deliver all functionality. Instead, we need to employ an ecosystem approach that allows first responders flexibility and choice. Autonomy needs to win the day.

Traditionally, aerial firefighters have had to limit their work against wildfires to daylight hours, with aircraft suspending operations between dusk and dawn. However, with global warming having severe adverse effects on temperatures, firefighters are facing increased challenges battling a relentless fire season. The advent of winter wildfires has now made a year-round fire season a frightening reality on a global basis.

To safely combat these fires, agencies are utilizing new technologies to help augment their aerial firefighting operations. These technologies are transforming the way fires are fought, leading to greater efficiencies and greater operator safety — but there is still a way to go.

One example of the use of new technology in firefighting is in the adoption of night vision goggles (NVG). Recent developments in NVG technology are opening up the possibility of adopting night-time aerial firefighting, which would be a game changer for wildfire prone regions, such as Australia.

Once nightfall hits, most resources are grounded in the country as civil aviation regulations only allow firefighting aircraft to operate between first and last light. However, NVG has the potential to overcome the obstacle of darkness.

Kestrel Aviation recently received approval from the Civil Aviation Safety Authority (CASA) in Australia to conduct unrestricted firefighting at night with its highly-trained pilots. Kestrel's approval allows for both ground and snorkel filling of its advanced Conair 85-KE belly tank systems.

In announcing the launch of Kestrel's night vision firefighting capability, the company's CEO, Ray Cronin, said it was working on bringing international best practices to Australia. "Night firebombing operations are already conducted offshore, and Australians can have confidence that specialist companies such as Kestrel are doing everything to stay abreast of international capabilities in fire suppression," he said.

The delivery of this capability is the result of significant cooperation between a number of agencies and private enterprises — highlighting a global push for collaboration to seek more effective alternatives in the firefighting space.

NVG technology is already transforming the way fires are being fought across the Tasman, leading to greater efficiencies and safety in New Zealand.

Graeme Gale, owner of Otago Helicopters, has seen first-hand how advantageous the technology has been for the industry.

"NVGs have transformed our work in EMS and aerial firefighting," Gale told me. "With the right training and the right cockpit, NVG is one of the most transformative tools for safety and efficiency in our work. At night time, we're now able to move from the fire, to a water source, and back with clearer vision — meaning we can get the job done more efficiently and with a greater sense of safety."

Having the ability to fight fires at night is increasing the effectiveness of airborne firefighting, as conditions during this time often make the fire more defeatable.

"In many cases, it is more beneficial to fight fires in the evening, as wind levels often lessen," said Gale. "With NVGs, we're now able to carry on fighting fires into the evening when fires have lessened."

More widely, increased airborne involvement in firefighting requires far greater efficiencies in fighting wildfires in a safer manner. The importance of air-to-ground data links will become even more vital for command and control.

Traditional technology platforms need to adapt to facilitate situational awareness by providing control centers with the mechanism to share a whole-of-response situational awareness picture, with additional data overlays to include metadata such as fire breaks, fire hotspots and positional exclusion zones. The industry has seen a huge need for this with drones entering conflicted airspace.

Connecting airborne intelligence back down to the ground will lead to superior outcomes, for the task at hand and for the safety of those involved. Furthermore, having the ability to achieve this at night will further enhance outcomes for those who operate in harm's way. Great communication begins with connection.

Innovation in isolation will never be effective. It requires a concerted coordination and cooperation at the interagency and private operator level so that those who are fighting fires can do their jobs more safely and more effectively.

Technology will continue to evolve. The key is for providers to work closer with first responders to ensure solutions act as enablers to their activities by providing time-critical information in real time through the correct channels.

First responders demonstrate the epitome of teamwork and collaboration, and it's their camaraderie that has helped the industry see such growth and success.

Technology providers need to take the same approach. No single company will deliver all functionality. Instead, we need to employ an ecosystem approach that allows first responders flexibility and choice. Autonomy needs to win the day. People first.

The future will continue to be challenging. The test for technology companies will be to ensure that operators receive the best support possible. Cumulatively, their role should be to help those who help others. NVGs are an example of this, but in isolation it will only make a stepped improvement. Interoperability will ensure that any improvement becomes an exponential one.

Providing state-of-the-art technologies that work seamlessly together could be the difference in saving communities.





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Column

Focus on Safety // Geoff Goodyear



The Icemen Cometh

“

Sometimes, despite our best efforts, we can't always see the risks ahead. That can be both exciting and disturbing — and I think it underscores the importance of good communication at the industry level.

Our gravity-defying activities have always been a risky business. Thankfully, our industry now spends more time and effort identifying and managing risk than ever before. Today, almost all commercial operators have some method of handling the risks that come along with their business, hopefully with positive effect.

Analyzing that risk, while sounding complicated, can be a fairly straightforward process. But getting the process started by identifying the risk can be a tad more complicated.

Early in my career, I lived on the shores of the Exploits River in central Newfoundland. Our home was heated principally with wood, which, I discovered to my dismay, meant occasionally collecting wood. As mentioned in a previous article, pulpwood sometimes escaped from the holding pens upriver and collected on islands not far from my house.

One February, the conditions on the bay and up the river were perfect for some pre-cut wood retrieval operations. Sheer thick ice with no snow meant that my four-wheeled ATV with an old boat trailer attached could be pressed into service. So, with the help of my neighbor, Cal, I did a quick informal risk assessment of the situation.

The ATV was serviceable (and we hoped would remain so). The ice was thick (the ATV wouldn't fall through) and clear of snow (it wouldn't get stuck). The temperature was about -30 C/-22 F (so we needed to dress warm) and the forecast was for conditions to remain clear for the balance of our harvest. Nothing could go wrong.

Firstly, the “dress warm” part drew howls of derision and laughter from our wives. When collecting wood, one does not wear anything of value. We both had on ripped and torn skidoo suits with coveralls — and every other article of apparel — mismatched in type and color. Hey, we were on a river in central Newfoundland, not on some Western U.S. ski slope! It was about keeping the house warm, not about fashion.

We struck off out to the bay and up the river with our old boat trailer in tow. The ice was smooth as silk, and once we got the ATV into high gear we were moving along at a fine clip. We discovered a nice cache of wood on an island several kilometers up the river, stopped there, and proceeded to load the trailer.

Now, if one is going to go through all this effort, you should ensure that the load is a worthy one. We loaded that poor trailer to the gunnels! The springs were pretty well flattened and I suspect we had enough wood on board to last to the turn of the century. Feeling very proud of ourselves, we prepared for the return leg. With the wood loaded, the trailer, the ATV, and the two fools aboard it, the whole combination had the same mass as a fully loaded ferry. It took us a while to get the thing moving, but we prevailed, and after a time and given the great ice conditions, we had gotten up to fifth gear and whatever the drivetrain could suffer.

We were clipping along at a very healthy pace and between periods of wiping the frozen tears from my eyes, I thought I could see... water. At -30? No, it couldn't be. It must be a mirage.

One thing we did not consider in our risk assessment was the changing tide on the bay! It was indeed water. It had come up with the tide through a small crack in the ice and formed a puddle the size of Texas. There was an obvious and immediate need for mitigation. I could have tried to turn, but we might have jack-knifed or just slid sideways out of control. We could have ejected the crew, but being stuck out in the middle of the bay in torn clothes did not have any appeal. I could have tried to slow down, but given our mass x speed, that was physically impossible.

The time for introspection was over.... The only thing we could do was to keep the whole affair as straight as possible and hope for the best.

As in space, when you scream on the middle of a frozen bay, no one can hear you. We hit the water at a high rate of knots, and a deluge immediately rose over us and flash froze us faster than a cod fish on a Russian trawler. We were completely covered in ice, loosely conforming to our shapes, with only a few tattered threads showing through here and there. It was like a scene out of a horror movie. Sort of a “The Abominable Snowman meets Antarctica” theme. Thankfully, Cal and I were the only ones to witness the affair, and could amend the story as required when we got back to shore. And speaking of the shore, we were able to limp back and eventually dislodge our frozen woodpile from the trailer.

General George Patton once said: “Take calculated risks. That is quite different from being rash.” Therein lies our challenge: Making sure our calculations take all into account before turning into some rash misadventure. Sometimes, despite our best efforts, we can't always see the risks ahead. That can be both exciting and disturbing — and I think it underscores the importance of good communication at the industry level. You might not be aware of it, but I am sure there is someone out there who knows that the metaphorical tide is about to rise.





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Column

Focus on Training // **Andy Roe**



The Collective Pitch Lever



Working the cyclic and collective in correct combination is an intense exercise in thought and dexterity, much more so than we ever thought it would be when we decided to learn to fly.

The cyclic and collective flight controls are the main focus of attention in helicopter training. The cyclic in front of the pilot closely resembles a gaming joystick, and the collective to the left looks like the handbrake in many cars. If you pull the collective up, it increases the pitch angle of each of the rotor blades collectively (thus the name), which gives the rotor system more lift to manage the weight of the airframe and its contents below. The collective controls both aerodynamic lift and engine power, and is unique to helicopters.

Increasing collective pitch also creates drag, and rotor rpm will decay unless throttle is increased at the same time. Early helicopter pilots twisted a throttle grip at the end of the collective to maintain rpm while raising and lowering the collective, but learning to coordinate the collective and throttle together correctly was a challenge. Helicopters with manually controlled throttles — like the Bell 47 — are still around, and some training aficionados maintain that students who learn to control rpm manually become better pilots. Are the better drivers the ones who know how to shift gears manually with a standard transmission? These are not settled debates.

When you raise or lower the collective, it registers a power setting on the manifold pressure gauge, expressed in inches of mercury. Piston engines have good throttle response, and overly aggressive use of collective with a manual throttle can easily spike the manifold pressure above the power-limiting red line on the gauge. Poor throttle control is a safety risk in high density altitude conditions, when the maximum engine power available is often much less than the red line indication. Learning effective collective control with a manual throttle can be confusing.

As interest in helicopter training grew in the 1980s, the number of crashes from poor rpm control grew as well. To alleviate this problem, throttle governors were installed on new piston helicopters. But in heavy weight or high-density altitude conditions requiring full throttle, rotor rpm will decay if pilots continue raising the collective despite the governor. If the pilot doesn't know to lower the collective immediately, the resulting blade stall will send the helicopter to the ground. Crashes from this overpitching condition occur more frequently than they should, often because of inadequate training or when pilots who are not well suited to helicopter flight take to the skies.

Everyone looks forward to flying turbine-powered helicopters, because they have interesting engines with more power. However, turbine engines have sluggish throttle response — and aggressive collective control can easily overtorque or overheat the engine. Turbine pilots must plan well in advance for all major power changes. Learning to fly any helicopter safely is a challenge.

Actively repositioning the cyclic in forward flight will result in changes to the aircraft's attitude and direction. Collective power control to manage lift and the progress of climbs and descents is much more passive. Students who are confused about the separate functions of these two flight controls often tend to pull the collective up when they are unsure of what to do. Pulling the collective lever as a gut reaction in situations of uncertainty is almost always the wrong control move and another safety concern.

In cruising flight, pulling aft on the cyclic will initiate a climb. Increasing power by raising collective will then establish a rate of climb. Many dual-rated helicopter pilots pull collective at cruise speed to climb because it's a technique used in airplane flying. However, with the rotor disk tilted forward in cruise pulling collective increases blade pitch angles and puts a heavy forward bending strain on the rotor mast. The flight manual/pilot operating handbook specifies maximum forward airspeeds at power settings above cruise that are much less than normal V_{ne} (never exceed) speeds. Pilots applying excessive power at high speeds have chased down seemingly unexplainable oil leaks when the mast tries to pry the lid off the transmission. Airplanes and helicopters are very different.

To descend smoothly and efficiently from cruising flight, lower the collective and maintain the cruise attitude and speed. This is easier said than done, because lowering collective in cruising flight on its own will drop the nose forward and increase airspeed — so aft cyclic needs to be applied. But too much aft cyclic places the helicopter in a low power, low air-speed configuration in level flight, and not in the descent intended. Working the cyclic and collective in correct combination is an intense exercise in thought and dexterity, much more so than we ever thought it would be when we decided to learn to fly.

The collective is a power control, but its role in controlling rotor rpm in autorotation should not be overlooked. Students learn the importance of fully lowering collective if all engine power is lost to maintain rpm. But, just as important, the collective needs to be raised and lowered in autorotation to control rising rpm in turns and speed reductions — especially if the helicopter is heavy. Raising the collective will extend the glide across the ground if necessary, by trading rpm for lift. At the end of the descent, a well-timed pull of the collective uses stored rotor inertia for a soft landing.

The skillful use of collective pitch is an art form. The best pilots have learned how to maximize the benefits of cyclic attitude control, which then allows them to minimize power use, resulting in efficient and graceful flight in the complex apparatus we call a helicopter.





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Column

Focus on Maintenance // John Carinha



Enabling a First Response

A first responder is often defined as someone who is designated or trained to respond to an emergency. But from my perspective, training alone doesn't explain how good first responders are able to do what they do. I believe the right instincts, courage, trial and error, and — with time — experience, hone a responder to be able to approach any given situation or set of circumstances and deliver the best possible result. And, for me, Windward Aviation is the definition of these qualities.

Windward has been a longstanding client of ours and I have enjoyed the privilege of working closely with their owners, Don and Donna Shearer — as well as their great technical crew of pilots and mechanics — for many years. Based in Maui, Hawaii, they operate in a temperate climate with plenty of sunshine and in a perceived paradise that is indeed beautiful and unique — but one that also carries hidden dangers and risks. And it is these to which they are often asked to respond with some form of rescue. Hearing first-hand from their pilots what they are exposed to and involved with in their day-to-day operations has left me with the upmost respect and admiration for the roles they play in the community. They are humble in their delivery, calculated and precise in their flying, and truly represent the ordinary person doing an extraordinary thing.

Of course, there are the lighter moments and stories. Two that stand out in particular are an all-female nudist yoga camp getting washed out by a flash flood. No life was lost, but a lot of clothes and personal items were. Or the time when a pilot's stand-up paddleboard got away from him during a downwind paddle, and was later recovered by the very guys who get ferried to and from their calls of duty by him. After the marathon swim to shore, he had all but given up on ever recovering his board. To his amazement, his cell phone lit up days later with interested callers in the board "he" had posted on Craigslist for sale.

Over the years, my company has rewired three quarters of Windward's fleet of MD 500s, and performed numerous onsite visits to oversee a variety of installations and service work. A recent routine visit brought up a laundry list of tasks that had been accumulating fleet-wide. One issue that caught my attention had to do with a slow or hung start on a previously rewired helicopter. During the engine start sequence, and operating off the 28-volt aircraft battery bus, the N1 tachometer would not get above 12 to 13 percent. If the 32-volt external power cart was utilized, the N1 crept up a percent or two. It was a real nuisance and added a delay to their daily flight schedules. In the business of saving lives, seconds can mean the difference between a rescue and a body recovery.

The MD 500D helicopter is designed with heavy gauge wires for the battery and starter, comprised of three 10 AWG wires paralleled and terminated together. I thought that perhaps if one of the three wires on any given segment had been compromised, then the current carrying capability of that wire (as a whole) would be limited. The solution for this would be to create a bypass. We procured 2 AWG wire — as is used on the MD 500E and F models — from a local auto shop for the purposes of testing the theory. We bypassed all the existing wiring responsible for providing the starter with power with the heavier 2 AWG wire. During installation, I also noted that the starter ground wire termination was loose. Upon further inspection, there was heavy corrosion below the terminal and hardware. No sooner had the bypass been complete and the corrosion addressed than a ground run of the engine produced upwards of 16 percent N1 and a much quicker light off.

I wanted to isolate the two "fixes" to determine which had the greater effect. Was it the bad ground, or the wire? Three 10 AWG wires have a combined cross-sectional area of 15.78 mm² and a combined current carrying capacity of ~78 amps. A 2 AWG wire has a cross-sectional area of 33.60 mm² and a current carrying capacity of ~141 amps, which is almost 80 percent greater. As it turned out, the wire bypass on its own contributed to a one- to two-percent increase in N1. The bad ground had a two-percent effect. Clearly, performance isn't derived solely on dynamic components alone; sometimes the devil is indeed in the details. ❖

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I thought that perhaps if one of the three wires on any given segment had been compromised, then the current carrying capability of that wire (as a whole) would be limited. The solution for this would be to create a bypass.



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Column

Focus on Leadership // **Kim Hutchings**



Too much of a good thing

“

Have you ever worked with a Conor McGregor? OK, maybe not that extreme, but maybe someone who had a tendency to yell or get angry while others remain calm for the most part?

UFC fighter Conor McGregor is known for being one of the best mixed martial artists of recent times, but he is also known for his temper. McGregor has made the news more than once for throwing things at other fighters. Most recently, in April, he was in the spotlight for throwing a dolly at a bus, injuring fellow lightweight contender Michael Chiesa, who was traveling on board with several other fighters and staff.

Around the same time McGregor had to appear in court for the dolly-throwing incident, I was going through the process to become certified to give EQ-i assessments, which are used for measuring the level of emotional intelligence someone has.

Part of the process was to learn the different components of emotional intelligence and what they mean. Prior to becoming certified, I thought that the ultimate goal was to score high on all aspects of emotional intelligence. However, one of the most important rules I learned was that too much of what may be thought to be a “good thing,” can actually be a not-so-good thing. The goal is balance, and unfortunately, McGregor does not display much of this. He is someone that most likely would score high on the self-expression composite and low on decision-making!

Dr. Steven Stein, author of *The EQ Edge*, describes emotional expression as “openly expressing feelings both verbally and non-verbally. In our interactions with others, whether or not we are aware of it, we constantly give out messages at an emotional level. These messages can be conveyed through the words we use and their meaning, the tone and volume of our speech, the expression on our face, or our body language. Others register these emotional messages that we send out; they also register their responses to them, both consciously and unconsciously. People who exhibit effective emotional expression are open and congruent in the emotional messages they send to others.”

The three areas that make up self-expression are emotional expression (the constructive expression of emotions); assertiveness (communicating feelings and beliefs in a non-offensive way); and independence (self-directed; free from emotional dependency — aren’t reliant on other people to make decisions).

Someone with a balanced level of self-expression would communicate feelings in a self-directed, non-offensive way, and they would express their feelings in a way that matched how they felt.

McGregor, on the other-hand, appears to have no issues with expressing how he feels, and he communicates it often, in an offensive way.

What adds to the intense emotional outbursts is scoring low on decision-making. According to Stein, the decision-making realm of emotional intelligence concerns your ability to use your emotions to help you solve problems and make optimal choices. Success in this area means that you can grasp the problem and devise effective solutions, deal realistically with situations, and manage impulses that may disrupt effective decision-making.

The three areas that make up decision-making are problem solving (finding solutions when emotions are involved); reality testing (being objective, seeing things as they really are); and impulse control (resisting or delaying the impulse to act).

The dolly-throwing incident is just one example of poor decision-making. It would appear that McGregor did not consider the consequences of his actions and see things for what they are (reality testing). In this instance, that would have meant realizing that throwing a dolly and other large items at a bus full of people could end up hurting innocent people and getting you arrested. If you have seen the videos of the event, there was not a whole lot of resisting the urge to express anger by throwing whatever objects could be found (despite people trying to stop him). And as far as problem solving, that speaks for itself. If he had a problem with one of the fighters, throwing objects to do major injury is not a constructive solution!

Have you ever worked with a Conor McGregor? OK, maybe not that extreme, but maybe someone who had a tendency to yell or get angry while others remain calm for the most part? A person who makes it known to others what is on his or her mind? This can make their fellow co-workers feel uncomfortable in the least, or at worst, feel attacked. If there is someone you know that sounds like this, it is likely that this person scores lower on the scale of self-control and is on the higher end of the scale of self-expression.

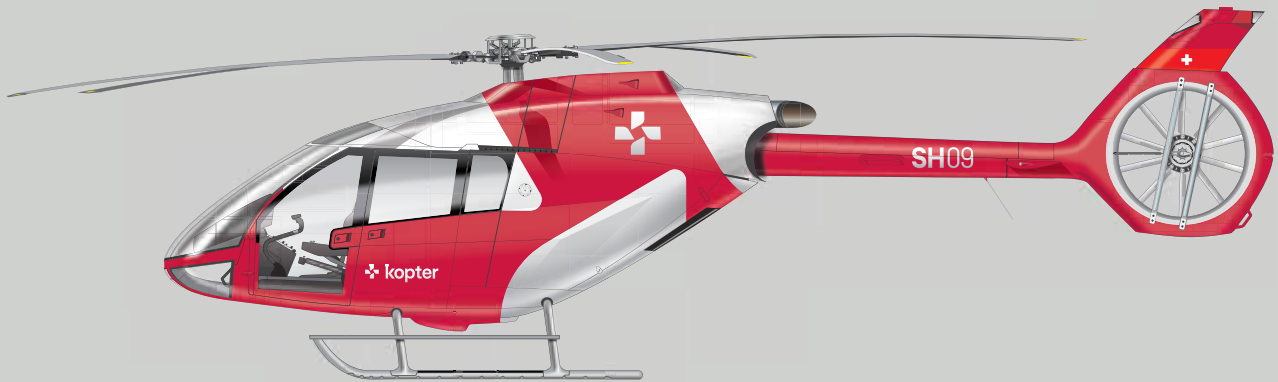
So, what can you do if you are on the receiving end of such an outburst?

Ironically, it appears the level of emotional intelligence flips. You will need to have high decision-making skills (because the other person will be making poor decisions), yet display low self-expression (because the other person will have high expression). First, you will check the reality with the level of this person’s anger; control the impulse to get defensive and yell back; look for a solution; and then calmly communicate that solution (making sure your body language matches the words you are saying).

The best thing is to use your emotional intelligence to manage yourself so that you don’t become involved on that level of interaction. The goal is to not get in a heated exchange.

Lastly, if after reading this article you feel like you may have a little Conor McGregor in you, it is important to work on building those skills listed above. And if you need any help, you can always contact an expert.





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Column

Focus on Operations // By Corey Taylor



Over-regulation curbs innovation

“

How to avoid regulations (hopefully by never having them signed into law) that interfere with the progress of our commercial industry seems to be constantly discussed, but never resolved.

Operating helicopters, especially visual flight rules (VFR) ones onshore, is a tough business. It's incredibly capital intensive, with narrow margins most years. It can swing to spectacular returns when fires and floods ravage the land, then back to insufferable losses when commodity prices plummet. Keeping the aircraft working oftentimes requires an entrepreneurial approach, and luckily, we have clever peers who have created devices that make our aircraft even more versatile. I used to think all we could do was find work — not create it — but the first time I saw a right-of-way saw hanging off a helicopter and creating a shower of branches, needles and leaves far more efficiently than any ground-based pruning method, I knew our imaginations were only limited by how much R&D money our bosses would give us. It's ironic, but using a helicopter to transport passengers is one of the least exciting things you can do with it — unless they're getting delivered by hoist or jumping out at altitude!

To keep our business growing, while fending off those insidious drones, we need to encourage the entrepreneurship and invention that makes a helicopter so much more than just a short-field airplane. When Igor was learning to hover, he probably never considered dropping water on a fire or putting air conditioners on top of skyscrapers; yet that type of work has been ubiquitous for decades, and can be some of the most lucrative. When helicopters were coming into their own in the 1960s, who could have predicted that one day, exploration companies would rely on helicopters moving millions of dollars of equipment each day, all without any assistance from people on the ground? Moving tons of very expensive equipment, swooping in and swooping out, while never seeing a person except from afar, can create a feeling of omnipotence. But, perhaps that's just being a pilot — no one who's done it seems to be immune from “my helmet must have shrunk” syndrome.

As we strive to improve safety and increase the utilization of our helicopters, what we do not need are unnecessary obstacles to our growth or even our survival by overzealous or out-of-touch regulators, no matter how well intentioned.

In Canada, a recent effort to improve the speed and comfort of marine pilot transfers was the victim of exactly this type of issue. Instead of pounding through heavy seas in a small boat for two hours, the marine pilots, who are essential to cargo traffic in and out of the country, would spend 15 minutes in climate-controlled, 130-knot comfort, and be delivered right to the wheelhouse of the ship by hoist. The happiness amongst the end users was, alas, all too short-lived. There were multiple reasons the contract was cancelled, but economic concerns were the main drivers. New regulations that were rolled out within the first few months of service commencement, seemingly cut and pasted from European rules, with little to no discussion with operators in Canada, certainly had an impact. The timing of the new regulations is reportedly coincidental, and they're an outgrowth of a rule-making exercise designed to increase offshore safety in the wake of some high-profile accidents and incidents, but the effect is the same. Cold water on a fire that was barely into the kindling. The standard operation in Europe, South Africa, and Australia is to deliver and retrieve marine pilots by helicopter, but it appears that Astoria, Oregon, will remain the only locale in North America to offer that service for the foreseeable future.

How to avoid regulations (hopefully by never having them signed into law) that interfere with the progress of our commercial industry seems to be constantly discussed, but never resolved. Unlike the U.S., whose regulator's mandate to “foster air commerce” hearkens back to the birth of aviation, there does not seem to be an equivalency in Canada, beyond vague mentions of “promoting aviation,” which is not the same thing at all. I have had these types of discussions in the past with American operators who always like to say that the Federal Aviation Administration (FAA) is unaware of that above-mentioned air commerce support. I would counter that while it may not be readily apparent every day and in every instance, the recent Utilities, Patrol and Construction Committee (UPAC) meeting at Heli-Expo in Las Vegas, Nevada, demonstrated radical differences between the Lower 48 and the Frigid 10+3. The FAA representatives at the meeting told attendees they had decided, based on the most current interpretation, that the external load equipment being used for human loads in power-line maintenance was not approved. They informed the rapidly heating crowd that they were taking a two-tined approach and would focus on rulemaking to rectify the issue, but in the meantime wanted everyone conducting that activity to apply for a variance. I'm boiling down a two-hour meeting into a few sentences, but the message was clear. The regulator wanted to support commerce rather than just impose and enforce regulations that may only have a passing relevance to the activity. It is beyond credulity to think of Transport Canada informing a group of operators they are all in contravention of regulation but, “don't worry, we're changing the rules and in the meantime, we're granting variances.”

Maybe if the power was out in the Prime Minister's residence — but barring that, it's unfathomable. ❖



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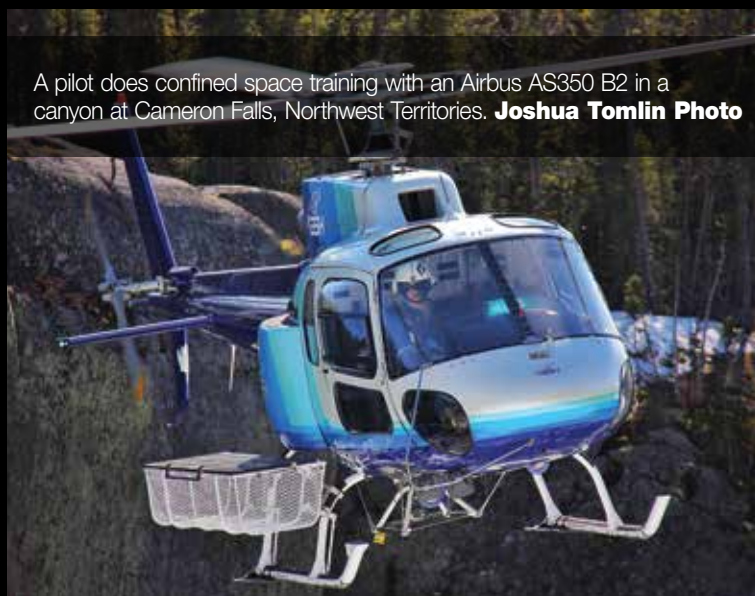
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An Airbus H125 en route to Circuit Zandvoort racetrack in the Netherlands for the Jumbo Racing Days event. **Jimmy van Drunen Photo**



A pilot does confined space training with an Airbus AS350 B2 in a canyon at Cameron Falls, Northwest Territories. **Joshua Tomlin Photo**



A Westland-Bell 47G-3B-1 approaches landing at Grenchen Airport in Switzerland, during Heli-Weekend in June 2017. **Andrea Capoferri Photo**



An Airbus AS350 AStar flies loads to a cabin under renovation in the scenic Oslo Fjord. **Tom A. Østrem Photo**



Two Airbus AS350s sit at Boulder City Municipal Airport in a lightning storm. **Ricardo Sá Photo**

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eVTOLs Charge On

New concepts and partnerships revealed at second Uber Elevate Summit



The eCRM-003 is the third eVTOL "common reference model" from Uber, and features four pairs of counter rotating rotors plus a pusher propeller. **Uber Image**

**BY OLIVER JOHNSON
AND DAYNA FEDY**

Uber unveiled a series of new advancements and partnerships that it hopes will help launch the world's first urban aviation network at the second annual Elevate Summit, held in Los Angeles, California, in early May.

Six months after announcing Los Angeles would be one of the first U.S. cities to launch uberAIR, the company reinforced its partnerships with key manufacturers and technology companies, with the aim of launching flight demonstrations in 2020 and commercial trips by 2023.

The company's ultimate plan is to create a network of small electric aircraft in

various cities around the globe to enable four-person ridesharing flights in densely populated urban markets.

Jeff Holden, chief product officer (who left Uber shortly after the summit), said the summit showcased the advancements the aviation industry had made "on many fronts" to make uberAIR a reality by 2023. "This includes multiple vehicle designs, new battery technology, manufacturing improvements and the 'operating system' that will enable safe, precise, environmentally friendly operations at scale and allow cities to radically improve their transit networks," he said.

"This gargantuan effort to 'push a button and get a flight' can only be accomplished

through close partnership across the public and private sectors, and that's exactly what Elevate Summits are all about."

But Uber isn't planning to manufacture the vehicles — instead, it has decided to work with industry leaders who will produce the electric vertical takeoff and landing (eVTOL) aircraft that will use the uberAIR network.

Uber launched the summit by publicly sharing the design specifications for its eVTOL common reference model (eCRM), which will fly more than 1,000 feet above the ground at a speed of 150 to 200 miles per hour. The model features four sets of electric propellers dedicated to vertical takeoff and landing, designed to make the aircraft safer —

and significantly quieter than current production helicopters, Uber said.

Embraer showcased its first VTOL model — the Embraer X — at the event, which also saw the debut of a new concept model from Pipistrel, the manufacturer of the world's first Federal Aviation Administration (FAA)-approved electric plane (the Alpha Electro). The Pipistrel eVTOL concept uses dedicated propulsion systems for both cruising and vertical lift and embraces an aircraft family approach of eVTOL able to carry from two to six passengers.

Karem Aircraft became a new Elevate vehicle partner at the event, announcing that it will collaborate with Uber on the Butterfly aircraft — a quad tiltrotor with four large rotors mounted on the wings and tail. The pair claim the Butterfly's design solves the tradeoff between hover and cruise efficiency, allowing for lift but creating a much quieter 100 per cent electric vehicle for the uberAIR network.

Uber also announced a new research agreement with the U.S. Army to help create new quieter, better performing rotor systems. The agreement includes joint funding and research development to create the first stacked co-rotating propeller; a new concept with two rotors placed on top of each other which rotate in the same direction and are significantly quieter for a flying craft.

The summit touched on new battery technology, with Uber revealing a partnership with E-One Moli to develop battery cells that can be used in future prototypes with vehicle partners.

The ride-sharing service also revealed it had signed a second Space Act agreement with NASA. It said NASA's research into Urban Air Mobility (UAM) concepts and technologies will generate the data necessary to support the creation of industry standards, Federal Aviation Administration (FAA) rules and procedures, and other regulations.

The summit wrapped up with the unveiling of ambitious and futuristic-looking "Skyport" designs from leading architecture firms. The Skyports will serve as the transit hubs of the uberAIR network, providing the connection between passenger and eVTOL.

NEW VTOL PROGRAMS PRESS AHEAD

In other VTOL news, Israel-based Urban Aeronautics has revealed that development of its Cormorant prototype is well underway, and has hopes of launching a full-scale development of the aircraft in the near future.

The Cormorant features front and rear rotors that are internal to the fuselage. Powered by a Safran Arriel 2S2 engine, it has the same payload-range, speed and altitude performance as small helicopters such as the Bell 206 or MD 500, Urban Aeronautics claims. Urban Aero's CEO, Rafi Yoeli, said the final engine on the Cormorant will likely be an Arriel 2N, and the aircraft's final payload will be 1,100 pounds (500 kilograms) with a range of up to 87 miles (140 kilometers) — plus a 20-minute reserve.

The internal, slow-turning rotors allow for a quieter performance of 70 decibels — 25 decibels quieter than an equivalent helicopter, said Yoeli. The company expects the aircraft's noise will blend in with city traffic from a block (or 820 feet) away. In addition, the internal rotors make for a safer aircraft, where people can stand next to or around it without risk of walking into external rotors.

The company has conducted over 250 test flights with the Cormorant, with 1,000 channels of telemetry — including on-board video and sound that's relayed to the ground in real time. "There's no doubt that the Cormorant will do the flight envelope that we've already proved it can do," he said. "We think there's a big future ahead of it."

Future goals for the company include a manned version of the Cormorant, which will be referred to as CityHawk, holding a maximum of five passengers plus a pilot.

The company plans to start establishing a certification basis for CityHawk together with the Federal Aviation Administration (FAA) or Transport Canada as early as this year. Since both the Cormorant and CityHawk are already designed to existing FAA standards for man-carrying helicopters, Yoeli told *Vertical* he sees a smooth road ahead with certification.

The Cormorant is projected to be ready for market in four years' time, with CityHawk following it three years later with an FAA or Transport Canada type certificate.

Back in North America, the Workhorse SureFly personal VTOL vehicle completed its first untethered flight on April 30 — a major step towards a planned certification of the quadcopter-style aircraft in late 2019/early 2020. The flight lasted about 10 seconds, and was witnessed by officials from the FAA.

Publicly unveiled at the Paris Air Show in June 2017, the SureFly's design sees a pair of counter-rotating propellers at the end of each of four arms that reach out in an "X" above a compact two-seat carbon fiber

cabin. The aircraft is controlled through a joystick for pitch and roll, and buttons for yaw and to change altitude.

"The first [untethered] flight really proved to us what we needed to know," Workhorse co-founder and CEO Steve Burns told *Vertical*. "The energy used, the audible noise, the ease of control with the joystick, [and] the balancing algorithms. . . . It really is the culmination of about 20 things we had to verify that we've been calculating for a long time."

Burns described the SureFly as a hybrid aircraft in terms of its power source, with a fossil fuel generator and dual 7.5 kWh lithium battery packs that serve as capacitors and emergency backup should the generator fail. Workhorse is developing the SureFly with a 200-horsepower piston generator, but plans to eventually offer a 300-horsepower turbine-powered version, too.

The piston-powered SureFly is designed to fly up to 75 miles (120 kilometers) at a speed of approximately 75 miles per hour (120 kilometers per hour), with an anticipated empty weight of 1,100 pounds (500 kilograms) and a maximum takeoff weight of 1,500 pounds (680 kilograms).

Burns said the turbine version will be more expensive than the \$200,000 piston-powered version, but would offer a greater payload or improved range.

Workhorse has made "a lot of progress" with the FAA in moving towards type certification and establishing what kind of credentials would be required to fly it, said Burns. The former is likely to require a new certification category, he said.

"New certification is double speak to me for long and expensive, but we've really found the FAA to move at lightspeed for us, and if we can prove it's safe, they're open to new types of vehicles," he added.

As for piloting the aircraft, Workhorse hopes to have "something similar" to a light sport aircraft rating, requiring about 20 hours of type instruction. While Workhorse is taking the SureFly through the certification process as a manned aircraft, it is building it to ultimately be capable of autonomous flight.

The SureFly and Cormorant are part of an increasingly packed field of personal VTOL aircraft, going up against the likes of the Volocopter 2X and Ehang 184, as well as heavily financed efforts from manufacturing giants Airbus (CityAirbus) and Bell (Urban Air Taxi) — as well as those announced at the Uber Elevate Summit.

Waypoint MUH ready to launch



The Waypoint MUH 139 is a reconfigured version of the short-nose AW139 that has been tailored to meet the needs of utility operators by Eagle Copters. **Waypoint Photo**

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BY OLIVER JOHNSON

Work on the first Waypoint Leasing medium utility helicopter (MUH) — a reconfigured Leonardo AW139 targeted towards utility operators — is in its final stages at Eagle Copters' facility in Calgary, Alberta. First revealed on Feb. 27 at HAI Heli-Expo in Las Vegas, Nevada, in the form of a "concept prototype" at Leonardo's booth, the MUH program represents a partnership between Waypoint, Eagle, and Leonardo, that hopes to develop a new niche for older off-lease AW139s.

The MUH program's origins can be traced to CHC Helicopter's Chapter 11 process, during which the operator rejected several AW139s it had on lease from Waypoint.

"Some of these were older vintage helicopters, known as short-nose 139s," said Allan Rowe, head of sales and relationship management at Waypoint. "They had perfectly good modern technology, but they just had some limitations in terms of avionics



RotorBits

AHS International becomes 'Vertical Flight Society'

The American Helicopter Society (AHS) International, Inc. is changing its name to the Vertical Flight Society — the tagline it has used in various forms for the past half-century.

"The helicopter has dominated vertical flight since 1943, but many of our members are now designing, developing, building and flying aircraft that are not conventional helicopters," said Mike Hirschberg, Vertical Flight Society executive director. "We're in an exciting period of transformation and disruption in the aerospace industry where helicopters are no longer the only VTOL aircraft in the skies.

"As innovation is expanding the realm of the possible, we're expanding the scope of our society to be inclusive of the exciting spectrum of future vertical flight technology."

VHA to sell LongRanger rotor blades direct

Rotor blade manufacturer Van Horn Aviation (VHA) will offer direct sale on its 206L LongRanger composite main rotor blades immediately following Federal Aviation Administration certification, which is expected in July 2018.

The company's other Bell 206 products — tail rotor blades for most 206 variants and main rotor blades for the 206B JetRanger — will continue to be distributed through Aeronautical Accessories.

The VHA 206L main rotor blades feature carbon fiber skin and spars; an efficient NASA-designed laminar-flow airfoil; tapered tip; and a combination of stainless steel and nickel abrasion strips that cover the entire length of the blade for erosion and lightning strike protection.

The focus of the conversion has largely been weight reduction, with a few pieces of equipment added to tailor it to utility operations.

"We talked to the operators we deal with in our business to see what kind of configuration they might like, given that this is a novel use for this aircraft," said Kielau. "I think it's going to be a process of trial and error . . . but we'll certainly make sure that it's going to be suitable for whatever the end customer is going to use it for."

Both Waypoint and Eagle agree the price point of the MUH will be critical to its success, and Rowe claimed it would be cost-competitive with the newer generation of medium twins like the Bell 412EP, "with substantially better performance," he said. "We're still in the midst of finalizing our conversion, we've got multiple interested parties, and that spans across the gamut from firefighting, to onshore oil-and-gas support activity, to personnel transport."

Leonardo has supported the program by creating a modified entry-into-service plan and power-by-the-hour support plan.

"I think the real benefit to something like the MUH is prolonging the useful life to an asset that may face some limitations in its traditional market," said Rowe. "[Leonardo] has seen the benefit greatly, just due to the fact that if the aircraft are flying for longer, they're benefitting from parts, service support, etc., so it's almost a second life for the [short-nose version of the] aircraft."

Although the aircraft on display at Heli-Expo was still a prototype "concept" of the MUH, it garnered significant interest from showgoers, said Rowe.

"We immediately had interest globally for the helicopter, in some cases for multiple models to replace fleets of older aircraft," he said, but added that Waypoint is still to secure the first customer for the MUH. "What we really want to do is place the aircraft with a customer and start the conversion on the next one, and place that."

Waypoint hasn't disclosed the number of short-nose AW139s it has — Rowe described it as "a handful" — but said the lead time for future conversions would likely be less than six months, depending on parts availability.

Eagle is excited about the possibility of continuing the program with further conversions, in the process enabling the entry of more modern aircraft into the worldwide utility fleet.

"It's been a great program, and we're just happy that we can support Waypoint in their efforts to get these terrific machines redeployed to alternate segments," said Kielau.

upgrades. . . . We thought if there's a preference for newer technology among the major oil-and-gas companies, we want to be proactive in looking for adjacent markets for 139s."

The utility sector stood out as an obvious candidate due to its sheer diversity, he added.

"We just found an underserved market — which is the utility market — where modern technology enhanced performance at a comparable cost was very attractive."

Eagle was an obvious candidate to complete the conversion due to its familiarity with the utility market and experience reconfiguring aircraft to better suit that market's needs.

"We have a niche where we've been very successful — the utility space, the firefighting space," said Jason Kielau, Eagle Copters' vice president, sales and marketing. "We've configured many Bell-type helicopters into the utility segment, so it made sense that we would be able to help configure this Leonardo machine into the utility segment."

The gross weight expansion for the S-92 provides benefits both in terms of range and cargo capacity, said Sikorsky. **Mike Reyno Photo**



Transport Canada approves S-92 GWE

BY OLIVER JOHNSON

Sikorsky's gross weight expansion (GWE) for the S-92 has been approved by Transport Canada, allowing Canadian operators to benefit from an additional 1,200 pounds (545 kilograms) of useful payload in the aircraft that has come to dominate the heavy-lift offshore transport sector.

The modification, which was approved by the Federal Aviation Administration (FAA) in 2015, increases the S-92's maximum take-off weight (MTOW) from 26,500 to 27,700 pounds (12,020 to 12,565 kilograms). Era was the launch customer for the GWE S-92, and now has four of the type in its fleet.

These have now been joined by one GWE S-92 in Canada. The aircraft was delivered in 2017, but had been operating at the S-92's original 26,500-pound MTOW until the increase was certified by Transport Canada.

Dana Fiatarone, vice president of commercial systems and services at Sikorsky, said the expansion provides benefits both in terms of range and cargo capacity.

"The key component is it does give you 1,200 pounds of additional useful load, so whether you use that in terms of passengers or fuel for added range is really up to the mission requirements of the customer," he said. "Let's say you want to take three

additional 200-pound passengers, and their packs, so you can take 700 pounds of people and packs, and put another 500 pounds of fuel into the aircraft. . . . It gives you that additional mission flexibility."

Fiatarone said the certification process with Transport Canada had been straightforward, but that Sikorsky had waited until securing a Canadian customer for the modification before pursuing the approval.

"For product improvement, it's typically best practice to have a customer requirement in mind, because they can go hand in hand with you and get that certification accomplished," he said.

Sikorsky also revealed that the FAA has certified a field modification kit that will enable existing S-92s to benefit from the 1,200-pound GWE. As with the certification of the production GWE S-92, it plans to add approvals for the modification kit from regulatory agencies around world based on customer demand. Sikorsky will continue to produce both versions of the S-92 — with and without the GWE.

Fiatarone said the manufacturer expects demand for the GWE in regions that have longer range missions, or a requirement for a full complement of 19 passengers at range, such as in Atlantic Canada, the Gulf of Mexico, and in Australia.

Sikorsky delivered the 300th S-92 — to Era Group — earlier this year during Heli-Expo in Las Vegas, Nevada, and Fiatarone said the type was proving its worth during the ongoing downturn in the offshore sector.

"Even in a downturn, we've been encouraged with the flight hour profile for the S-92." He said the global fleet had a significant increase in utilization mid-2016, and flight hours increased by three percent in 2017. Sikorsky is expecting another five percent increase this year.

"Even in a soft market, we have been happy that the aircraft is being utilized at continually higher rates, and that the flight hours for the fleet have continued to climb," he said. "I think that's a real testament to the aircraft and certainly to the pilots and the maintenance crews that fly and take care of the aircraft."

He said he expects that general trend to continue, especially with the oil-and-gas market "showing signs of life," with oil-and-gas companies increasing their capital expenditure in the form of leasing new rigs and bidding on new basins and territories.

"All those things are encouraging signs to bolster new opportunities for the [S-92]," said Fiatarone. "In the interim period, we have seen continued demand for search-and-rescue platforms and head of state platforms, so that's been positive for us in the oil downturn."

In terms of the ongoing evolution of the S-92, Fiatarone said Sikorsky is aiming to increase the availability of the aircraft above its current rate of 95 percent, through the use of its forward stocking locations around the world, for example; and on the technology side, is introducing developments to improve crew situational awareness by implementing offerings like "real-time HUMS."

The latter was launched last year in collaboration with operator PHI and communications provider Outerlink, and provides operators with the ability to transmit in-flight HUMS data in real time from the aircraft to their operations center. It is already in operation in aircraft in the Gulf of Mexico, the North Sea, Western Australia, and now in Canada.

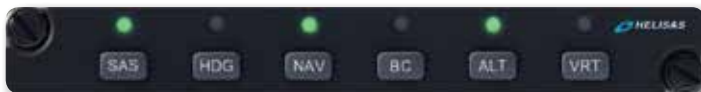
Fiatarone said he hoped to see the use of real-time HUMS expand as the system proves its worth in operation, and pointed to "good early positive returns" from customers thus far.

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Airbus: Diesel engine viable for light singles



According to Airbus Helicopters, a light single like the H120 would have greater endurance with a diesel engine. **Airbus Helicopters Photo**

BY THIERRY DUBOIS

In the framework of a European research program, Airbus Helicopters completed a flight-test program with a diesel engine on an H120 single in 2016. Test results have been analyzed and the program was a technical success, Airbus claims. However, an application still has to be found, as no engine manufacturer has picked up the work yet.

The goal, as part of the European Union's Clean Sky public-private "technology initiative," was to demonstrate a diesel engine is a viable alternative to a turboshaft on a light single. The expected benefit was a reduced fuel burn, thanks to the greater efficiency. Challenges, meanwhile, were the torque oscillation of a piston engine, its weight and cooling.

With a diesel engine, a light single would have a greater endurance. The tested H120 could have flown eight hours, Christian Mercier, Airbus Helicopters' chief research engineer for new engines, told *Vertical*. It would thus be highly suitable for operations such as power line surveillance, he said.

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The company refers to a “high-compression engine,” rather than “diesel,” perhaps to keep away from the negative publicity that has hit diesel engines in the automotive sector in recent years.

After a two-month evaluation on an iron bird followed by one month of ground tests with the H120, five flight hours were enough to check every specification was met, according to Mercier. The trials of the 330-kilowatt (440-shaft-horsepower) powerplant were thus “a complete success,” Mercier said.

At takeoff power, the fuel consumption (using kerosene) was cut by 30 percent over that of a turboshaft. At cruise power (around 130 shp), it was “more than halved.” The average reduction, calculated over a mission, was 42 percent.

The solution to torque oscillation was the dampening system Airbus and its Clean Sky partners designed. The diesel engine was thus made compatible with a helicopter gearbox.

Another challenge was cooling. A piston engine’s thermodynamics call for a more complex system. The “power pack” on the H120 included a large fan and added non-negligible weight to an already heavy engine. Nevertheless, the engine and accompanying cooling system are much cheaper than a comparable turboshaft, according to Mercier.

At 0.8 kg/kW (including the cooling system), the weight index density is twice lower than that of a turboshaft but much better than piston engines in conventional cars. That number was achieved thanks to the input of a company specializing in car racing, Teos Powertrain Engineering. A power density of 0.6 kg/kW is within reach, Mercier said.

Teos and Austro Engine (part of the Diamond Aircraft group) co-designed the V8 engine. However, Airbus retains its intellectual property, Mercier stated. No established engine-maker seems to have expressed interest yet.

In addition to helicopters, the engine is deemed suitable for fixed-wing aircraft in general aviation, as well as auxiliary power units for commercial aircraft.



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Garmin introduces G3000H

Garmin International has unveiled the G3000H, an instrument flight rules (IFR)-capable integrated flight deck specifically designed for Part 27 turbine helicopters. Shortly after the G3000H was announced, Kopter revealed it will be integrating the flight deck into the upcoming SH09 single-turbine helicopter from first deliveries.

The forward-fit G3000H offers a number of features, including WAAS/SBAS, ILS approach capability, visual flight rules (VFR) and IFR helicopter charts, and Connex wireless integration.

It's also equipped for ADS-B In/Out, offers visual approach guidance and an HSI map. Garmin said the G3000H's touchscreen interface has in-flight features and benefits that reduce pilot workload, and increase situational awareness.

"The G3000H blends a superior feature set and safety-minded technology into a contemporary platform for the VFR/IFR turbine helicopter market," said Carl Wolf, vice president of aviation marketing and sales. "With the G3000H, we're excited to bring IFR capabilities in an advanced integrated flight deck and further expand our product offering so our partners have even more options within this class of helicopters."

Built with a flexible and scalable architecture that can be tailored to a variety of helicopter designs, the G3000H combines widescreen, high-resolution

displays with touchscreen controls that serve as the pilot interface to the integrated flight deck. The landscape-oriented displays offer immediate access to critical in-flight information in a consolidated, easy-to-read format.

The G3000H also features pilot-selectable split-screen capability that allows for two or more separate pages to be displayed simultaneously, so pilots can access valuable decision-making information on a single screen.

The G3000H's features and optional capabilities include helicopter synthetic vision technology (HSVT) for an "out-of-the-window" view of the surroundings on the primary flight display; hover display, which provides a combination of location, heading and vector references to help guide and orient pilots during hovering maneuvers; Connex wireless integration; and Telligence Voice Command, which uses automatic speech recognition technology to accept hundreds of voice commands at the push of button on the cyclic.

"The G3000H will ease the workload of SH09 pilots while providing best-in-class situational awareness," said Michele Riccobono, Kopter's executive vice president of technology. "This will enable a higher level of safety for every mission, the core principle behind the design of our helicopter."



The Garmin G3000H is an IFR-capable integrated flight deck that has been designed specifically for part 27 helicopters.
Garmin Image

Vertical shortlisted in Aerospace Media Awards

Vertical Magazine and its contributors have made the shortlist of finalists in several categories at the 2018 Aerospace Media Awards.

The awards were created to recognize individuals and publishers who have made a significant contribution to international aerospace publishing. This year, more than 250 nominations were received.

The finalists include Anthony Pecchi and Mike Reyno (Best Aviation Image); Elan Head (Best Safety, Training & Simulation Submission); Oliver Johnson, Ken Swartz, and Dan Megna (Best Rotorcraft Submission); and *Vertical* Magazine (Best International Publication).

Winners will be announced at a gala in London, England, on July 15.

FAA approves DART Bell 505 EFS

DART's Bell 505 Emergency Flotation System (EFS) has received certification from the Federal Aviation Administration (FAA).

"The validation of the Bell 505 EFS by the FAA in a relatively short timeframe reflects the confidence that the authorities have in the design of this product and the substantiating documentation," said David Shepherd, vice president of certification at DART Aerospace.

FAA certifies Bell 505 cargo hook

Bell's 505 cargo hook has been approved by the Federal Aviation Administration (FAA) to carry up to 2,000 pounds (907 kilograms).

The company said Northwest Helicopters will be using the cargo hook capabilities on its 505 aircraft for lifting air conditioning units, building materials, and carrying water cargo for firefighting operations.

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The Metro Aviation study looked at 43 helicopters in its fleet, including EC135s, AS350s, EC130s and EC145s.
Metro Aviation Photo

Metro study finds Pulselite helps prevent bird strikes

BY DAYNA FEDY

The Precise Flight Inc. Pulselite System is a significant factor in reducing the number of bird strikes with aircraft, according to a new study conducted by Metro Aviation.

Precise Flight, based in Bend, Oregon, developed the Pulselite System in 1984, and it has since been installed on over 25,000 aircraft — both fixed- and rotary-wing. The system is a Federal Aviation Administration (FAA)-certified lighting controller that pulses the existing lights on an aircraft, both to increase aircraft recognition to other pilots and to reduce bird strikes.

Moving lights are recognized earlier by both the human eye and the avian eye than static lights, said Doug La Placa, CEO of Precise Flight. The FAA released a Technical Note in May 2012 that showed static lights actually attract birds, while pulsing lights repel birds, he added.

According to the U.S. Fish and Wildlife Service, populations of large bird species are on the rise in North America; as these bird populations grow, as does the threat of catastrophic strikes with rotorcraft.

Within the last five years, the Pulselite System has become increasingly popular

with rotorcraft, with supplemental type certificates (STCs) covering their installation on all Airbus helicopter models; various Bell models including the 407; the Robinson R22 and R44; and the Leonardo AW139. With a patented traffic collision avoidance system (TCAS) integration, the Pulselite System automatically initiates when a TCAS alert is activated on an aircraft.

Companies such as Maverick Helicopters and Qantas Airways have conducted successful studies on the effectiveness of the system in relation to bird strikes in the past, and now Metro Aviation has joined the list of operators giving the system their approval.

“Metro Aviation has been a leader in aviation safety for many years,” said La Placa. “Their recent study on the effects of pulsing lights on bird strikes is another example of their seriousness and dedication to rotorcraft safety.”

Metro Aviation conducted its investigation into bird strikes as part of an overarching safety evaluation of its operations.

“When we initially started the study, we weren’t planning on looking specifically at the Pulselites — that was just one factor out of all the different factors we were looking at,” said Brady Carpenter, FOQA/SMS data analyst at Metro Aviation. “It just so happened when we

got the results, the Pulselite System seemed to be the most significant result out of the study we performed.”

The study looked at 43 helicopters in Metro’s fleet for the migratory months of September and October in 2016 and 2017, as well as an entire two-year period for those two calendar years. The 43 aircraft included EC135s (which make up the bulk of Metro’s fleet), AS350s, EC130s, and EC145s.

During the September and October periods, Metro found it was five times more likely to have a bird strike an aircraft that was not Pulselite-equipped than hit an aircraft that was. For the entire two-year period, it was three times as likely to have a bird strike on an aircraft that was not Pulselite-equipped.

“The chances [of bird strikes] were significantly reduced with Pulselites,” said Ed Stockhausen, director of safety at Metro Aviation. “You could see it over all periods and across the country. . . . Our long-term goal is to, over time, equip the fleet with the Pulselites — it’s an ongoing effort.”

Metro also found that aircraft cruising below 2,000 feet were at greatest risk to strikes. “Data shows — not just our data, but bird-strike data that the FAA collects — that you’re 62 to 64 percent more likely to have a bird strike below 2,000 feet, as opposed to above 2,000 feet,” said Stockhausen, adding that the company’s average altitude of bird strikes varied between 1,300 and 1,500 feet.

“If you look at it purely from a financial perspective, it only takes one bird strike typically for the Pulselite System to pay for itself many times over,” said Precise Flight’s La Placa. “If you look at it from a safety perspective, the value is enormous.”

Metro’s study also found a correlation between the extent of damage caused by bird strikes and whether the aircraft had Pulselites. Stockhausen said the damage to aircraft and average out-of-service time after a bird strike was greater if the aircraft didn’t have the Pulselite System on board.

The Pulselite System’s customers include PHI Helicopters, Sundance Helicopters, the U.S. Forest Service, Blue Hawaiian Helicopters, the L.A. County Fire Department, ERA Helicopters, and most recently Air Methods — which La Placa said is in the process of conducting its own bird-strike study with the system, to be completed by the end of the year.

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What is the future of safe BVLOS operations?

BY DAYNA FEDY

Simulyze Inc, based in Reston, Virginia, is looking to pave the way for drones to fly safely beyond visual line of sight (BVLOS) with its Mission Insight platform.

The data-focused application processes, analyzes, and manages large streams of data from various sources in relation to BVLOS, and visualizes all aspects of multiple flight operations in a single, customized graphical interface.

"To effectively and safely do BVLOS, you need to plan; you need to coordinate UAS [unmanned aircraft systems] into the airspace," said Simulyze's CEO, Kevin Gallagher. "Then, during flight, you need proactive situational awareness — so you know everything around you and what's going on, so you can actively monitor flight."

Planning and situational awareness are two aspects that have been incorporated into Mission Insight. The platform enables UAS operators to submit flight plans, monitor aircraft status and telemetry, activate flights, transmit aircraft position data to NASA's Unmanned Traffic Management (UTM) research platform, and monitor other surveillance information. Simulyze believes data management is the key to UAS pilots

flying safely BVLOS in the same airspace as other UAVs and manned aircraft.

The Mission Insight application is built on an advanced operational intelligence (OI) platform, which Gallagher said tunes in all the big-data problems. OI puts data sources together and supplies information in real time to drone operators so they can react. The platform uses real-time analytics to monitor potential conflicts (like weather) and alerts the operator when necessary.

With technology like Mission Insight moving forward and BVLOS test flights with NASA progressing, Gallagher believes BVLOS drone operations are on track to become a reality in the future.

"There's still a lot of work to do, but we envision it's all going to be possible," he said. "I envision that you're going to be able to do long-haul kinds of operations, and there will be a coordinated traffic management system to help organize and enable all of that."

Simulyze has been participating in research efforts and test flights with NASA's UTM program in North Dakota and Alaska. The test flights are currently at Technical Capability Level 3, which focuses on technologies for BVLOS. The company has been supporting tests for detect-and-

avoid technologies with drones, as well as communication and navigation.

"With that research, we think we're going to get the rest of the work done to get [NASA's UTM] built, and then the challenge is to get regulations out there in a timely fashion," Gallagher said. Once completed, the UTM program will be handed off to the Federal Aviation Administration (FAA), and the research will be used to inform rulemaking for drone operations.

The company is also participating in the FAA's UAS Integrated Pilot Program, representing two of the 10 selected programs that will collect drone data involving flights beyond the pilot's line of sight over the next two and a half years.

Simulyze has built a UAS Service Supplier (USS) platform, which handles the traffic management and data processing behind the bigger concepts — such as dealing with contingency operations, and how those may affect other operations.

"Maybe I've got a long BVLOS operation, but I have a vehicle problem and I have to return to base. I might be returning along a path that I didn't reserve for my operation, and now I have to coordinate that," Gallagher explained.

(Cont'd on p.36)



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(Cont'd from p.34)

"Our UAS Service Supplier will automatically figure out what airspace you need and coordinate that with the other operations so you can handle your vehicle emergency."

And while BVLOS is a topic that may bring safety concerns to pilots or the public, Gallagher said with advanced technologies and testing, these out-of-sight flights may even be safer than some manned flights. "But with anything there's risk," he added. "There are risks in driving cars; there are risks in

flying airplanes; and there are risks in drones. . . . The more people understand it, the more they can become accustomed to it."

However, BVLOS operations are still far out from becoming a reality, due to rigorous testing processes and future regulatory obstacles. "To fully enable simultaneous, complex BVLOS operations . . . we're a little ways away," said Gallagher. "We still have some research and exercises to go through, as well as some technology pieces, and then the regulatory pieces – which take some time to put in motion."

RotorBits

CHI supporting ops in Afghanistan

CHI Aviation has been selected to provide additional helicopter airlift support for the U.S. military in Afghanistan. The mission includes tactical troop transport, and internal and external cargo operations with rotary-wing aircraft.

The contract is for two Sikorsky S-61s out of Bagram Air Base, which will join two CHI helicopters operating out of Kandahar. Operations are to start by mid-June 2018.

"We are very pleased to continue to support the troops operating out of these additional bases," said Chris Turner, president of CHI Aviation.

Cal Fire orders Firehawk

The California Department of Forestry and Fire Protection (Cal Fire) has ordered a Sikorsky S-70 Black Hawk aircraft, to be modified into the Firehawk firefighting configuration by United Rotorcraft.

Once assembled, the aircraft are modified by United Rotorcraft with a 1,000-gallon (3,785-liter) water tank equipped with a unique snorkel system for 60-second tank refill, extended landing gear, single pilot cockpit layout and a medically equipped interior, all of which arm the aircraft for its role as a multi-mission firefighting tool.

"United Rotorcraft and Sikorsky are honored to support Cal Fire's stewardship of over 31 million acres throughout California," said Mike Slattery, president of United Rotorcraft. "As seasons have become longer and more severe, it's crucial that California has these high-performance Firehawk helicopters, which allow initial attack capabilities that can knock down fires early before they spread widely."

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RotorBits

The Collective Pull Down lowers the collective when a low-rotor rpm situation is detected.
Terrence Wyman Photo



HeliTrak launches R22/R44 Collective Pull Down

BY TERENCE WYMAN

HeliTrak has created a Federal Aviation Administration (FAA)-approved after-market device to help pilots react to an engine or driveline failure in a Robinson R22 or R44. The Collective Pull Down (CPD) lowers the collective independent of pilot action when a low-rotor rpm situation is detected. According to the Flight Safety Foundation, it takes pilots two to three seconds, on average, to recognize a problem, and then an additional four to six seconds to react. The CPD is designed to virtually eliminate this delay.

It works by sensing a low-rotor rpm occurrence using the aircraft's existing low-rotor rpm warning system, and activates in less than a second to reduce the collective to the full down position — achieving this in less than three seconds.

Vertical was recently given the opportunity to complete a demonstration flight in a CPD-equipped Robinson R44 with Ray Debs, HeliTrak's demonstration pilot and vice president of engineering, to experience firsthand how the device works.

At first glance, the installation is very well integrated into the aircraft. In the cockpit,

there is a small toggle switch forward of the collective to select and reset the CPD, and an amber caution light on the panel to signal whether it is on or off, much like the governor light. On the aft end of the collective, there is an anchor for the actuating cable that links the CPD to the collective lever and collective friction arm. The rest of the device is located underneath the panel below the collective and is hidden from sight as well as interference from any loose objects in the cockpit.

Testing the system before takeoff showed that the CPD activated normally in conjunction with the low-rotor rpm system check that is standard in a Robinson product. Purposely drooping the rotor rpm to test the system resulted in the CPD lowering the collective completely to the down stop in less than a second. The force the CPD employs for this is adjustable from 5.5 to 10 pounds; the demonstration aircraft was set on the heavier end of the range at nine pounds. After a CPD activation, you have to manually reset the device before it can be considered "armed" and ready for use once again. This check is part of the preflight procedure.

(Cont'd on p.40)

StandardAero announces Canadian MRO COEs

StandardAero is to restructure its primary Canadian maintenance, repair and overhaul (MRO) facilities to create three different Centers of Excellence (COEs) specifically for supporting helicopter airframe/component MRO services, helicopter engine MRO services, and turboprop engine MRO services. The COEs will be located at its facilities in Langley, British Columbia; Winnipeg, Manitoba; and Summerside, Prince Edward Island, respectively.

Additionally, and as part of the restructuring, StandardAero intends to wind down operations at its Richmond, British Columbia, facility by June 2019. Helicopter engine MRO services currently performed at Richmond will be relocated to StandardAero's Winnipeg facility, including all Safran Arriel 1&2, Rolls-Royce M250, GE T700 and Pratt & Whitney Canada (P&WC) PT6T helicopter engine MRO services.

Winnipeg will serve as the company's COE for all helicopter engine MRO services. Helicopter dynamic components, currently located in Richmond, will be relocated to the company's Langley facility, which will serve as the COE for helicopter airframes/component MRO services moving forward.

Bristow secures contract extension in Norwich

Bristow Group has won a three-year contract extension from Perenco U.K. Ltd for helicopter support in the U.K. Southern North Sea through December 2021.

Bristow plans to support the operations from its Norwich base, utilizing up to five existing Leonardo AW139s and dedicated back-up support. This increases Bristow's aircraft support from three to up to five operational AW139s compared to its current contract with Perenco.



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(Cont'd from p.38)

The CPD does not manipulate the throttle in any way — that task is still accomplished by the pilot.


In level flight, normal autorotation entries were done manually to demonstrate the autorotational characteristics of the R44 under prevailing conditions. On the day of the flight test, slight aft cyclic input was necessary to set the proper glide pitch attitude, along with an increase in collective to maintain rotor rpm in

the green arc. With the CPD armed and ready for activation, rotor rpm was drooped by throttle manipulation to the point of warning system activation (97 percent rpm). At this, the CPD activated, lowering the collective to the down stop. With the slightly heavy nine-pound pull, it felt as if the CPD was an attentive flight instructor helping you initiate an auto; not strong enough to pull the collective out of your hand, but positive enough to not be confused for something else. CPD activation was demonstrated from

an out of ground effect hover up to 90 knots indicated airspeed. In all cases, rotor rpm was maintained on entry to the auto, with pilot input then being needed to manage airspeed and rotor rpm during the glide portion. A maximum glide distance autorotation configuration was demonstrated as well. After entry, rotor rpm was stabilized at 90 percent. The CPD activated for three seconds, then stopped. Counteracting CPD activation was a simple matter of holding the collective up while putting the aircraft into a max glide configuration.

In hover operations, the CPD can be overridden easily when necessary. While in a two- to three-foot hover, rotor rpm was drooped down to activation of the low rotor light and horn. At CPD activation, it was a simple matter of holding the collective up to prevent ground contact for the three-second timeframe of CPD activation. During hovering autorotations it was again a simple matter to counteract CPD down collective motion while timing the up collective pull to cushion the touchdown.

Overall, the CPD should prove to be a very useful device for safety. It is light (less than two pounds installed), does not take up any storage space, is very low maintenance, is relatively inexpensive (under US\$10,000 for the R22 and under US\$15,000 for the R44, plus installation), and easily overridden by the pilot when necessary. HeliTrak worked very hard for a simple design, ending up with something the company characterizes as a “1/2 axis autopilot.” After experiencing the CPD firsthand, it felt very similar to the stick shaker/stick pusher devices found in the fixed-wing world; safety devices that work to assist the pilot while being unobtrusive during regular flight regimes.

In addition to the CPD, a future product to look for from HeliTrak will be an autopilot for the Robinson R44. Initially planned to be two-axis, it will support expansion to three- or four-axis and include low-G detection and upset recovery. It will also be linked to the CPD, allowing further integration for safety of flight. Certification is expected by the end of 2018. 

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Q & A

interviewed by Maria Langer

Zachary Noble | Deputy Director of Flight Operations for Helicopter Association International



Zachary (Zac) Noble worked in the military as both a pilot and mechanic, and then gained civilian experience as a medevac pilot. With multiple helicopter and fixed-wing certificates, Noble now works in support of Helicopter Association International's members, providing advice on a vast range of operational and regulatory issues.

Q: What you do for HAI?

A: In the Flight Operations department we handle all things flight-related, supporting a number of members, whether that's UPAC [Utilities Patrol and Construction], air tour industry, air taxi industry — any of the operators that have a specific segment in the helicopter community. We help advise them on maintenance issues, as well as working with the FAA on maintenance and rules and rulemaking. We are involved with a number of the aviation rulemaking committees to try to benefit our membership.

Q: How long have you been with HAI and what did you do before that?

A: I started with HAI in March 2017. Prior to that, I was a helicopter pilot in the Army, where I flew the AH-1 Cobra, AH-64 Apache, Longbow Apache, and King Air 200. I have flown in a number of different countries supporting the Department of Defense.

After I got out of the Army in 2006, I flew air medical for 11 years, working for a couple of prominent air medical companies: Air Methods Corporation, Metro Aviation, Seven

Bar Aviation, and the University of Virginia. I flew EC135, EC130, BK 117, and Agusta 109.

My credentials that help me do my job: I'm a dual-rated ATP for helicopter and multi-engine airplane, I'm a CFII in airplanes and helicopters, and I'm an active A&P and IA. So with those credentials, I fit the Flight Operations department and can help on many levels. Anyone who has a question about flying or maintaining aircraft can come to my office and get an answer. And if I don't have an answer, I can dig a little deeper or start going up the chain.

Q: How long were you with the Army?

A: I was actually in the service for 24 years. I didn't start out in the Army, though. I started out in the Marine Corps. I was a helicopter mechanic in the Presidential Helicopter Squadron at Quantico, Virginia.

Q: Marine One?

A: Marine One, that's right. So I did that for about five years; total Marine Corps service was about seven years. Then I switched over to the Army for flight training.

Q: Tell us about your air medical work. How did you like it?

A: Mostly, I enjoyed it. There were a few times I did not enjoy it. It's always helpful when you can help people and feel like you're making a difference. Those days and nights when you're making a difference — yeah, that's enjoyable. You go home feeling good, you feel like you helped somebody.

There were times when it was only VFR [visual flight rules] and there were times when I was doing single pilot IFR [instrument flight rules]. I flew the Agusta 109 for the University of Virginia, doing air medical for them. I really enjoyed that. Really nice equipment. The Agusta is a fast and sleek helicopter, but for EMS [emergency medical services] purposes, I really enjoyed the EC135 and EC130.

Q: What do you like most about the work you do for HAI?

A: I like a challenge — I like a challenge that I can resolve. The challenges that are difficult to resolve or not resolvable are not

much fun. I like it when the membership reaches out to us to get a different angle or perspective on something that's going on with their operation and we can provide positive input for them. I like it when a member calls up and says, "I'm trying to do X. What can I do to do X?" In my job, I try to tell you what you can do and not what you can't do. And that's where the fun begins.

Q: I guess the FAA tells you what you can't do.

A: And this is one of the challenges to HAI. A lot of our membership doesn't reach out to us until it's too late. Sometimes, when members call us after letting a problem issue sit too long, it's too late for us to do much about it. Then we have to become reactive instead of proactive. I would like members to be a little more oriented to call us — even if they just hear something [that might affect their operations] — and ask what we think about it. Then we can be more proactive and then we might be able to provide bigger, faster input [to head off a problem].

Q: Do you have any success stories you want to share? Projects that you've tackled that you feel good about?

A: Well, I reached out to Flying M Air after reading an article that had just been published in *Vertical* magazine about Part 135.160 requiring a radar altimeter in all Part 135 helicopters, including VFR-only R44 helicopters. Did we win that battle? No, we didn't really win that battle, but we gained a little ground and the FAA extended the time period for the R44 operators until Oct. 23, 2018 [from the original deadline of April 24, 2017] to comply with that rule. That was one of my biggest challenges here at HAI. I won't even say that it was a real success but I don't think it was a complete failure either.

I really enjoy helping the small operators. The larger operators have their own teams of experts that are at their disposal all the time. But the small operators may not have that. They shouldn't be afraid to call HAI and say, "Hey, Zac, I need to chat about something. This is what's happening," or, "This is what I'm seeing. Is there anything I can do about this?" I may not have the answer,

but we have some smart people and I can put it in the thinktank and see what we can come up with. I do enjoy working with the small operators and helping them stay in business. I have a small business myself — flight training in airplanes — and I know that it can be a struggle. Money is always tight. Resources are limited. If you're a member of HAI, call. Or even if you're not a member of HAI — I can't tell you how many times I've been proactive with helping folks who aren't members. I try to impress upon them that we are their voice. If you fly or own a helicopter, being a member of HAI can benefit you.

Personally, I own a couple of airplanes. I have a Cessna 172 and a Bonanza K-35. I believe in association advocacy. I am a member of HAI, AOPA [Aircraft Owners and Pilots Association], EAA [Experimental Aircraft Association], Cessna Pilots Association, and the American Bonanza Society because I believe these organizations protect and defend my right to fly. We each need a voice, a voice to represent us to the FAA and Congress. They keep us flying and if you don't believe it, just look at personal and business flying in other countries.

Q: You have a Bonanza and a Cessna? Do you do a lot of pleasure flying?

A: I do a fair amount of pleasure flying. I live in Virginia. The beaches are close by. I can fly down to the Outer Banks of North Carolina in about an hour and Myrtle Beach in South Carolina in a little less than two hours. I do a little instruction and biennial flight reviews. I've done some full training from day one to private pilot certificate for a few people. My time with HAI doesn't really allow me to do that too often unless someone wants a long, drawn out training period.

Q: What do you think is a major concern in our industry?

A: One of the things that bothers me a lot is our accident rate. That's across the board for helicopters and airplanes. Inadvertent IMC turning into spatial disorientation is something that really bothers me and I struggle to understand why this is still happening. Jimmy Doolittle flew the first instrument flight in 1929 — that's 89 years ago this year. And every year we still have people, 89 years later, getting into

trouble and dying because of their inability to get out of an instrument meteorological condition. I don't know how to fix that. When I'm conducting training, I teach people not to be afraid of the clouds, but if they're not certified, do not go into the clouds. But if they do end up in IMC, fly the machine. Continue to fly the machine. It just baffles [me] how, here we are — 89 years later — and it's still one of the major causes of accidents.

Very few accidents are caused by maintenance or material failure. It used to bother

me when I was a young pilot and people said an accident was due to pilot error. But after years of doing this, I've realized that it usually is. It may not be a hands-on error; it may be a decision-making error.

Q: Is there anything you want to add?

A: As far as HAI goes, I'd like members to feel more free to reach out to HAI. I can't say that we can fix everything — nor *should* we fix everything — but we can be another voice in the dialogue. ✖

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AERIAL FIREFIGHTING IN 2018

After a record-breaking year of wildfires in 2017, what challenges does the aerial firefighting industry face as the Northern Hemisphere season begins? And how is it placed to meet them?

In the United States, over 10 million acres of land were burned by wildfires in 2017. Since 1952, the only other time wildfire has been as destructive in the country was in 2015. The U.S. Forest Service spent a record \$2 billion fighting wildfires last year, with the Great Plains, Florida, the Rockies, and particularly California being areas of focus. Beyond the U.S. border, Western Canada was devastated with British Columbia experiencing its worst fire season on record with over two million acres burned. In Europe, the number of wildfires doubled from 2016 to 2017, as drought conditions gripped the southern part of the continent. Portugal and Spain were especially hard hit with dozens of fatalities. Even typically cold locations such as Siberia and Greenland saw wildfire problems. And parts of Australia joined California with the beginning of a seemingly year-round fire season.

What does 2018 hold in store? *Vertical* asked those involved with the industry around the globe to take the pulse of aerial firefighting, and over the next few pages, you can see what the most recent fire season — in the Southern Hemisphere — has taught us; the forecast for 2018 in North America from *Vertical's* meteorologist; the view from the American Helicopter Services and Aerial Firefighting Association; and some of the new developments from bucket and tank manufacturers. One thing for sure: helicopters will continue to provide a vital role in the ongoing battle to keep wildfires under control.

LESSONS LEARNED FROM THE **SOUTHERN SUMMER**

By Paul Sadler

It's been a season of change for aerial firefighters Down Under, following two major developments during the southern hemisphere summer. Firstly, following a two-year trial, Australia's aviation regulator certified the use of night vision imaging systems (NVIS) for aerial fire attack at night, bolstering aerial firefighting capabilities in the country. The second development was the start of a program to import and locally refurbish more than 10 ex-U.S. Army UH-60 Black Hawks into helitacks, with some to be permanently based in Australia year-round.

On March 17, the Civil Aviation Safety Authority (CASA) approved Canada's Coulson Aviation and local Kestrel Aviation to undertake unrestricted aerial fire suppression operations using NVIS to attack bushfires at night. The approval to attack wildfires into the night followed an extensive practical trial at Ballarat, northwest of Melbourne, Victoria, earlier this year, which saw witness to an Australian first.

A Coulson Aviation Sikorsky S-61 became the first helicopter in Australia to successfully conduct night fire suppression operations — including hover filling from open water sources — with its crew using NVIS.

"This is the first time on the planet that a helicopter has gone into the wild, at night, dipped into a dip site, loaded it up and brought the water to put the fire out," Coulson Group president and CEO Wayne Coulson told *Vertical*.

After witnessing the deadly Black Saturday wildfire incident cross the state of Victoria in February 2009, claiming 173 lives (Australia's highest-ever loss of life from a bushfire), Coulson returned to Canada at the end of that season and embarked on a mission to establish a night firefighting capability.

"We started night flying with our Sikorsky S-61 helicopters in the timber business flying trees at night in the late 1990s,



and have 2,000 flight hours of night timber harvesting,” Coulson said. “Our [NVIS firefighting] process started with company trials of proof-of-concept. Multiple trials continued under the watch of Canadian scientific wildfire research firm, FP Innovations, until we were satisfied with the process and formalized a Coulson Night Firefighting operations manual that eventually was the basis of our application to CASA.”

Being able to fight fires at night is seen as a real game-changer in Australia. Policies and procedures are now in the process of being further developed to ensure night firefighting operations can be undertaken safely in real situations before next summer, as the conditions were tightly controlled during the trial. Australia’s bushfire season runs usually for around 10 months, with northern parts of the country becoming active with bushfires as early as July (mid-winter in Australia).

“We have started to plan with Emergency Management Victoria and CASA on a night vision goggle [NVG] trial in early 2019 using the our C-130 Hercules,” Coulson said. “At this point, there is no legislation with CASA to allow any fixed-wing NVG operations, so in a sense we will be working to help shape legislation for all operators looking to do NVG operations in Australia.”

Coulson believes by early 2020, legislation will be in place that will allow fixed-wing aircraft to operate using NVIS for night fire suppression operations and notes the CASA certification would be valid in Canada and the U.S.

Kestrel Aviation, based at Victoria’s Mangalore Airport, has become the first local operator to gain CASA approval for night time suppression operations, including hover fills.

“We have approval to carry out night firebombing at any time with an appropriately equipped helicopter, however our current operations are all written around the Bell 412,” Kestrel Aviation managing director Captain Ray Cronin told *Vertical*. “Longer term, this will include the Aircrane fleet.”

Kestrel Aviation has been providing six Erickson S-64E Aircranes, under contract, to state and territory fire agencies in Australia since 2013.

Both Coulson and Kestrel Aviation are undertaking further work to help develop a deeper understanding of how night aerial fire attack can be integrated into current on-ground firefighting practices in a safe and effective way.

“L.A. County Fire and some other companies have been NVIS firebombing predominantly with ground fill only,” Cronin said. “However, this is taking the activity in Australia to a new and mature level for it to become a workable option for the fire agencies in the future. This winter, we hope to continue training with the relevant



stakeholders so that when the next bushfire season starts we will have a functional capability that is ready to roll out on-demand.”

In July 2017, Sikorsky Helitech, Kaan Air Australia and StarFlight Australia jointly signed an agreement to bring an initial 10 ex-U.S. Army UH-60 Black Hawks into Australia for aerial firefighting, emergency services and disaster relief operations. The “as new” refurbished Black Hawks will be operated by StarFlight Australia, with Sikorsky Helitech providing ongoing maintenance and repairs.

“Each Black Hawk will undergo a three-month-long extensive refurbishment, which will include fitting new, higher-performing General Electric T700-GE-701D turboshaft engines, upgraded gearboxes, and new avionics,” StarFlight Australia chief executive John Skeen told *Vertical*. “The purchase of 10, plus an option for a further 10 Black Hawks, represents a significant milestone for the firebombing and disaster relief helicopter industry in Australia.”

The Black Hawks, which are being hand-picked by Sikorsky when they become available from the U.S. Army, will operate with a mix of buckets and internal tanks.

“We have a couple of tanks options available,” Skeen said. “One is a locally-designed and -made tank and the other one is from overseas. Work to select our preferred tank in progress right now.”

The first Black Hawk for refurbishment is due to arrive at Sikorsky Helitech’s Brisbane facility by the end of this year.

As *Vertical* was going to press, StarFlight Australia just announced the purchase of a Leonardo AW139 for multi-role operations. To be fitted with a Simplex belly tank, an updated version of the one fitted to L.A. City Fire Department’s AW139s, this helicopter will become the first of its type in Australia configured for aerial firefighting and other search-and-rescue and training roles.



A Coulson Aviation Sikorsky S-61, equipped with a 1,055-US gallons (4,000-liter) belly tank and night vision imaging systems, takes part in nighttime firefighting trials in Victoria, Australia. **EMV Photo**

A Los Angeles City Fire Department Leonardo AW139 during firefighting operations on the La Tuna fire in September 2017. **Mike Gilbert Photo**



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THE WILDFIRE FORECAST

by Ed Brotak

How to forecast a fire season? Obviously, it would be a great help if the severity could be predicted ahead of time. In the past, future fire conditions were forecast using current information and extrapolating ahead — so, if you were in a drought with high fire danger, this was given as the outlook. And some regions have typical climate factors that can be allowed for — for example, the West Coast of the U.S. always has a dry summer, and fire danger peaks until the wet season starts later in the fall. Alaska not only warms and dries out in the summer, but thunderstorms also become prevalent, with lightning strikes providing fire ignition sources.

But, as the science of weather forecasting advanced utilizing complex mathematical models and super computers, the accuracy of long range forecasts (several months out) increased. Today, these long range forecasts are incorporated into fire weather outlooks. Simply put, if the forecast is for above normal temperatures and below normal precipitation, be ready.

The 2018 wildfire season has already gotten off to a fast start in the U.S. By the end of May, over 1.6 million acres had been burned, primarily in Texas and Oklahoma where “exceptional” drought conditions have been noted. In addition, Florida has recorded 1,600 fires that collectively burned over 100,000 acres. Typically, wildfire activity will shift westward as summer begins, out of the Plains and into the Rockies, the Intermountain West, and the West Coast. The mountainous areas tend to get summer thunderstorms with numerous dry lightning strikes. The West Coast is dry and has numerous man-made fire ignition sources.

The official National Weather Service forecast for the summer shows that the western third of the country is forecast to have above normal temperatures, particularly in the Southwest. Most of the west is forecast to have near normal precipitation — so, typically dry conditions. Consequently, the drought in the Southwest is forecast to continue. Putting this together, the National

Significant Wildland Fire Potential Outlook is calling for “Above Normal” wildland fire potential in the southern and central Rockies and the interior and south coastal areas of California for June. By July and August, the “Above Normal” potential moves more seasonally to the northern Rockies, the mountains of the Pacific Northwest, and into California.

For Canada, although conditions improved greatly in New Brunswick over the winter, drought persisted in southern Saskatchewan and Manitoba. After a slow start, wildfire activity increased rapidly in April and May. For the summer, Environment Canada has predicted above average temperatures for much of the country, with dry conditions continuing from the Central Plains to the West Coast.

Forecasts for fire weather severity from Natural Resources Canada for June show almost all of central Canada in the “High Danger” category. By July and August, most of central and western Canada have elevated fire risk. “Extreme Danger” is noted for much of the summer from the southern parts of Saskatchewan through British Columbia.

This year could also bring more destructive fires to Europe. The official summer forecast calls for above normal temperatures throughout much of the continent, with only the British Isles and Scandinavia being spared. Below normal rainfall will accompany the high temperatures.

Beyond 2018, scientists believe the wildfire problem will only get worse. Climatic change has brought warming temperatures and dramatic swings in precipitation. Droughts and floods can occur simultaneously, even in one country — and one location can go from one extreme to the other in a short period of time. With droughts becoming more frequent and more intense, major wildfires will become common. The demand for helicopter firefighting services will likely increase dramatically.

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THE ASSOCIATION'S VIEW

By Oliver Johnson

According to George Hill, executive director of the American Helicopter Services and Aerial Firefighting Association (AHSFA), the main challenge his members are facing in the upcoming fire season isn't the volume of work — it's the reduction in number of exclusive-use contracts from the U.S. Forest Service (USFS), and an increasing reliance on call-when-needed contracts.

When an operator has an exclusive-use contract with the USFS, it is obliged to have the contracted aircraft immediately available for dispatch (during the contract period) when the USFS requests it. The operator gets paid a set amount regardless of how much the aircraft is used by the USFS.

Operators with a call-when-needed contract can turn down a request from the USFS, and have up to 48 hours to respond. Call-when-needed contracts are paid on a per-incident basis.

"On the rotary-wing side, the USFS has recently reduced the number of Type I helicopters on exclusive-use contracts from 34 to 28," Hill told *Vertical*.

There are several impacts of this, he said. For the operators, this obviously includes the loss of guaranteed income — but with the potential of higher reward if it's a busy season through the more lucrative call-when-needed contracts.

And to prevent machines sitting idle, simply hoping calls will come for firefighting work, Hill said operators are likely to find other work for them — and that this work could preclude them from responding when the USFS calls.

"I think the major impact is going to be on availability of assets," said Hill. "I would predict that you're going to have a case where [the USFS] starts down the list of call-when-needed airplanes and there may not be any available."

There is also the impact of the differing response timeframes between exclusive-use and call-when-needed aircraft. "As you can well imagine, if you call someone and then they have two days to get on-scene, the fire could go completely uncontrollable in that period — if not much earlier," said Hill. "Some contractors, I believe, will have their helicopters ready and available in much less than 48 hours, but the difficulty with that is scheduling your maintenance, scheduling your aircrews, doing all the preparation work that you normally do — all those sorts of things are going to be a lot more complicated."

In terms of the work itself, Hill said wildfires have started early in Arizona, Colorado, California, New Mexico, and Utah, and aerial firefighters should prepare for a long season.

"I think it's going to continue to be difficult in terms of firefighting in general," he said. "It'll probably be another tough year."



An Erickson S-64E Airplane performs a water drop while fighting a wildfire. The aircraft's tank can hold up to 2,650-US gallons (10,000 liters) of water. **Skip Robinson Photo**

THE WORLD'S EVOLVING THREATS **HAVE MET THEIR MATCH.**



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Billings Flying Service will begin firefighting operations with a custom-designed tank for its Boeing CH-47 Chinook this summer. The 2,600-US gallon (9,840-liter) tank was designed and manufactured by Kawak Aviation. **Skip Robinson Photo**

BUCKET & TANK DEVELOPMENTS

By Oliver Johnson

To help aerial firefighters in their battle against wildfires, bucket and tank manufacturers are continuing to develop and enhance their product lines.

SEI Industries, manufacturer of the famed Bambi Bucket line, is working on the latest evolution of the product family — the Bambi i-Max. Currently slated to be launched in 2020, the i-Max integrates a load sensing head that is able to measure the load of water in the bucket. The information is captured in a touchscreen control in the cabin, through which an operator can adjust water shedding levels, the coverage speed, and the number of drops for each load.

As *Vertical* went to press, the i-Max was scheduled to begin beta flight tests with the California National Guard in a Sikorsky UH-60 Black Hawk, and in Spain in a Bell 412, in June 2018.

"We'll collect information in terms of the performance of the product, make adjustments, and then during next year we're probably going to put some of those units in with specific customers for operating during that season," Sergio Fukamati, director of the firefighting division at SEI Industries, told *Vertical*. "Then we'll do the final adjustments so that we can make the product available commercially."

The rest of the Bambi line is also seeing continual upgrades based on customer feedback, said Fukamati, in terms of reinforcement of critical areas, small adjustments to the design, and component upgrades.

"If a customer is buying a standard bucket today, it's not going to be exactly the same as it was last year, there will be some new improvements," he said. "We have two engineers totally dedicated to reviewing the performance of the products, collecting information in terms of customer feedback and quality reports, and incorporating that into a continuous improvement program."

On the fire ignition side of the business, SEI is getting ready to introduce its Sling Dragon into the market. Rather than be attached to the inside of the helicopter, as with other fire ignition products in SEI's range, the Sling Dragon is a fire ignition dispenser that is slung from the aircraft hook.

"The main reason for this project and development is to eliminate any potential concern or risk by having the other type of dispenser that is still attached to the inside of the helicopter," said Fukamati. He said having the dispenser slung underneath the aircraft also allowed for it to be built bigger than SEI's other ignition products. As compared to the Red Dragon's 600/700 sphere capacity, the Sling Dragon can hold 5,000 ignition spheres.

In late May, the Sling Dragon was in Florida completing flight tests, ready for a commercial launch in the last quarter of 2018.

A HEAVY FOCUS

A new 2,600-US gallon (9,840-liter) firefighting tank will be making its debut over wildfires in 2018 in the belly of a Billings Flying Service Boeing CH-47D Chinook. Billings contracted Kawak Aviation of Bend, Oregon, to design and manufacture the tank after getting good results from Kawak in a previous project to design a bottom-filling refill pump for the CH-47's Bambi Buckets.

Kawak had previous experience designing entire systems with a 700-US gallon (2,650-liter) system it created for the Kaman K-Max in 2006. But most of its work since then has been focused on pumps and in providing maintenance on existing tanks.

"Basically what they were looking for was a better performing higher quality solution that was well supported, and that's kind of the name of the game with what we do," said Andrew Sawyer, director of marketing at Kawak Aviation.

Kawak designed the entire system, from a fully independent hydraulic system that is run off the aft transmission, the gearbox that attaches to that, the refill pump, the doors, the internal tank itself, and all of the structural components. It subcontracted Trotter Controls of Fort Worth, Texas, to develop the door controls for the tank.

The tank received a supplemental type certificate from the Federal Aviation Administration in May 2018, allowing the first Billings Chinook with an internal tank to begin fire operations this summer.

"We're already working on the second one," said Sawyer. "The goal right now for Billings initially is four full systems."

Depending on the tank's performance over the fire season, there may be opportunities for other non-competing companies to purchase the tank, said Sawyer, adding that the feedback Kawak has received from Billings so far has been great.

"They've been fairly ecstatic about the performance," he said. "The refill times have been — they're doing 20- to 30-second refill times for a typical load. If you're talking about full salvo, dropping the entire load at once, they're dropping about 90 percent of the load in about three seconds. Out of a 2,600-gallon tank, that's pretty impressive."

Before the Chinook tank project had even finished, Kawak had already secured another major project — this time to develop an entirely new complete external tank system for Cal Fire's Firehawks.

"We're trying to reduce the maintenance cost, simplify the system, and make it much easier for their maintenance crews to work on the systems," said Sawyer.

"The goal right now is have this system ready for the 2019 fire season and we are seven weeks into the design phase, so we're on a very short timeline. We've been working diligently on the management side of the project to ensure we meet that deadline, and working very closely of course with United Rotorcraft and their team there so that we all meet at that deadline. Things are looking very good."

Finally, operators may also eventually see Kawak move into the firefighting bucket segment.

"We've been approached by quite a few customers over the last several years about producing a bucket solution," said Sawyer. "We're doing some investigation there at the moment and considering helping our customers out and potentially giving them some better, well supported solutions. We'll see where that goes."



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A Bell 412 operated by Wisk Air Helicopters demonstrates a water drop with its 375-gallon (1,420-liter) Simplex Belly Tank. The aircraft is one of three 412s in the operator's fleet, and is working on a major firefighting contract this summer.

A yellow and white Wisk Air helicopter is shown in flight against a clear blue sky. The helicopter is angled upwards and to the right, with its main rotor blades blurred from motion. The tail boom is prominent, featuring a blue stripe and a "DANGER" warning label. The background is a solid blue sky, with a hint of clouds visible in the bottom left corner.

BRINGING THE THUNDER

The recent growth at Wisk Air Helicopters, based in Thunder Bay, Ontario, is proving that there is reason for more than just optimism in the utility sector.

By Oliver Johnson | Photos by Mike Reyno



WATCH VIDEO



It's not been an easy time to be a utility helicopter operator over the last few years. While the helicopter industry as a whole has been affected by almost unprecedented economic headwinds, the decline of work and cuts in rates within the utility sector has been particularly devastating. But for those with an enterprising spirit, opportunities still exist; with new contracts in hand, fleets expanding, and rotor blades turning, there is more than just an air of optimism about the future at some operators — there is genuine excitement about the present. This is the atmosphere that pervades the offices and hangars of Wisk Air Helicopters in the Northwestern Ontario city of Thunder Bay.

Situated on the northwestern shore of Lake Superior — the largest of the Great Lakes — and surrounded by hundreds of kilometers of relative wilderness, numerous provincial parks, and thousands of lakes on its other three sides, Thunder Bay has the feel of a city on the frontier.

"The [feeling of] remoteness really goes from here to Churchill, [Manitoba,]" explained Wisk Air founder, president and operations manager Mark Wiskemann. "It's all boreal forest on Canadian shield, with rivers and rocks and waterfalls. That's all you see when you fly here."

As such, it's perhaps no surprise that Wisk Air's traditional workload was tied to natural resources exploration across the region, as well as supporting the remote northern communities, providing medevacs, firefighting, and constructing powerlines.

But while the former tasks provided the bulk of the company's work in its formative years, it's firefighting work and powerline construction that is allowing Wisk Air to expand its fleet and bolster its workload. Indeed, as *Vertical* arrived at the company's facility at Thunder Bay International Airport, one of the fleet's newest members — a Bell 412 — was getting ready



to depart for the start of a major new firefighting contract with the Ontario Ministry of Natural Resources and Forestry. The contract, which spans seven years with the option to extend a further year, is for two Bell 412s equipped with 375-gallon (1,420-liter) Simplex Belly Tanks for firefighting operations. The contract win was the reward for Wisk Air's thoroughly researched acquisition and customization of the medium-lift aircraft, which had represented something of a step into the unknown for the company back in 2014.

With the downturn in investment in natural resources exploration in Northern Ontario, the mining work that had traditionally represented a large percentage of the company's work had largely disappeared. With an almost complete lack of action at the hugely promising Ring of Fire chromite mining project in the James Bay Lowlands, Wisk Air needed new aircraft to maximize opportunities in other sectors.

1 // Wisk Air has a close-knit team of 22 core staff, including 10 pilots and eight aircraft maintenance engineers. The numbers grow during the busier summer months. Most staff members are long-time employees, giving the company a very familiar, family-like atmosphere. **2** // A Wisk Air Bell 206L and 407 in operation along the shores of Lake Superior — the largest of the Great Lakes. Wisk Air operates a fleet consisting entirely of Bell aircraft.





Firefighting work is typically performed by the company's Bell 412s, but it has a range of Bambi buckets to allow its entire fleet to fight wildfires when needed. Here, a Bell 407 fills a bucket in a river.

"We saw that we had to do something, so we looked to bigger aircraft, and we felt that the move towards twin-engine is an up-and-coming requirement," said Wiskemann. "We wanted to be at least on that curve or ahead of the curve, so we looked at the 412s because their capacity, reliability and speed performance. . . . Since then, we have been developing towards powerline construction, where the 412 really shines."

The move paid off quickly, and the aircraft proved so popular that Wisk Air has just added a third 412 to its fleet. And with the potential amount of powerline construction work needed to connect 22 communities to the grid in Northern Ontario—a project that began last year and is likely to last well into the 2020s — things are indeed looking bright for Wisk Air.

FROM LEASING TO OPERATING

Wiskemann established Wisk Air in 1984 as an investment while he was working as a base manager with Midwest Helicopters — a former operator in Thunder Bay. Building up to a fleet of three helicopters, Wiskemann bought and then leased out the aircraft to non-competing operators.

When Midwest Helicopters ended its operations in 1988, Wiskemann liquidized his small fleet of leased aircraft and established Wisk Air as an operator in its own right. He bought a single Bell 206B from Midwest to begin his company, and as Wisk Air established itself within the Thunder Bay region, the fleet gradually expanded to include two Bell 206L LongRangers.

In 2005, the company acquired its first Bell 407, and the aircraft was so successful in its role that Wisk Air quickly built up its fleet to include four of the type.

Today, in addition to the three Bell 412s, Wisk Air's fleet includes three 407s and two LongRangers, and its work takes it across



Canada — from the East Coast to the West Coast, up north to the Arctic, and down into the U.S.

The 407s spend most of their time with customers such as Hydro One (Ontario's largest electricity transmission and distribution company), Ontario Power Generation (OPG), and government entities in Ontario and other provinces.

The LongRangers are typically used for powerline and roadway environmental assessments, and reconnaissance work for woodlot allocations for forestry. One of the LongRangers is also equipped with floats for operations with various mining entities in Northwestern Ontario.

The 412s are all classic models with 1,800-shaft-horsepower Pratt & Whitney PT6T-3B engines and BLR Aerospace FastFin kits. They have been heavily customized to meet the operational requirements of many of the provincial firefighting agencies in Canada. This process has seen the aircraft extensively rewired, refinished, and made as light as possible (one ship, previously flying as an air medical aircraft in Colorado, had over 1,000 pounds of material removed). It was also important to install wire strike kits, high landing gear, and have the capacity to install water tanks — and the aircraft needed to be fast, with a relatively low noise profile, and be capable of performing a variety of missions.

"The Ontario, Alberta and B.C.

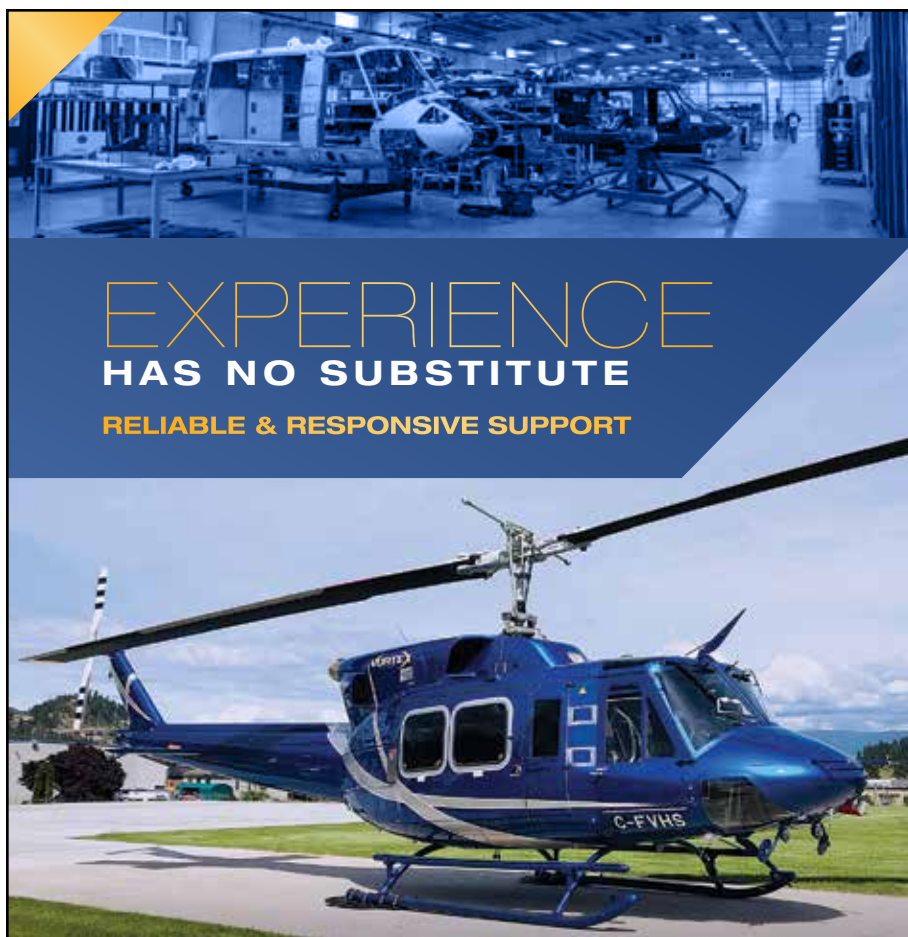
governments were very clear on what they were looking for," said Wiskemann.

Wisk Air acquired its first Bell 407 in 2005, and now has three of the type in its fleet. The aircraft typically perform powerline work — another growth area for the operator.

"We've really got a high-performance aircraft, and it delivers exactly what we expect and what we promise, so even though there are other 412s with bigger engines and more fuel tanks, the actual deliverables are quite similar if not better in this model."

The customized 412s have a maximum gross takeoff weight of 11,900 pounds (5,400 kilograms), a useful load of up to 4,500 pounds (2,040 kilograms), and can accommodate up to 14 passengers in their 220-cubic-foot cabins. With live GPS tracking, satellite phones, and high-visibility paint and rotor blades, the aircraft have all the elements required for safe wildfire operations.

"The 412 is working out really well for us," said Brock Yaskovitch, the company's training pilot. "The aircraft itself is fast, stable and strong; it's an amazing machine, truly. And




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they're still building them. These things are — in the medium world — state of the art."

With regards to the FastFin, Yaskovitch said the main benefit it provides is the reduction of stress on the tailboom.

"It's not necessarily about performance," he said. "I would say it has some extra performance, but it's more that, as an operator, if it's less stress on the aircraft, that's a plus — that pays for itself right there."

EXPERIENCED PERSONNEL

Wisk Air has a core staff of 22, including 10 pilots and eight aircraft maintenance engineers. Most of them are vastly experienced, and have been with the company for a number of years.

"We have a very steady roster," said Wiskemann. "Our guys have been with us anywhere from five to 20 years — and most of them for more than 10 years."

As for what leads to this type of loyalty, he said listening to his employees and valuing their participation is key.

"My philosophy is that if I engage the individual meaningfully and listen and heed what they offer, it just brings better performance," he said. "They know they're seen and heard, they know that they're valued, and they know that they are participating and guiding the successes of the company. And there's value in that in my opinion."

Wiskemann believes having long-term experienced staff presents a major marketing advantage, too.

"We can bring a repeatable product to our customers, and that seems to be wanted and is more welcome than aggressive pricing," said Wiskemann. "We look for fair remuneration for what we feel to be a high-end service."

Brock Yaskovitch has been a pilot at Wisk Air since 2009, and is one of several with more than 10,000 flight hours of experience.

"Everybody here has quite a bit of time, which is nice, and





2



4

1 // A Bell 407 holds a hover in front of the Kakabeka Falls near Thunder Bay, Ontario. Boreal forest with rivers, rocks and waterfalls cover much of the region. 2 // Wisk Air has a fleet of eight aircraft, including three Bell 412s, three 407s and two LongRangers. 3 // A 412 refills during wildfire training. The operator recently won a seven-year contract from the Ontario Ministry of Natural Resources and Forestry to provide firefighting support with two 412s. 4 // A Caribou wanders in front of one of Wisk Air's Bell 412s during winter operations. Northern Ontario can present some extremely cold conditions for the operator. **Wisk Air Helicopters Photo** 5 // Mark Wiskemann's two children work as junior pilots at the company, and are taking increasing responsibility to help take the company into the future.



Wisk Air's maintenance team performs all work on the aircraft except major overhauls, which are sent out to Standard Aero in Winnipeg, Manitoba, and AGO in Kingston, Ontario.



Wisk Air has eight full-time aircraft maintenance engineers. Over time, they have each developed their own area of specialization.

everybody is very well acquainted with a long line," he said.

The pilots generally work a 21-days-on, 10-days-off shift in the busier seasons, but there is flexibility in that, said Yaskovitch.

Being based in Northern Ontario, and with operations that take them into the Arctic, Wisk Air's aircraft and staff face some extreme winter temperatures. To help combat this, the aircraft have Tanis heaters to protect the most important components from the cold.

"We cover the aircraft, we provide a chase trailer for each aircraft, a ground crew, and then in more remote communities, we do as others do and either find hangarage through our fixed-wing brothers or we simply live outdoors," said Wiskemann.

Yaskovitch said the sheer diversity of the weather encountered in Thunder Bay is a challenge in itself.

"We get some pretty nasty weather because of the Great Lakes, with serious fog banks, freezing fog, and some pretty nasty storms," he said. "We get lots of coastal weather here — as Superior is a massive lake, it's no different to being on the coast somewhere. Winter operations are actually really nice here; when you do get the nice cold high pressures come in, it's beautiful, the aircraft perform amazingly — but you want to be well-prepared if you're going anywhere."

While it is headquartered in Thunder Bay, Wisk Air operates from bases across Canada, including Airdrie/Springbank, Alberta; Oliver, B.C.; Brandon, Manitoba; Red Lake, Ontario; and Goose Bay, Newfoundland and Labrador. According to Wiskemann, 35 percent of the company's work is now outside the borders of Ontario, and it has recently begun expanding into lidar and stereoscopic photography work south of the border in the U.S.

A good deal of the company's work inside Northern Ontario is on land owned by First Nations communities, so Wisk Air has spent a great amount of time and effort cultivating mutually



Longtime Wisk Air pilot Brock Yaskovitch flies one of the company's 407s over the Kaministiquia River near Thunder Bay. Yaskovitch said the region sees weather typical of coastal locations due to the sheer size of Lake Superior, with major fog banks and storms.

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beneficial working relationships with First Nations. It now has 19 agreements in place with various First Nations entities to allow it to do business in their traditional lands.

"We see the First Nations Community members to be the purveyors of the land, and with these agreements, we provide things like training and traditional flights and a small discount which allow them to do things like deploy community members for goose, caribou, and moose hunts," said Wiskemann. "For that, they allow us to do business, conduct training, and grow our business within their community's traditional lands."

A FLEXIBLE HANGAR

The company's home base consists of two hangars either side of a central office area. One hangar was on the site when Wisk Air moved in, and the second was an addition built in 2008.

"It's a bit of a unique setup, but it works really well," said Kevin Robins, the head of the maintenance department. "What we try to do is not to have any major projects in the new hangar and keep the serviceable aircraft in there — clean and ready to go — and we keep the major maintenance in the other hangar, where our sheet metal shop, tool crib, and everything else is."

Robins has been with Wisk Air since 2002. "It's a really well-oiled team," he said. "Everybody has been able to find what they're good at and naturally grow into a role that's really been able to suit them."

The team performs all maintenance required on the aircraft except the major overhauls, which are sent out to Standard Aero in Winnipeg, Manitoba, and AGO in Kingston, Ontario.

"We just finished the first major five-year inspection on a 412," said Robins. "That was a big job, but it was a great opportunity for everybody to get a forensic view of the 412s."

When on a contract, each 412 is accompanied by a trailer that contains a workspace and all the parts, spares and supplies the aircraft might need. For the LongRangers and 407s, each engineer carries their own personal aircraft support kit, which they are responsible to manage.

"The guys have their Pelican cases and their list of what they need in it, and when they come back they restock it," said Robins. "It is a good system."

The shift pattern generally sees the maintenance staff work a 20-days-on, 10-days-off rotation in the summer, and a five-days-on, two-days-off rotation in the quieter winter months.

Robins said the company has maintained a good relationship with nearby Confederation College (which offers training for aircraft maintenance engineers), so is never short of applicants for positions as it grows.

"We are pretty lucky with a college right here," he said. "So we get quite a few resumes, people are always stopping by, looking to get into it."

Among the more recent employees at Wisk Air are the next generation of Wiskemanns, with Mark's two adult children currently serving as the company's junior pilots, with 200 and 500 hours under their belts, respectively. Wiskemann said he feels confident for the company's success as they grow into their roles and take on an increasing amount of responsibility.

"I'm satisfied with what we have in front of us for the next eight years, and I think the work that we're doing in the powerline business is going to be the augmentation for our success into the future," he said.

That optimism is shared across the company. "We're really excited about the seven-year contracts, that's a huge difference, that's piece of mind; so having those aircraft committed for seven summers is huge," said Robins. "Last summer and over this winter, and moving into the summer, there's been a new feeling in the air. It feels like it did five or 10 years ago, when we were just getting rolling into a really busy time. It's kind of exciting; it's fun to be part of it."



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 oliver@mhmpub.com. Follow him on Twitter @orjohnson_



A Bell 407 and Bell 206L come into land at Wisk Air's Thunder Bay home base after a long day in the field.

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AGAINST ALL ODDS

Three years ago, flight nurse Dave Repsher was burned over 90 percent of his body in a post-crash fire. Now, he's finally ready to share his incredible story of survival and recovery.

By Elan Head

Photos courtesy of Amanda Repsher

Dave Repsher's memory of the accident is spotty.

It was Friday, July 3, 2015, the beginning of a Fourth of July weekend that had brought throngs of visitors to Summit County in the Colorado Rockies. The weather was promising, with a moderate breeze and scattered clouds in a sunny blue sky. For Repsher, a flight nurse with Flight For Life in Frisco, Colorado, it was simply another day at work. Nothing that happened that morning struck him as eventful.

Around 1:30 p.m. local time, Repsher strapped into the left aft seat of the Flight For Life helicopter, an Airbus H125, at the Summit Medical Center Heliport. Seated across from him in the cabin was flight nurse Matt Bowe; at the controls of the aircraft was pilot Pat Mahany. The three of them were headed just a short distance west to Gypsum to make an appearance at a Boy Scout camp. Because it wasn't a medical mission, "there was no urgency," Repsher recalled. "The takeoff — the run-up to it — nothing seemed out of the ordinary."

But at some point during or immediately after takeoff, Repsher realized that something was wrong. Surveillance camera footage of this moment shows the helicopter starting to turn counterclockwise as it lifts from the ground; the rotation continued as it rose higher in the air.

"Matt and I looked at each other, and he got on the intercom and asked Pat if we were OK, and we didn't hear any answer," Repsher said. "I was sitting in the left seat and I could see how hard Pat was working, and Matt and I looked back at each other and just cinched down our belts and hung on."

Dave and Amanda Repsher with their faithful companion, Turq. Dave has made an extraordinary recovery since sustaining near-fatal injuries in the 2015 crash of a Flight For Life helicopter. The Repshers now hope their story can inspire positive action on issues they're passionate about, including helicopter safety.





Dave Repsher lived an active lifestyle before the helicopter crash, having grown up with a passion for outdoor adventures. He was equally passionate about his work as a flight nurse. "It was very challenging and very rewarding," he said. "If I could go back to it I would."

A witness estimated that the aircraft reached a height of about 100 feet (30 meters) above the ground before it started to descend, still spinning. Thirty-two seconds after takeoff, the aircraft impacted a parking lot and recreational vehicle. Jet fuel spilled from the helicopter's ruptured fuel tank. In the surveillance video, the first flames of a post-crash fire are visible within seconds.

"I remember an impact," said Repsher. "I can't tell you anything about it." He doesn't remember being knocked out, but it's evident from the video that he must have been briefly unconscious. "My first memory was, it was like someone dumped a five-gallon bucket of cold liquid right over my shoulders. Maybe that's what woke me up, I don't know, but it felt like this big gush of fluid over me. And then there was fire."

Repsher didn't understand where he was, or what was happening to him. A door from the helicopter was lying on him; he pushed it off and began running, his flight suit drenched in fuel and on fire. "I didn't know where I was running to, I didn't know where anything

was, I was just gone," he recalled. "I took in a couple big breaths of smoke and flame. I remember a guy yelling at me to get down on the ground and roll. And I guess I rolled down a hill, and here's this poor guy, throwing dirt on me, trying to get the fire out."

Summit Medical Center personnel arrived and put Repsher on a scoop stretcher, then began running with him toward the emergency room (ER). He was still disoriented, but sufficiently aware by that point to know he was in bad shape.

"As they were taking me in, I told them they were going to have to intubate me, because I knew I took in that much smoke. I was starting to feel things at that point. I had my hands up in front of me as I was on the backboard and I could just see the skin sloughing off my hands."

Repsher was so badly burned that ER personnel struggled to find a place to insert an IV. "They eventually got the IV," he said. "I asked them to give me as much ketamine as they had. Before they did, I looked up at one of the nurses and said, 'Tell Amanda I love her.' I knew what was going to happen; I knew I was in trouble. Then it was black for five-and-a-half months."

A DEFINING MOMENT

That summer day was a turning point not only for Repsher, but for the entire helicopter industry. Horrific images of the accident and post-crash fire galvanized action around crash-resistant fuel systems (CRFS) in a way that decades of dry accident investigation reports had failed to do.

A few months after the crash, the Federal Aviation Administration convened a Rotorcraft Occupant Protection Working Group to study the regulatory loopholes that had allowed the Flight For Life H125 to be built without crash safety protections that had been mandated in 1989 and 1994 (see p.38, *Vertical 911, Winter 2018*). Meanwhile, Airbus Helicopters and Vector Aerospace (now StandardAero) began working on CRFS retrofit solutions for H125 and legacy AS350 series aircraft, and Airbus is now in the process of incorporating CRFS as standard equipment on all new H125s in the global fleet (see p.82).

Bowe survived the accident with serious injuries. Mahany died of blunt force trauma and thermal injuries a short time after the crash, and in the years since his widow, Karen, has become an outspoken advocate for crash safety (see p.44, *Vertical 911, Winter 2018*). Only recently, however, has Repsher been in a position to champion her efforts. His recovery from the accident, aided by his wife Amanda, has been a harrowing mental and physical journey; a medical saga that continues today, and will for the rest of his life.

It's not something that Repsher ever expected. A Summit County native, Repsher grew up with a passion for the outdoors that he supported through a career in emergency medical services (EMS). His first exposure to helicopters as a possible avenue for that career came when he was working ski patrol. He recalled being on the side of a mountain, "up to his neck" treating a patient, when an air ambulance arrived.

"Here come these people out of the helicopter, James Bond-esque, just cool, calm, collected, and they come grab your patient and fly away. It's just something that really impressed me, and something that I wanted to aspire to do possibly, someday."

The further Repsher progressed in his EMS career, the greater the draw became. He completed nursing school, which positioned him to join the Flight For Life team when an opening became available in 2012. Once he started, the job was everything he expected it to be. "It was the best job I ever had; I miss it today," he said. "Not to be arrogant, but I was very proud of what I was doing. To be able to serve the region is a great honor."

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Although Repsher was aware of the inherent risks involved in flying, he said he never perceived himself to be in danger.

"Right from day one, I felt there was an incredible culture of safety at Flight For Life," he recalled. "No corners were cut, when something was due it was done, when something didn't add up it was taken out of service, and choosing missions was the same way. If there was anything questionable, or if weather might be moving in, or if we might be able to make it one way and maybe not back, we didn't go. And I had absolute, 100 percent, total faith in all our pilots to make the right choices, like they always did."

Amanda — who is also a nurse and paramedic, although not a flight nurse — was a little more acutely aware of the risks, because one of her paramedic trainers had been killed in an air medical helicopter crash. But she and Dave took it for granted that he was safer in the air than on a ground ambulance. Amanda's work

involved extensive road travel, and "I told myself that statistically, like Dave said, I was more at risk driving around the state for my job than he was in a helicopter. But I guess maybe not."

'I KNEW'

Amanda and Dave have been together since 1999; like him, she is passionate about the outdoors, particularly river rafting. A few days before the accident, the Repshers had been on a rafting trip on the Middle Fork of the Salmon River in Idaho. "I remember thinking on the trip, 'Wow, this is one of my favorite river trips ever,'" she said. "We were just so lucky to have an amazing time."

On July 3, 2015, Amanda was still on her days off from work. She had gone to the gym and the grocery store and was sitting down to eat a sandwich when her phone rang. It was their friend George. "He said, 'Amanda, I heard that there was a helicopter that crashed in Frisco but that everybody walked away.'" He didn't tell her that it was the Flight For Life helicopter.

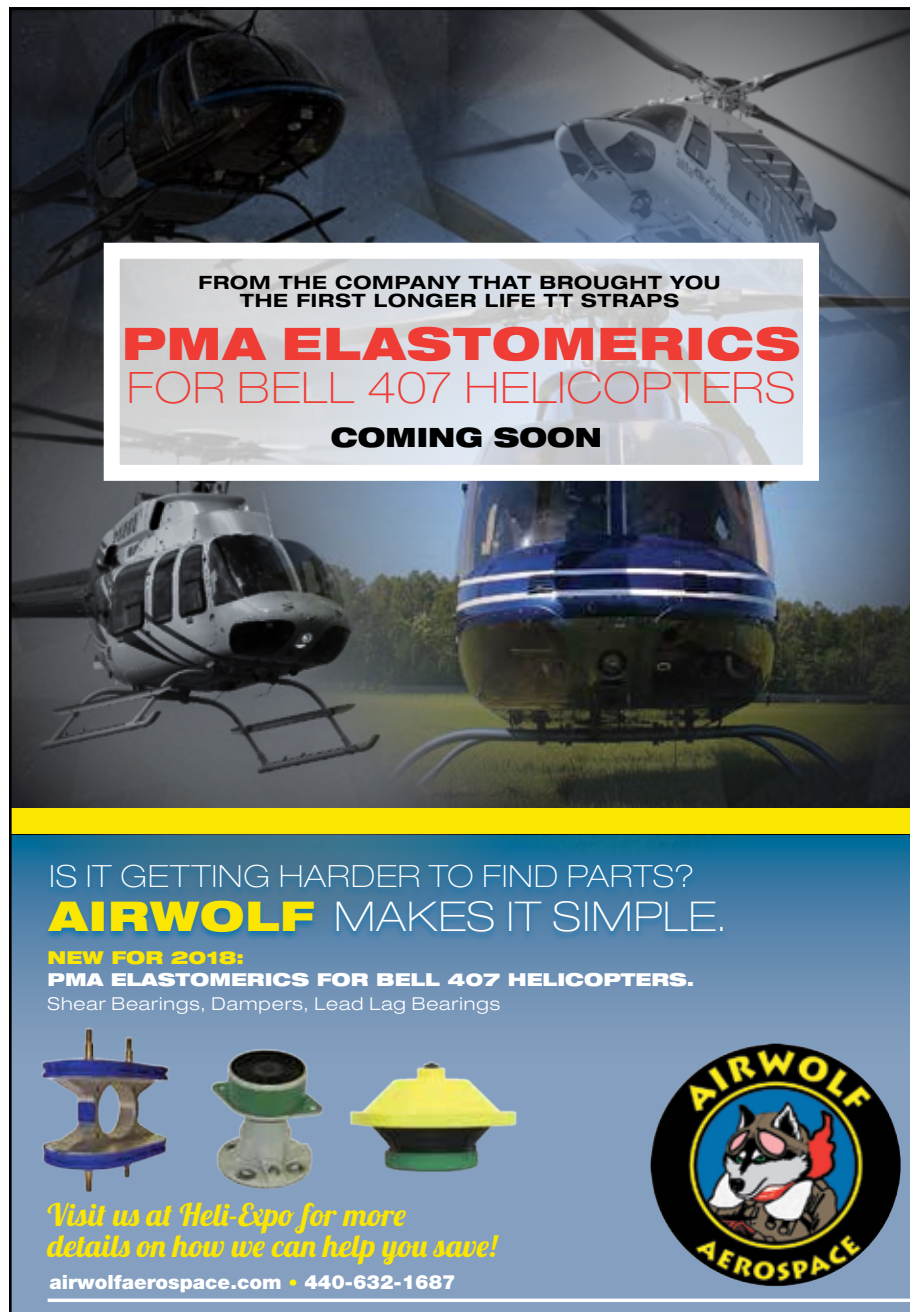
Amanda called Dave's cell phone. He didn't answer, but that wasn't unusual, since he often left his phone in his bag while at work. She called the nurses' office line at Flight For Life; there was no answer there, either. She was looking up the number for Flight For Life dispatch when her phone rang again — this time it was their friend T.R., who worked at Summit Medical Center.

"As soon as I saw his caller ID, I knew," Amanda said. "I picked up the phone and I said, 'You tell me now, what.' And he said, 'He's alive, we're intubating him now.' I just completely fell apart, I felt like I couldn't breathe, and I just said, 'You've got to get me to the hospital, now.'"

While the ambulance supervisor headed to the Repshers' house, Amanda called Dave's mother, Marilyn, and stepfather, Dave Raymond, who lived just a couple of miles away. They met her at her home and jumped in with the ambulance supervisor for the ride to the hospital. Summit County was bursting at the seams with people for the holiday weekend; traffic was excruciatingly slow. Finally, they arrived at the hospital, and Amanda ran into the ER.

"I got to Dave's room, and I took one look at him," she said, and paused. "I used to work at the burn center in the ER and I know what a 90 percent burn looks like when they first come in. And I took one look at him, and I knew. I looked at his hands and they were just so bad."

Another helicopter was already on its way to transport Dave to the University of Colorado Hospital in Aurora, just east of Denver. Amanda knew that she wouldn't be allowed to fly with him, but she had to ask anyway, because she feared he wouldn't survive much longer.



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"They got him all packaged up and we went to the helipad and loaded him in and it was starting to rain, and the winds were blowing," she recollected. "Peter the chief flight nurse was there holding onto me and I'm like, 'Peter, are we really putting him back in a helicopter right now?' But the whole time in my brain I knew that that was his only chance of survival, because he had to get to the burn center."

By the time Amanda arrived in Aurora a few hours later, Dave had been transferred to the burn center's "tub room," where the most severe burn victims have their wounds cleaned and treated. It can be a traumatic sight for loved ones to witness, which is why the tub room is generally off limits to them. But because of Amanda's background in critical care nursing, she was allowed in.

"Dave was back there for about four hours, and that's when they came up with the determination that he was 90 percent burned," she said. "When they first told us, I came out, I was outside with Marilyn when they first started estimating and we just grabbed each other and started crying. I just knew it was going to be against all odds for him to even make it through the night. But he did. And he's here."

DAY BY DAY

Amanda had no way of knowing it at the time, but Dave would be in the University Hospital for the next 397 days. She would be by his side every one of those days, not leaving even for her father's funeral.

Dave began talking on day 42 of his hospital stay, but not with conscious awareness. Amanda didn't know if he would ever truly "wake up," but she knew that she wanted to be there if he did.

"One of my biggest fears before him waking up [was] what he was going to feel like and what his perception would be," she said. "I talked to some other burn survivors. One had told me that his first recollection of the hospital was seeing someone cleaning his room, and I was like, 'That's not going to be Dave. When he wakes up, he's going to know that we're here, and we love him.'"

That moment finally happened on Dec. 14, 2015. "It was a bizarre thing," Dave recalled. "I describe it as like a camera shutter opening. For me it was just from black to light across the eyes, and I was awake."

"It was crazy," Amanda said. "I knew the second he woke up, because he looked me straight in the eye, and for five-and-a-half months he had not done that."

Even with Amanda at his side, the experience of waking up was terrifying for Dave. He had the perception that he couldn't move. He couldn't talk, because he had a tracheostomy, and the speaking valve was not on. "I was scared," he said. "I didn't know what to do. I knew I didn't want to be bedridden and unable to communicate. I wasn't sure I wanted to keep going on."

Eventually his speaking valve was attached, and he was able to voice a few

words. Within a few days, he was able to spend hours conversing with Amanda (as she put it, "We had a lot of catching up to do!"). But his progress from there was unsteady. He would battle septic shock for another four months, alternating between periods of clarity and disturbing hallucinations. During those times when he was conscious, he was often in excruciating pain.

"It came time to try to get up out of bed and move, and I can't begin to describe the amount of pain," he said. "The pain was so bad that you couldn't give medication for it, it wouldn't take the pain away, unless I was completely unconscious. [So] I'd do as much as I could until I literally couldn't stand any more, and I'd slump back in bed and sleep for a couple of hours."

Before the accident, Dave had been 180 pounds (82 kilograms) of muscle. In the burn unit, he wasted away to just 89 pounds (40 kilograms). His muscles had atrophied to the point that he had to



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re-learn the most basic physical tasks from the beginning, even swallowing. From the time of his first swallow evaluation, it was six months of daily swallowing exercises before he was allowed to eat.

"It was things like that in every dimension," Dave said, "every body system starting over to try to learn how to function again, and making a decision at that time, 'Can I go through life, do I want to go through life, knowing that I can never eat again? Can I go through life knowing that I may not be able to get out of bed, and I'm going to be 100 percent dependent for everything? Can I go through life in pain? Can I go through life not being able to get outside and do anything that I like to do?'"

Those are the decisions that faced him every day that he wasn't hallucinating. Somehow, he made the decision each day to keep going on.

"I don't recall it ever being a conscious decision, it was just something that I did," he said. "And honestly it had everything to do with Amanda. I wouldn't be here without her. . . . She brought me through."

FOCUSED ON THE FUTURE

Thirteen months after he was admitted to University Hospital, Repsher was discharged. But his medical ordeal was far from over. His health remained precarious, particularly because his intense antibiotics regimen had destroyed his kidneys. Five nights a week, Amanda, who had become his primary caregiver, administered dialysis at the small apartment she had rented for them close to the hospital in Aurora.

An acquaintance of Dave's mother named Matt Martinez had heard about Dave's ordeal and decided he wanted to help. He volunteered as a kidney donor; incredibly, he and Dave were a near-perfect match. In August 2017, Dave received the kidney transplant that gave him a new lease on life. These days, he is still in and out of the hospital with various complications and surgeries, but he is more active, and looking forward to the prospect of finally moving home to Summit County. He is humbled by Martinez's selfless act.

"The silver lining, or the outcome or the benefit of all this, is seeing the good side of humanity," Dave said. "Unfortunately it usually takes something tragic to get people together, but it's

been a really neat experience, a beautiful experience from our perspective, to just see what people can do for each other, and the impact that it makes."

The National Transportation Safety Board investigation into the Flight For Life accident highlighted issues with the design of the H125's dual hydraulic system, as well as the lack of a CRFS and crashworthy crew seats in the accident aircraft. Earlier this year, the Repshers received a \$100 million settlement from Airbus Helicopters and Air Methods, the operator of the helicopter.

According to Amanda, that staggering sum was largely determined by the severity of Dave's injuries, which have already resulted in \$20 million in medical bills, and may cost another \$40 million over his lifetime. But it has also given the Repshers the ability to establish a foundation that, in the future, will help them contribute to charitable causes including helicopter safety, organ donation, and supporting burn survivors.

"Dave can help, just be an inspiration to so many people," Amanda said. "When he was in the ICU, [a burn survivor] who was 87 percent burned would come in, and just seeing her was so amazing for me. I was like, 'It's possible.'"

Dave hopes that his story will help drive change in the helicopter industry, so that no one else will similarly suffer in a preventable post-crash fire. But he's trying not to dwell on the fact that his injuries were avoidable.

"I don't want to become angry, I don't want to be that person — it just doesn't serve anyone well, especially myself," he said. "I'd rather focus my energy on trying to improve things for the next person. If all of this just boils down to helping one other person walk away from something, then it's all worth it."

Inspired by Dave's approach, Amanda is taking a similarly forward-looking attitude.

"When you're blessed enough in this life to find someone that you want to share your life with, and have that true love and that partnership, and then to be given the gift to have it still after what we've gone through — you know it makes you just want to live life. And that's what it's about, to experience love and share love," she said.



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.



1 // The Repshers with Dave's kidney donor, Matt Martinez. "I wouldn't be here, especially in this condition, without him," Dave said. **2 //** This photograph was taken shortly before the accident, while the Repshers were on a rafting trip in Idaho. Even then, "we always tried to live each day like it was our last," Dave said. "And to get back to that, that's what it's all about. Just getting out there and having fun and being with fun people and always looking around that next corner for a new adventure."

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- John Mandernach, VP of Maintenance, Maverick Helicopters

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SPACE ROTORS

Vertical visits the Kennedy Space Center's helicopter unit to discover what role rotary-wing aircraft are playing at the dawn of a new space age.

By Kenneth I. Swartz



The sound of an approaching Bell UH-1H Huey II helicopter echoes across the John F. Kennedy Space Center (KSC). The blue and white helicopter is a veteran of the Vietnam War, but it now wears the colors of the National Aeronautics and Space Administration (NASA) and is used to support multiple missions at Kennedy's sprawling 220-square-mile (144,000-acre) spaceport on the north part of Merritt Island on the Atlantic coast of Florida.

The iconic center includes the massive Vehicle Assembly Building, Launch Control Center, Orbiter Processing Facility, Shuttle Landing Facility, Crawler Transporters and the historic Launch Pads 39A and 39B, where 11 manned Apollo and 135 Space Shuttle missions blasted into space. On July 8, 2011, the last Space Shuttle mission roared skyward, and the Kennedy Space Center fell silent as more than 10,000 NASA employees and contractors were made redundant.

But now, with an American space renaissance underway and more human spacecraft in development than at any time in history, Florida's historic launch pads are in the midst of a billion-dollar upgrade to accommodate a new generation of launch vehicles and spacecraft.

And supporting those operations and technical advancements in aeronautics across the U.S. is a fleet of 59 non-spacebound aircraft and four large unmanned aerial vehicles (UAVs) from seven major centers. The diverse fleet includes Cirrus SR22 and Cessna 206H light aircraft; Beech T-34C and King Air 200, de Havilland Twin Otter, Short C-23 Sherpa, Lockheed P-3C Orion and C-130H Hercules turboprops; Gulfstream III and Dassault HU-25C business jets; Douglas DC-8 and McDonnell Douglas C-9B jetliners; Northrop T-38, Lockheed ER-2, S-3A and Martin WB-57 military jets; and Bell UH-1H helicopters.

SPACE HERITAGE

NASA was born in 1958 to lead the American effort in the space race, after the Soviet Union gained an early advantage with the launch of Sputnik — the first manmade satellite — into orbit on Oct. 4, 1957.

The new entity combined the 8,000 employees of the National Advisory Committee for Aeronautics (NACA) and its leading labs (such as Langley and Ames) with America's top military rocket and space organizations and labs.

On May 5, 1961, the Mercury spacecraft Freedom 7 blasted off from Cape Canaveral carrying astronaut Alan Shepard Jr. — the first American in space — on a 15-minute suborbital flight, with both astronaut and capsule recovered by a Sikorsky HRS-1 (S-58) flown by Marine Air Group 26.

NASA built a new launch center at Merritt Island, north of Cape Canaveral, to accommodate the large and powerful Saturn V rockets required to send the Apollo spacecraft to the moon. On November 29, 1963, the center was renamed the Kennedy Space Center in honor of the 35th President of the United States who had just been assassinated.

Helicopter units belonging to the Department of Defense (primarily U.S. Air Force, U.S. Navy and U.S. Marine Corps) and the U.S. Coast Guard supported Mercury, Gemini and Apollo spacecraft launches and recoveries, and various contingencies.

NASA helicopters also played a small but significant role in the Apollo program. All mission commanders scheduled to fly the Lunar Module had to receive helicopter flight instruction before they could practice simulated moon landings in the Bell Aerosystems jet-powered Lunar Landing Research Vehicle. Bell 47Gs used for astronaut vertical flight training were based at Patrick Air Force Base, Florida, at Ellington Field near the Manned Spaceflight Center in Houston, Texas, and at NASA's Flight Research Center at Edwards AFB, California.



DOWNLOAD WALLPAPER

This helicopter view of Space Launch Complex 37 at Cape Canaveral Air Force Station in Florida shows the United Launch Alliance Delta IV Heavy rocket as it stands ready to boost NASA's Orion spacecraft on a 4.5-hour mission on Dec. 4, 2014. The liftoff was postponed because of an issue related to fill and drain valves on the Delta IV Heavy rocket that teams could not troubleshoot by the time the launch window expired. **NASA/Kim Shiflett Photo**



1



2



3

SHUTTLE ERA

In early 1980, NASA KSC Flight Operations acquired a fleet of Army surplus Bell UH-1 Huey helicopters to support the Space Shuttle program and conventional rocket launches from pads at Cape Canaveral.

NASA's shuttle fleet — Columbia, Challenger, Discovery, Atlantis and Endeavour — flew a total of 135 missions over 30 years. STS-1 launched on April 12, 1981, and STS-135 on July 8, 2011, with 78 flights also ending with a Kennedy landing.

NASA originally based the Hueys at Patrick AFB where they shared a hangar with modified Gulfstream II business jets that astronauts used to practice landing the shuttle "glider" on KSC's 15,000-foot long, 300-foot wide Shuttle Landing Facility.

Launch and landing incidents were the most feared mass casualty events during the shuttle era, but non-flight related incidents when maintaining or fuelling the shuttle were considered more probable. In the event of an emergency, NASA's rescue service vehicles included its own helicopters and Air Force Sikorsky HH-60G Pave Hawks operated by the 920th Rescue Wing at nearby Patrick AFB (see p.30, *Vertical 911*, Spring 2016).

Three Hueys — Search 1, Search 2, and Search 3 — were assigned specific roles during every shuttle launch, with a fourth Huey as backup.

Search 1 flew emergency response team (ERT) sharpshooters on security sweeps checking areas inaccessible to KSC's road and water patrols. On launch day, the armed Huey escorted the Astrovan that carried the Shuttle to launcher, then guarded the site on orbit right up to the moment the Shuttle's three engines and two solid booster rockets ignited with a deafening 7.8 million pounds of thrust.

Search 2 was on medevac alert at the Occupational Health Facility helipad with a flight surgeon and two paramedics ready to evacuate injured NASA workers and visitors to Florida hospitals.

Search 3 was based at a heliport next to the Shuttle pad with the crew on high alert to forcefully intercept any unwelcome land, sea or air intruders during the 72 hours prior to launch. This Huey was equipped with M240D machine guns mounted in each rear cabin door, and it departed the helipad 15 minutes before launch time to secure the site.

Prior to every launch, Air Force helicopters helped clear restricted areas offshore and were on standby to fly astronaut medevacs and search-and-rescue (SAR) for an aborted launch.

Shuttle landings were less intense, with two NASA UH-1s used to sweep runway approach routes in both directions and then on SAR standby in case the shuttle landed off runway or ran off the runway. If a landing accident occurred, Search 1 became the command and control aircraft for all KSC rescue assets.

Helicopter crews regularly practiced flying first responders to inaccessible areas and supporting the hazmat crews needed to contain the hazardous fluids and fuels found on the shuttle.

About a million spectators viewed the last three shuttle launches. The Hueys helped clear the large post-launch crowds by flying traffic officers from local sheriff's departments.

BRINGING IN THE HUEY IIs

The UH-1Bs were replaced by larger UH-1Hs in the early 1990s and by more powerful UH-1H Huey IIs in 2008, when NASA took delivery of three aircraft modified by US Helicopter (now Bell) at Blackwell Field Airport in Ozark, Alabama.

The mid-1970s era U.S. Army UH-1Hs received new commercial main and tail rotor hubs, blades components, and tail booms, combined with a 1,800-shaft-horsepower Honeywell T53-L-503 engine to provide increased hover performance in hot conditions.

1 // NASA Astronaut Alan B. Sheppard Jr. is hoisted up in a body harness by a U.S. Marine Corps helicopter recovery team following the first Project Mercury suborbital space flight. **NASA Photo** 2 // During an early morning training exercise for aircraft operations pilots at the Kennedy Space Center, a NASA UH-1 "Huey" helicopter flies past the Mobile Launcher that will be used for the agency's new Space Launch System rocket. The new launch vehicle will send humans to deep-space destinations such as a near-Earth asteroid or Mars. The center's helicopter operations support numerous missions at the multi-user spaceport. **NASA/Kim Shiflett Photo** 3 // Dave Ramsey, NASA KSC's chief of flight operations, performs a preflight before a mission. Ramsey joined NASA after spending 21 years in the U.S. Army. **Alan Walters Photo** 4 // A NASA Bell UH-1H Huey II flies past the historic Vehicle Assembly Building at the Kennedy Space Center in Florida. **Alan Walters Photo**

"The UH-1 Huey is the most versatile [helicopter] ever made, and there is no mission that our helicopters can't do," said Kevin Hurd, maintenance manager for NASA's helicopter unit.

The unit moved from Patrick Air Force Base to the Reusable Launch Vehicle building at the Shuttle Landing Facility, and today shares the hangar with Starfighters Inc., a Florida company that flies a growing fleet of supersonic Lockheed F-104 Starfighter jet fighters for flight research and suborbital payload work.

The helicopter operations and maintenance contract used to fall under NASA's large Institution Service Contract, but in October 2015 it became a separate \$7-million, five-year fixed-price contract managed by AECOM subsidiary URS Federal Technical Services Inc.

Today, NASA employs three helicopter pilots (the chief of ops, safety pilot and a pilot who divides their time between flight ops and UAS operations), a maintenance director, and contracts nine people, including three pilots, three mechanics, an inspector, and a stores man and administrator from URS.

All three NASA Huey IIs were upgraded in early 2016 by Sarasota Avionics in western Florida with a new touchscreen Garmin GTN 750 integrated GPS/NAV/COMM that will provide the NASA pilots with greater situational awareness and ensure the aircraft meets ADS-B requirements.

For the latest Huey II upgrade, the KSC drew on the technical aircraft expertise of the team at the Johnson Space Center in Houston to upgrade the helicopter cockpits with BAE lightweight, crashworthy pilot seats.

Kennedy's three Huey IIs perform security patrols, medical evacuation, wildfire firefighting, and assist environmental experts in keeping track of local wildlife at the Merritt Island National Wildlife Refuge. The aircraft fly about 300 hours a year.

"Our main helicopter mission, past and present, is flying security patrols of the Kennedy Space Center," explained Dave Ramsey, NASA KSC's chief of flight operations. Ramsey spent 21 years in the U.S. Army, mainly piloting, instructing and managing Boeing CH-47 Chinooks in Europe and Airbus UH-72 Lakotas and Sikorsky UH-60 Black Hawks at Fort Belvoir, Virginia. "Obviously working for NASA is a special honor. I grew up watching the Shuttle launches and I now find myself working alongside former Shuttle commanders."

For the security patrols, the unit flies with members of the site's large emergency response team, "who can provide a strong and highly visible armed year-round response to any potential intruders," said Ramsey.

When the shuttle program ended, the ERT shifted its training focus to workplace safety, and threats like active shooters, hostage takings or a terrorist.

Joint ERT training includes practicing a number of scenarios, including missions where team members perform fast-rope exits from the helicopter over land and hover jumps over the water. The NASA helicopters don't have hoists, but this equipment is on the unit's wish list.

In 2015, all the KSC helicopter pilots were qualified with night vision goggles (NVGs), increasing the unit's safety margins and allowing it to fly at night at altitudes of less than 500 feet.

The 140,000-acre Merritt Island National Wildlife Refuge overlaps with the Kennedy Space Center, and provides a wide variety of habitats hosting more than 1,500 species of plants and animals and 15 federally listed species. Part of the helicopter unit's remit is to support environmental operations in the refuge.

"Once a month we also fly scientists from the U.S. Fish and Wildlife Service to the Merritt Island National Wildlife Refuge, which overlaps with the space center, for wildlife surveys that include bald eagle, alligator, and manatee counts," said Ramsey, adding that "the flying is more intensive in nesting and migratory bird season."

Florida receives a lot of lightning strikes, and in 2000 the Hueys were equipped with SEI Bambi Buckets to fight fires for the U.S. Fish and Wildlife Service in the Refuge, as well as on NASA property.

As the helicopters are considered national assets, they have been tasked to respond to other natural disasters in Florida, such as hurricanes and wildfires.

EXPANDING MULTI-USER SPACEPORT

Prior to 2012, the Kennedy Space Center was fully dedicated to NASA programs, but was suffering from diminished government funding. A fresh approach was needed to transition Kennedy from a monolithic NASA facility to a multi-user spaceport, where private companies could develop innovative new launch systems more efficiently and affordably than a government bureaucracy.

Today, if you fly over the Space Coast in a Huey II, you will see nine launch pads — three at Kennedy and six at Cape Canaveral — being refurbished or used by NASA, the Department of Defense and commercial space companies for International Space Station (ISS) resupply missions, commercial satellite launch missions, and U.S. government science and national security missions.

In 2008, NASA contracted spacecraft developed by two private spaceflight firms — the SpaceX Dragon and Orbital ATK Cygnus — to fly low earth orbit cargo missions to the ISS.

Elon Musk's SpaceX leased Cape Canaveral's Launch Complex 40 and KSC's historic pad 39A, and in 2012 started flying cargo to the ISS using the Falcon 7 rocket and Dragon spacecraft, and Orbital ATK started cargo flights from Cape Canaveral and the Mid-Atlantic at Wallops Island, Virginia.



In January 2016, NASA contracted Sierra Nevada Corporation's Dream Chaser spaceplane to be a third cargo supplier to the ISS. The Dream Chaser glides back to Earth and lands on a runway like the NASA Space Shuttle. During early unmanned test flights, the Dream Chaser was hoisted aloft by an Erickson S-64 Airplane high above Edwards Air Force Base in California and released to glide back to the base runway. For the most recent glide test in 2017, the aircraft was dropped from a Columbia Helicopters 234.

NASA's Commercial Crew Program will soon see the resumption of manned space flight at Kennedy carrying astronauts to the International Space Station. These flights will be performed by the commercial SpaceX Dragon capsule and Falcon 9, and Boeing CST-100 capsule and Atlas V.

"We will be developing new security and medevac procedures as we get closer to commercial crew launches later this year," said Ramsey. "There will be a much more heightened ops tempo and full force training."

NASA expects that the launch companies will contract more helicopter time as human launches from American soil resume after seven years.

"We are happy to support any one of NASA's space partners," added Ramsey.

The private cargo and crew contracts allow NASA to concentrate its resources on the development of the Space Launch System (SLS) and Orion spacecraft, which are designed for long duration, deep space missions to near-Earth asteroids and Mars.

The first non-crewed launch of the SLS — named Exploration Mission-1 — is now expected in 2020.

Kennedy is also seeking new partners to use its 15,000-foot-long shuttle runway and restricted air space for spaceplane and unmanned aerial vehicle (UAV) flight testing.

ADVANCED FLIGHT RESEARCH

Over the years, NASA has operated a significant fleet of rotorcraft — including helicopters, tilt-wings and tiltrotors — and the achievements of its Langley Research Lab in Hampton, Virginia, were recognized by the Vertical Flight Society (formerly known as AHS International) in 2014, when it designated the lab a Vertical Flight Heritage Site.

Today, NASA has one Bell UH-1H based at Langley, which is currently inactive, but has been used for flight research projects and to support rocket launch activity at NASA's Wallops Flight Facility and the adjacent Mid-Atlantic Regional Spaceport at Wallops Island, Virginia.

The Langley UH-1H has also been used to flight-test NASA's Autonomous Landing Hazard Avoidance System (ALHAT), which will allow spacecraft to automatically land, precisely and safely, on the surface of another planet.



The self-contained ALHAT system was attached to the belly of the high-skid UH-1H and flown over test areas at Langley and Kennedy, where it analyzed terrain data acquired by three different laser sensors — a flash lidar, Doppler lidar, and high altitude laser altimeter — to determine the most suitable and safe landing sites.

NASA believes helicopters can also use the ALHAT to automatically land safely in low visibility conditions, such as brownouts.

And on May 11, 2018, NASA announced that it will develop a small unmanned helicopter to explore the surface of Mars.

"The Mars Helicopter, a small, autonomous rotorcraft, will travel with the agency's Mars 2020 rover mission, currently scheduled to launch in July 2020, to demonstrate the viability and potential of heavier-than-air vehicles on the Red Planet," said NASA.

The Mars Helicopter project started in August 2013 as a technology development project at NASA's Jet Propulsion Laboratory. The result of the team's four years of design, testing and redesign weighs in at a little under four pounds (1.8 kilograms). Its fuselage is about the size of a softball, and its twin, counter-rotating blades will bite into the thin Martian atmosphere at almost 3,000 rpm — about 10 times the rate of a helicopter on Earth. Mars 2020 will launch on a United Launch Alliance Atlas V rocket from Space Launch Complex 41 at Cape Canaveral Air Force Station in Florida, and is expected to reach Mars in February 2021.

At the Kennedy Space Center two modes of vertical flight — helicopters and rockets — have shared the airspace for more than 35 years. The evolution of the site into a multi-user spaceport will require the continual support of helicopters in the decades to come.



Ken Swartz | Ken has spent most of his career in international marketing and PR with commercial aircraft manufacturers, airlines and helicopter charter operators. An award-winning aviation journalist, he runs Aeromedia Communications, and can be reached at kennethswartz@me.com.



NASA's Bell UH-1s supported the launch of 135 Space Shuttle missions from Kennedy Space Center over 30 years. Some Shuttles returned to KSC on top of a converted NASA Boeing 747. **NASA Photo**

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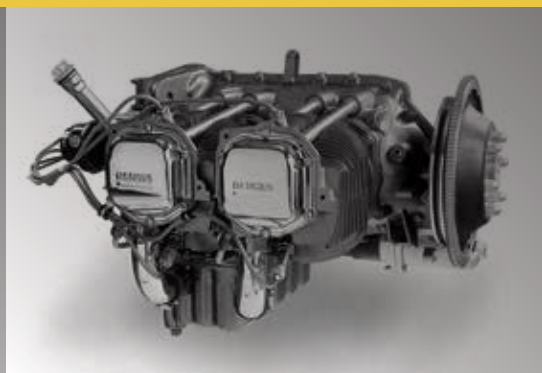
Vertical 2018

HELICOPTER & ENGINE

MANUFACTURERS SURVEY

Nearly 1,000 members of the helicopter industry took part in our fourth annual industry survey, which this year combined our airframe and engine surveys. Here's what they told us.

By Elan Head | Data Analysis by PMG Intelligence





When we made the decision to combine our Helicopter Manufacturers Survey and

Helicopter Engine Survey earlier this year, we weren't sure what to expect. We know our readers value their time, and worried that requesting them to complete two lengthy surveys might be too much to ask. But we also know that engine performance and reliability are key to helicopter operators' overall satisfaction — and hoped that while they were telling us about their airframes, they'd want to tell us about their engines, too.

We weren't disappointed. Nearly 1,000 members of the helicopter industry completed our Helicopter Manufacturers Survey, our Helicopter Engine Survey, or both this year, with more than 1,500 surveys completed in total. Not only did our respondents take the time to score the original equipment manufacturers (OEMs) on a range of measures, they also provided detailed comments to help us understand why they evaluated the OEMs the way they did.

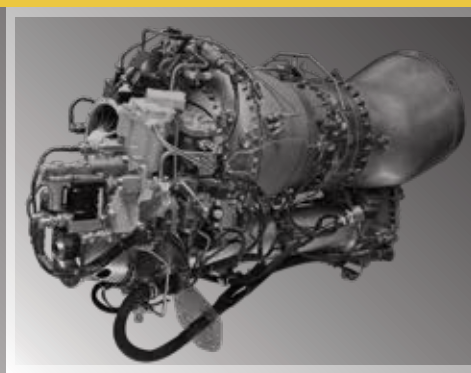
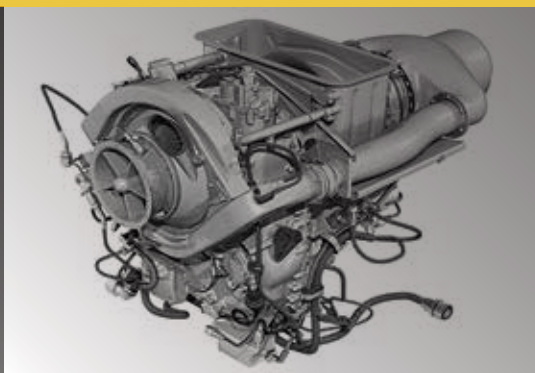
There were some shakeups this year. Notably, while Bell performed well in our survey, it did not dominate the rankings as it has in years past. This year, that honor went to Robinson Helicopter Company, which over the past several surveys has consistently improved on an already solid foundation of customer support. Meanwhile, our results

indicated that Airbus Helicopters and Sikorsky have largely preserved the gains they've made in customer support, while Leonardo Helicopters and MD Helicopters, Inc., have seen some declines in customer satisfaction over the past year.

On the engine side of the house, Pratt & Whitney Canada ranked first in overall satisfaction, consistent with its strong performance in our debut Helicopter Engine Survey in 2016 (we skipped the survey last year in order to align its schedule with our Helicopter Manufacturers Survey). In a close battle for second place were Safran Helicopter Engines and GE Aviation. The latter is new to our survey this year — while GE did not receive enough evaluations in our debut survey to qualify for ranking, this year fully 80 respondents completed evaluations of GE engines.

To conduct our 2018 survey, we once again partnered with the independent research firm PMG Intelligence, to ensure that our data collection and analysis met industry best practices. *(For more details on our survey methodology, see p.105.)* Then, after receiving the results from PMG, we asked each OEM to comment on its performance in the survey, and on its customers' most frequent complaints.

As usual, we'd like to express our appreciation not only to everyone who completed the survey, but also to the OEMs who took the time to listen and respond to their customers' concerns. Every year, we ask the OEMs some tough questions, and they put considerable time and effort into composing thoughtful replies. It is our hope that this critical feedback will continue to make the industry better and safer — which is why we look forward to repeating our surveys in 2019.



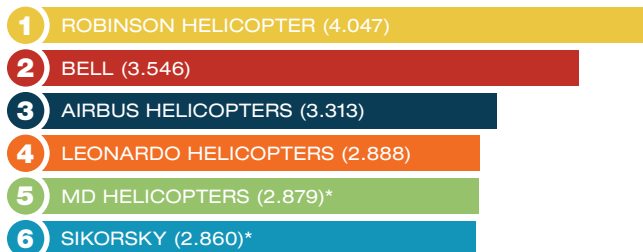
*TO QUALIFY FOR RANKING IN A SECTOR, AN OEM NEEDED MORE THAN 10 RESPONSES IN THAT SECTOR. ASTERISKS INDICATE THAT THE OEM REPRESENTED LESS THAN 10 PERCENT OF THE RESPONSES FOR THAT SECTOR.

Airframe results by sector

AIRBORNE LAW



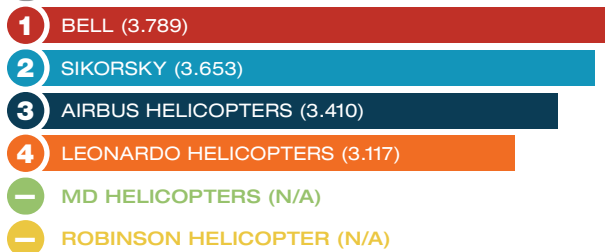
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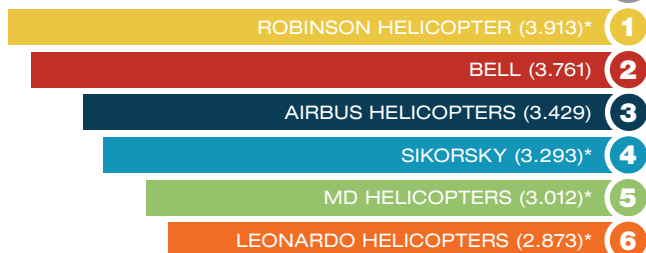
CORPORATE



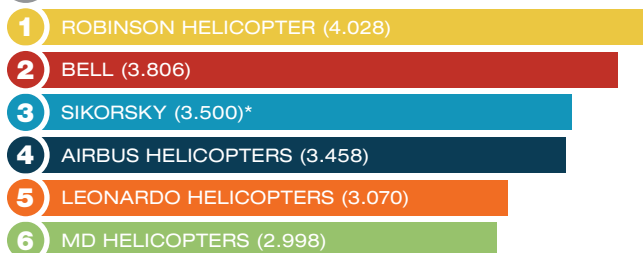
OFFSHORE



FIREFIGHTING



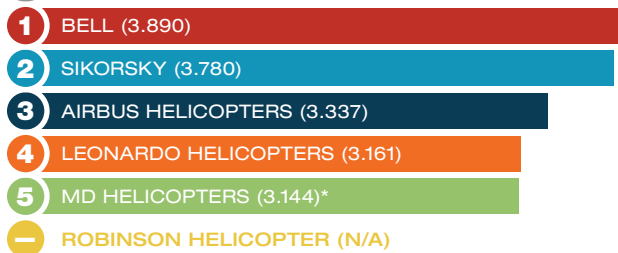
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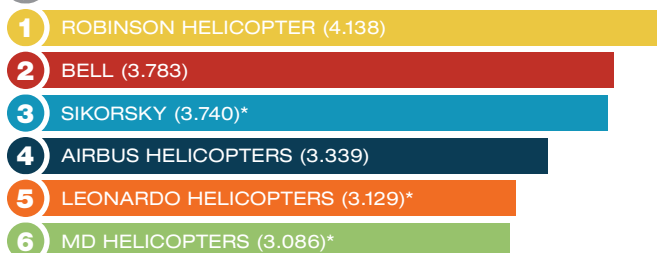
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Airbus Helicopters

Compared to last year's survey, Airbus Helicopters saw slight declines in its scores across the board, although none of these drops were statistically significant. The two complaints we heard most frequently from commenters related to the **cost of parts** and the quality of **technical publications** — the latter being a consistent weak spot for the company.

While there's evidently still room for improvement on these measures, Airbus told us that it has, in fact, been making progress on both. "Airbus Helicopters has been working to reduce parts prices since 2015 and has now reduced the prices of 25,000 parts," the company said. "We have achieved up to 84 percent reduction on some filters and up to 40 percent reduction on selected parts for key families such as actuators, electrical equipment, pumps, navigation equipment, and valves. The customers who buy most of their parts directly from Airbus Helicopters will benefit the most from these price reductions."

Meanwhile, with respect to tech pubs, Airbus said that it continues to address TechData portal accessibility, user-friendliness, and completeness through a transformation project it launched in 2015. "Since then, we have introduced our ORION viewer ePortal to provide our technical documentation online with dedicated apps and operating systems/browser," the company said. "We have also improved the connectivity performance on our multiple servers based on rigorous monitoring. We have improved the user-friendliness of our TechData to allow filtering by maintenance inspections. We have also reinforced the

TechData completeness at aircraft delivery especially regarding the maintenance manual. And we will continue to do this for the illustrated part catalogue over the next two years."

Airbus told us that many more improvements are planned in the area of TechData to enhance maintenance operations and efficiency, adding, "Our latest survey results indicate that customer satisfaction has improved in this area and that we are on the right track."

As in previous years, our respondents had good things to say about the performance and versatility of the H125/AS350 series, the workhorse of Airbus' light product line. However, several commenters noted that **the H125 has recently been losing contracts** to the Eagle 407HP, due to performance differences that may be more pronounced on paper than reality. As one put it, "I would like to see Airbus work to increase the performance limits for the aircraft to be competitive, through the use of enhanced charts based on power check values, as Bell has done."

Airbus said that it is aware of this customer feedback, and promised, "we will keep improving the H125 — as we have been doing until today — to provide the best product to our customers." In the meantime, the company emphasized that H125 performance figures are not subject to any operational restrictions such as wind limitations, contending that "the H125 offers today by far the best performance/acquisition price/operating cost ratios on the market."

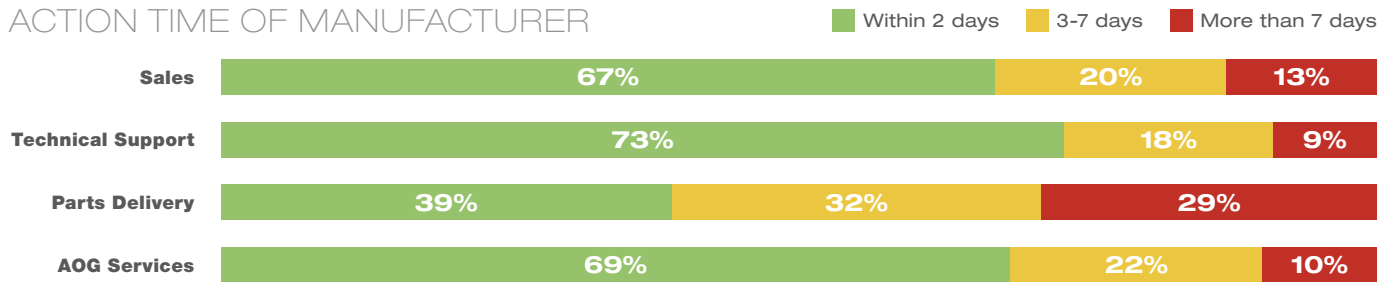
The other requests we heard related to the H125/AS350 series were for increased availability of **crash-resistant fuel systems** (CRFS), and help in paying for CRFS retrofits. Airbus,

Anthony Pecchi Photo

"AIRBUS HELICOPTERS HAS MADE HUGE STEPS FORWARD WITH THEIR ENTIRE SUPPORT PROGRAM. THEY'VE BECOME A GENUINE PLAYER WITH THEIR PRODUCT SUPPORT. STILL ROOM FOR IMPROVEMENT."



ACTION TIME OF MANUFACTURER



TOTALS MAY NOT EQUAL 100 PERCENT DUE TO ROUNDING ERRORS.

which has made rupture-resistant fuel tanks standard on all light helicopters manufactured in the U.S. since 2016, said it is now in the process of incorporating CRFS as standard equipment on all new H125s in the global fleet.

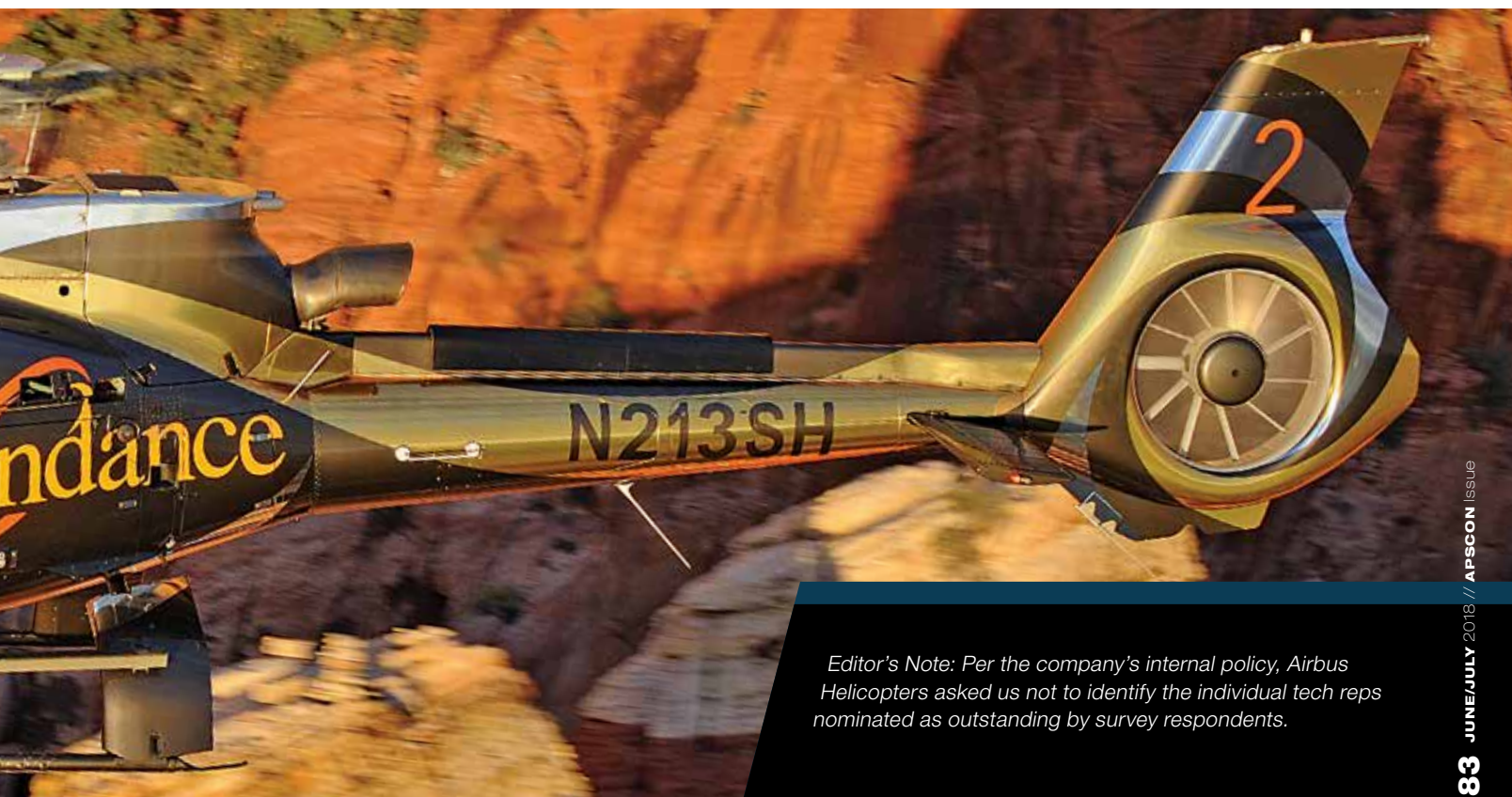
"For all customers operating any H125/AS350/EC130B4 model that is not currently fitted with a CRFS, there exists a retrofit solution between the Airbus CRFS retrofit kit and the StandardAero (formerly Vector Aerospace) CRFS STC kit. We are working closely with our vendors and with StandardAero to ensure the necessary availability of these kits to fit customer demand," the company said, adding, "Airbus is offering its retrofit kit at aftermarket production cost (meaning no profit) in order to facilitate our customers in fitting this solution onto their fleet."

Meanwhile, a few respondents mentioned **teething problems with the H175**, including out-of-service time due to the gearbox overhaul interval. Airbus told us that the H175 fleet has now logged more than 25,000 flight hours since its entry into service, and that it is using the in-service experience of its customers to drive maintenance improvement initiatives to increase fleet availability.

"Almost all of our customers are covered by HCare PBH [Parts by the Hour] contracts ensuring a reactive replacement of any parts requiring repair or overhaul," Airbus told us. "We are working actively on the maturity program of the platform to extend overhaul intervals and address unscheduled maintenance drivers. Design improvements are on the way and solutions will arrive in the next 12 months."

Finally, while the gearbox problems that grounded the H225 were not the acute concern that they were for many of our respondents last year, several commenters expressed continued dissatisfaction with the company's **support for the H225 community**. Airbus told us that the model's return to service has now been approved by all civil and military regulators worldwide, and that more than 150 H225/225M helicopters are once again flying.

"Airbus is supporting all of its customers according to their individual needs," the company said. "The H225 continues to be a reliable workhorse with unrivaled mission capabilities. We are offering a full range of upgrades to allow our customers to have the right aircraft for their mission."



Editor's Note: Per the company's internal policy, Airbus Helicopters asked us not to identify the individual tech reps nominated as outstanding by survey respondents.



Bell

As usual, Bell had a very strong showing in our survey this year, and while it saw lower scores in some measures, none of these declines were statistically significant. However, for the first time it did not dominate customer satisfaction in our survey, ceding that honor to Robinson Helicopter Company, which recorded significant improvements across a number of measures.

For many of Bell's customers, Robinson does not manufacture

“CSF [CUSTOMER SERVICE FACILITY] NETWORK IS VERY STRONG, ALTHOUGH BELL HAS STARTED TO ADD MANY CONSTRAINTS TO THEIR APPROVED CSF NETWORK THAT ARE NOT SUPPORTIVE OF THE END OPERATOR.”

a helicopter that meets their mission requirements, so this development is unlikely to shake their opinion of Bell as the best in the business. However, it was clear to us that there is growing unrest in Bell's customer ranks, much of that related to Bell's **decision to limit part sales** to owners and authorized customer service facilities only.

Last year, a number of commenters voiced concerns about this policy, with one describing it as “a HUGE MISTAKE.” This year, we received many more negative comments on the policy. As one respondent put it, “Bell contracting the sale of parts to owner or

operators only is foolish. I used a part 145 repair station with a 25-year proven track record for major inspections and they can no longer order my parts? Operating Bell products is becoming a chore when compared to other OEMs.”

Bell told us last year that the decision to limit part sales was motivated by safety concerns, as “it is important to the integrity and quality of our aircraft that all repair and overhaul is performed by certified customer service facilities.” However, some respondents this year suggested that the new policy could actually have an adverse impact on safety. Wrote one, “The issue of spares having to be ordered and invoiced direct to customers now also opens the door for some owners to bypass approved maintenance facilities and fit items by themselves or ‘white van people’ and risk the problem of catastrophic incidents.”

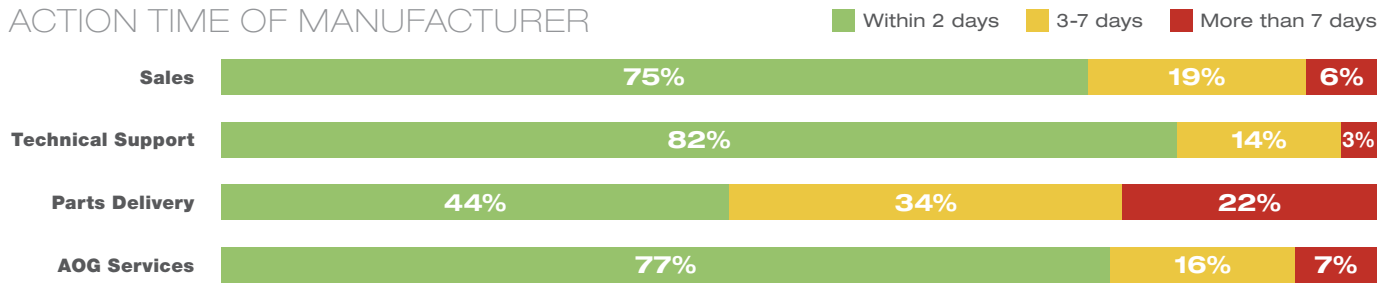
Bell wants customers to know that it hears their concerns.

“At Bell, delivering an exceptional experience to our customers is a top priority,” the company told us. “We value this input, we have been listening, and are exploring new ways to make our services better. We have recently realigned our Commercial Business organization to provide our customers with a more focused and robust support and services experience around the world. Based on the survey feedback and other customer input, we are evaluating our policies to address areas of concern in parts distribution and better ways to provide customer service. In the next few months, you can



Anthony Pecchi Photo

ACTION TIME OF MANUFACTURER



TOTALS MAY NOT EQUAL 100 PERCENT DUE TO ROUNDING ERRORS.

expect to see several new aftermarket initiatives including technology enhancements, with a dedicated customer portal that will service our customers throughout the entire lifecycle of their aircraft."

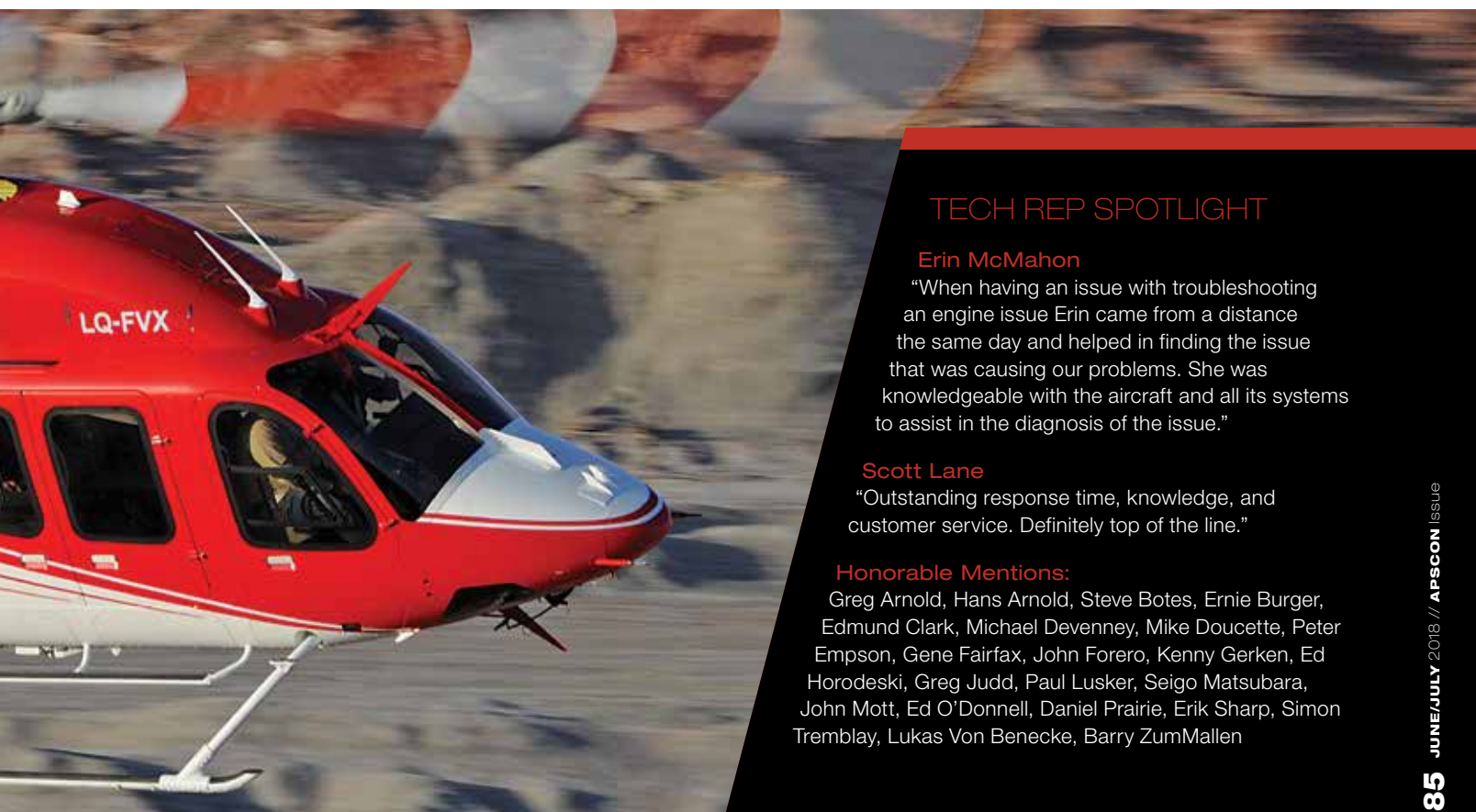
With respect to the safety concerns raised by commenters, the company said, "Bell policy changes were intended to ensure customers received Bell qualified parts but may have resulted in unintended consequences. We are receptive to this feedback and will evaluate our policies to determine how we can best serve our customers around the world while maintaining the highest safety standards. Our maintenance manuals are available to Bell operators and maintainers to ensure safe and approved maintenance practices are followed."

Another complaint we heard from respondents related to the **cost of parts**, although Bell scored better on this measure than any OEM except Robinson. Bell told us that keeping its customers flying is a top priority for the company as it brings new aircraft to market; to address this, its price point for in-production aircraft parts has remained flat.

"For customers operating legacy aircraft, we also continue to supply parts," Bell added. "However, despite our best efforts, some parts for out-of-production models are seeing an increase in price due to the limited volume of demand."

Operators of Bell **legacy aircraft** also voiced particular concerns this year with respect to **parts availability**. Bell told us, "We are working to address this concern and have launched Customer Advantage Plans (CAP) for the Bell 206B and Bell 212. . . . In the next few months, you can expect to see several new aftermarket initiatives that will address our parts distribution to improve availability."

Summing up, the company said, "Bell values our reputation in providing customers with the best in aftermarket support and have not taken our historical ranking for granted. We have acted swiftly to reshape our Commercial Business organization to ensure that we deliver an improved customer experience moving forward. We value our customers and will utilize their feedback to develop a better way to provide customer support and services including revised policies."



TECH REP SPOTLIGHT

Erin McMahon

"When having an issue with troubleshooting an engine issue Erin came from a distance the same day and helped in finding the issue that was causing our problems. She was knowledgeable with the aircraft and all its systems to assist in the diagnosis of the issue."

Scott Lane

"Outstanding response time, knowledge, and customer service. Definitely top of the line."

Honorable Mentions:

Greg Arnold, Hans Arnold, Steve Botes, Ernie Burger, Edmund Clark, Michael Devenney, Mike Doucette, Peter Empson, Gene Fairfax, John Forero, Kenny Gerken, Ed Horodeski, Greg Judd, Paul Lusker, Seigo Matsubara, John Mott, Ed O'Donnell, Daniel Prairie, Erik Sharp, Simon Tremblay, Lukas Von Benecke, Barry ZumMallen



Leonardo Helicopters

In recent years, Leonardo Helicopters (formerly known as AgustaWestland) has been a leader in bringing new products to market, including the new-generation AW189 and AW169, which build on the considerable success of the AW139. For the most part, Leonardo's customers are enthusiastic about their helicopters — they just wish the company was better at keeping

“LEONARDO MAKES A GREAT PRODUCT, IT WOULD BE NICE IF THEY OPENED UP THEIR SUPPORT NETWORK AND MADE SERVICING AND PARTS AVAILABILITY BETTER.”

them flying. As one survey respondent put it, “The AW169/AW139/ AW189 aircraft are all best in class from a product performance perspective. It's a pity that Leonardo doesn't take better care of their customers from an after-sales perspective.”

Leonardo has consistently struggled in our survey, and this year was no exception. In fact, compared to 2016, the company saw statistically significant declines in areas including parts availability, cost of parts, speed of service response time, technical publications, overall service and airframe/product satisfaction, and commitment to product improvement.

For many of our respondents, **parts availability** was of particular concern. “Shipping parts from Italy that Philadelphia should have in stock is expensive and takes approximately two weeks, not good if you are AOG [aircraft on ground],” wrote one. Commented another, “Regular use parts availability needs to be improved. Should not need to go AOG for parts that only last 200 to 400 hours!”

According to Leonardo, “Large investments have been launched in mid-2017 to fulfill customers' operational requirements in terms of supply chain to increase the level of support worldwide; benefits will be seen during 2018 even if in some cases the improvement has been recognized.”

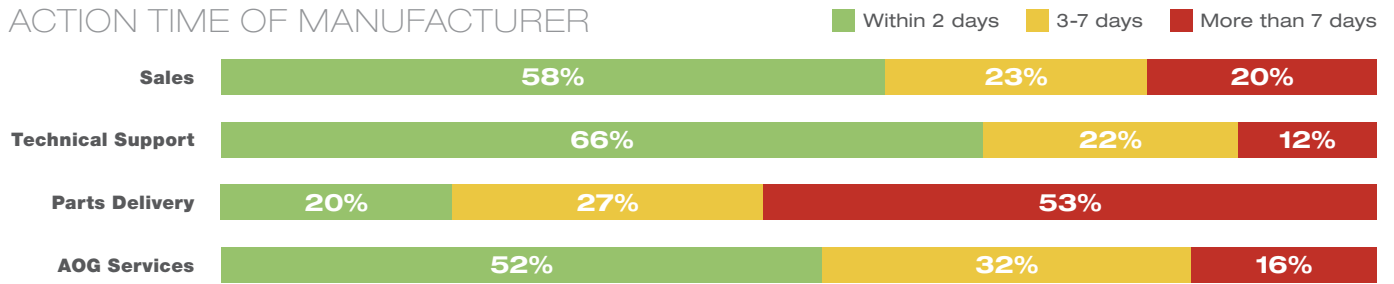
As an example, Leonardo said, the supply of AW189 parts almost tripled during 2017 and will see an additional increase of 30 percent this year. All of the company's logistics hubs will benefit from this increase to ensure proper fleet support worldwide. Leonardo also reported that it has improved AOG response times, and is targeting a further increase in the speed of service.

“It is a fact that Leonardo Helicopters has had a great increase in the fleet in the past years, for which the aftermarket had to follow with increased investments [to] guarantee proper level of support,” the company told us. “The AW139 helicopter is now considered the best-seller that set the standard, and with the investments made in the past years, today customers are seeing a reliable platform with available spares network and technical support worldwide.”



Anthony Pecchi Photo

ACTION TIME OF MANUFACTURER



TOTALS MAY NOT EQUAL 100 PERCENT DUE TO ROUNDING ERRORS.

Leonardo said that it has launched a similar effort for its new AW189 and AW169 platforms, making a dedicated support package — including network technical services and onsite spares from day one — available to these customers to facilitate their entries into service. “Today, the AW Family Products score more than 95 percent of aircraft dispatch availability, which we aim to increase with a new spares service policy that will be published to customers within 2018 in parallel to the increased investments that will make this possible,” the company said.

Quality control has been an issue for Leonardo in previous years, and a number of our respondents mentioned it again this year; as one remarked, “Product quality control needs to improve greatly.” Leonardo told us that it is putting increased effort into managing industrial quality control as part of a reorganization that occurred at the end of last year, “which is focusing more and more on delivering what is promised with the right level of quality.” The company said that a new quality system has been

functioning since early 2018, “with integrated feedback exchange between the customer (via Customer Support & Services) and manufacturing plants that is aimed at transforming real cases into a system fix to prevent them from happening again — this in addition to the integrated production and quality structures with shared objectives.”

Several of our respondents suggested that Leonardo **open up the aftermarket** for maintenance, repair, and overhaul (MRO) in North America, so we asked the company if this is something they’re considering.

“The company is considering [opening] the aftermarket (in North America but not limited to) on MRO if beneficial in enhancing customer experience in terms of support responsiveness, performance, quality, and costs,” the company said. “As an example, several collaborations have been launched with different partners in that respect, starting from a network of authorized repair centers for ‘make’ components like blades or transmissions.”



TECH REP SPOTLIGHT

Curtis Sutton

“Day or night, Curtis is always available to assist with any issue our operation comes across. He is truly valuable to Leonardo and our operation.”

Terry Ward

“Dedicated and follows up on everything we ask.”

Honorable Mentions:

Philip Camacho (customer support manager Central America); Marco Maltagliati (customer support regional manager Europe); Silvano Manenti; Roberto Molinari (AW109/119 product support engineering); Tetsuji Ogawa; Fabrizio Tenardi; Kane Tolhoek (international government sales); Arnaldo Regagioli (customer support manager Global Operators Europe)



MD Helicopters

MD Helicopters, Inc. (MDHI) had a relatively poor showing in our debut survey in 2015, but made significant gains in customer satisfaction in the subsequent two years. This year, however, the company struggled. MDHI saw statistically significant declines in its scores in a number of areas, including parts availability, responsiveness of service representatives, satisfaction with authorized service centers, quality of technical publications, quality of pilot and maintenance training provided, and overall service satisfaction.

One particular area of concern for many of our respondents was MDHI's **decision to bring overhauls in house** for main rotor transmissions of its single-engine aircraft. Last year, commenters expressed the worry that MDHI might not be able to keep up with demand for these overhauls. This year, their fears appear to have been realized. As one put it, "Overhaul prices and availability of the main rotor transmissions is very alarming."

Despite customer complaints, MDHI is standing firm on its decision to require these overhauls to be performed at the factory, emphasizing that the move was driven by safety concerns. Nick Nenadovic, the company's vice president of Aftermarket and Customer Support, explained, "The decision to remove single-engine transmission overhaul procedures from the Component Overhaul Manual (COM-5 manual) and bring these services in-house came after a joint review with the FAA [Federal Aviation Administration] of several reports submitted through the MDHI Service Operation Report of cracked ring gears in overhauled transmissions, and many near-catastrophic failures from the field. It was determined that transmission overhauls were not being performed in accordance with our COM-5 manual; without the use of a suitable test stand and without the performance of gear pattern checks.

"These practices put pilots and passengers at risk. As safety and correct maintenance practices is something our team takes great pride in, we were essentially forced to bring single-engine transmission overhauls in house in order to ensure the provision of [a] safe, reliable, effective product to the operator."

Nenadovic said that the lead time of an overhauled main rotor hub is typically 60 days, not the 400 days cited by one of our respondents. "Of course, there may be extenuating circumstances that preclude our part 145 facility to complete an overhaul within this timeframe," he noted. "When such an issue occurs, those particular circumstances are communicated with our customers immediately."

As for the cost of the overhauls, he said, "Rotorcraft ownership is expensive. There is no way around that. The price of main rotor transmission overhauls and exchanges for MDHI airframes has not increased in nearly five years. In fact, prices were reduced 13 percent and 35 percent respectively over the past two years as we negotiated favorable supply agreements and improved our processes.

"As we continue to bring on more experienced personnel, institute new and refined processes, and retain our tenured, thoroughly trained employees, MDHI will continue to reduce turnaround time and cost for component overhauls completed in house."

One of our respondents expressed interest in MDHI offering an **hourly support product** to make it easier to plan and budget for maintenance; according to Nenadovic, MDHI is currently discussing that possibility.

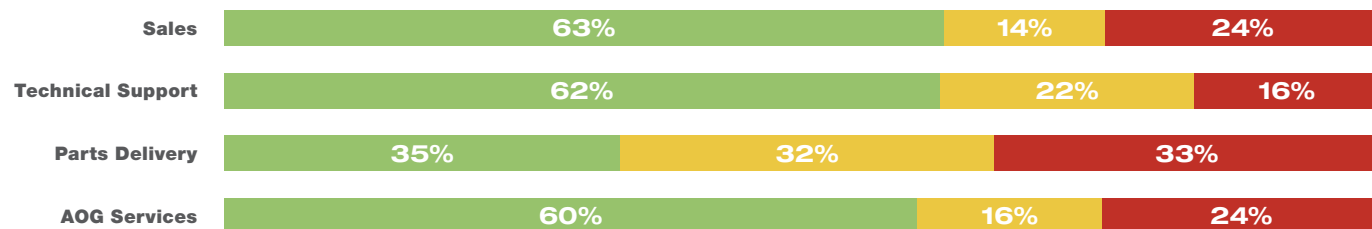
Other respondents had **complaints about MyMD.aero**, which launched in 2016 as a free, web-based tool for maintenance tracking and real-time access to parts availability information. In particular, a number of respondents were unhappy

"GREAT LEGACY PRODUCT THAT HAS A SOLID MARKET FOR YEARS TO COME. MORE SPARES NEEDED TO SUPPORT FLEET. NO SPARES, NO NEW SALES."



ACTION TIME OF MANUFACTURER

■ Within 2 days ■ 3-7 days ■ More than 7 days



TOTALS MAY NOT EQUAL 100 PERCENT DUE TO ROUNDING ERRORS.

with MDHI's decision to charge for technical publications through the portal, arguing that they should be free to registered customers. Nenadovic responded, "We are not the only OEM to charge for technical manuals. Many aircraft manufacturers, including our competition, charge for some sort of manual level of service. MyMD.aero technical publications customers are able to enhance their customer experience by having more than just access to our tech pubs, but by also having an advanced search capability and a mobile application interface that runs on phones, tablets, laptops, and desktops that run on Windows, iOS, or Android platforms.

"This combination delivers true anytime, anywhere access to the exact information required regardless of where it is located within voluminous maintenance-related publications including product updates, Airworthiness Directives (ADs), and Service Bulletins (SBs). This real-time access helps maintainers reduce aircraft downtime and keep their aircraft safe and airworthy."

In general, our respondents were enthusiastic about MDHI's airframes, which they described as "a great airframe" with an "operational capability [that] is still reasonably unmatched by competitors." However, as in previous years, several commenters expressed the **concern that MDHI is neglecting the civil market**; as one wrote, "They've focused so much on military

sales that commercial operators are an afterthought."

Nenadovic acknowledged that the military market has always been the foundation of the company's business, dating back to the 1960s, when the Hughes OH-6 Cayuse helicopter was mass produced for the U.S. Army.

"In recent years large military contracts seem to have overshadowed other mission profiles; however, MD Helicopters' commitment to its commercial market operators has not wavered," Nenadovic said. "We are as committed as ever to law enforcement, utility, natural resource and wildlife management, and VIP operators as well as the EMS and air ambulance operators of our six- and eight-passenger NOTAR platforms worldwide.

"In fact, it is these often-criticized military contracts that have helped to stabilize our supply chain operations, improve parts availability and fill rates, and most importantly reduce cost, for all our operators. As an example, last year we were able to reduce direct operating costs of our single-engine models by over 10 percent.

"We have one of the world's most favored single-engine rotorcraft platforms," he concluded. "We are unmatched in safety and by-class performance. Our reemergence as a preferred provider for U.S. and foreign military operations only enhances our ability to integrate the advanced technologies and enhanced capabilities that benefit all operators, regardless of mission."

Skip Robinson Photo

TECH REP SPOTLIGHT

Larry White

"Excellent tech rep. Very knowledgeable and down-to-earth."

Honorable Mentions:

Les Odem, Brad Rushton

Robinson Helicopters

Robinson Helicopter Company has always done well in our annual survey, but it had an outstanding showing this year. In a year in which many OEMs saw their scores decline or plateau, Robinson saw statistically significant gains over last year in areas including cost of parts, warranty fulfillment, speed of service response time, satisfaction with factory-owned service centers, and overall service satisfaction.

Compared to previous years, the company also recorded statistically significant improvements in commitment to product improvement, parts availability, responsiveness of service representatives, satisfaction with authorized service centers, and overall airframe satisfaction. And the company has consistently improved its average response times for sales, technical support, parts delivery, and aircraft-on-ground (AOG) service. As one respondent summed up, Robinson offers a "reliable, solid, simple product with much improved customer support."

"Quality customer service has been and always will be a priority at Robinson," said company president Kurt Robinson. "We're gratified that Robinson operators all over the world acknowledge and appreciate our efforts along with the individual support they receive at each of Robinson's over 460 service centers worldwide."

"Our tech reps and customer service reps are dedicated to helping our customers find timely solutions to issues that arise in the field. We recognize how important it is to help them operate our aircraft at full efficiency, and don't hesitate to involve our engineers and vendors if need be. Listening and gaining a thorough understanding of customer issues helps us find solutions. Robinson values its relationships with our customers and we believe they know that by the consistent effort we put forth to help them."

Many of our respondents particularly appreciate the value proposition of Robinson products; as one commented, the "good basic cost of operation makes helicopter operations on our small scale feasible." So, we asked Robinson how the company has managed to **keep costs low and reliability high.**

"Ultimately, customer satisfaction is the result of good design and engineering in a product," he told us. "Frank Robinson envisioned and developed the R22 around those key concepts and today they still govern everything we do. Our engineers love to fly helicopters and are as good as they come in this business. We strive to make our manufacturing processes incredibly efficient and Robinson employees take immense pride in producing quality products that exceed our customers' expectations."

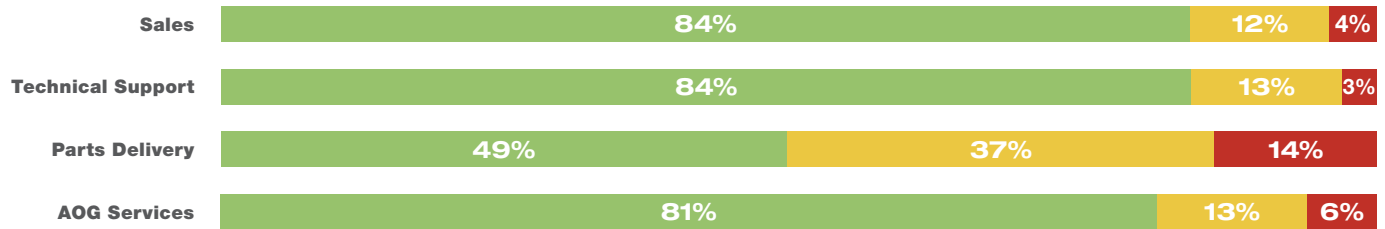
Skip Robinson Photo

"GREAT COMPANY TO WORK WITH. TECH SUPPORT STAFF ARE KNOWLEDGEABLE AND AVAILABLE. PARTS SUPPLY STAFF ACT VERY QUICKLY. BEST OEM TO WORK WITH IN THE ROTOR-WING SECTOR."



ACTION TIME OF MANUFACTURER

■ Within 2 days ■ 3-7 days ■ More than 7 days



TOTALS MAY NOT EQUAL 100 PERCENT DUE TO ROUNDING ERRORS.

Our respondents did have a number of **assorted requests for product improvements**, with a couple of them expressing interest in an option for a different autopilot model. According to Robinson, the company “continually reviews and tests avionics, instruments, autopilots and other equipment from a wide variety of vendors. When we find something we like or that customers tell us they really like we try to make it available on our aircraft.”

While **mast bumping** was not the acute anxiety for many of our respondents that it has been in previous years, a number of commenters still expressed continued concerns about the phenomenon. Said Robinson, “Aviation safety is of paramount importance to every aircraft manufacturer, including Robinson. Pilot awareness and thorough training are key facets of overall flight safety. Robinson remains committed to ensuring that pilots

who fly our aircraft understand two-bladed rotor systems and the importance of flying within the designated operating limits of an aircraft.”

And speaking of training, several commenters asked for **expanded training options**, including online courses and more flight time at the factory safety course.

“The Robinson Safety Course has been a huge success for many years and we are very proud of the amount of pilots who have attended,” Robinson told us. “We will continue adding to our website safety videos which highlight specific areas of interest and allow pilots to view them as often as they wish. Regarding enhanced training we believe this is an area best left to flight schools with knowledgeable instructors experienced in specific types of flying, such as mountain, cargo hook, night, instrument, etc.”



TECH REP SPOTLIGHT

Peter Hallqvist

“Peter has always been very patient, kind, and willing to help. He doesn’t know about this, but he has helped me better understand Robinsons since I was a student pilot and used to email him frequently.”

Daniel Huesca

“Daniel Huesca is committed to finding solutions and answering inquiries no matter how insignificant or basic.”

Honorable Mentions:

Patrick Cox, Keith Newmeyer, Frank Nieto, Chris Rogers

Sikorsky

In this year's survey, Sikorsky continued to solidify the gains it made last year. Sikorsky showed slightly higher scores across most measures of our survey, and while none of the gains between 2017 and 2018 were statistically significant, they represent a great improvement from its relatively poor showing in 2016. One area in which Sikorsky has consistently excelled is in its tech reps, and this year, the company ranked first among the OEMs for "responsiveness of service representatives" — the only measure in which the first-place ranking did not go to Bell or Robinson.

However, our respondents indicated that there's still considerable room for improvement, particularly with respect to **parts availability**. That being the case, we asked Dana Fiatarone, Sikorsky's vice president, commercial systems and services, to give us an overview of how Sikorsky is continuing its efforts to improve customer support.

"Our recent strategy has been to increase parts and services close to where our customers operate to ensure that whenever they have a mission to fly, they choose Sikorsky," Fiatarone told us. "This is a direct result of listening to our customers to best understand their needs to keep them flying. We've seen a significant improvement in our AOG [aircraft on ground] response time, and attribute part of this to the four forward stocking locations (FSLs) that Lockheed Martin has deployed around the world. Since 2016, Sikorsky has launched FSLs in Aberdeen, Scotland; Rio de Janeiro, Brazil; Brisbane, Australia; and Stavanger, Norway."

Notably, the Stavanger FSL, which supports the largest S-92 operating region in the world, has averaged a response time of less than an hour for requests for AOG parts since beginning operations in September 2016, Fiatarone said. "We are committed to positioning more of our aftermarket inventory close to our operational aircraft. Through forecasting tools and methods, Sikorsky is globally placing the right inventory near our operators' missions."

Sikorsky also continues to expand its customer support centers. "We announced at HAI Heli-Expo that Thai Aviation Services will operate as the first Sikorsky customer support center in Thailand," Fiatarone continued. "Sikorsky's customer support centers enable quick access to Sikorsky logistics and spare parts inventory for operators while providing advanced service capabilities. This support center will be Sikorsky's seventh in the Asia-Pacific region and adds to the growing network of 22 Sikorsky support centers worldwide."

According to Fiatarone, all of these investments are yielding benefits. "We continue seeing an increase in flight hours for the S-92 fleet, which surpassed 1.25 million total hours in 2017. We anticipate continued flight hour growth in 2018. In March, the total monthly flight hours for the S-92 fleet were nearly 16,000 for the first time. In the same month, the flight hours for the energy sector alone were nearly 14,000 hours."

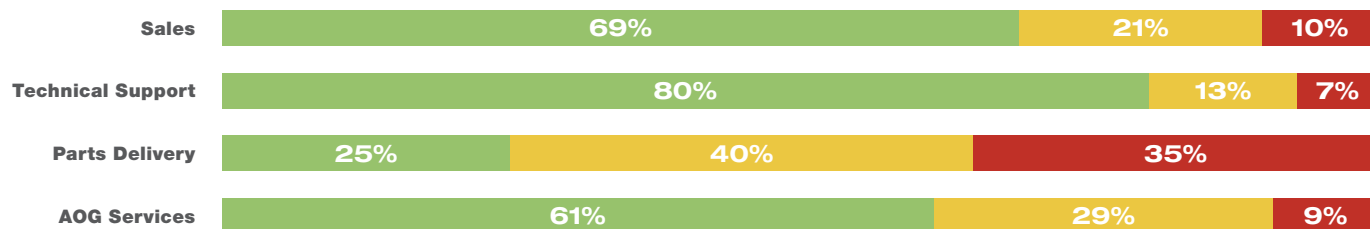
In October 2017, Sikorsky launched its Next Generation Customer Portal, with the goal of providing an enhanced and more direct web-based location for all customer needs regarding maintenance and

"SIKORSKY'S
STRENGTHS FOR US
ARE THE PEOPLE
THEY HAVE WORKING
FOR THEM...NONE
OF THE OTHER
MANUFACTURERS EVEN
COME CLOSE TO THE
PERSONAL SUPPORT
WE GET FROM THE
SIKORSKY AOG TEAM."



ACTION TIME OF MANUFACTURER

■ Within 2 days ■ 3-7 days ■ More than 7 days



TOTALS MAY NOT EQUAL 100 PERCENT DUE TO ROUNDING ERRORS.

questions about their aircraft. The company also continues to conduct live webcasts for its S-92 customers (every two weeks) and S-76 customers (every four weeks) to facilitate a two-way dialogue; one of our respondents described these webcasts as “an excellent forum.”

Beyond improved support and spares availability, a number of our respondents mentioned that they’d like to see some **specific improvements on the S-92 and S-76D**. With respect to ongoing product development, Fiatarone told us, “Sikorsky continues to invest in product improvements for both the S-92 and the S-76 helicopters. Many of our improvements come directly from the inputs that we receive from our large customer base.

“The S-92 has seen recent improvements to the main rotor damper as well as improved elastomeric materials in the rod end bearings that reduce wear and improve maintenance. Upcoming improvements to the transmission drip pan and boot cover on the tail rotor blade are planned for 2018. On the S-76, improvements to the landing gear harness and the rotor brake accumulator have

been released, while upcoming improvements to the collective position transducer and an update to the software in the RDAU [remote data acquisition unit] are planned for 2018.”

This year, we were pleased that we didn’t have to ask Sikorsky how it plans to improve **support for customers of the S-300 line** that the company originally purchased from Schweizer Aircraft, and which languished under Sikorsky’s ownership. As Fiatarone noted, “In January, Sikorsky completed an agreement to sell the Sikorsky Light Helicopter product line, including the S-300 and S-333 models to Schweizer RSG, an affiliate of Rotorcraft Services Group of Fort Worth, Texas, in line with Lockheed Martin’s commitment to retain and grow Sikorsky’s core commercial S-92 and S-76D production and sustainment businesses. This allows us to focus even more on our core products.”

We hope the arrangement will be just as beneficial for S-300 operators, too.

Mike Reyno Photo

TECH REP SPOTLIGHT

Stephen Goodall

“Steve is available 24 hours a day for our program and is very responsive to all of our issues that our fleet encounters.”

Gary Tate

“Gary is very knowledgeable with the product and is always eager to solve problems.”

Honorable Mentions:

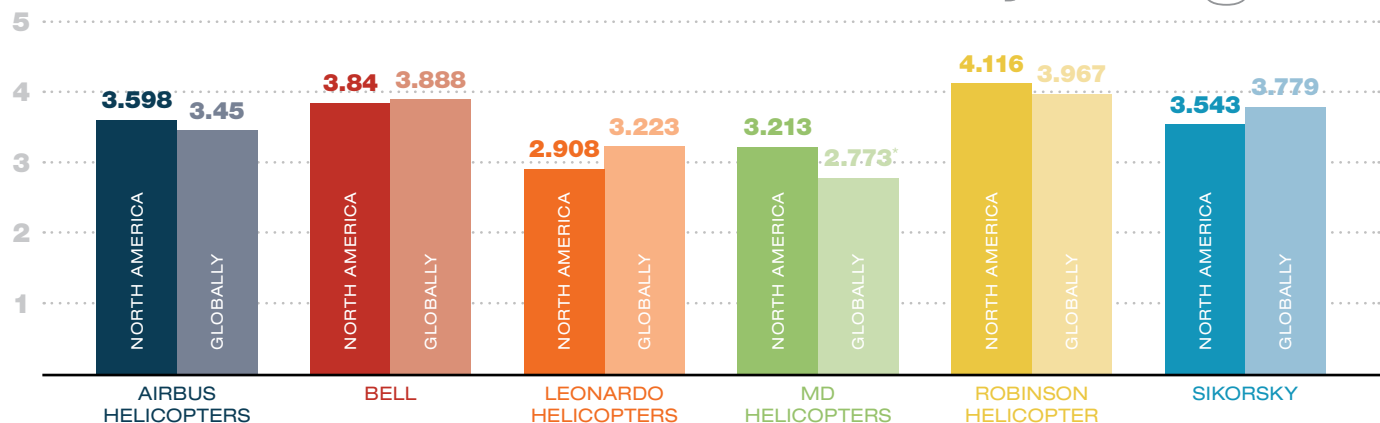
Frank Ambrosino, Megan Behan, Fernando Brandão, Steve Carracino, Glenn Chadbourne, Gavin Coach, Ola Henning Dahl, Justin Ferris, Stephen Goodall, Dennis Griggs, Shuxi Guan, Peter Hansen, Austin Lee, Bob Levesque, Mick Little, Guilherme Lopes, Eric Marsden, David Martin, Kenji Okabe, Sophie Pearl, Jon Rudy, Pete Sack, Steven Saunders, Sean Whitman, Carl Violette

All Mean Scores

		AIRBUS HELICOPTERS	BELL	LEONARDO HELICOPTERS	MD HELICOPTERS	ROBINSON HELICOPTER	SIKORSKY
COMMITMENT TO PRODUCT IMPROVEMENT	2017	3.73	3.73	3.39	3.12	3.67	3.46
	2018	3.69	3.66	3.2	2.76	3.86	3.68
PARTS AVAILABILITY	2017	3.43	3.74	2.82	3.09	4.06	2.9
	2018	3.31	3.67	2.59	2.58	4.32	3.09
COST OF PARTS	2017	2.68	3.08	2.67	2.55	3.3	2.58
	2018	2.57	3.06	2.42	2.36	3.64	2.81
WARRANTY FULFILLMENT	2017	3.57	3.82	3.35	3.51	3.4	3.6
	2018	3.52	3.84	3.15	3.27	3.82	3.71
SPEED OF SERVICE RESPONSE TIME	2017	3.53	3.84	3.11	3.36	3.63	3.5
	2018	3.49	3.87	2.73	2.96	3.99	3.54
RESPONSIVENESS OF SERVICE REPRESENTATIVES	2017	3.85	4.03	3.44	3.71	3.82	4.05
	2018	3.75	4.1	3.21	3.2	4.11	4.21
SATISFACTION WITH AUTHORIZED SERVICE CENTERS	2017	3.6	3.99	3.48	3.98	4.05	3.72
	2018	3.56	3.91	3.2	3.46	4.3	3.78
SATISFACTION WITH FACTORY-OWNED SERVICE CENTERS	2017	3.51	3.87	3.1	3.45	3.63	3.51
	2018	3.44	3.63	3.06	3.06	4.09	3.61
QUALITY OF TECHNICAL PUBLICATIONS	2017	3.57	4.25	3.59	3.77	4.08	3.82
	2018	3.42	4.18	3.39	3.27	4.07	3.81
QUALITY OF PILOT TRAINING PROVIDED	2017	3.95	4.3	3.83	4.28	4.15	4.04
	2018	3.89	4.35	3.69	3.63	4.33	4.19
QUALITY OF MAINTENANCE TRAINING PROVIDED	2017	3.95	4.31	3.81	4.11	4.08	3.92
	2018	3.94	4.25	3.63	3.57	4.29	3.98
OVERALL SERVICE SATISFACTION	2017	3.64	3.98	3.32	3.87	3.89	3.59
	2018	3.59	3.88	3.11	3.69	4.17	3.77
OVERALL AIRFRAME/ PRODUCT SATISFACTION	2017	3.87	4.1	3.57	3.49	3.96	3.94
	2018	3.81	4.02	3.3	2.99	4.13	3.96

ON A SCALE OF 1-5, WHERE 5 MEANS 'EXCELLENT' AND 1 MEANS 'POOR'

Overall Mean Scores by Region



ON A SCALE OF 1-5, WHERE 5 MEANS 'EXCELLENT' AND 1 MEANS 'POOR'
* DENOTES LOW SAMPLE SIZE



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GE Aviation

GE Aviation (GE) did very well in its first appearance in our engine survey, scoring essentially on par with our second-place finisher, Safran Helicopter Engines. It ranked first among the OEMs on a number of measures, including "commitment to product improvement," "cost of parts," "warranty fulfillment," "AOG (aircraft on ground) service," and "satisfaction with factory-owned service centers." And our respondents were nearly unanimous in describing GE engines as "reliable." As one put it: "Extremely reliable engines. I've very rarely run into a bad one, and the ones that have been bad were made good quickly."

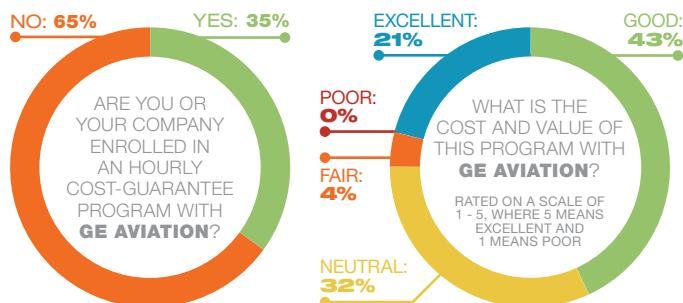
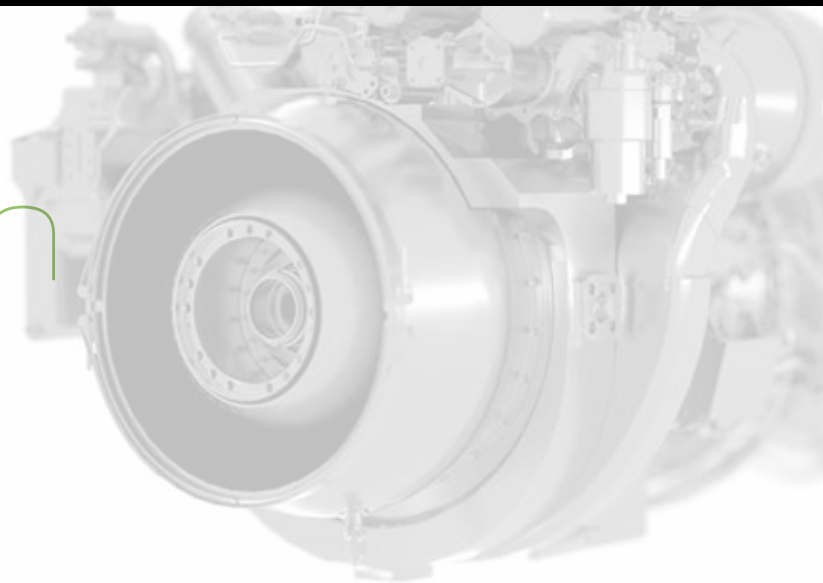
There's a good reason for that **reliability**, GE told us. "GE's civil helicopter engines benefit from the T700 engine legacy of more than 20,000 engines and 100 million flight hours coupled with new technology infusion resulting in products that have proven themselves on more than a dozen platforms in all operating environments. Our MCPH [Maintenance Cost Per Hour] service product provides predictable costs and our product support team, both in the field and at the factory, provide prompt resolution of customer issues," the company said.

Despite GE's strong relative ranking on "cost of parts," our respondents still wanted to see **lower prices** for GE parts and overhauls, so we asked the company how it is striving to keep its engines affordable.

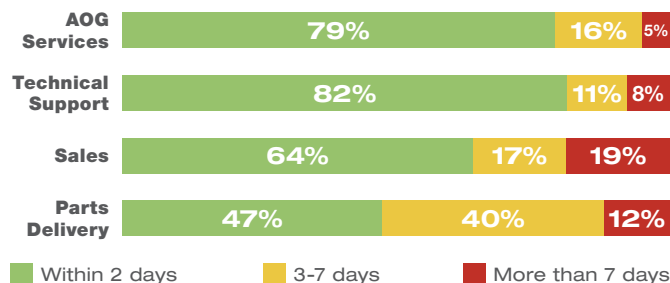
"GE continuously reviews its operational product experience and invests in improvement programs to reduce operating costs," the company told us. "We partner with operators to maximize engine time-on-wing using the modular design of the engine and its on-condition maintenance structure to minimize shop visits. Additionally, we are now leveraging select digital and fleet monitoring tools and experience from our fixed-wing engines to further support our civil helicopter customers, which will result in reduced operating costs."

Finally, with more military surplus **UH-60 Black Hawk helicopters entering the civil market**, we asked the company how it plans to support these customers. GE told us that it has established a network of authorized T700 maintenance, repair and overhaul providers to support commercial UH-60 operators; these include Standard Aero in Vancouver, Canada; Asia Pacific Aerospace (APA) in Brisbane, Australia; and H&S Aviation in Portsmouth, England.

"Customers operating the T700-700 model engine may do so knowing that GE and our network of providers are here to help them utilize existing fleet assets to keep them flying," the company said. "For customers looking to get more performance out of their UH-60 helicopters, GE is encouraging operators to upgrade their engines to the T700-701D model. The -701D allows up to 50 percent more payload in high/hot conditions and excellent response to power demands. GE is committed to providing technical support and maintenance solutions to this growing community of operators."



ACTION TIME OF MANUFACTURER



TECH REP SPOTLIGHT

Carl Unger

"Phenomenal support at all times."

Scott Shepherd

"Supports us well."

Honeywell

In our last survey, we only heard from a handful of respondents who were operating Honeywell's HTS900, the new-generation helicopter engine that is installed on the Eagle 407HP. This year, 11 of our respondents had experience with HTS900 engines, but once again the vast majority of our evaluations for Honeywell were for its legacy engines, notably the LTS101 and T53, the latter of which has been in active service for more than 60 years and out of production since the 1990s.

For many of our respondents this year, **price increases** were a major concern. As one commented, "Proven engine but cost increases for parts and technical publications will soon make the engine cost-prohibitive to operate."

In response, Honeywell told us, "In the last few years we have experienced cost increases due to replacement of worn tooling, supplier exits and transitions, expiration of long-term price contracts, and lower order volumes. Through the re-negotiation of long-term supplier contracts to control costs and the use of distributor relationships to take advantage of economic order quantities, we do not anticipate any significant changes to our 2019 prices which were published last year and expect future years to be stabilized as well with reasonable adjustment for inflation."

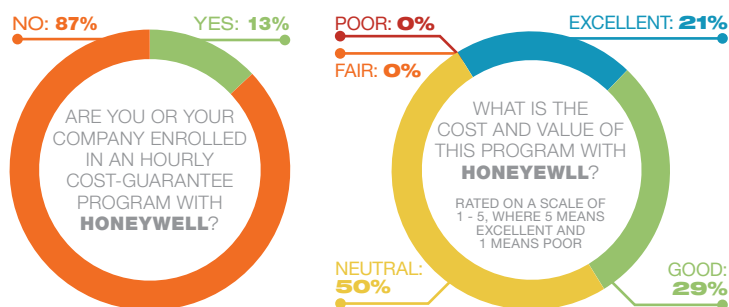
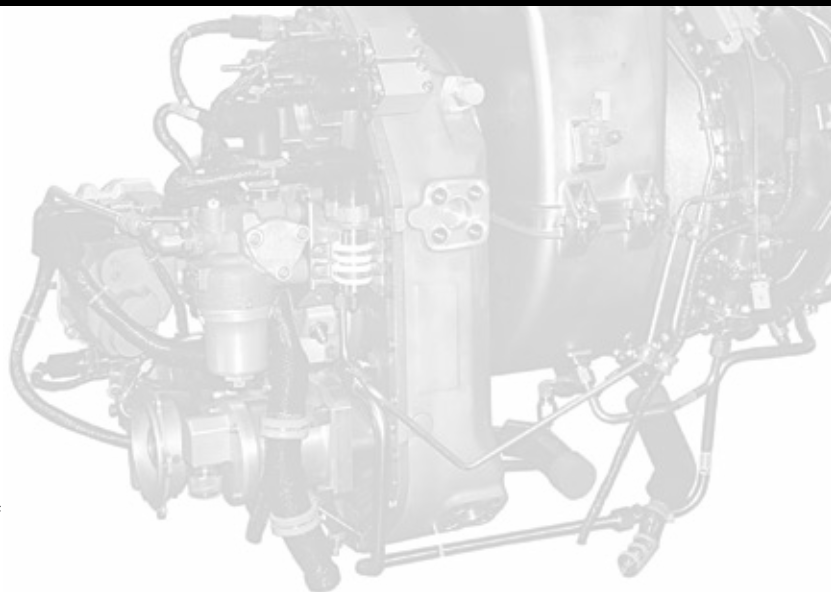
"In addition, in 2018 Honeywell reduced the price for T53 technical publications 80 percent for operators utilizing Honeywell Authorized Service Centers. We will be assessing our LTS101 and HTS900 technical publications pricing for 2019."

Honeywell is a massive corporation, and a number of our respondents expressed the perception that it's **hard to get the company's attention**. Honeywell explained that to give helicopter operators the personalized service they deserve, it relies on a network of authorized channel partners — including Intermountain Turbine Services, which was praised by a number of respondents.

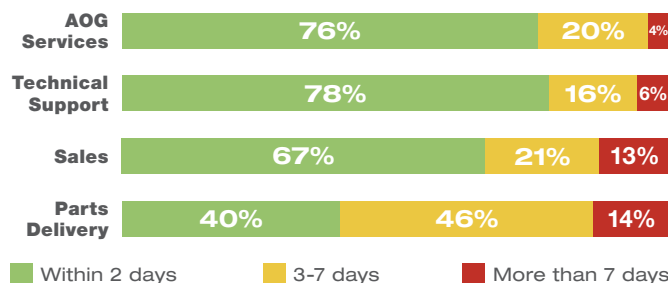
"These channel partners are some of the most experienced in the industry and are passionate about the engines they support," Honeywell told us. "This network is focused on the operators' needs and can be more agile in responding to specific needs over traditional Honeywell-only responses on a routine basis."

The company noted that in addition to the channel partner network, it also has a website called MyAerospace Portal that supports immediate ordering needs, order status, technical publication requests, services and maintenance plans, and immediate technical support. Recent additions to the portal include technical support webforms and a directory to locate the closest channel partner worldwide to meet customer needs.

In 2016, Honeywell told us that in addition to the 407HP and the Marengo Swiss helicopter (now Kopter) SH09, it would be placing the **HTS900 on another platform**, yet to be announced. This year, Honeywell said, "We are close to adding another platform, but are unfortunately unable to disclose details of the program at this time due to NDAs in place with the companies we are in discussions with. Our focus is to ensure the HTS900 engine is on platforms in which we add significant differentiation and value to the operators for what this engine brings to the market."



ACTION TIME OF MANUFACTURER



TECH REP SPOTLIGHT

John Sanner

"John is easily accessible and very knowledgeable."

Honorable Mentions:

Mike Matthews (Intermountain Turbine Services), Arif Muhammed (Honeywell tech sales)

Lycoming Engines

Lycoming's survey performance this year was comparable to its performance in 2016; none of the minor differences in its scores were statistically significant. Although we've once again included Lycoming in our overall ranking, the only piston engine manufacturer in our survey remains in a class by itself.

Although our respondents were generally happy with the affordability and maintainability of Lycoming engines, we heard some specific complaints this year related to **warranty work**. "Lycoming needs to diligently work on warranty work," one respondent commented, citing a warranty claim that was ongoing after eight months.

In response, the company told us, "Lycoming works diligently to support our customers' needs, whether they have purchased a genuine Lycoming factory engine or genuine Lycoming spare parts. For example, Lycoming implemented a Customer Care Program (Service Letter Number 273) to offer financial relief to qualified customers affected by Service Bulletin 632. We have offered slightly higher allowances for helicopter engine applications.

"Lycoming's worldwide distributor network collects information and files warranty claims for our customers. We find this to be in the customer interest because many of the distributors have a stock of parts on their shelf, ready for order and installation. Once a part is replaced, the distributor works with the customer to file a warranty claim, and the suspect part is shipped back to Lycoming for warranty review."

Many of our respondents also wanted to see **enhancements to Lycoming engines**, including digital fuel injection and electronic ignition systems. As Lycoming explained to us in 2016, many of its latest innovations have not yet made it to the helicopter market because of the time and expense involved with Federal Aviation Administration (FAA) certification. This year, the company reiterated that observation: "The FAA certification process is complex, and approvals are required by the FAA to make component improvements within an existing type design. We are constantly evaluating the market and potential for new and technologically advanced solutions, and work to incorporate these advancements into our existing engine configurations and future applications."

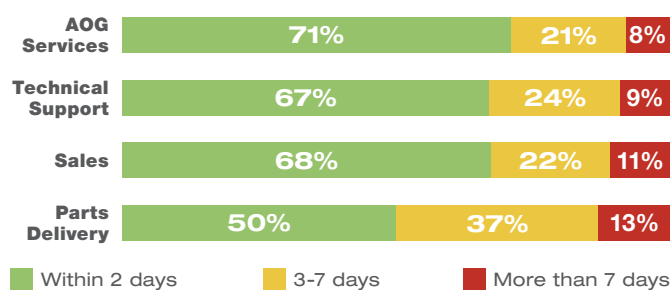
From an innovation perspective, Lycoming told us that it is finishing certification of its iE2 engine this year. "The iE2 engine is our company's flagship technology and is the most advanced piston aviation engine available on the market today. It is an

engine and engine control concept designed from the ground up to be electronically controlled. The iE2 system features a continuously optimizing fuel injection and ignition system for optimum power and fuel consumption performance. The electronically controlled system enables operators to realize reduced maintenance costs and increased availability while simultaneously reducing pilot workload. Added to this is the ability of the engine control unit to continuously monitor and report engine performance."

In the meantime, the company noted, its HIO-390-A1A engine is now certified for use in Enstrom's TH180 Trainer helicopter. The HIO-390-A1A is a direct-drive four-cylinder, horizontally opposed, fuel-injected, air-cooled engine; it has tuned induction, and a down exhaust. Lycoming said the engine will offer TH180 operators "low maintenance costs, strong performance, and reliable safety."

NOTE: HOURLY PROGRAM DATA NOT INCLUDED FOR LYCOMING AS IT DID NOT MEET OUR MINIMUM THRESHOLD FOR REPORTING.

ACTION TIME OF MANUFACTURER



* DENOTES A LOW SAMPLE SIZE; USE CAUTION WHEN INTERPRETING RESULTS.

"TRIED AND TRUE. SOME THINGS COULD BE UPDATED, LIKE ELECTRONIC IGNITION."

TECH REP SPOTLIGHT

Brian Costello

Lycoming Engines regional sales manager

Geoff Kisch

Lycoming Engines field service technical representative

Rolls-Royce

Rolls-Royce's performance in our survey this year was consistent with its showing in 2016: it ranked fourth among the OEMs overall, and while it ranked third in 2016, that was only because GE did not receive enough evaluations to qualify for ranking. There were no statistically significant changes in most of Rolls-Royce's scores between the two years, with the exception of its slightly longer average times to take action in the realm of technical support and parts delivery.

For most of our respondents, Rolls-Royce's strengths are its **large global service network and the relative affordability** of its engines, so we asked the company what it is doing to preserve these advantages.

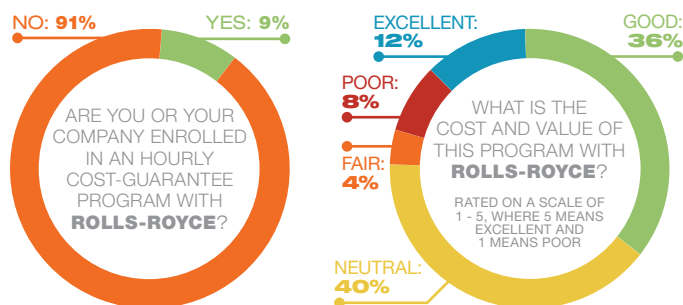
"Our Rolls-Royce FIRST (Fully Integrated Rolls-Royce Support Team) network, which is the authorized global support network for operators of M250 and RR300 engines, plays an important part in providing customers with affordable, reliable support solutions," the company told us. "The FIRST network includes more than 30 approved, licensed service centers and Aviall locations around the world, and its competitive structure means operators can find affordable and reliable service anywhere for Rolls-Royce M250 or RR300 engines. Aviall Inc. (a Boeing company) is a key part of the FIRST network and is the global authorized distributor for Rolls-Royce M250/RR300 engines, parts, modules, and tooling. We've recently made it even easier for our customers to find information about their nearest FIRST network service location with a new smartphone app."

The company continued, "While maintenance of this world class network is important, Rolls-Royce also continues to invest in safety and reliability improvements. We are pleased that overall reliability has continued to trend in a positive direction over the last several years after introduction of a number of improvements targeting reduction of metal in oil events leading to reduced maintenance costs for our customers."

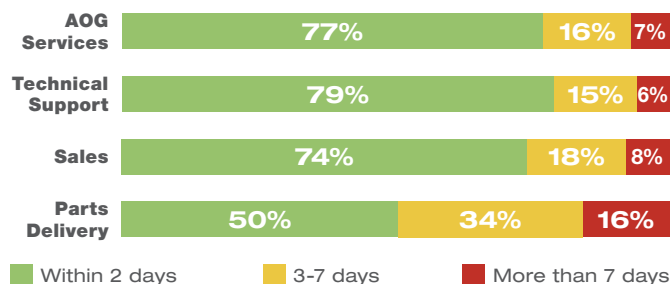
Despite these improvements, reliability was a concern for many of our respondents this year, with many of them specifically citing problems with **M250 power turbine wheels**; according to one commenter, "Manufacturer is having a problem making wheels that are reliable and will not crack consistently." When we asked Rolls-Royce to address this issue, the company told us, "Rolls-Royce continues to invest in safety and reliability improvements. Rolls-Royce continues to evaluate all of our parts, including turbine wheels, to ensure safe operations. Rolls-Royce works closely with our extensive FIRST network partners to address our operators' commercial and technical concerns implementing engine service bulletins."

In 2016, Rolls-Royce announced an agreement with Innova Aerospace to put its RR300 engine on Innova's C630 helicopter under development. Unfortunately, that program won't be coming to fruition anytime soon, Rolls-Royce told us: "Innova Aerospace has restructured its business and elected to pause the C630 program. We await re-engagement direction from Innova at this time."

With respect to other **new products**, the company said, "Rolls-Royce continually surveys both turboshaft and turboprop OEMs for new market opportunities and explores viable market opportunities collectively with the aircraft OEM. In parallel, we continue to invest in upgrades to the current engine line including a state-of-the-art controls system for our latest M250-C47E series of engines, and achieving certification for those upgrades."



ACTION TIME OF MANUFACTURER



TECH REP SPOTLIGHT

Gregory Houston

"Excellent support with technical advice and sourcing of parts."

Scott Kern

"He always looks for ways to help the operator, to give them the best service on Rolls-Royce engines."

Honorable Mentions:

Simon Kemp, Ben Kesler, Marcos Matos, Jim Taylor (Rolls-Royce employees); Stuart McIntyre, Dan Wyatt (authorized Rolls-Royce FIRST network representatives)



Pratt & Whitney Canada

Pratt & Whitney Canada (P&WC) was once again the clear winner of our Helicopter Engine Survey, ranking first in both overall service satisfaction and overall engine satisfaction, and in a number of other (although not all) categories. Compared to our 2016 survey, P&WC saw slight declines in some scores and slight gains in others, but none of these differences were statistically significant. Our respondents were generally appreciative of the effort that P&WC puts into customer support. Wrote one, "Fantastic equipment, support and service; we have no issues with them, but they come to see us twice a year to ask how they can do better."

We asked P&WC for an overview of how it's **striving to maintain its No. 1 position** in the industry. "We continue to develop products and services that meet our operators' changing needs," the company told us, citing six new services it launched at HAI Heli-Expo 2018, including a Certified Pre-Owned (CPO) engine program for helicopters; Small Fleet Pay-per-Hour (PpH) solution; ESP Platinum coverage for PW206/PW207 engines; an enhanced Line Replaceable Unit (LRU) availability program; tailored customer services for defense and security mission-readiness; and mission-ready services for heads of state and other VIP transport helicopter fleets.

"Our Fleet Management Plan contracts respond to the evolving needs of our customers," P&WC explained. "We continue to innovate by embedding new contractual solutions that enable our

"P&WC IS ALWAYS LOOKING TO IMPROVE THE PERFORMANCE AND QUALITY OF THEIR ENGINES. THEY ARE THE BENCHMARK WHICH THE OTHER OEMs SHOULD USE."

customers to focus on their primary missions. We are willing to enter into long-term partnership agreements with our customers allowing them to plan strategically and operationally also in the longer term."

Beyond this, the company said, it continues to invest in reliability and availability improvements across all of its engine models. For example, its PT6C-67C engine (which powers the AW139) exceeds 99 percent availability, and the company has also certified its FAST (Full-flight data, Acquisition, Storage and Transmission) prognostic solution for the PT6C-67C. P&WC said it is also in the process of commercially introducing its "game-changing" Oil Analysis Technology, a highly sensitive prognostic solution that detects tiny metal traces within engine oil, enabling the identification of deterioration of specific components well before a potential event occurs.

"Additionally, we are investing in our Parts Distribution Center network to ensure we have spare helicopter engines strategically located where our flying helicopter engine fleet is most concentrated," the company continued. "We strategically locate LRUs and rotables throughout our centers to further improve our service levels, which currently exceeds 90 percent.

"We are focused on optimizing engine/aircraft availability to ensure our customers can proceed with their next scheduled flight without delay.

We invest heavily in frontline support efforts and in ensuring our first contact with the customer is seamless. Our 'first call' resolution rate consistently surpasses 80 percent and first-call technical recommendations are delivered in less than one hour."

Despite our survey respondents' generally favorable impression of the company, we did hear some complaints. **"Stop the price increases!"** was a sentiment we heard from multiple commenters, while others were displeased at having to pay for technical publications.

P&WC responded, "An important metric to look at is total costs over the product lifecycle and on that aspect we ensure our products are extremely competitive. We minimize the risk of 'surprises' by securing long-term agreements, improving reliability, durability and time on wing, developing new commercial solutions to meet various needs, and improving our product offering with more performance and mission capability.

"In addition, we continue to invest in more repair capabilities in our network enabling more re-use of components. We also invest and bring to market pro-active solutions like FAST and our Oil Analysis Technology . . . to drive cost of repairs down by detecting issues before they become service-affecting. When put in this context, we are convinced that our engines remain highly competitive and that our spare parts policy is balanced."

With respect to tech pubs, P&WC noted that these are provided free to customers for the first two years. The company added, however, that it is continually investing in new features for its tech pubs, including current efforts to enhance mobile and offline capabilities, as well as an effort to reformat its manuals to allow for more interconnectivity between publications (such as the ability to navigate from an engine maintenance manual to an illustrated parts catalogue).

"With these new added features we aim to offer a premium service, while maintaining a more basic package for customers who require less enhancements and who want to maintain a basic library at a lower cost," P&WC told us.

Not all of our respondents were thrilled with the company's web service portal, telling us that **MyP&WC Power is difficult to use**. P&WC said that its internal surveys indicate that 79 percent of the portal's 20,000 registered users are satisfied with it. That said, "We know there is always work to be done, and we will continue to work diligently to increase our customer satisfaction performance," the company told us.

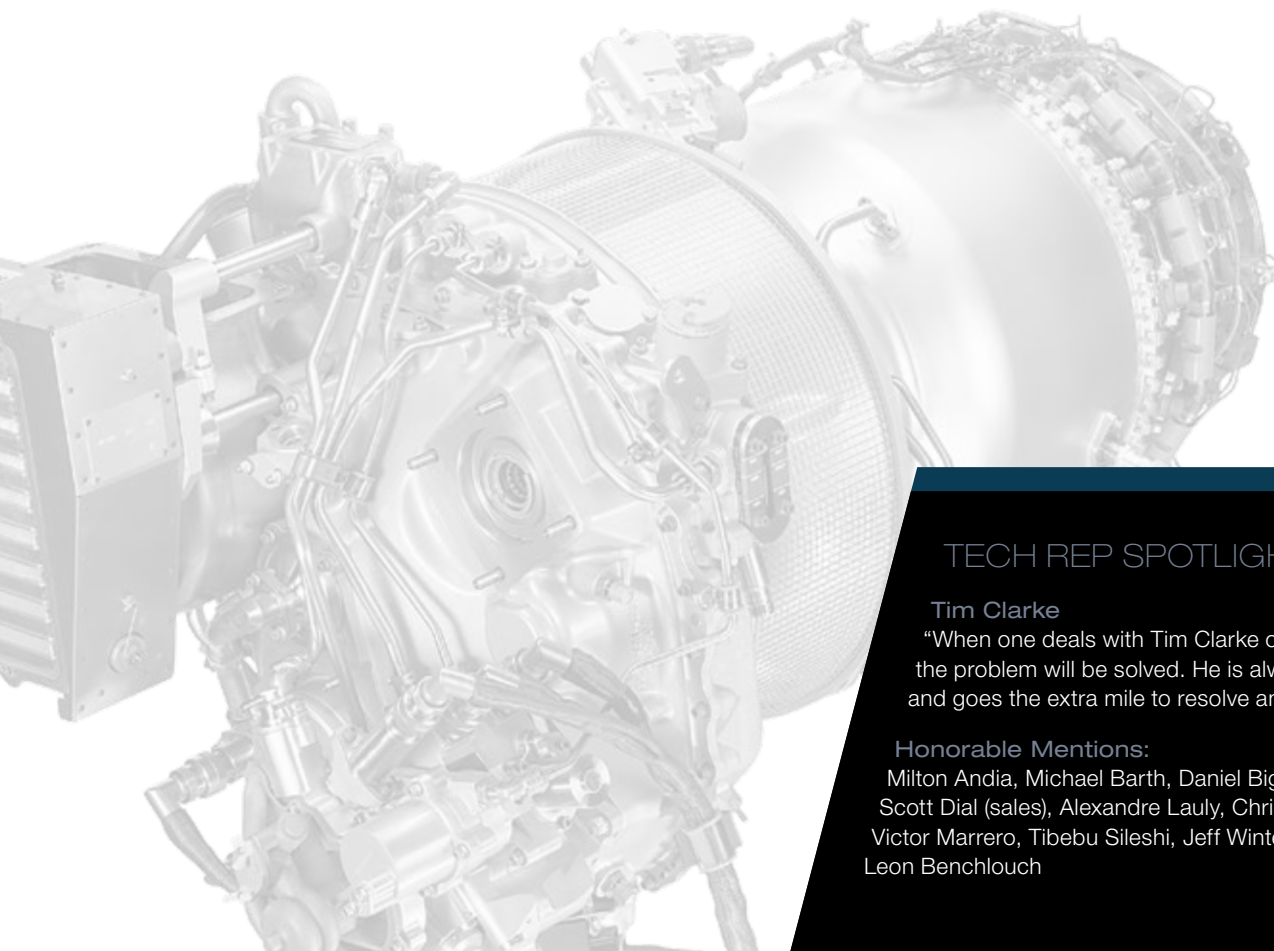
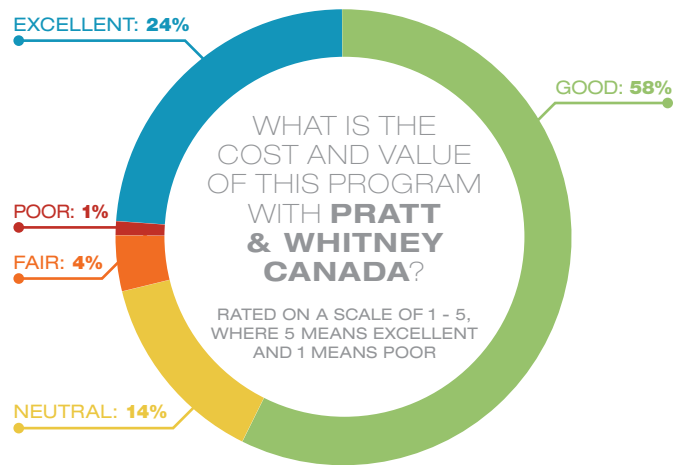
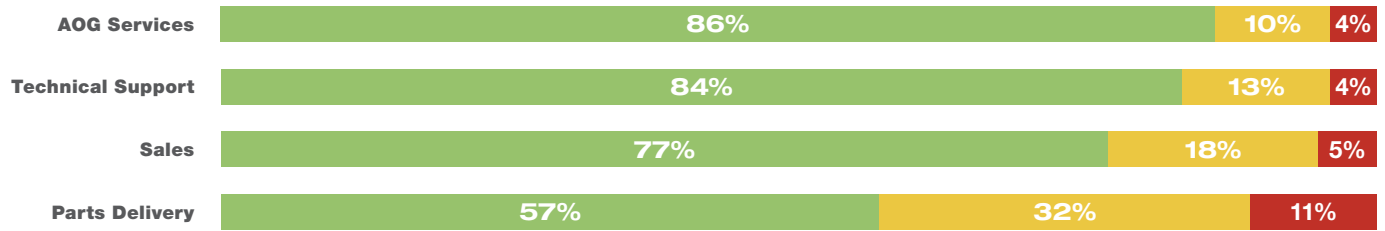
"We are constantly making refinements to MyP&WC Power. For example, in the next few weeks we will make changes to the registration process that will make enrollment easier. At the same time, we will be making improvements to the RSVP feature that allows users to report issues or suggestions relative to our technical publications.

"Enhancements related to ease and speed of navigation are incorporated every two weeks. Over the last 12 months, for example, the page-loading time went from 6.5 to 3.2 seconds on average. Customer comments are analyzed periodically and those serve as the basis for future improvements."



ACTION TIME OF MANUFACTURER

■ Within 2 days ■ 3-7 days ■ More than 7 days



TECH REP SPOTLIGHT

Tim Clarke

"When one deals with Tim Clarke one can guarantee the problem will be solved. He is always contactable and goes the extra mile to resolve any issues."

Honorable Mentions:

Milton Andia, Michael Barth, Daniel Bigras, Scott Dial (sales), Alexandre Lauly, Christopher Meadows, Victor Marrero, Tibebe Sileshi, Jeff Winters (sales), Leon Benchlouch

Safran Helicopter Engines

Safran Helicopter Engines had a strong showing in our survey this year, narrowly edging out GE to rank second among the OEMs in overall engine and service satisfaction. As in our previous survey, Safran's tech reps earned particularly high marks; our respondents went out of their way to praise individual Safran employees, and "quality of service and technical reps," "speed of service response time," and "communications" were all areas in which Safran ranked first among the OEMs. As one respondent commented, "Safran listens to their customers. They communicate well and engage. Their **customer focus is a huge strength** for the company."

"The satisfaction of our customers is at the heart of Safran Helicopter Engines strategy; it is reflected in our vision, 'Focused on you,' " the company told us. "This strategy is based on the proximity of our field reps to our customers, which is the backbone of our company. They do everything to keep helicopters flying; they also take every opportunity to report customers' concerns, questions, recommendations, and remarks."

Safran told us that, after our last survey, it launched a global tech pubs improvement based on customer feedback. That effort appears to be paying off: compared to 2016, Safran made statistically significant improvements in "quality of tech pubs" and "website functionality and ease of use," and it also ranked first among the OEMs on those measures.

"The first major milestone was reached in June 2017 with the release of the Web IETP service," Safran said. "This new online

Compared to our last survey, Safran recorded a slight but statistically significant improvement in the cost of parts; however, it still ranks near the bottom of the OEMs on this measure. Our respondents were particularly concerned with the **cost of overhauls**, which one described as "heart-stopping outrageously high." Another commented, "The product is fantastic, but the constant increase in cost is not sustainable."

"We at Safran Helicopter Engines are very attentive of the costs our customers face," the company told us. "Our ambition is to offer the best products and best services to our customers. This requires major investments in continuous research and development, innovation and diligent proximity to our customers, in order to constantly nurture product improvements and enhance our range of services."

Safran said that it has recently introduced a number of cost-saving measures for customers, which include lightening the 15-year calendar limit requirements on various products, extending the time between overhaul (TBO) of the Arriel 2D engine to 5,000 hours, enlarging the number of repair schemes of engine accessories, and reducing the maintenance program of several variants.

"For the oldest engine variants, when the helicopter is getting old and the operator has less visibility of the future, we are able to propose alternative options to overhaul such as engines through upgrades (i.e. newer variants) or low-remaining-hour replacement assets," the company said. "For SBH [Support By the Hour] programs, our customer support managers can offer several

terms and conditions that can be adapted to operators' constraints such as capped price escalations or fixed prices over several years."

Speaking of SBH, Safran said this "pay as you fly concept" is proving to be extremely popular with its customers as a way to smooth scheduled and unscheduled costs through a fixed hourly rate, and to reduce

down-time through immediate support from a pool of materials.

"In addition to this," the company said, "our EngineLife range has recently been enriched with **new SBH customization options** to meet every single operational need: SBH 5Star for small fleet operators (sold through our certified network partners), SBHM for military and various other options to facilitate the enrollment into our program. For instance, through a close working relationship between our customer support managers and our operators, we have successfully designed some customized solutions to alleviate the buy-in conditions and to enable the operators to enter into the SBH program."

"This customization effect pushes the 'by-the-hour' contract ratio upwards. It used to be 30 percent five years ago; it is now 50 percent and it is still growing. In 2017, no less than 100 new SBH contracts were signed worldwide. Whatever their location, their fleet size, the age of their fleet, and their mission are, customers will find their most appropriate solution in our SBH programs."

"THEY HAVE GREAT PRODUCTS AND SUPPORT; THEY NEED TO WORK ON REDUCING OVERHAUL AND PARTS COSTS WHEREVER THEY CAN. MAJOR EVENTS (I.E. OVERHAULS) ON THE ENGINE ARE TYPICALLY EXPENSIVE."

interactive tech pubs is compatible with all devices and features 3D animations and easy-to-navigate folders.

"The gateway to the Web IETP is the EngineLife Customer Portal, formerly known as TOOLS. It has been fully redesigned over the last 12 months to create a real digital experience with Safran Helicopter Engines. With just one click, the customer has now access to new digital services such as health monitoring, e-spares, Expert link (live video feed with Safran experts), MRO process tracking and, of course, Web IETP."

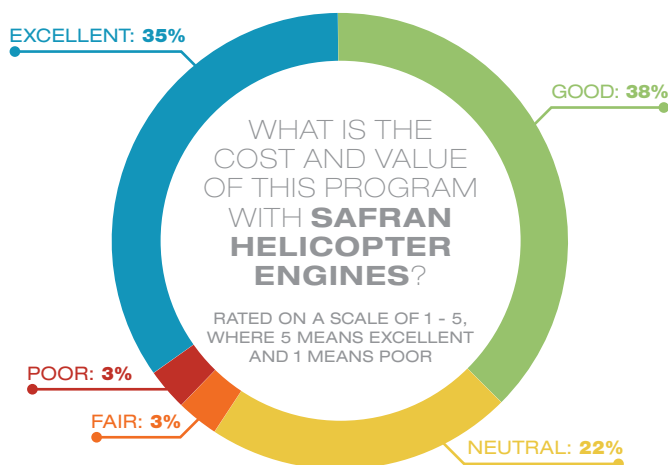
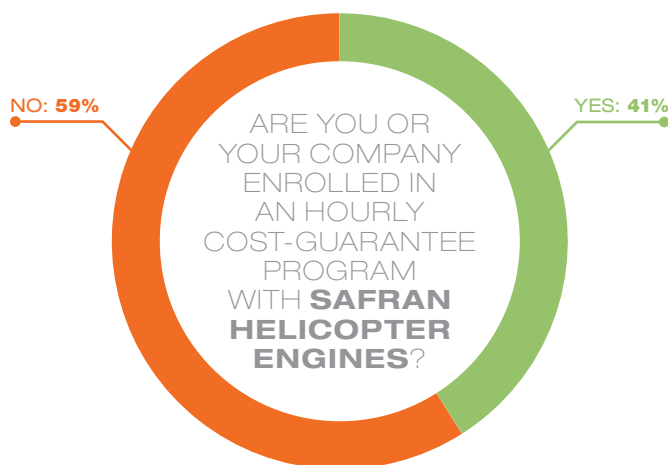
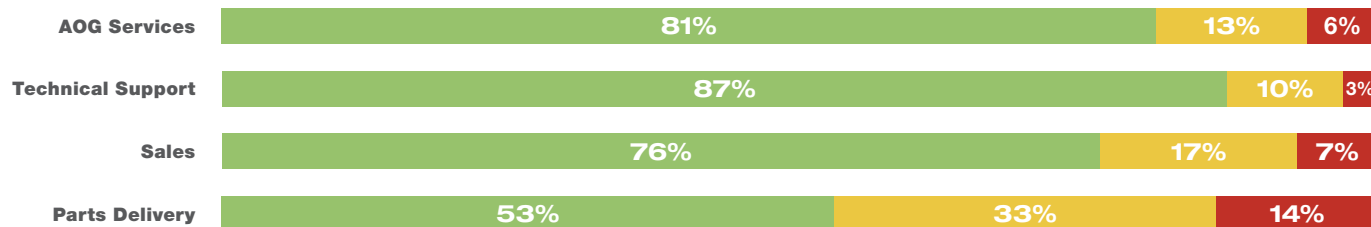
Safran said that it also continues to invest in strengthening its industrial processes and supply chain, with positive results. The company reported that its 24-hour AOG service rate is above 95 percent for the fifth consecutive year; its pool of engines still shows a high availability with a standard exchange service rate of 98 percent; and its average repair turn-around-time for Arriel and Arrius engines is now around 50 days.

"We still also pursue our strategy for product improvement. The mean-time between failure (MTBF) has increased on average by 50 percent for our complete engine range over the last five years," the company told us.



ACTION TIME OF MANUFACTURER

■ Within 2 days ■ 3-7 days ■ More than 7 days



TECH REP SPOTLIGHT

Bob Snow

"One of the best in the business, will absolutely support the customer 100 percent of the time, goes above and beyond to help out."

Russ Morris

"Russ is available 24/7 and is extremely well versed in his product line and will do whatever is necessary to get the problem solved in as short a time as possible with minimal financial impact to the customer."

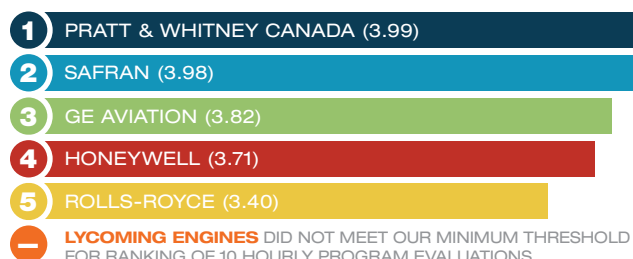
Honorable Mentions:

Mark Brannon, Joe Braz, Alan Dilleuth, Josh Esquivel, Mike Evans, Rich Fullmer, Christian Gabriel, François Grall, Hans Kaehler, Christian Lepage, Eric Levesque, Jason Mitchell, Russ Morris, Bob Snow, Rob Soucy, Mario Venutti, Mathieu Pelletier, Attapon Posaart, Aurélien Ramel, Falk Rechtenbach, Suresh Subramaniam, Francois Grall, Jean-Francois Servant, Jean-Paul Mérieaud, Juan Carlos Lopez Galicia (field reps); Carolina Aranguren, Tom Belew, Carine Martins (customer support managers); Ramona Kok (service engineer); Marie-Anne Michel (product support engineer); Alexandre de Linage, Tiffany Olvera, Raj Naggyah, Gabrielle Choice (customer service representatives)

Overall Ranking



Hourly Satisfaction



All Mean Scores

		GE AVIATION	HONEYWELL	LYCOMING ENGINES	PRATT & WHITNEY CANADA	ROLLS-ROYCE	SAFRAN HELICOPTER ENGINES
COMMITMENT TO PRODUCT IMPROVEMENT	2016	4.24	3.4	3.18	3.88	3.19	3.91
	2018	4	3	3.13	3.99	3.37	3.94
AVAILABILITY OF PARTS AND ASSETS	2016	4.06	3.28	4.09	3.94	3.75	3.57
	2018	3.83	3.04	3.84	3.95	3.75	3.66
COST OF PARTS	2016	3	2.84	3.25	3.05	2.89	2.5
	2018	3.23	2.57	3.2	3.2	2.98	2.8
WARRANTY FULFILLMENT	2016	4.21	3.44	3.62	3.76	3.44	3.76
	2018	4.02	3.22	3.3	3.88	3.46	3.75
SPEED OF SERVICE RESPONSE TIME	2016	3.86	3.3	3.54	3.91	3.62	3.76
	2018	3.87	3.24	3.43	3.88	3.56	3.9
QUALITY OF SERVICE AND TECHNICAL REPS	2016	4.31	3.68	3.56	4	3.91	4.2
	2018	4.12	3.65	3.5	4.06	3.87	4.21
COMMUNICATION	2016	N/A	N/A	N/A	N/A	N/A	N/A
	2018	3.94	3.21	3.26	3.89	3.56	3.99
AOG SERVICE	2016	4.13	3.26	3.58	4.06	3.79	3.87
	2018	4.05	3.41	3.39	4.03	3.75	3.97
SATISFACTION WITH AUTHORIZED SERVICE CENTERS	2016	4.3	3.53	3.79	4.05	3.96	3.71
	2018	3.93	3.73	3.62	4.02	3.93	3.87
SATISFACTION WITH FACTORY-OWNED SERVICE CENTERS	2016	4.22	3.57	3.5	3.79	3.49	3.62
	2018	3.92	3.2	3.38	3.89	3.65	3.75
QUALITY OF TECHNICAL PUBLICATIONS	2016	4.41	3.67	3.56	3.97	3.74	3.62
	2018	3.8	3.27	3.5	3.85	3.71	3.9
WEBSITE FUNCTIONALITY AND EASE OF USE	2016	3.75	2.86	3.09	3.64	3.26	3.42
	2018	3.6	2.82	3.35	3.52	3.33	3.69
QUALITY OF TRAINING PROVIDED	2016	N/A	N/A	N/A	N/A	N/A	N/A
	2018	4.02	3.5	3.49	4.04	3.91	4.07
OVERALL SERVICE SATISFACTION	2016	4.53	3.4	3.49	3.96	3.6	3.79
	2018	3.83	3.27	3.43	3.99	3.66	3.94
OVERALL ENGINE/PRODUCT SATISFACTION	2016	4.61	3.71	3.81	4.13	3.77	4.09
	2018	4.24	3.64	3.73	4.26	3.82	4.07

ON A SCALE OF 1-5, WHERE 5 MEANS 'EXCELLENT' AND 1 MEANS 'POOR'

Methodology

Our combined survey was conducted by PMG Intelligence, a market research and data analysis consulting company based in Waterloo, Ontario. As in previous years, PMG created a dedicated website for our survey, collected the responses, and performed all data analysis. This year, that analysis also included significance tests to determine which mean score differences between our 2015, 2016, 2017, and 2018 surveys were statistically significant.

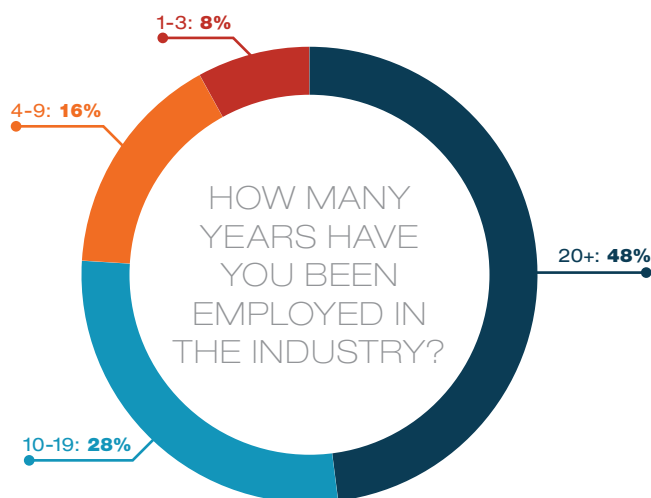
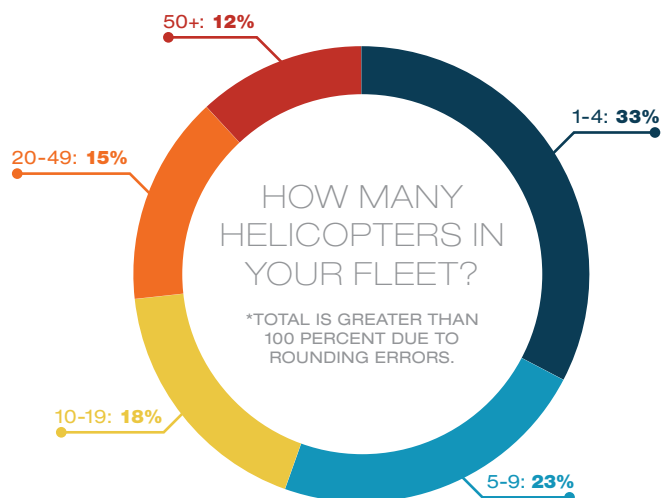
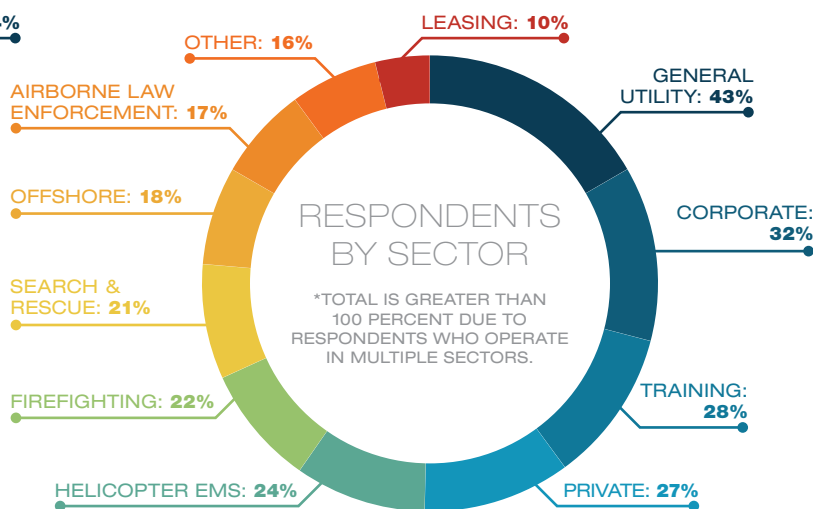
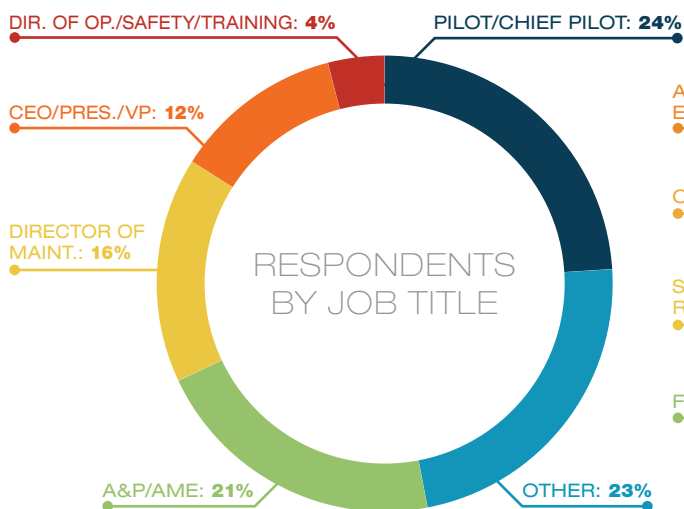
We distributed the survey link via email to subscribers on our *Vertical Daily News* email list, and to customers on mailing lists provided by helicopter OEMs. We also promoted the survey through advertisements on our website and in *Vertical Daily News*; and through promotion on Facebook, Twitter, and Instagram.

The respondents were qualified through the process of initial questions directly related to the helicopter industry. If respondents did not indicate that they are currently employed in the helicopter industry, with recent operational or maintenance experience on specific helicopter models, they were redirected

out of the survey and notified that they did not qualify. If respondents disqualified on the survey, their IP addresses were marked and cross-referenced to ensure that they did not try to re-enter the survey. All responses also underwent a data cleaning process in which response patterns were validated to ensure authenticity of results prior to analysis.

We asked respondents to supply their name and email address for further validation; however, all responses were kept completely anonymous. PMG only provided us with contact information for those respondents who indicated that they were willing to be contacted to discuss their comments.

Data collection took place between March 26 and April 20, 2018. A total of 955 respondents participated in the survey, with 887 respondents completing the airframe survey, and 655 respondents completing the engine survey. To qualify for ranking in our survey, an airframe OEM required a minimum of 50 evaluations, while an engine OEM required a minimum of 45 evaluations.



NOTE: DEMOGRAPHIC INFO IS FOR AIRFRAME SURVEY RESPONDENTS. ENGINE SURVEY DEMOGRAPHICS WERE SIMILAR.



The Helitrades Way

Over nearly 40 years, Helitrades has built and maintained a loyal customer base for its structural repairs, field maintenance and dynamic and hydraulic component overhauls.

Story by Dayna Fedy
Photos by Peter Handley



For nearly 40 years, Helitrades has been providing structural repairs, field maintenance, and dynamic and hydraulic component overhauls for its loyal customer base of helicopter owners and operators. Over this time, it has built a reputation for delivering its services on time and with care, with an average lead time of just one to three weeks.

The company was established in 1979, and today has a staff of 19, with facilities in Vankleek Hill, Ontario; Alliston, Ontario; and Airdrie, Alberta. “We do a lot of hydraulic repair and overhauls,” said Gerald Tom, Helitrades’ president/owner. “We’re a Bell service center, and we also do overhauls on transmissions for [Bell aircraft].”

Helitrades focuses primarily on servicing Bell models, but recently gained the ability to service the Robinson R44 and R66 at its Alliston facility. As *Vertical* went to print, Helitrades was in the process of receiving approval from Robinson Helicopter Company to become a service center for the original equipment manufacturer (OEM) for two locations.

The company’s Vankleek Hill location is a Bell-approved customer service facility for component overhauls on the Bell 205, 206, 206L, 212, 407 and 412. This location also offers field maintenance on the Bell 412. Focusing on specific types of aircraft allows the company’s technicians to hone the quality of their work, said Tom.

Established with a commitment to service at the forefront, Helitrades has been passed down through generations of the Tom family with that commitment intact. “My father was in the helicopter industry, and he had started the company in 1979,” said Tom. “I finished school in ’87 and joined [the company], and then in ’95 I became a partner, and my parents retired.” When Tom took over, he hoped to grow the reliable business his father had spent 16 years building. Since then, Helitrades has continued to thrive.

SERVING MANY

The company provides repairs and overhauls for aircraft belonging to the Canadian Armed Forces, the Canadian Coast Guard, and other commercial and government operators in various parts of the world. Although it’s a modest-sized company, Helitrades has completed work on dynamic and hydraulic components for 85 Canadian Armed Forces aircraft over the last 19 years, as a primary vendor through Bell Helicopter Textron Canada. Alongside this, the company provides transmission overhauls at its Airdrie location for Bell 412s operated by the Department of National Defence (DND).

With its facilities located solely in Canada, it’s no surprise that the majority of Helitrades’ business comes from Canadian helicopter operators. And with Bell establishing its Canadian franchise in 1986, there are now roughly 4,900 Bell aircraft manufactured in Canada — and roughly 1,000 Bell helicopters operating in the country — creating an abundance of service opportunities.

A small percentage of Helitrades’ business comes from customers in the United States who are looking for specialized helicopter services to be completed on budget — which is even more achievable with the Canadian dollar being quite low against U.S. currency. “The reason we don’t get as many [customers] from the United States is because they seem to be pretty loyal to going to [facilities] that are already down there,” explained Tom. “But that may change in the future.”

Helitrades’ extensive capabilities have also resulted in the company expanding to provide services for various oil companies in the Middle East that use helicopters for their operations. Tom said the company supplies spare parts for Bell aircraft to these companies, and it often receives aircraft components from overseas customers that require hydraulic repairs.

1 // Canadian company Helitrades focuses primarily on Bell helicopters, performing maintenance, repairs, and component overhauls on the manufacturer’s rotorcraft. The company provides services for Bell aircraft belonging to the Canadian Armed Forces, the Canadian Coast Guard, and other commercial and government operators in various parts of the world. **Mike Reyno Photo** **2** // Helitrades technician Jean-Roger Lalonde is shown disassembling a Bell 206 hydraulic servo. **3** // The family-owned business started out in 1979 with just a few employees, and now has a total staff of 19. Helitrades’ president Gerald Tom (far right) took over the company from his parents in 1995. **4** // Helitrades is one of two companies in North America that has a Woodward HRT-approved facility. Its Vankleek Hill location has all the right tools to perform overhauls on HRT hydraulic components, which are featured in numerous Bell aircraft.



1



2



3

UNIQUE CAPABILITIES

The majority of Helitrades' services consist of hydraulic component overhauls for aircraft. With several Bell helicopter models featuring hydraulic components manufactured by Woodward HRT, Inc., Helitrades decided to become a Woodward HRT-approved facility, making it one of only a few companies that have the ability to perform maintenance and overhauls on these particular components. "There are only two of us in North America, so we get quite a bit of volume because of that," said Tom. The company will see HRT hydraulic components from Bell 204, 205, 206, 206L, 212, 407, 412 and 427 aircraft go through its facilities.

Three years ago, Tom and the company decided they wanted to offer more than component overhaul services to their customers, and purchased Usacan Aviation Sales — a sales, overhaul and major repair facility in Alliston that also specializes in Bell helicopters.

"We wanted to expand our Bell capabilities further, and [Usacan] seemed to be the best way to go," explained Tom. "It was cost-effective to buy the equipment used rather than buying new."

The move allowed the company to carry out structural repairs for Bell aircraft, including main cabin and tailboom structural repairs for Bell 205, 206 series, 212, 407 and 412 helicopters. Usacan is now rebranded under the Helitrades name, and its Alliston facility focuses mainly on field maintenance for Bell models, as well as services for the R44 and R66; Helitrades' structural repair services have been relocated to its Vankleek Hill location.

Though it focuses mainly on helicopter components, Helitrades will sometimes see entire aircraft go through its facilities. At the beginning of the year, the company received a request from the government of Maine to perform a structural repair on a Bell 206, which was completed in February. Having the appropriate structural repair approvals from Bell made Helitrades the right candidate for the job. Tom said the low Canadian dollar is also an added bonus for helicopter operators in the U.S. who are looking for the types of services Helitrades offers.

For its Canadian customers, the company does its best to offer cost-effective services with quality results. "Being a small owner-operated business, we can be more flexible on pricing than larger companies," said Tom. "Quality is always first, but next [to that], very close, is pricing." For Helitrades, these are the two key factors it has found its customers value the most.

For the last 39 years, Helitrades has stuck with what it knows best: Bell helicopters. And its employees have become specialists on the OEM's rotorcraft. However, broadening the scope of aircraft the company performs maintenance on isn't entirely out of the question; if an opportunity to expand presents itself, it would be a plausible option, Tom said.

Helitrades is gearing up for its 40-year anniversary in 2019 — a remarkable milestone for any business. When *Vertical* asked Tom what he believes is the secret to success, he replied, "Quality... quality is the main thing, and always coming through on what we promise to do."



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.

1 // Technician John Metivier completes a final assembly of a Bell 412 hydraulic cylinder. 2 // While the Alliston facility now focuses mainly on field maintenance for Bell models, as well as services for the Robinson R44 and R66, all structural repair services have been relocated to the Vankleek Hill facility. 3 // Helitrades technician Gilles Cuerrier carefully inspects a valve belonging to a Bell model.

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Sky Helicopters has built its reputation as a premier flight training and newsgathering operator with a fleet composed entirely of types from just one manufacturer: Robinson Helicopter.

**Story & Photos
by Skip Robinson**



DOWNLOAD WALLPAPER



SKY now has an R66 Newscopter in its fleet. Its smoothness in flight, power, and extra space are proving popular.



Finding the right tool for a job can sometimes be a challenge. But when Ken and Connie Pyatt picked a Robinson R22 to begin operations with the helicopter company they were establishing in Garland, Texas, in 1992, it was quickly clear they had found a perfect vehicle for their ambitions. Over the following years, as SKY Helicopters' grew its fleet, it stayed true to the manufacturer that was fueling that growth. And today, the full range of Robinson types — from the R22, to the R44, R66, and even the new R44 Cadet — can be seen flying out of and into SKY's facility at the Garland/DFW public heliport,

performing flight training, electronic newsgathering, and general light utility operations in the North Texas skies.

SKY Helicopters and Robinson are so well matched that in addition to SKY operating a fleet of 23 of the manufacturer's aircraft (seven R22s, two R44s, 10 R44 Newscopters, two R44 Cadets, and two specially-equipped R66s), it serves as a Robinson Helicopter Dealer and Robinson Factory Authorized Service Center for the R22, R44, and R66.

"I don't know how we could have done all of this without the Robinson product line," Connie said. "They are everything that

1 // The new Robinson Cadet trainer is a winner, said Ken Pyatt. He is very happy with its performance and especially its air conditioning on hot Texas summer days. **2** // Connie and Ken Pyatt have built a very successful business using Robinson Helicopters, and they now operate two heliports. **3** // A good pre-flight makes sure everything keeps running smoothly.



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Frank Robinson designed them to be: reliable, economical, and able to do as advertised."

The couple's ties to aviation stretch back to Ken's time in college, where he started flying small airplanes while working on his electrical engineering degree. After college, he moved to Dallas to work for Texas Instruments (TI) and spent 13 satisfying years there. "TI taught me how to plan, strategize, [and] how to get stuff done," he said.

During a work trip to Europe, Ken stopped in at Sloane Helicopters, near London, U.K., for a flight in an R22. "That was pretty much it for me," he said. "That flight began the end of my corporate career. You have to have a reason to bound out of bed every morning and go to work, and flying helicopters did this for me," he said. He now sits at 9,000 rotorcraft hours.

Connie's background is in the graphic arts. "Neither of us were young when we started SKY helicopters," she said. "We were willing to sacrifice to make this business work. Through years of hard work and good management, we expanded to where we are today with a large fleet, good contracts and paid-off helicopters. In the end, both Ken and I were passionate about SKY becoming a successful business."

A LONG RELATIONSHIP

Today, SKY's business is composed of about 30 percent flight training, 30 percent aerial electronic newsgathering (ENG), and 30 percent light commercial (including energy surveys, aerial photography and videography, and flightseeing tours). The remainder is composed of its maintenance, sales and fixed-base operations (FBO) work.

After establishing itself in its first few years with the R22, a pivotal moment for the company was the delivery of its first R44 in 1995 — one of the first of the type ever produced. "We knew it would change our business for the better," said Connie. "With its four seats and additional power, the R44 gave us the ability to carry more, fly farther, and do things the R22 simply couldn't do."

SKY also bought the second R44 Newscopter Robinson produced, which started the operator's ENG business. More recently, it bought the first-ever R66 Newscopter and a couple of the first few R44 Cadet trainers, which Ken said have proved popular with the company's students.

"Over the years, we've leased a Bell 407 and then owned an [Airbus] EC130, and we just couldn't make any money with them," said Ken. "For what we do, the Robinsons are a proven moneymaker. Robinson has a strong engineering staff, and product support has always been great. All the Robinson product lines are reliable, but when we have an issue, it doesn't cost much to fix it and we get parts quickly."

SKY Helicopters recently invested in a police version of the R66 with plans to get an independent air support unit established using an all-inclusive business model — similar to the model it offers ENG customers. The idea is that small communities will be able to use SKY's police R66 when required, offering them the benefit of an airborne law enforcement asset at a fraction of the cost of a full-time unit. To date, SKY has trained 26 local officers as tactical flight officers (TFO), and is ready to begin providing the service.

As a Robinson Factory Authorized Service Center, SKY performs Robinson overhauls and other routine maintenance

1 // Training flights are a daily occurrence at the busy Garland Heliport. 2 // Maintaining, overhauling, and repairing a fleet of 23 Robinson Helicopters keeps SKY's maintenance staff busy.



R44

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work at its Garland location. "We have an outstanding maintenance team, one of the finest directors of maintenance and best A&Ps I've ever come across," said Ken. SKY's maintenance team also offers maintenance for third-party helicopters. "We can do simple annuals all the way through to the heaviest of maintenance jobs," he said.

"WE THINK WE HELP [STUDENTS] GO OUT INTO THIS INDUSTRY WITH BETTER TOOLS IN THEIR TOOLBOX. THE LEARNED SKILLS OF CONDUCTING A REAL COMMERCIAL FLIGHT GIVE OUR PILOTS AN ADVANTAGE IN THE REAL WORLD."

- CONNIE PYATT, VICE PRESIDENT OF SKY HELICOPTERS

AN EVOLUTION IN TRAINING

As part of its training program, SKY conducts around 50 check rides per year. "Obviously it depends on the economy, but flight training has been very steady for us since we started the company," said Ken. "We have a nice blend of full-time part-141 students, and part-time private/commercial/instrument students. Some of our students just want to fly recreationally, and we keep those folks [as customers] for years as renters or eventually helicopter owners."

SKY hires its instructors only after they complete the Robinson safety course, as Ken considers the course very

important in maintaining safety and a good understanding of the manufacturer's helicopters. "We try to hire from within, but occasionally hire from outside the company," said Ken. "We know if they trained here they will be experienced with the DFW area's complex airspace, and by the time they move over to flying our ENG contracts, they know the area very well."

Although SKY has used the R22 for flight training because of its lower hourly cost, Ken has become a big fan of the new R44 Cadet. "I love them," he said. "This [Cadet] will prove to be a home run for Robinson."

Among the Cadet's benefits are an air-conditioned environment

(particularly helpful in Texas and other warm states), a wider weight-CG envelope, and better performance at altitude. "I think Robinson got it right with the Cadet and it will become the standard for flight training," said Ken. "Now that Robinson added a float package for the Cadet, it gives the aircraft additional flexibility."

Connie said SKY tries to pay its CFIs better than most flight schools to make sure it keeps good people. The company also offers them diverse flying opportunities, including tours, photo flights and survey/charter opportunities.

"We think we help them go out into this industry with better tools in their toolbox," said Connie. "The learned skills of conducting a real commercial flight give our pilots an advantage in the real world."

COVERING THE NEWS

SKY first proposed using the R44 NewsCopter to TV stations in the late 1990s, and picked up a number of part-time jobs, backing up existing operators around the country when they went down for extended maintenance, overhaul, or in-between contracts. "Back then, TV traffic watch was still done in helicopters, and there was a need for a reliable, inexpensive solution — and the R44 worked out perfectly," said Ken. "We would fly 1,200 hours per year just on one contract. Nowadays, TV traffic is pretty much all DOT [Department of Transportation] cameras or interactive graphics."

When the U.S. switched from analog standard definition TV to digital high definition TV in 2008-2009, SKY was ready with the latest R44 HD cameras and transmitters. "Three of our four TV stations in DFW were network-owned, so there was a tremendous amount of technical and organizational scrutiny," said Ken. "Our big-market news customers had to be sure the airframe and its ENG equipment were capable of near-24-hour per day operation."

In 2017, SKY added the R66 Newscopter to its fleet. The R66 has

Field Maintenance for Bell 206, 206L, 205, 212, 412 and Robinson R22 and R44.

Dynamic and hydraulic component overhaul and part sales for the Bell 204, 205, 206, 206L, 212, 407 and 412.

Structural Repairs Fixtures for Bell 206, 206L, 407, 205, 212, 412.

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Electronic newsgathering (ENG) is a big part of SKY's business. With Robinson's Newscopters, they can provide a reliable and economical service for smaller ENG markets.

the ability to seat four people because its news equipment is placed in the helicopter rear storage bay. "The R66 is a real performer," Pyatt said. "Robinson produced a reliable low maintenance machine with excellent power on hot days and an air conditioner fully up to the task of keeping the pilot and equipment operator cool."

Today, Sky flies full-time for all four networks in the Dallas-Fort Worth region (FOX, CBS, NBC, & ABC) as well as for other TV stations around the country. For DFW TV stations, SKY supplies the R44 or R66 Newscopters, as well as the pilots and camera operators. "We're able to microwave real-time HD video from over 100 miles away, serving the 7+ million TV viewers in North Texas," Ken said.

SKY's news flight crews base out of a newsroom at the Garland Heliport building, providing coverage Monday through Friday from 5:30 a.m. to 6:30 p.m. The company also has crews available for after-hours or weekend news events. "To get called out during the weekend usually takes a pretty big story but we are always available to go," said Ken.

The company has always made an effort to keep up with the changing TV technology in its fleet. "We can beam down two separate video streams

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simultaneously, embed picture-in-picture video from the cockpit, or add street-mapping overlays to the video," said Ken. "[The aircraft is] more of a flying command center than a helicopter with some TV equipment."

He said the next evolution in TV will be broadcasting 4K. "It's already being demo'd in several markets and we're gearing up with 8K cameras just to make our equipment future-proof," said Ken. "These big camera sensors present a whole new set of technical challenges — the data rates coming off the cameras are immense. We are looking at installing 100 Terabyte servers on the helicopter just to hold the video."

A BROAD BASE

The Garland/DFW public heliport, located about 10 miles northeast of downtown Dallas, is one of three public heliports that serve the greater Dallas-Fort Worth area. Sitting on the Dallas-Garland border, facing a major six-lane artery, and moments away from interstate highway I-635, the heliport has a very urban feel. It opened in 1988, but SKY took over the responsibility of managing it in 1992.

"The Heliport had some humble beginnings," said Ken. "We say we worked out of a 'modular terminal building' because it sounded better



than 'doublewide trailer.' One of the first things we did was build a 4,000-square-foot [370-square-meter] hangar to house our only R22. I thought 'Oh, we've overbuilt,' because the R22 just looked so lonely in that hangar."

But as the company's fleet grew, it filled that hangar beyond capacity. In 2005, SKY constructed a new facility that includes a 6,000-square-foot (560-square-meter) terminal, a 10,000-square-foot (930-square-meter) hangar, and a 4,000-square-foot covered canopy. This was then followed by the construction of

more ramp space and more hangars. "That last hangar project consumed all the available land at Garland, and we started considering a second location," said Ken.

The Garland heliport contains offices, conference rooms, training areas, and bathrooms with showers and changing areas. There is also a dedicated newsroom/office where the news crews can watch for breaking news, work on video already gathered, or just rest while waiting for the next flight. There is even a kitchen area where there's always something for lunch,

1 // Ken Pyatt still enjoys flying as much as he did when he started over 25 years ago. **2** // The Pyatts decided to establish the DeSoto Heliport after the Garland location reached its build limits. It opened for business in 2014. **3** // The Garland Heliport. Ken and Connie took over responsibility for managing it in 1992, and have gradually expanded SKY's facilities there over the years.



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SKY recently added a police version of the R66 to its fleet. It plans to offer the aircraft to small communities on an all-inclusive basis when they need it.

since news crews are on standby and can't leave the building. A nice additional touch at the heliport is an "after hours conference room" where the team can get together and socialize after work.

Because Garland Heliport was reaching its build limits in the mid-2000s, Ken and Connie began looking to expand with a second location. "We looked around the area and decided we did not want to be at an airport," Ken said. Instead, the couple decided to open a new public heliport in DeSoto, about 20 miles south of Garland. The move was supported by DeSoto's mayor at the time, Colonel Bobby Waddle.

Built on 19 acres in an industrial setting, the heliport comes with a long-term lease. It includes a 10,000-square-foot hangar, a combined 25,000-square-foot [2,320-square-meter] hangar and office space, a self-serve fuel farm, a 32-space parking lot, and easy road and highway access. A large multipurpose room can be reconfigured to accommodate classes or conferences for up to 60 people. Texas air medical operators CareFlite and PHI Air Medical routinely conduct training for their pilots and medical crews at the heliport.

Ken and Connie designed the heliport to be neutral and not strongly associated with SKY Helicopters. "We wanted DeSoto to be an independent heliport and not be known as SKY Helicopters South," Ken said. It took about five years to plan the project, with construction taking a further year. The heliport opened for business in August 2014.

During the design stage, the Pyatts decided to put extra effort on the architecture. "It mattered to us how it would look from the outside," said Connie. The same applied to the interior. "I like nice artwork, I like tasteful decorating where we work everyday," said Connie. "An attractive and tasteful work environment helps retain good people and influences operators or clients who decide to locate here."

PHI Air Medical moved its maintenance personnel to DeSoto to perform work on all the operator's North Texas-based air medical aircraft. PHI also conducts pilot training out of DeSoto, including initial airframe, recurrent, and night vision goggle training, keeping an EC-135, Bell 407, and Bell 412 in DeSoto for the purpose.

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THE FLYING FROEBES

How three farm boys from rural Manitoba made Canadian aviation history with a homemade helicopter at the height of the Great Depression.



1 // Doug Froebe in the pilot seat during a run-up test of the original Froebe helicopter during the fall of 1938. **2** // Doug sits on a man-powered coaxial helicopter designed by the Froebe brothers at the family's farm in Homewood, Manitoba. Unfortunately, they were unable to make it fly. **3** // A front view of the Froebe helicopter in front of a farm building. Note the small fuel tank on the side of the engine. **4** // The three Froebe brothers – Doug, Nicholas, and Theodore – on their farm in Homewood in the mid-1930s.

The small community of Homewood, Manitoba, may not be the first place that comes to mind when people think of Canadian aviation landmarks, but it was the location of one of the most notable achievements in the country's aviation history — the flight of the first Canadian-made rotary-wing aircraft. The story behind that flight, which took place in the winter of 1938/1939, is the story of three brothers: Douglas (Doug), Nicholas, and Theodore Froebe.

The Froebe brothers were born in Chatsworth, Illinois, during the 1910s, where they regularly saw early aircraft flying over their farm. "I guess that's where I became interested in flying machines to start with," Doug Froebe later recalled in an interview with the Western Canada Aviation Museum. "There were Curtiss JN-4 'Jennys' and de Havilland DH.60 Gipsy Moths, and all kinds flying over."

In 1921, the Froebe family immigrated to Canada after their father purchased a farm in Manitoba. As they matured, the mechanically gifted Froebe boys experimented in building sleds and snow machines on the farm, while continuing to read up on developments in aviation. They saw an ad in *Mechanics Illustrated* magazine about the Heath Parasol kit, and placed an order for the "build-your-own" airplane.

Powered by a 27-horsepower motorcycle engine, the Heath Parasol was a high-wing, single-seat airplane with a 26-foot wingspan. Over 20,000 were built and 24 were registered in Canada. The aircraft was found to be very stable, and it handled quite easily. The kit cost about \$1,000 — a lot of money in the late 1920s.

The Froebe brothers' aircraft gradually came together, and it was ready to fly in 1927. But the brothers' attempts to get the aircraft into the air, having had no flying instruction, were not successful.

Doug Froebe knew he had to get some flying lessons. He contacted Connie Johansson, of Johansson Flying Service, in Winnipeg and was soon taking his first flying instruction in a de Havilland DH.60 Gipsy Moth. According to Doug, at one point during the flying lessons, Johansson turned to him and said, "Take the control stick between your two fingers; you are not handling a plow now." Doug soon caught on and made some competent landings.

He returned home and started flying the Heath Parasol. After his first successful flight, he moved the tail wheel back on the fuselage to correct a tail-heavy issue. The brothers also had to warp the wings so as to counteract the engine torque. But on his next flight, Doug quickly became lost. After making a complete turn and straightening the airplane out at about 100 feet elevation, he was able to land in a soft field without hurting the Parasol. On his fourth flight, Doug was not so lucky. After getting airborne, he got uncomfortably close to some high tension powerlines. He pushed down on the stick, and the underpowered Heath Parasol ended up landing partly on a gravel road, sliding into ditch, then ending up in a fence. The fuselage and landing gear were damaged, but Doug was fortunately not hurt.

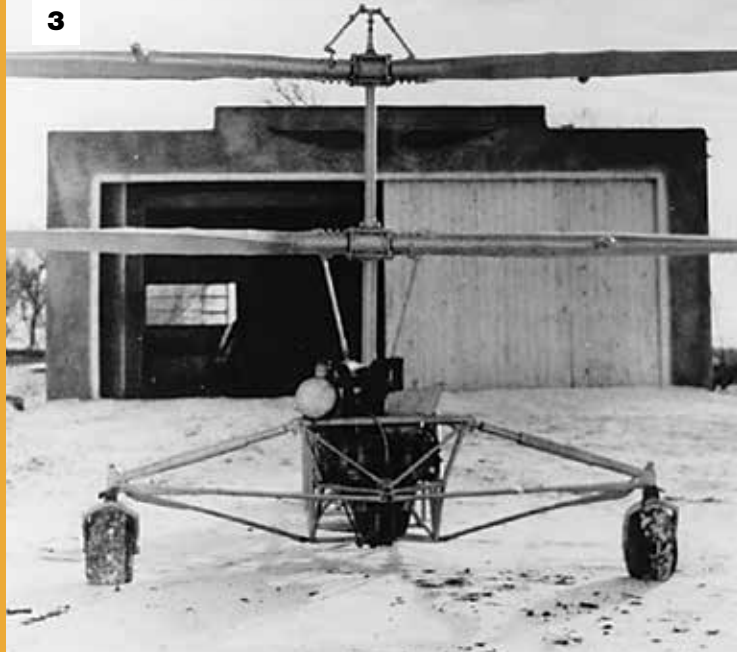
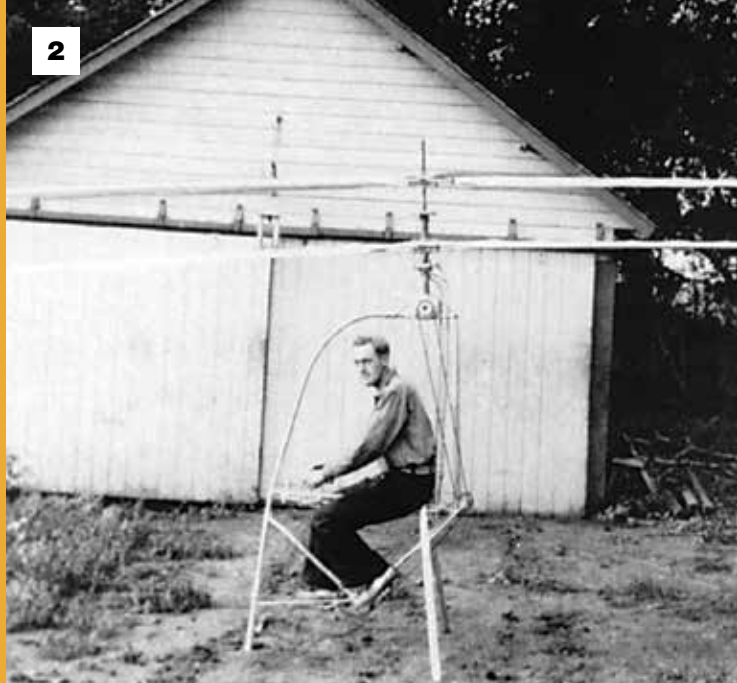
Undeterred, the brothers purchased a damaged Barling NB-3 aircraft for \$250. Designed by Walter Barling in 1927, the NB-3 was a tandem-seat low-wing aircraft with an open cockpit. It was powered by a 60-horsepower Anzani engine, which was later upgraded.

The three Froebe boys restored it back to flying condition as money became available. Nicholas, Theodore, and Doug travelled to Portage la Prairie to take proper flying lessons on the Barling NB-3, and all became proficient flyers as time went by. Then, in 1933, a friend had an accident with the aircraft near the Froebe farm. This ended the brothers' fixed-wing flying for a while.

SWITCHING TO ROTARY-WING

It was about this time that the Froebe brothers turned their attention to rotary-wing aircraft. Aware of the limitations of contemporary projects to develop helicopters, the Froebe brothers knew they needed to solve problems with torque and design a successful rotor system if they were to successfully build their own.

The boys headed to Oakland, California, during the winter of 1936/1937 to find out all they could on rotorcraft design and their



**1****2**

dynamics. Doug met James Nisson, a student studying aeronautical engineering at Berkeley, and explained their plan to build a rotorcraft. Nisson put him in touch with Professor Ward, an aeronautical engineer at the University of California, Berkeley Campus. Ward worked with Doug on design parameters, and was quite enthusiastic about the rotary-wing project. He suggested the Froebes talk to Walter Barling, the inventor of the Barling aircraft, who wanted them to come down to California to build their rotary-wing aircraft.

Next, they needed to find an engine for the proposed helicopter. Charles H. Babb, owner of one of the largest used aircraft dealerships in the Western U.S., sold the Froebes a de Havilland Gipsy 98-horsepower Cirrus engine for \$100 in January 1938. The boys also picked up wheels and oleos for the helicopter, and hauled everything back to Canada in their house trailer.

With great enthusiasm, the Froebe boys went to work on the helicopter frame. Between them, the three had skills in design, mechanics, and welding. MacDonald Brothers Aircraft Ltd. in Winnipeg, Manitoba, supplied the aircraft-grade steel chrome molybdenum metal tubing for the frame.

The construction of the helicopter with the Gipsy Moth engine proceeded smoothly, and next came the clutch assembly and flywheel for forward thrust. The transmission designed by Doug was from available farming machinery components, while the crown gears and a pinion were from a Chevrolet truck. Designing a flange to fit the pinion,

Theodore Froebe then welded it to the shaft. The gear case was constructed of chrome molybdenum steel which had to be bent and welded to shape. The drive and contact bearings were SKF bearings.

The engine was installed in the helicopter on Sept. 5, 1938, and it was bolted to the gearbox. There were a few problems starting the engine, but that concern was soon worked out. By November, the engine had been run up from 1,300 rpm to over 2,000 rpm.

To provide the aircraft's lift, the Froebes decided on a coaxial design with two main rotors turning in opposite directions. This would solve antitorque problems. "The rotor blade design was just logical thinking — you know, a coaxial design," Doug recalled in his interview with the Western Canada Aviation Museum.

The rotor blades were constructed of metal with a fabric covering. The main spars were 18-gauge metal for four feet out from the hub, then 20-gauge metal out to the tip. MacDonald bent the spars and welded them together to form a semicircular half, eventually welding the halves together. The curve design of the blades came from the U.S. National Committee for Aeronautics. The curve on the bottom was the same as the top of the blade. The rotor blades provided lift and directional control, and the original versions were 20 feet in diameter. The vanes (rotor blades) were not covered during run-ups in October/November of 1938.

The Gipsy Moth engine was started by pulling the lower rotor blade around, disengaging the clutch when the engine started. The speed was increased and the clutch eased in, thus turning the rotor blades once the engine was up to the required speed. "The spars [were] really strong," Doug recalled. "You could hang right off the tip of the blade and tip the whole helicopter over from it. There was hardly any flexibility at all. Ours were rigid all the way through."

The helicopter was 13 feet and seven inches long. The pilot sat in a single seat at the rear of the helicopter with the main rotor mast and engine in front of him. The undercarriage had a two-wheel arrangement up front with a single tail wheel at the back. The fuel tank was originally located in the front of the fuselage.

In terms of controls, the helicopter had a collective, cyclic, and throttle, with a stick for directional control. The hubs were basically a flange with a tubular spindle and SKF bearings. The control arms were mounted forward at the leading edge so that the controlling arm would correct the tracking of the blades. "We figured if we could control the cyclic pitch control on the lower blades, it would be sufficient to give lateral and longitudinal control, and of course, the directional control is by torque, by increasing the top and decreasing the bottom through foot pedals," recalled Doug. "There was a crank-operated collective pitch control through which you could increase all the blades together."

1 // A top view of the rotor hubs on the two coaxial blades. The blades were rigid all the way through. **2** // The Froebe helicopter with the original 20-foot counter-rotating metal blades. The metal blades were covered in fabric.



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TAKING TO THE SKIES

By the late fall of 1938, as the Froebes prepared to attempt to get their aircraft airborne, snow had already started to accumulate in the fields around Homewood. With Doug selected as the pilot, ground run ups began in November, and by mid-December, the Frobes were ready for air tests.

On Dec. 20, Doug got into the pilot's seat, and the helicopter was started up. He made his first attempt at flight after reaching about 1,400 rpm. Working the controls, the tail rose up about three feet, and Froebe pulled the stick back, resulting in the two front wheels leaving the ground. The helicopter was in the air. Froebe was able to fly a short distance and settled the helicopter to the ground. The first "flight" had lasted about 20 minutes — and was a huge success.

Nicholas Froebe wrote in the log book: "3 wheels off. Running very true. Several jumps were accomplished with all wheels off at once. Highest being 3 feet. No failures were encountered."

The team was extremely excited, but Doug was a bit nervous about the whole episode. "It was a harrowing kind of experience," he recalled. Nevertheless, history had been made — the first man-controlled vertical flight in Canada.

However, there were a few problems that required attention. It was obvious that the helicopter was nose-heavy, and there was significant vibration and shaking. The gas container was moved to the back of the helicopter behind the pilot's seat to improve the center of gravity. Later flights saw the helicopter reaching five to six feet off the ground for distances over 50 feet.

But the severe vibration continued to be a problem as additional flight tests took place. The Froebes lengthened the rotor blades to 28 feet, which resulted in some improvement. Next, they removed some of the rubber from the rotor hub mounts, and added balance weights on the leading edge of the blades. Nicholas tried to fly the helicopter during one of the flights. The helicopter shook so badly that he never tried to fly it again.

The aircraft also experienced torsional problems, which developed after it passed 1,400 rpm. Eventually, bearings in the rotor hubs failed and they were unable to solve the problem. A few months into 1939, after trying to refine the helicopter into a reasonably safe aircraft to fly, the Froebes abandoned their project. They had carried out a series of short flights for a total of four hours and five minutes of flight time by March 2, 1939.

All this was during the depths of the Great Depression of the 1930s, when money was hard to come by, and the world was on the brink of war. Disappointed, the Froebe brothers decided to go back to fixed-wing flying.

MAKING A MARK

After the war, Doug was approached by a group of businessmen that were interested in forming a company to promote the development of helicopters. All he had to do was build a flyable helicopter, and then he could apply for \$100,000. "I would supply the helicopter and would be the test pilot," he recalled. He also had to put up a \$50,000 of his own money into the new company, for which he would get one-fifth of the company. He turned the offer down.

Sadly, Theodore was killed in an accident while flying a Heath Parasol in 1943, and Nicolas died in a crop dusting accident in 1959. Doug continued to do some flying over the years and ended up moving to California. He maintained his interest in aviation.

In the mid-1970s, Doug returned to Manitoba to start a new aviation venture. "I built a 20-foot diameter aircraft that I called an ornacopter which had wings," he recalled. "By flapping with the wings you would eliminate the torque. I had two wings flapping down and two flapping up at the same time. It weighed around 130 pounds. I brought it up to Homewood in 1976 to try it out. I was able to get about 25 to 30 revolutions per minute out of it just by peddling." However, Doug never was able to get his ornacopter to fly. He ended up giving it to the Winnipeg museum.

The original coaxial helicopter was found in a granary on the Froebe farm in the 1970s in surprisingly good shape. Arrangements were made with the Froebe family to have it moved for display at the Western Canada Aviation Museum (now renamed the Royal Aviation Museum of Western Canada) in Winnipeg.

In later life, Doug said of the Froebe helicopter: "I don't know if it amounts to much — maybe an interesting object of art, I suppose you might say."

Despite this modesty, the Froebes had a lot to be proud of. They had made history in the Canadian aviation industry, achieving rotary-wing flight before Igor Sikorsky flew his VS-300 helicopter in the U.S.

This year will mark the 80th anniversary of the Froebe helicopter flight, and the town of Homewood has not forgotten its place in aviation history. It is marking the occasion with the erection of a special monument to celebrate the Froebes' historic achievement.



Bob Petite | Bob is a member of the Twirly Birds, the Vertical Flight Society, the Canadian Aviation Historical Society, the American Aviation Historical Society and the Bell 47 Helicopter Association, Inc. He is the author of *The Bell 47 Helicopter Story*.

1 // Doug Froebe designed and built the Froebe helicopter with his two brothers Nicholas and Theodore. He was the self-learned test pilot for the rotary-wing aircraft in Homewood. **2** // A later view of the Froebe helicopter on a cold snowy day. A larger fuel tank was put at the back of the helicopter to improve the center of gravity, and the rotor blades were lengthened to 28 feet.



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There I Was...

written by Dorcey Wingo

Where Did Scotty Go?

When our Huey-loggin' outfit moved to the high plateau overlooking Payette Lake north of McCall, Idaho, we were very happy to be working the summer in "God's Country." Except for the fact we'd be logging at the ragged edge of a Huey's performance, aka high density altitude.

I considered myself fortunate to have a mechanic who was well known to me, someone I trusted like a brother. "Scotty" and I had worked more than one job together, crewing fire-fighting Lamas in the High Sierra — or pushing tin in and out of the main hangar back at home base. Scotty was The Man!

On remote logging jobs like this, it was not uncommon to find the field mechanic camped out in his trailer adjacent to the helicopter "service landing." From there, it was a hop, skip and a jump to work every morning for a Huey mechanic who went to bed late most every night.

Scotty was too cheap to spend good money on a trailer. He had a substantial emu ranch under way back in Oregon, the place he called home. In the field, he spent precious little on himself. Most of his per diem money was being reinvested in emu egg-incubators and fencing materials.

So, instead of living in town in a \$30-a-night pink motel room or camping out in a trailer next to the bird, Scotty did all his eating and sleeping in the company's one-ton Ford service van.

Never mind that the van was already fairly full of tools, parts, manuals, and lubricants. Scotty saved space by cooking on a Coleman stove and eating everything out of the same skillet, needing only a large spoon and a fork to round out his silver service. AM radio for the news.

He made his bed on the ¾-inch plywood floor of the van, devoid of a mattress or even a pad.

I, for one, admired my mechanic's determination in saving his hard-earned money. He was one tough character, as far as I

Chris Rohrmoser Illustration



was concerned. I pampered him whenever I could, but he took a lot of pride in not asking for favors, or complaining about conditions whenever it hailed hard, or nights were lonely and cold.

I had been working on my logging memoirs during this time with Scotty, which probably made me more introspective about him than your average, devil-may-care logging pilot. I put myself in his shoes frequently; when I was cozy in my motorhome, enjoying a good movie from the DVD player, Scotty was wrenching away on a tall ladder, or huddled in his stinking sleeping bag.

Driving up the logging road to "service" every morning before dawn, the tops of three large boulders would come into view, then a tall dead snag, then our faithful Huey. I could depend on Scotty having done the morning inspection with a signed-off maintenance logbook by then.

There was no little blue building anywhere on this state-sponsored fire sale, so pilots took their "breaks" in a nearby weed patch, and I assumed that our mechanics did the same. They had work shovels, after all — but many weeks would go by before I needed to borrow Scotty's shovel.

It turns out that the suits who worked for

State Forestry back then paid little heed to the service landing. Their forest had burned down a year before our materialization, after all, so they were primarily concerned with harvesting the salvageable timber and planting new trees. Why would they question where our mechanics "went" — as this writer did — months into the project?

So it finally came to pass that we were in a midday maintenance break, and I inquired of Scotty where "the head" was. Scotty pointed toward the three prominent granite boulders, adding, "the blue shop towels are in the van." Damn it, I had some Charmin back in the motorhome!

The boulders were over 20 feet high and arranged in such a manner that, as you walked through the two closest to service, a shady grotto would come into view. And from one end to the other of this stinky retreat, there were HUNDREDS of used blue shop towels strewn about, and months of unburied business.

In shock, I suddenly no longer needed a shovel. I was not going to contribute to the bad news behind the boulders. I had gleaned something important, though. I knew where Scotty went. And it's not an easy thing to get out of one's head.



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