

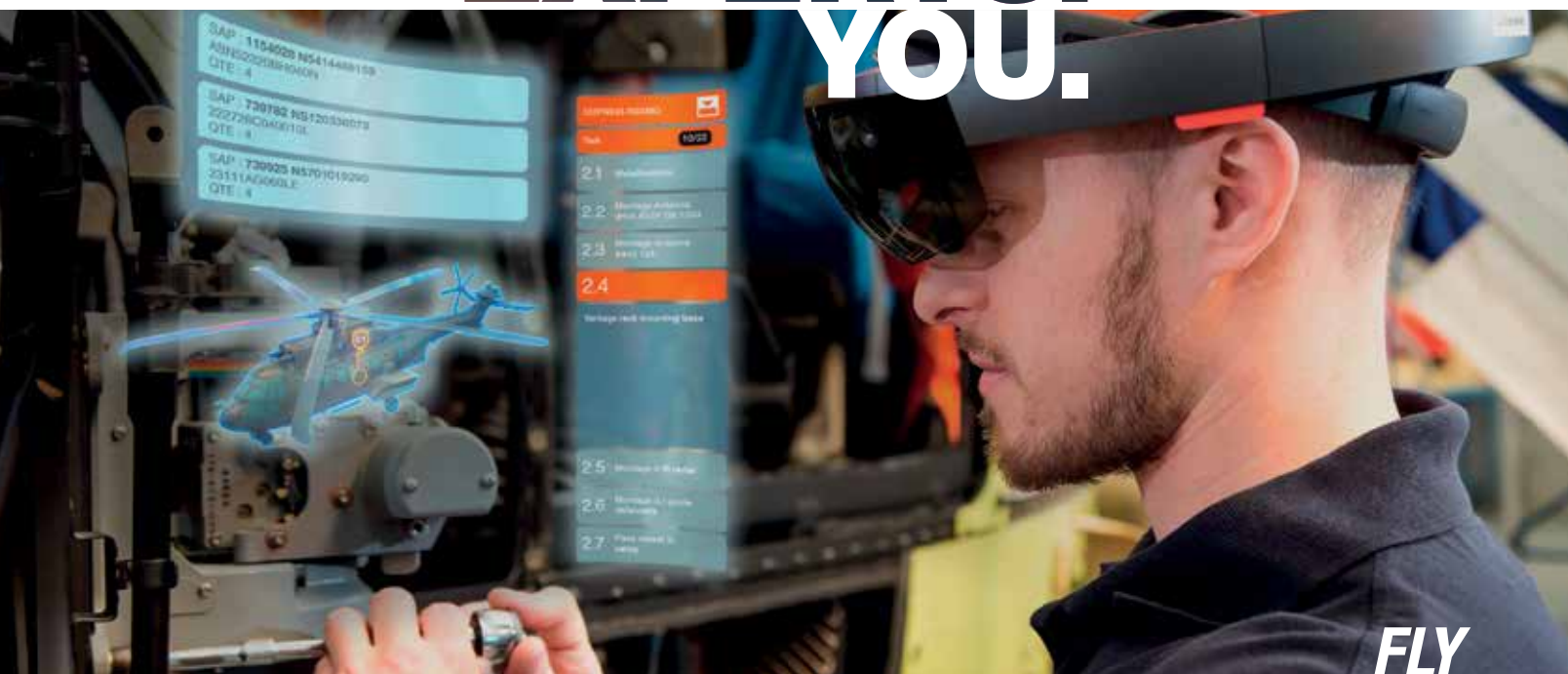
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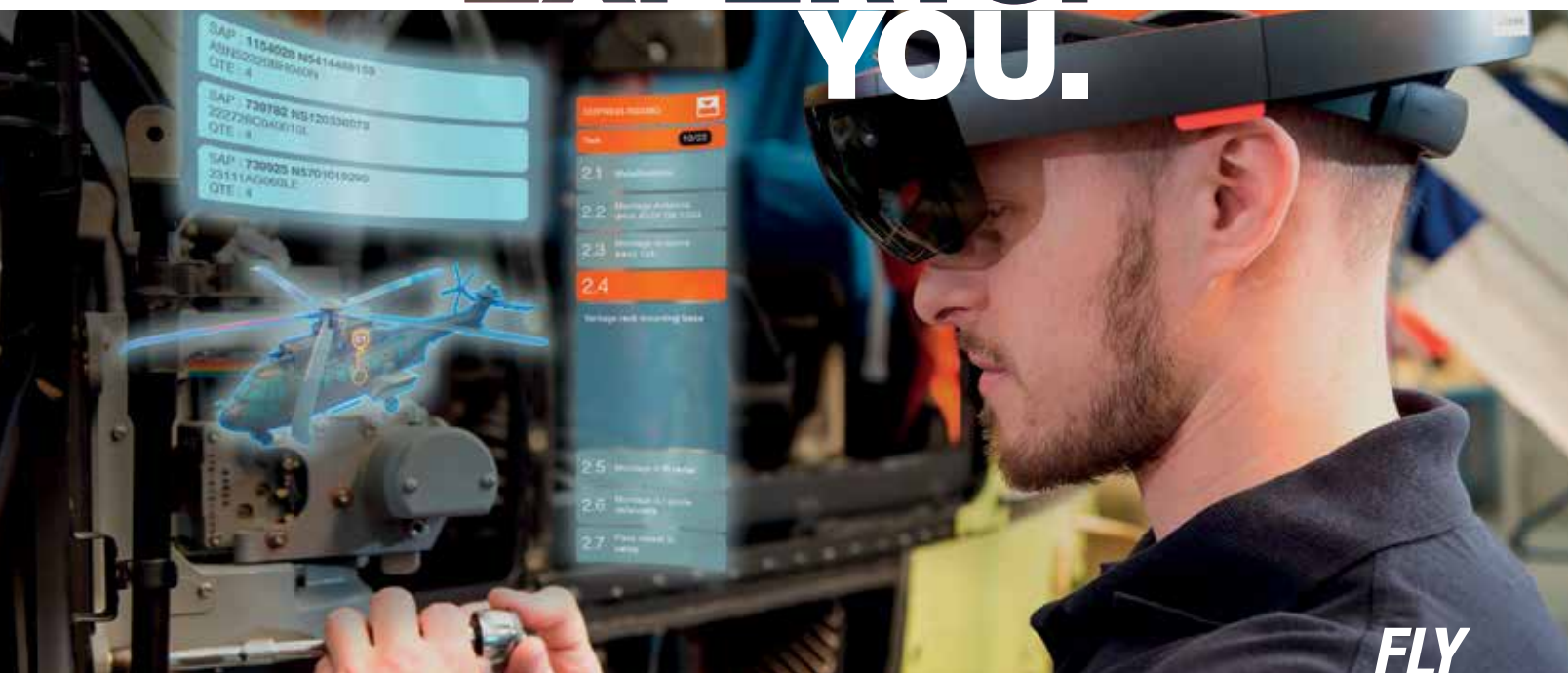
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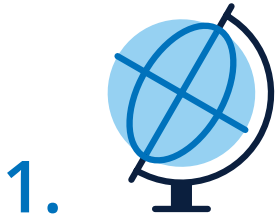


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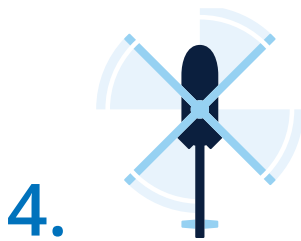
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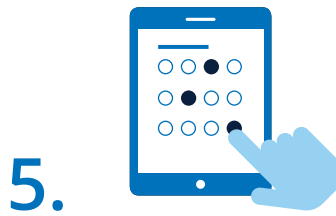
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## ON THE COVER

Two Hillsboro Aviation Bell 205s fly in front of Mount Hood near the operator's facility in Hillsboro, Oregon. Having split from its flight school four years ago, the company is embarking on a new era from an award-winning new headquarters.

**HEATH MOFFATT PHOTO**

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# The Team

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# Column

Focus on Safety // Geoff Goodyear



## The best laid plans

I always found it ironic that all of us in our industry spend an inordinate amount of time and energy planning, knowing full well that the plan will never come off as anticipated.

Now, don't get me wrong. Planning is essential in a work environment as technically challenging and as fraught with risk as ours; but really... when was the last time one of your plans worked out?

Circumstances are often random and unpredictable, which can not only play havoc with well-made plans, but also compromise risk assessments. Planning may be essential, but we must always be prepared for the inevitable diversion and any new hazards that brings our way.

Having been exposed to detailed project planning early in my career, I naturally extended the practice to my personal life. The installation of a large swinging gate in our backyard fence springs to mind. This should have been a rather simple process, but I had all winter and spring to accomplish the task, so I instinctively made it far more complex than necessary.

First came design. It would consist of two gate doors which would close and meet in the middle. The Internet was consulted to establish the proper construction process and materials were purchased.

My garage was cleared to make room for the lay down, critical cut, and assembly phases. Measurements were made ad nauseam to be incorporated into the drawings and assembly. Measure twice, cut once is my philosophy.

Cutting, fitting, gluing, and hammering went on all winter. The proverbial gates of heaven required less effort to construct. But all this effort started to show visual progress, and the doors took shape on my garage floor. Finally, with construction complete, all I had to do was wait for two months for the more than eight feet of Labrador snow to melt and reveal the location of the fence — which was still completely buried in snow!

While I waited for nature to take its course, I often went into the garage to wander and inspect the doors. As the months went by, my faith in my planning efforts and pride in my construction grew with each stroll. The gate doors became a frequent topic of conversation at dinner parties as neighbors feigned interest in whatever the hell I was doing in the garage.

At last, as happens most springs, the snow receded and the fence was eventually laid bare. The big day finally arrived and the last phase of the project was about to be executed: installation! The gate doors seemed a tad heavier than I had anticipated, and I had to drag the beasts out to the fence. I then began the process of lifting them up and levering them into place to attach the hinges (a critical piece of hardware that I actually included in the planning).

With hardware attached, I stood back to admire the scene. Something did not look right. I closed the gate doors expecting them to meet in the middle with the finest of tolerances. To my horror, they met in the middle with an 18-inch overlap! I could not believe it. I actually did measure twice so I would only need to cut once, but the planning gods had other things in mind — and clearly I was being punished for my hubris and pride. Oh my.

Patient planning and meticulous construction has its place, but I had had enough of this nonsense and immediately went to the garage to get my chainsaw. I eyeballed a vertical line in the larger gate door and went down through it like a hot knife through butter. There. Fixed!

The gates now met in the middle, although one side was a tad curvier than the other. No one would be the wiser... except my neighbor across the road who witnessed the whole affair. At subsequent dinner parties, friends would inquire about the progress of the great door project and I would not have a chance to utter a word before the chainsaw event was relayed to everyone's great delight and entertainment. So be it.

You never know how it's going to turn out, which is why, despite detailed planning incorporating exhaustive risk assessments, we must remain frosty... with chainsaws at the ready.



“

I actually did measure twice so I would only need to cut once, but the planning gods had other things in mind — and clearly I was being punished for my hubris and pride.

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# Column

Focus on Training // **Andy Roe**



## Don't Underestimate Helicopter VFR

“

Most pilots feel that their newly-acquired license should be all that is required to find work. But without a decisive game plan, employment might not be on the horizon.

Most individuals who consider embarking on a career as a helicopter pilot assume that the process is entirely logical: you get your license and then find a job. Although that game plan has worked for many in the past, for many others it has not. There is nothing quite as sad and desperate as a despondent helicopter pilot without a job.

No matter what sector of the helicopter industry you would like to get involved with, you should start out with a good base of comprehensive visual flight rules (VFR) charter work as a prerequisite. This means regular off-airport landings at unprepared sites.

When I was a chief pilot, a young pilot with 500 hours called me looking for work. I asked him how many confined area landings he had made during that time, and there was no reply. Simply logging flight hours doesn't necessarily mean you've gained the experience you need as a new pilot.

Because VFR charter work is hard to get, the traditional route to experience usually involves building time in flying jobs such as scenic flights, co-pilot instrument flight rules (IFR), or even instruction. The hours logged in these activities don't really count for much if an employer is (understandably) looking for a pilot with charter-related experience. Think of it this way: the 200 hours you logged sailing your remote controlled yacht in Central Park won't really help in your quest for a crew position in the Americas Cup. The question of how to gain useful experience flying the tougher — yet more fulfilling — VFR charter jobs in the helicopter industry has been asked for decades (six, to be exact).

Every 10,000-hour career helicopter pilot started out as a low-timer looking for work. So how did he or she get going in the first place? The answer is marketing. Every new pilot who got a start and progressed along the path to experience had the right personality, work ethic and the keen desire to succeed — and they knew how to market themselves to an employer. Unfortunately not every new pilot is suited to a flying career or is able to market themselves effectively.

Most pilots feel that their newly-acquired license should be all that is required to find work. But without a decisive game plan, employment might not be on the horizon. At the risk of raising a few eyebrows, I have always felt that someone with the right drive and industry knowledge could convince a helicopter employer to hire them, even if they are not licensed. Successful helicopter pilots are the ones that have that same marketing drive as well as the required commercial license.

Safety and control is another problem for low-time pilots. Many newly-licensed pilots purchase their own helicopter, only to crash not long after. New pilots left on their own often lack the discipline to flight plan properly, and are generally overconfident about their control proficiency and decision-making and problem-solving skills. The best advice for new pilots with commercial flying aspirations is to work hard at marketing themselves to commercial operators. If they are successful, they will be among experienced pilots and personnel who will nurture them along as they gain experience.

If newly-licensed pilots are happy to be flying tours, or working as career first officers or basic VFR instructors for the long term, then the “get a license/get a job” game plan will work.

Some pilots who start their careers as IFR first officers manage to become captains, but their skills are limited to managing automation and basic VFR control. I know an ambulance captain who had a tail strike on approach to a small enclosed field next to a serious vehicle accident on a freeway because of his lack of off-airport VFR experience. With 500 or 1,000 hours of good VFR experience, a pilot can then more easily move up to IFR, middle management positions like chief pilot or advanced instruction.

If airplane flying is your career goal, the private, commercial, multi-engine, IFR and then the Airline Rating training will give you the accreditation you need towards a gainful fixed-wing career. If helicopters are your passion, then the commercial license is all you need to get going on a good career in VFR charter flying. IFR and Airline Ratings can come later.

Getting a VFR flying job is possibly more difficult now than it was in years gone by. Learning to fly a helicopter well is a vexing challenge, and finding work is even more so. My advice to new pilots and those wishing to become pilots is to focus intensely on researching the helicopter industry to determine how best to market yourself successfully to an employer.

Learning to fly and control a helicopter safely is difficult and expensive, and securing work after training requires a self promotional sales campaign likely more difficult than the training program itself. Those who are most effective in selling themselves will succeed. Get a good VFR job to build those first hours; it will pay dividends in the long run.



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# Column

Focus on Maintenance // John Carinha



## A Team Effort

While talking with some friends recently, I was asked what I missed most about working for a larger company, versus owning my own small business. My answer was simple: the brotherhood and alliances formed through years of experiences, long hours, and many an aircraft overhaul. Solidarity is something that builds with time and the right mix of personalities. I look no further than the “four horsemen” I cut my teeth with when first introduced to the helicopter industry. Fixed-wing work had long been a part of my career, but spinning wings? Completely new territory.

Soon into my work with a local maintenance, repair and overhaul (MRO) facility, I was asked to take a lead position on an S-64E Airplane rewire that was taking place out of town. We would be tag-teaming with another U.S. MRO facility that had been tasked with looking after the structural aspects of the overhaul. We had a great crew. Our days consisted of working for 10 to 12 hours, running off to the gym for a workout, finding dinner, and then finding some form of entertainment. The latter usually ended up with consuming too much liquid courage and emptying our wallets of one-dollar bills. We were young, we were earning an honest living, and most importantly, we were having a lot of fun.

Being bound by policy and not governed by ability was something very foreign to me. As a lead on this project, I pushed paper but also picked up tools. We were told at the onset what the expectations would be of each company's presence, and the purpose associated to each. We'd pull wire and chase electrons, the others would bang metal and squeeze rivets. Working side-by-side with my mates and putting horsepower into the tasks we were given that day was our unspoken mantra. “The Canadians” — as we were often called — were making a name for themselves, and it became clear very early on that we were working at a pace that was unparalleled and unfamiliar to our counterparts.

The hub of the electrical wiring was the circuit breaker panels. These required piano-style hinges to be riveted in place to secure them. This needed to be done before we could do our job of populating them with the appropriate circuit breakers and routing the corresponding wires. With each passing day, the rats nest of wire pouring out of the panel cut-out grew, almost on par with the pace at which my patience was running out. The company tasked with the job of riveting the panels had a lackluster crew. They were good guys to have a beer with, but not so great when it came to putting in a solid day's work. Their long nights of drinking and visiting not-so-sleepy college towns was taking a toll, and we as a collective team were feeling the effects each morning.

Having waited days and been left sitting on a pile of wire to terminate that threatened our end of the completion, I made a decision — one that my crew backed me up on. I went over to the stores department to sign out some air tools and consumable rivets, sorted out the hole patterns and pitch of each hole, and drilled and riveted the afternoon away. It took me back to my basic training, as I hadn't done that level of riveting since making a large table coaster back in my school days. Nevertheless, it was done and we could now move forward.

When the project lead for the structures MRO shop came in later that afternoon, you could sense his surprise and wonder. It permeated the shop floor like a ripple of energy that had no identity. Was he happy? Upset? Bewildered? As he spoke to his supervisor on the phone, all I could hear was him repeat “It's done! It's already done!” and my crew and I smiled at each other. I later spoke to him, explaining my stance and the reasoning behind it. It didn't sit well with him initially, but he eventually came to realize that it was by no means an act of defiance on our part, but rather a “Get ‘er done” attitude. With my crew and I all embodying that ethos, there was no blowback and no fighting words spoken.

When we take home a paycheck from our jobs, it reflects compensation for the time and effort we put into our roles. But, for most of us, the final product of that effort is actually the culmination of work put in by all those who we rub elbows with at the proverbial water cooler each day. It's a great feeling to be surrounded by good will, trust, humor and understanding as the clock turns, and we each earn our living.



“

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# Column

Focus on Operations // **Corey Taylor**



## Eliminating the Unknown Unknowns

“

We need to find facts, not fault. Facts lead to solutions, and solutions save lives and, as a side benefit, they save companies from ruin.

It was a normal day, just like any other — until it wasn't. As he was spiralling towards the ground, hands gripping the controls so hard he felt the plastic oozing through his fingers, the pilot was perplexed at what had gone wrong with a perfectly performing aircraft. Had something failed in the main rotor? Was something jamming the controls? After plowing into the ground with substantial damage to the helicopter — but thankfully none to him or his full load of passengers — he got his chance to look, but could find no obvious answer.

What had gone wrong? Nothing. Or at least nothing had changed with the aircraft.

A couple of months later, a few hundred miles away, a different pilot landed on a timber pad, like she had done so many times before. The machine she normally flew had the best center-of-gravity range of any light helicopter, making pad landings almost child's play compared to earlier types that were notorious for being tail-heavy. Standing alongside the pad with the client, her shock was palpable, and her adrenal glands responded instantly, when she saw the helicopter shifting until its nose was pointed at the sun. In a rapid, and wholly appropriate, maneuver, she pushed the client out of the way and jumped on the toe of the skid to bring it back to Earth. Too late. The helicopter slid down the hill, planting its tailskid solidly into the ground, with only minor damage.

What could have happened to cause this unforeseen and unfortunate event? Had the pad failed? Had something broken on the helicopter? Neither was found to be true.

If nothing failed, how could experienced pilots end up in these situations? Maybe we all share a little responsibility, as members of an industry that doesn't like to share. At least, we don't like to share information that might help us all, anyway.

There's a cliché about mistakes, which also happened to be the slogan of the old Canadian safety newsletter, the *Aviation Safety Vortex*: “Learn from the mistakes of others; you won't live long enough to make them all yourself.” The fact that the newsletter is long gone and the cliché has passed out of common usage is perhaps a reflection of how the phrase was somehow insulting to those who erred and had accidents. I would posit that we all have erred and had accidents, but some of us are limited to falling down the stairs or shooting colleagues while out hunting (yes, you Mr. Cheney). In the spirit of “There but for the grace of God go I,” we need to stop sweeping things under the carpet and, instead, circulate information that will prevent others from duplicating our bad experiences.

In the first case above, after the accident, I called a friend who was involved at the management level of the machine's operator. I was stunned to learn the causative phenomenon was, in fact, common for that type of aircraft, although most of the time pilots managed to recover. Ever the skeptic, I called another pilot with thousands of hours on type. Yes, he said, it was common and nerve-racking but could be prevented with foreknowledge and carefully applied airmanship. I sought a third opinion, and am now satisfied this phenomenon is real. So another pilot somewhere, maybe today, is going to end up in a spiral dive in a perfectly good helicopter with unknown results. I have worked at several companies with robust safety management system (SMS) structures, yet never have I seen a report from a pilot who experienced this uncontrollable spiral dive in that type of helicopter. My fellow pilots, please step up and report these things in real time. Unknowns are unrepairable.

These (missing) reports should be the first line of defense in a safe operation, but the next steps are what we sorely lack and need to rectify.

We need to share our learnings as *companies* with other operators. Not in ways that will give others a competitive advantage, which seems to be our biggest fear, but in ways that will prevent damage, injury, or death.

In the second case referred to above, which occurred just in the last few months, the aircraft was the twin-engine version of a very common aircraft. I have many hours flying the single version but have none in the twin. Immediately after the incident, I was told by two different pilots that fly this model that they also almost fell off pads when flying the twin due to its much further aft center of gravity. I haven't seen any such SMS reports, but have confirmed this phenomenon to be real. Park one aircraft on a pad, then park an identical aircraft of the twin variety in the same place and it may fall off. This may be “obvious” in retrospect, but was it factored into the risk assessment of using the twin vs. the single? Unknown facts are hard to take advantage of.

It's easy to blame a pilot for preventable events and say they should have taken more care, but if a pilot does the same thing they have done many times, always without incident, how can we blame them when things go wrong?

To quote another Canadian institution, the Transportation Safety Board, we need to find facts, not fault. Facts lead to solutions, and solutions save lives and, as a side benefit, they save companies from ruin.

For years now there has been discussion about companies sharing occurrence information with others to help them avoid the same fate. It is time to stop wasting that time. Let's share information with each other that can help us all. Please.





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A Boeing AH-64D Apache Longbow sits on the flightline in Logar Province, Afghanistan, during combat operations support for Operation Freedom Sentinel. **CW2 Bobby Triantos Photo**



A patriotic-looking MD 500 lands at an airfield on World Helicopter Day. **Ray U Photo**



A Bell 407 and Bell 505 Jet Ranger X fly above beautiful South African terrain. **Uros Podlogar Photo**

**Dirk Collins** captured this beautiful shot of a Bell 206L4 LongRanger under the stars on the Galt Ranch near White Sulphur Springs, Montana. As profiled in the *December 2014-January 2015* digital edition of *Vertical*, owner Bill Galt uses his LongRanger to gather cattle on the ranch, in addition to firefighting, spraying, and search-and-rescue missions.





oct/nov 2018

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## UNIVERSAL GOES CONTINENTAL

**BY OLIVER JOHNSON**

Universal Helicopters has spread its operations across North America following two major deals that have taken its footprint into British Columbia and California.

On Sept. 6, the Goose Bay, Labrador-based operator announced it had purchased a 49-percent share of South Coast Helicopters, headquartered in Fullerton, California. The stake is the highest percentage of ownership allowed to foreign aviation operators under U.S. law.

Just four days later, Universal revealed it had purchased Lakelse Air of Terrace, British Columbia — becoming Canada's only coast-to-coast Indigenous-owned helicopter services company.

"We chose to go to B.C. and to the U.S. as it gives us access to new and bigger markets," Universal president and CEO Shane Cyr told *Vertical*. "The market in Newfoundland and Labrador has been shrinking at a steady pace for the last four to five years. There's too many [similar] aircraft in that market, so we're trying to find some opportunities to redeploy some assets and find some work outside of Newfoundland and Labrador."

Lakelse has a fleet of 12 aircraft (including the Bell 212, Bell 206, Airbus AS350 B2/D2, and AS355 N); bases in Terrace, Prince Rupert and Prince George, British Columbia; and has a staff that varies in number depending on the season, but is typically around 30.

The operator flies a variety of visual flight rules operations in northwestern British

Columbia, including aerial construction and powerline support, mining and exploration, oil-and-gas support, and forestry and forest fire suppression.

"There is huge mining potential in the 'Golden Triangle,' a mineral-rich area of northwestern B.C.," said Cyr. "We see opportunity in transporting people and supplies to these remote areas, as well as in supporting the construction of powerlines."

Cyr said Lakelse will continue to operate with its existing staff and management, with the latter joined in a leadership team with a few key advisors from Universal. These will include Cyr, who will serve as Lakelse's accountable executive.

"It's going to be operated as a separate business," he said. "However, we are going to

# RotorBits

A Universal Helicopters Bell 407 in operation near the company's headquarters in Goose Bay, Labrador. Thanks to its recent expansion, Universal now has a fleet of 37 aircraft.

**Mike Reyno Photo**



opportunities that will result in even more beneficial ties with Indigenous groups across the country.”

South of the border, the deal with South Coast represents Universal's first investment in a U.S. operation.

The company provides aerial cinematography services to the film industry, as well as providing aerial tourism flights, firefighting support to the U.S. Forest Service, and aerial research-and-design services to NASA and aerospace companies. It has a staff of six and a fleet of five aircraft, including a Bell 205, a Bell UH-1H, and three Airbus AS350 B2s.

“[Being in] the U.S., [it] gives us an opportunity to work in the wintertime and try to even out the heavy seasonal part of our business,” said Cyr. “The movie work will continue, and there are different opportunities in firefighting — it goes fairly late down there compared to up in Canada, and there are seismic opportunities, and tourism [work] in terms of heliskiing.”

He said South Coast was chosen because of its owner, Cliff Flemming, who is now Universal's partner. “A lot of why we went with South Coast had to do with meeting him and seeing the operation down there,” said Cyr. “It's a great company.”

Including the aircraft owned by Lakelse and South Coast, Universal now has a fleet of 37 aircraft, but Cyr said it has no plans to further increase that through airframe purchases or other company acquisitions.

“Right now, we're going to be focusing on running the businesses that we invested in and acquired,” he said, “[and] getting those 37 aircraft working.”

Universal is celebrating its 55<sup>th</sup> anniversary in 2018, but Cyr said the downturn in the mining sector had made the last five years a particularly “tough marketplace” in Newfoundland and Labrador. However, he said there are signs that a resurgence could be coming.

“Investment in the resource sector I would say is cautious at this point,” he said. “There is some investment, but you're not seeing really large programs go out for drilling and that type of thing yet. The last two years, we have seen an uptick for mining clients doing a little bit more work, but at this point it's not fully into drill programs yet. Hopefully we'll see that next year.”

provide strategic direction for the company.”

The appeal of Lakelse is in the access it will provide to mining and powerline work on the West Coast, said Cyr — as well as its established relationship with Indigenous groups in the area.

“We are majority owned through the Nunatsiavut beneficiaries, through a couple of trusts, and we need to leverage that,” said Cyr. “I do think that's going to create opportunities.”

He added that Indigenous groups want true partnerships that build long-term benefits for their communities.

“Lakelse has built sound relationships with the Haisla, Nisga'a, and Tahltan people, he said. “Universal strongly supports that approach and we are anxious to explore

**Rosen Sunvisor Systems Photo**



## Rosen Sunvisor Systems debuts Robinson Visor

Rosen Sunvisor Systems has received a supplemental type certificate for its new Robinson Visor System. The system features a pair of center surface-mounted visors, which are clamped around the central spar. Rosen said the cast acrylic lenses provide optical grade, no distortion reduction of sun glare, resulting in more comfortable and safe operation of the aircraft. The neutral density tint doesn't alter colors — reds remain red, and greens remain green.

The system, which weighs 1.42 pounds (0.65 kilograms) has multiple pivot points along a supporting arm to allow a pilot to adjust the lenses for maximum coverage.

## Bell 505 MAGnificent interior gets STCs

**Mecaer Aviation Group Photo**



Mecaer Aviation Group, Inc. (MAG) has announced multiple approvals for the VIP MAGnificent interior in the Bell 505, including from the Federal Aviation Administration, European Aviation Safety Agency, and national civil aviation agency of Brazil.

The supplemental type certificate is an optional upgrade, and can be installed in new or used aircraft. It includes modified crew and passenger seats, new interior panels for the door, overhead and aft bulkhead, carpet, storage and an overhead passenger service unit with outlets for the air-conditioning/air gaspers and reading lights.

MAG intends to complete the installations at their FAA Part 145 in Philadelphia, Pennsylvania. The kits will be produced at MAG's Cabin Comfort Systems headquarters in Montepandone, Italy.

# Vahana eVTOL aims for 'direct to autonomy'

BY ELAN HEAD

Most developers of electric vertical takeoff and landing (eVTOL) aircraft believe that fleets of these air vehicles will eventually be whisking passengers through cities autonomously, with no human pilots at the controls. But even many champions of autonomy expect that it will take us a while to get there, and that along the way, eVTOL aircraft will be required to fly with human safety pilots who can take control of the vehicle if the autonomy fails.

A<sup>3</sup>, the Silicon Valley outpost of Airbus, has a different philosophy. As it works on its own tiltwing eVTOL project, called Vahana, A<sup>3</sup> is advocating a "direct to autonomy" approach that would bypass human

backup pilots altogether. According to Vahana project executive Zach Lovering, that's because eVTOL air taxis simply can't afford to have a passive pilot occupying one of a handful of seats — neither from an economic perspective, nor a safety one.

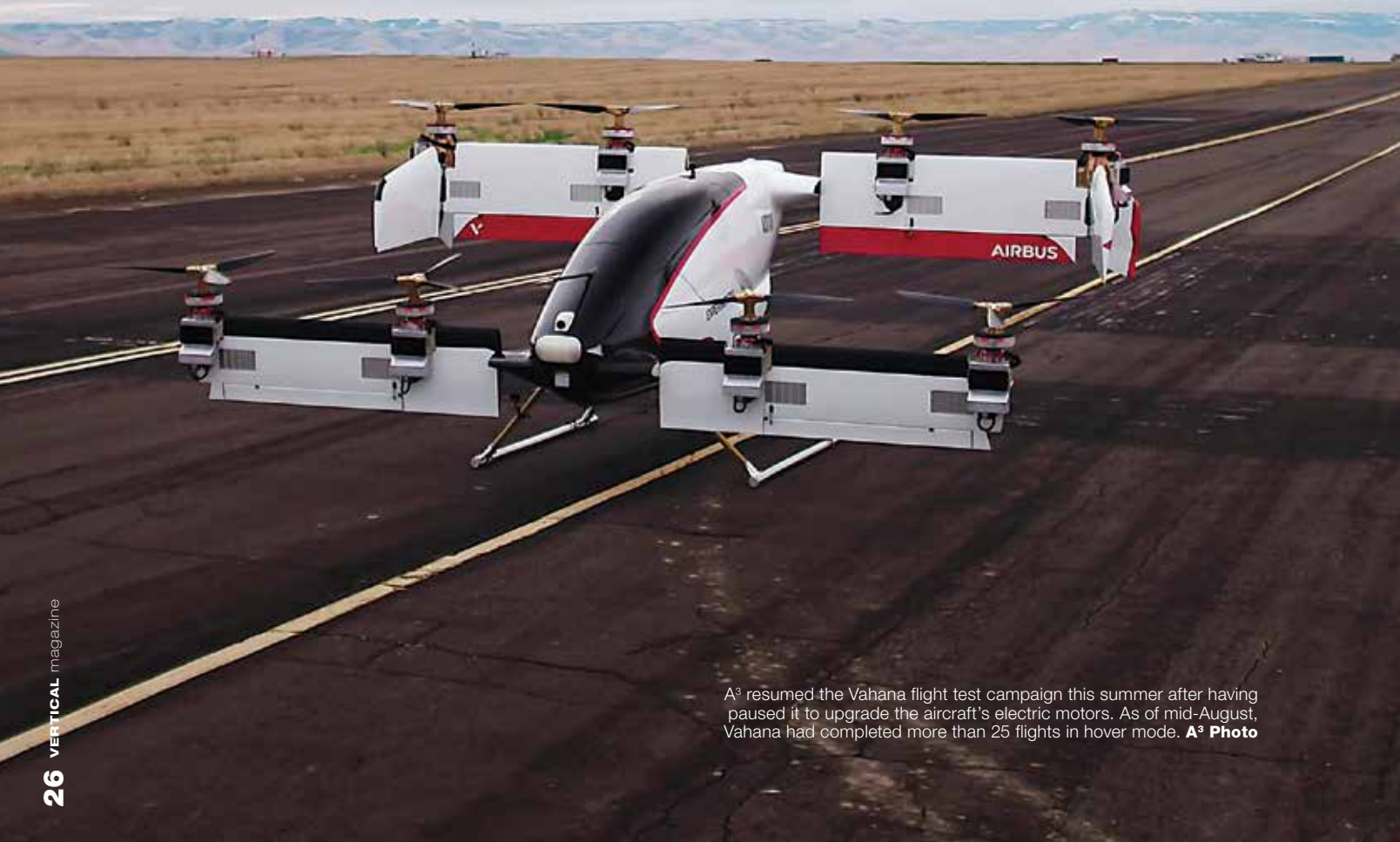
"A gradual path to autonomy where you have a safety pilot as a backup is, in my opinion, a dead end," Lovering told *Vertical*. His argument will sound familiar to anyone who has studied the pitfalls of increasing cockpit automation; simply put, human pilots have a hard time staying alert when there's nothing for them to do.

"The challenges you have there are you're requiring that this safety pilot remain vigilant as you're moving more and more tasks

from that person's responsibility and at the same time expecting them to respond to more and more obscure hazards," Lovering explained.

"They're effectively sitting there doing almost nothing for 99 percent of their job, and then the one percent of the time or 0.1 percent, whatever it happens to be, they are expected to react in a timely fashion to a failure mode or a situation that even the engineering design teams couldn't predict. Which makes the training of that very difficult."

Because the economics of the eVTOL air taxi model rely on affordable, mass-produced aircraft transporting high volumes of passengers, Lovering contends that it just isn't feasible to have an expensive, highly



A<sup>3</sup> resumed the Vahana flight test campaign this summer after having paused it to upgrade the aircraft's electric motors. As of mid-August, Vahana had completed more than 25 flights in hover mode. **A<sup>3</sup> Photo**

trained pilot occupying a potential passenger seat — not to mention the additional engineering work involved in designing a suitable pilot interface system for an otherwise autonomous vehicle.

But that doesn't mean that aircraft like Vahana will be flying autonomously through complex airspace from day one. Lovering suggested that the safety objectives behind a phased approach to autonomy can instead be achieved by constraining the environment in which eVTOL aircraft operate, and gradually expanding it as they prove their capabilities, similar to the approach being taken by self-driving car companies like Waymo.

"In that case, I'm not looking for universal autonomy. I've just officially constrained my operation, but I'm guaranteed that I can master those operations with a full autonomy system from the beginning," he said.

"From my perspective, if autonomy is something that you care about, then [that's] the thing you should go after. Building an aircraft with partial autonomy that has a pilot interface system that somehow has to communicate errors back to the pilot and deal with human psychology and vigilance decrement and all kinds of other things — that to me is a much, much, much greater challenge that's going to be ultimately more expensive than just pursuing what you want from the beginning."

Lovering said the Vahana program has been making significant progress since the first and second flights of the full-scale Vahana Alpha technology demonstrator on Jan. 31 and Feb. 1 of this year. Following those flights, the Vahana engineering team paused flight testing in order to upgrade the aircraft's electric motors; the flight test campaign resumed this summer at the UAS test range in Pendleton, Oregon.

When *Vertical* spoke with Lovering in August, Vahana had completed more than 25 flights in hover mode and had just started testing the transition into forward flight, with the longest flight to date lasting around seven-and-a-half minutes.

Meanwhile, the Vahana team has been using small multicopter drones to test the aircraft's sense-and-avoid systems, including the cameras and imaging radars used for cruise-stage hazard detection, and the lidar system used for landing. In one recent demonstration of landing-phase hazard detection, "the multicopter drone came

down, detected the hazards automatically, avoided them, and then found an appropriate landing site," Lovering said.

Vahana's Alpha aircraft has a nominal weight of 1,600 pounds (725 kilograms) and has seating for one passenger. However, Lovering said there are no plans to fly a human in the Alpha technology demonstrator. That milestone will have to wait for the next Vahana design, which is targeting certification and production by the mid-2020s.

Lovering said that model will have between two and four passenger seats, but it has not yet been determined how closely the production aircraft will resemble the Alpha aircraft. "There are certainly a lot of benefits to the configuration that we're flying today; however, we are considering other options as well," he said.

And even the Beta version will log several hundred if not thousands of hours before it carries a human passenger. "One of the greatest things about having an autonomous aircraft is that I can do tons of flight testing without anybody onboard," Lovering said. "So putting the passenger onboard will be one of the last steps in the flight test program. Hopefully it'll be me, but maybe that honor will go to our chief engineer."

Lovering is aware that not everyone will share his enthusiasm for hopping aboard an autonomous aircraft. But he pointed out that elevators used to have human "pilots," too. While the idea of an elevator without a human operator was once a scary proposal, today, most people would rather trust their lives to an automated elevator than take the stairs.

"If you had asked at least the last three or four generations the same question about different kinds of technology that went 'autonomous,' each generation expressed some fear about autonomy early on, but then. But then within one or two generations that fear is replaced by recognition of the social and safety benefits of the technology," Lovering said.

"When we design vehicles like Vahana, while we still need to consider the current generation, we have to keep in mind that the primary users are the next generation and the one after that. For those generations, vehicle autonomy — from cars to aircraft — is going to be far more common than it is today."

## RotorBits



Onboard Systems International Photo

### Onboard Systems Super Puma weighing system certified

Onboard Systems International, Inc., has announced that its Onboard Weighing System for the Airbus AS332 Super Puma aircraft has received supplemental type certificates (STCs) from the Federal Aviation Administration (FAA) and European Aviation Safety Agency (EASA).

Onboard has also submitted the system to Transport Canada for certification.

Onboard Weighing Systems are a complement to a helicopter's external lifting system. They display the weight of the load being carried on the primary belly hook and consist of three components: the cockpit-mounted indicator, the internal harness, and the load cell.

Heli Austria GmbH was the launch customer for this project, purchasing six units for its fleet.

### HFI now accepting 2019 scholarship applications

Helicopter Foundation International (HFI), a nonprofit organization, offers up to 19 scholarships each year to help support students studying to become part of tomorrow's helicopter industry.

The organization is now accepting applications for its Commercial Helicopter Pilot Rating Scholarship; Bill Sanderson Aviation Maintenance Technician Scholarship; Maintenance Technician Certificate Scholarship; and the Michelle North Scholarship for Safety.

Each scholarship has various qualifying requirements that can be found on HFI's website. The applications must be submitted by midnight EST on Nov. 30, 2018.



Helitech International returns to the Amsterdam RAI in 2018, but next year's event will see it move out of London and into Farnborough International. **Mike Reyno Photo**

## Helitech to move to Farnborough

After considering feedback from visitors and exhibitors alike, Helitech International has announced it is moving location to Farnborough International in 2019.

Described as the "birthplace of British aviation," Farnborough International is the town's recently launched permanent structure for exhibitions.

The purpose-built, 135,000-square-foot (12,500-square meter), multi-functional venue and airfield will provide exhibitors enhanced facilities to showcase their latest technologies, solutions, upgrades and new models from aircraft interiors, avionics and navigation systems to communication equipment, night vision, engines and leasing.

It will also provide visitors the ability to easily fly to the event.

Demo flights or flying directly to the venue will be easier than ever in the airfield, with landing fees for all exhibitors and visitors subsidized in order to maximize the potential of the new location.

"We're very excited to announce that Helitech International will move to Farnborough's new exhibition hall in 2019," said Teresa Heitor, event manager for Helitech International. "Farnborough International has a long history, rich in pioneering heritage and presenting cutting-edge innovations. We're looking forward to welcoming the very best of the rotorcraft industry to our new U.K. home next year, where they will find facilities better suited to our industry requirements."



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# Great Slave to reorganize after posting huge losses



Great Slave Helicopters has a fleet of 51 helicopters for onshore operations, with a staff of roughly 200. **Graham Lavery Photo**

**BY OLIVER JOHNSON**

Great Slave Helicopters has been granted creditor protection to allow it to reorganize, with court documents revealing the company has been posting annual losses of more than \$5 million “for the past several years.”

The company, based in Yellowknife, Northwest Territories, is one of the largest onshore operators in Canada, with a fleet of 51 light, intermediate and medium helicopters, and a staff of about 200.

The protection, provided under the Companies’ Creditors Arrangement Act, will allow Great Slave Helicopters to continue to operate while a court-approved “monitor” begins a process to sell or restructure the company’s business or assets, or both. Under that process, those interested in bidding for some or all of Great Slave’s assets must submit their bids by Oct. 17, 2018.

In its initial application for the protection, Great Slave said it had incurred losses of about \$13.7 million over the last two fiscal years, with those losses increasing year over year, and revenue declining.

In court documents, Alasdair Martin, who has been president of Great Slave Helicopters since June 2016, said the company’s financial difficulties were the result of “many external and internal factors,” including a downturn in the oil-and-gas and mining sectors, and the general slowdown in the helicopter industry that has affected operators around the globe.

“In addition to rising costs, [Great Slave Helicopters] has been unable to raise flying rates or boost utilization due to an oversupply of helicopters in the market,” Martin said in his affidavit.

Until recently, Great Slave Helicopters was solely owned by Discovery Air Inc., which filed for creditor protection itself on March 21, 2018, with \$127 million of debt set to mature, including \$93 million of secured debt that had been guaranteed by Great Slave Helicopters and other members of Discovery Air’s group.

Martin said Great Slave Helicopters is already in default of its existing financial obligations with creditors, and had been working with one of them “to restructure its business and operations to be viable on a long-term basis.”

However, he said the company’s “persistently difficult financial condition” and need for more funding to continue operations meant that any restructuring or sale of its business or assets was best completed through court-supervised proceedings.

“[Great Slave Helicopters’] business is highly seasonal, with a significant percentage of its gross revenue earned in June to September of each year, while requiring ongoing significant funding for maintenance and other operating expenses throughout the entirety of the year,” Martin said in his affidavit. “Because of its seasonality, the [company’s] business will incur losses commencing in October and will require significant funding until its next busy season, which starts next June.”

Great Slave Helicopters won several firefighting contracts from the Province of Ontario in April, along with similar contracts in Alberta and the Northwest Territories, which run until the end of September 2018. In the court documents, it said it would continue to provide these critical services until the end of the season.

The company said it was “considering its next steps” for its Chilean subsidiary, DA Chile, which employs about 55 people.

## RotorBits



**Christian Keller Photo**

### Milestone & Airbus provide 5 H145s to Aramco

Milestone Aviation Group Limited and Airbus Helicopters are to provide five H145s to Aramco Overseas Company, a subsidiary of Saudi Aramco — a fully integrated, global petroleum and chemicals enterprise.

The five aircraft are sourced from Milestone’s orderbook with Airbus, and are expected to be delivered to Aramco over the next 12 months. This latest lease commitment of five light-twin aircraft will be in addition to the 24 medium aircraft Milestone currently has contracted on lease to Aramco.

“We are pleased that Aramco has selected the H145 for its light-twin fleet renewal program in the Kingdom of Saudi Arabia, which is a key and historic partner for Airbus and home to our subsidiary in the region,” said Airbus Helicopters’ CEO Bruno Even.

### Bristow begins new contract in Barents Sea

On Sept. 1, Bristow Norway AS began a five-year helicopter offshore crew change service and search-and-rescue contract to support Eni Norway and Equinor from its Hammerfest base.

“We are very proud of the recognition we have received in securing this work in the Barents Sea,” said area manager, Norway, Heidi Wulff Heimark.

Bristow Norway has delivered helicopter services for Eni Norway and Equinor operations in the Barents Sea for the last nine years and is well established in Hammerfest.

Bristow will utilize an existing Sikorsky S-92 in oil-and-gas configuration to provide crew change services for offshore platforms, and an existing all-weather SAR (AWSAR) S-92 for the search-and-rescue work to significantly improve offshore safety and rescue capability.



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## Homewood, Manitoba, honors flight of first Canadian helicopter

The Froebe helicopter was recently put on public display. Today, the helicopter resides in the Royal Aviation Museum of Western Canada. **Bill Zuk Photo**

### BY DAYNA FEDY

On July 17, 2018, residents of Homewood, Manitoba, honored the community's past with a reunion to celebrate the flight of the first helicopter built in Canada — the Froebe helicopter — which took place 80 years ago.

With over 300 former Homewood residents in attendance of the celebration, reunion chair and emcee Charlie Froebe was amazed at the turnout because the tiny community never had a population of more than 50 people.

The Froebe helicopter was the first Canadian-made rotary-wing aircraft, and was built by the three Froebe brothers — Douglas, Theodore (Charlie's uncles) and Nicholas (Charlie's father). The Froebe name is legendary in Homewood.

With the assistance of the Canadian Aviation Historical Society (CAHS), Manitoba Chapter president Jim Bell worked with CAHS member Gerry Suski (who was a Froebe family friend), to determine the pedigree of the Froebe helicopter as Canada's first helicopter.

The Homewood reunion was marked by speeches from RM of Dufferin Reeve George

Gray, MLA Blaine Pedersen and CAHS representative Bell, as well as a greeting from the crew of STARS Air Ambulance, who flew a helicopter on a special trip to Homewood, landing near where the Froebe helicopter had made its proving flights in the 1930s.

In the 1930s, the Froebe brothers were the

typical backyard mechanics who tinkered with machinery of all kinds, including soup-ing up jalopies and crafting homebuilt aircraft, and even teaching themselves to fly.

The brothers soon turned their energies to solving the problems of building a helicopter. Throughout a protracted period of

Homewood Reunion Committee members Frank Froebe (left), Gerry Suski and Charlie Froebe (right), along with CAHS Manitoba president Jim Bell stand with crewmembers from STARS Air Ambulance. **Bill Zuk Photo**





With support from the community, a cairn was presented at the reunion that identifies Homewood as the site of the Froebe Brothers' helicopter, the first to fly in Canada.  
**Bill Zuk Photo**

experimentation that began in 1937, the Froebes put together a sturdy twin-rotor contra-rotating machine, powered by a used four-cylinder, air-cooled, front-mounted de Havilland Gipsy engine.

The open tube frame and rotors built from aircraft chrome molybdenum steel purchased at the MacDonald Brothers in Winnipeg also had a bevy of handcrafted or adapted parts salvaged from automotive or farm machinery.

Doug Froebe was the primary test pilot during a series of test flights undertaken in 1937-39, recording Canada's first controlled manned vertical flights. His notebooks, log-book and letters (now preserved at the Royal Aviation Museum of Western Canada) provide a vivid picture of the pioneering flights.

"During the first attempt to fly, the tail came off the ground about three feet. I hauled the stick clear back and the front wheels came off one at a time," wrote Doug. "When I'd shut the throttle down, it would just take its time coming down – didn't stall – just float down like a feather."

Although the helicopter suffered from severe torsional vibration and overheating, it easily transitioned into vertical and hovering flight, and while only flights of short duration were attempted, a total of four hours and five minutes was logged before the test flights ended on March 2, 1939.

After an effort to sell their design to the U.S. Navy during the Second World War failed to gain a contract, the Froebe helicopter was stored at the family farm. Later, the family donated the helicopter to the Royal Aviation Museum of Western Canada (formerly the Western Canada Aviation Museum), where it resides today.

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# Bell closing Lafayette facility

BY OLIVER JOHNSON

Bell is closing its Lafayette Assembly Center after Louisiana Economic Development (LED) announced it was cancelling its contract with the manufacturer to support the project, with the state accusing Bell of failing to meet its obligations.

"Effective Monday, Aug. 20, Bell began taking steps to close its Lafayette Assembly Center and has begun transitioning 525 cabin sub-assembly work to [Bell's facility in] Amarillo, [Texas]," said Robert Hastings, EVP, chief of communications at Bell, in a statement provided to *Vertical*. "Without economic incentives, Bell cannot continue operations at the [Lafayette] facility."

The \$26.3-million facility was funded by the State of Louisiana, with Bell committing to creating 115 new jobs as it broke ground at the center — originally slated to hold the final assembly line for the new 505 Jet Ranger X — in August 2014.

Bell and state, regional, and local officials celebrated the grand opening of the 82,000-square-foot center 12 months later,

but with the helicopter market in a downturn, in 2017 the manufacturer negotiated a change to the Cooperative Endeavor Agreement (CEA) it had signed with LED. Assembly of the 505 was moved to Bell's facility in Mirabel, Québec, while the Lafayette Assembly Center was to be used for cabin subassembly of the 525 Relentless. The amended CEA also reduced Bell's job commitment to creating 95 jobs and extended the term of the agreement from 2029 to 2031.

In a statement issued Aug. 21, LED secretary Don Pierson said that just 22 people were employed at the site.

"Following four years of underperformance by the company and a failure to produce either of the agreed-upon operations, LED has elected to terminate its Cooperative Endeavor Agreement with Bell Helicopter," Pierson said. "From the beginning of this project in 2013, LED valued Bell Helicopter as a world-class manufacturer with world-class aerospace products. We regret that our experience with Bell Helicopter has left the State of Louisiana with no other choice but to terminate the CEA for a once-promising project."

Employees in Lafayette were notified of the facility's closure on Aug. 20, said Hastings. "Bell is actively working with each of them to either find positions within the company appropriate to their skills and interests or help in finding work in the local community," he added.

The manufacturer has filed an action seeking the Louisiana State Court's help to determine the rights and responsibilities of the parties to the CEA, while LED has called on Bell to settle "its financial obligations to the State of Louisiana."

"Despite LED's efforts to accommodate Bell Helicopter, the company never identified a path forward for meeting its obligations to the State of Louisiana," said Pierson. "The State of Louisiana has met its obligations for the project; Bell Helicopter has not."

"We regret that we must terminate the CEA and close out the project, but the company has defaulted on numerous occasions, leaving us no other course. We must protect the interests of the State of Louisiana and its taxpayers."

# TAS S-76D fleet passes 10,000 hours

Thai Aviation Services operates an all-Sikorsky fleet including five S-76D helicopters. **Ned Dawson Photo**



In a major milestone for the Sikorsky S-76D helicopter, Thai Aviation Services (TAS) has surpassed 10,000 flight hours with its S-76D fleet.

TAS currently operates five D models in support of oil-and-gas customers in the Gulf of Thailand, having taken delivery of the aircraft in late 2016 and early 2017. The company also operates two Sikorsky S-92 helicopters, and an older S-76C++.

The latest version in the S-76 series, the S-76D features Pratt & Whitney Canada PW210S engines, new main rotor blades, and a Thales TopDeck avionics suite and autopilot, among other upgrades.

"When comparing to the earlier version, the D model obviously has a lot more new functions and technology on the aircraft. The engine has more power, which provides less exposure time in the environment

and the area we are operating the aircraft," TAS managing director Suwanawat Koeworakul told *Vertical* by email.

Koeworakul acknowledged that the transition to the S-76D has not been without its challenges. However, he said that detailed planning by TAS, along with support from Sikorsky and Pratt & Whitney Canada, helped minimize disruptions to the company's operations.

In a press release announcing the milestone, Audrey Brady, Sikorsky's vice president of Commercial Systems & Services, stated, "We genuinely value the trust and confidence Thai Aviation Services has demonstrated in Sikorsky products over the past three decades. Sikorsky is extremely proud to provide TAS with safe, reliable aircraft to support such a high operational tempo with first-rate availability."

As a privately owned air operator certificate holder registered in Thailand, TAS has supported offshore oil-and-gas operations in the region for 30 years, using Sikorsky helicopters exclusively. Earlier this year, Sikorsky authorized TAS as the first Sikorsky Customer Support Center in Thailand, making it the seventh such support center in the Asia-Pacific region and one of 23 worldwide.

In addition to the flight-hour milestone, TAS is also forecasting that the flight of its 100,000<sup>th</sup> S-76D revenue passenger will occur later this fall.

According to Sikorsky, the offshore oil transportation mission accounts for around 65 percent of the more than 7.25 million hours flown by the global S-76 fleet. Since 1977, Sikorsky has delivered more than 875 S-76 helicopters of various models to customers around the world.



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# BLM revises Black Hawk terms; won't re-bid contract



The U.S. Bureau of Land Management has now issued a public aircraft operations declaration for its exclusive-use UH-60A Black Hawk, contradicting what it told prospective bidders for the contract last year. **Skip Robinson Photo**

## BY ELAN HEAD

The U.S. Bureau of Land Management (BLM) does not intend to re-evaluate its award of an exclusive use firefighting contract for a restricted category UH-60 Black Hawk helicopter, despite having now contradicted what it told prospective bidders during the solicitation period.

The BLM issued its solicitation for a Type 1 “Heavy” helicopter last February, specifying minimum aircraft requirements that pointed toward a Sikorsky UH-60 or S-70 Black Hawk. The solicitation indicated that the aircraft would be used for missions including the transport of “qualified non-crewmembers” and specified that the winning contractor must operate in accordance with all portions of 14 Code of Federal Regulations (CFR) part 91, “including those portions applicable to civil aircraft.”

Some prospective bidders — including Timberline Helicopters of Sandpoint, Idaho — recognized a conflict in the BLM’s requirements. Currently, no model of the Black Hawk holds a standard airworthiness certificate (normal or transport category) from the Federal Aviation Administration (FAA), which is a prerequisite for transporting passengers. Although there are now a number of UH-60 and S-70 Black Hawks operating in the United States under restricted category type certificates, 14 CFR part 91 strictly limits who can be carried

onboard a restricted category aircraft.

Specifically, 14 CFR 91.313 states that no person may be carried on a restricted category civil aircraft unless that person is a flight crewmember or flight crewmember trainee, “performs an essential function in connection with a special purpose operation for which the aircraft is certificated,” or “is necessary to accomplish the work activity directly associated with that special purpose.”

Although a restricted category aircraft may be certificated for the special purpose of firefighting through the “aerial dispensing of liquids” (ADL), the FAA has made it clear that such a certification does not allow it to transport firefighters generally. Instead, any non-flight crewmembers on board must be there to perform tasks essential to the ADL operation, such as hooking up the water bucket or directing water drops via radio.

Civil aircraft regulations do not apply to public aircraft — aircraft operated by or exclusively for a government entity — provided those aircraft carry only crewmembers or qualified non-crewmembers whose presence is associated with the performance of a governmental function. That’s a definition that could readily apply to a BLM exclusive-use helicopter transporting only the agency’s own firefighters.

However, the FAA now requires commercial operators who conduct public aircraft operations (PAOs) under contract to obtain a

written declaration of public aircraft status from their contracting government entity. When Timberline asked the BLM in March 2017 whether it intended to issue a PAO declaration for the transport of “qualified non-crewmembers,” the agency replied that it did not.

“There is no intent to issue a public aircraft declaration, the agency sustains its position that an aircraft which meets the requirements of this solicitation will be able to perform most missions listed under B1 Scope of Contract,” the BLM stated.

Timberline concluded that the BLM’s solicitation was defective, as the minimum aircraft requirements called for a Black Hawk, yet no existing Black Hawk could legally transport passengers under part 91. Timberline urged the BLM to cancel the solicitation; when the agency declined to do so, Timberline protested the solicitation to the Government Accountability Office.

The protest was ultimately unsuccessful. On June 29, 2017, the BLM awarded a contract worth up to \$14 million to PJ Helicopters for a restricted category UH-60A. By the time the exclusive use contract period concluded in September, the agency was using the Black Hawk to transport firefighters between heli-bases, sometimes in the absence of any ADL operation.

On Sept. 12, 2017, *Vertical* asked the BLM whether a PAO declaration had been issued

for these flights. A spokesperson responded, "A public aircraft operations declaration is not necessary, therefore one has not been issued." The BLM maintained that clarification correspondence it had received from the FAA prior to the award of the contract authorized the conveyance of firefighters as essential or necessary personnel.

The FAA begged to differ, telling *Vertical*, "The FAA and DOI/BLM are still working to clarify which personnel are 'essential and necessary' for the operation of their restricted category aircraft. The FAA allows transportation of people in restricted category aircraft only if they are essential and necessary for the aerial work portion of the special purpose operation specified — in this case, aerial dispensing of liquid for forest and wildlife conservation."

### A PAO DECLARATION AFTER ALL

The second season of the contract started this May. On May 24, the FAA issued a legal interpretation explicitly addressing the BLM's use of the restricted category UH-60A to transport firefighters for ground firefighting purposes. The FAA concluded, "no — the activity cannot be performed in compliance with [14 CFR part 91 or part 119]."

Since then, the BLM's parent agency, the Department of the Interior (DOI), has issued a PAO declaration for the contract. According to a BLM spokesperson, this declaration "is specific to the exclusive-use contract UH-60 Black Hawk and provides departmental approval to transport firefighters regardless of water bucket utilization."

The decision to use the UH-60A for firefighter transport goes against a longstanding DOI and U.S. Forest Service (USFS) policy against transporting interagency personnel on restricted category aircraft. In a recent policy clarification memo, the BLM defended its departure from this policy by arguing that "contract language prevails" when there is a conflict between a contract and the Interagency Helicopter Operations Guide, and "the transportation of firefighters on N803PJ is within the scope of the Type 1 contract."

The PAO declaration appears to resolve the most pressing legal concerns associated with the Black Hawk's operation. However, the contract initially counted on the FAA's safety oversight — and it is not clear whether the BLM, in hastily issuing a PAO declaration, has ensured that it has the policies and resources necessary to assume that oversight responsibility itself.

The PAO declaration also doesn't do much for those operators like Timberline who declined

to bid on what they correctly perceived to be a legally questionable, albeit lucrative, contract.

When *Vertical* asked the BLM if it intends to cancel and re-bid the contract in light of its decision to issue a PAO declaration after all, the agency indicated that it does not.

"Based on information received from the FAA Office of the Chief Council, we will continue to operate the Type 1 helicopter within the terms and conditions of the contract and FAA regulations," the BLM spokesperson stated.

In a statement provided to *Vertical*, Timberline Helicopters chief operating officer Travis Storro responded, "As an operator of the

incredibly capable and effective UH-60 Black Hawk — an aircraft with redundant safety systems, twin-engine reliability, and fast incident response capabilities — Timberline has always believed that it is the right aircraft for the heli-tack mission.

"However, FAA regulations and policies, as well as USFS and DOI policies, have prohibited transport of passengers or cargo in restricted category helicopters. We believe these issues should have been resolved before awarding a contract that would require the successful bidder to violate FAA regulations and interagency policies to perform under the contract."


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# StandardAero to close former Vector facility



StandardAero will retain a presence in Langley as well as a smaller presence in Richmond, British Columbia, but will be consolidating its helicopter engine MRO services in Winnipeg, Manitoba. **StandardAero Photo**

## BY ELAN HEAD

StandardAero has provided more details on restructuring plans that will see the closure of a former Vector Aerospace maintenance, repair and overhaul (MRO) facility that employs 245 people in Richmond, British Columbia.

StandardAero acquired Vector from Airbus Helicopters in late 2017. In May, StandardAero announced that it would be restructuring its Canadian MRO facilities to create three different “centers of excellence”: one for helicopter airframe/component MRO services in Langley, British Columbia; another for helicopter engine MRO services in Winnipeg, Manitoba; and a third for turboprop engine MRO services in Summerside, Prince Edward Island.

As part of the restructuring, StandardAero announced that it intends to “wind down” operations at the legacy Vector facility on Agar Way in Richmond by June 2019. Helicopter engine MRO services currently performed at that facility will be moved to

StandardAero's Winnipeg campus, while helicopter dynamic components work will be relocated to Langley.

The decision has caused some consternation not only among employees at the Agar Way facility, but also among many of the facility's customers in Western Canada.

In an interview with *Vertical*, Manny Atwal, StandardAero's VP of sales, marketing and business development for commercial helicopter services, explained that the decision to consolidate helicopter engine MRO services in Winnipeg is part of a company-wide effort to improve efficiency by eliminating duplicate operations.

Several factors made Winnipeg the best choice for a helicopter engine center of excellence, he said, among them the flexibility afforded by a larger campus that employs nearly 1,300 people and has multiple engine MRO groups.

“When we see peaks and valleys in the marketplace, we have the ability to move people around to different engine lines . . .

to best match capacity and demand,” Atwal said. “And that has really helped us provide some of the best turn times in the industry.”

The fact that StandardAero's engineering and engine part repair groups are also based in Winnipeg is another reason why the location made sense as a center of excellence for helicopter engine MRO services, he noted.

“When it comes to repairs, that's something that Winnipeg has a very strong competency in, is piece part and component repair for engines. If you can repair a part rather than replace it, you can save the customer money. We call it our ‘repair versus replace’ strategy, and that's something that's good for everybody.”

Although the Agar Way facility will be closing, Atwal pointed out that StandardAero will be maintaining its legacy Rolls-Royce M250 engine shop on Russ Baker Way in Richmond. Additionally, the company will move some employees to that facility in order to continue providing field service

repairs for Safran Arriel 1 and 2, and Pratt & Whitney Canada PT6T Twin-Pac engines out of Richmond.

While a certain number of employees from the Agar Way facility will move to the Langley facility — about a 30-mile (45-kilometer) drive east — others have been offered positions in Winnipeg and “competitive” relocation assistance, Atwal said. He was unable to provide a precise number of how many employees will be required to relocate or lose their jobs, explaining, “We’re in the process of going through that assessment right now.”

StandardAero’s senior VP of marketing and communications, Kyle Hultquist, noted that the company announced the restructuring with a more than 12-month lead time with the goal of “helping every employee impacted one way or another either [find] another job within a StandardAero facility or outside of the company over a long transition period. . . . That’s what our end goal is, to help find work for everybody during the process.”

The restructuring will bring some new product lines to the Winnipeg campus, including the Arriel 1 and 2 and PT6T Twin-Pac engines. Atwal said that StandardAero is taking “a couple of different approaches” to ensuring that the transition goes smoothly, with a principal focus on relocating specialists for those engines.

“The more people we can relocate and bring to Winnipeg that work on those engines, the better for us, and that’s obviously the single biggest goal for us, to relocate as many as we can,” he said.

However, the company is also providing training on these models to current gas turbine technicians in Winnipeg, both by bringing technicians to Richmond for training, and by bringing subject matter experts from Richmond to Winnipeg. StandardAero is also leveraging its relationship with a community college in Winnipeg to train technicians from the ground up.

“Obviously it’s a big challenge, we realize that. There’s going to be hiccups, we also realize that,” Atwal said. He added, however, that this is not the first time that StandardAero has moved or added new engine lines: “We’ve done that in Winnipeg a number of times, so we do have a fair bit of lessons learned.”

According to Atwal, StandardAero has also been receiving good support from engine original equipment manufacturers (OEMs)

as the company prepares for the transition.

“It’s in their best interest to make sure operators are taken care of as well, so we’ll work with the OEMs to get whatever assistance they can provide to make this as easy as possible,” he said.

Atwal said that StandardAero has received a “mixed reaction” from customers to its restructuring plan, with some welcoming the change, but others less enthusiastic about it.

“Some of them are a little bit skeptical because they’ve dealt with [the] legacy

Vector site for so many years and they’ve developed relationships and they’ve got good service out of there. If they’ve not dealt with StandardAero in the past, for them it’s new and it’s a big change, but we’re trying to work with them and trying to assure them that we’re going to make sure that their objectives are being met,” he said.

“Quality, turn time, delivery, those are things that our customers are looking for. That’s what our focus is when we’re talking about ‘center of excellence,’ and that’s what we’ll try to produce here out of Winnipeg as we bring the products over,” he concluded.



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The Solar Advantage windshields and windows are said to improve the blocking of ultraviolet rays and reduce infrared and solar radiation. **Bell Photo**

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## New Solar Advantage windshields and windows for Bell 407

Solar Advantage, new Aeronautical Accessories-branded windshields and windows that utilize a new, innovative acrylic, is now available for Bell 407 aircraft.

The Solar Advantage windshields and windows positively impact the pilot and passengers, improve blocking of ultraviolet (UV) A and B rays, and reduce infrared and solar radiation.

At higher elevations, UV rays are stronger and exist at higher levels. Research shows that UV reduction protects pilots' eyes from UV radiation and preserves color vision. The Solar Advantage windshields and windows reduce both UV A and UV B exposure even further than traditional acrylic windshields and windows, improving UV blocking up to 400 nanometers (nm).

Pilot and passenger protection and comfort are a priority, Bell said.

Solar Advantage helps prevent heat build-up in the cabin, which allows the Bell 407's cabin to remain more comfortable for the pilot and passengers, the company said.

In addition, it said Solar Advantage reduces fading of the interior fabric, extends the life of the aircraft interior plastics, and reduces weathering of components.

The new Solar Advantage product still features all the same benefits of the traditional Aeronautical Accessories-branded windshields and windows for the Bell 407, including clarity, durability, ease of removal and replacement.

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The X-Back MOLLE+ features a floating buddy line, a TSO-approved strobe light, detachable spray hood, and a permanently attached leg loop. **Switlik Photo**

## Switlik unveils new survival suit & life vest

Switlik's new CAP1034-compliant life vest, anti-exposure dry suit and compressed air emergency breathing system is now available, following approval from the British Civil Aviation Authority.

The new X-Back MOLLE+ life vest complies with ETSO-2C504, and features the same low profile and ergonomic fit of the X-Back MOLLE, but with specific design features to comply with ETSO 2C504 requirements.

These include a floating buddy line, a TSO-approved strobe light, detachable spray hood, and a permanently attached leg loop.



The new ETSO Pilot and ETSO Passenger suits comply with ETSO 2C503 requirements, and have an upgraded design based on the same U-Zip-It Anti-Exposure Dry Suit worn by U.S. Coast Guard helicopter crews.

The U-Zip-It low slung entry zipper design helps ease donning, unassisted zipper closure and freedom of movement. It has waterproof, breathable, stretch socks attached to the suit and a neoprene hood and glove kit. It also has additional reflective panels for visibility, and pockets for storage on the arms and legs.

Switlik has collaborated with Capewell Aerial Systems and Aqua Lung America to integrate the SEA LV2 CA-EBS manufactured by Aqua Lung into the Switlik survival ensemble.

"This approval allows us the opportunity to expand into new territories," said Sarah Switlik, VP of sales and marketing. "We are very excited to bring the Switlik Signature X-Back and U-Zip-It designs to new users."

Together, the ensemble is approved under ETSO 2C502 and CAP1034 for use in helicopter operations to and from helidecks located in hostile sea areas.

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# Tennessee Valley Authority purchases MD 530F

Tennessee Valley Authority (TVA) has purchased a new MD Helicopters MD 530F, configured to support powerline utility, inspections, and construction operations throughout TVA's multi-state service area. It will be the third MDHI F-model to join the TVA fleet.

TVA is the largest public power utility in the United States and one of the largest producers of electricity in the country.

"The MD 530F is revered for its safe, reliable and cost-effective operation in a broad range of utility missions," said Lynn Tilton, chief executive officer for MD Helicopters, Inc. "We could not be more pleased that TVA chose to add another MD 530F helicopter to their fleet."

TVA's new MD 530F is the first commercially-delivered F-model with MDHI's newest all-glass single-engine cockpit, including Howell Instruments electronic engine-indicating and crew-alerting system; Garmin G500[H] TXi electronic flight instrument system (EFIS) with Touchscreen GDU 700P primary flight display and multifunction display; and Garmin GTN 650 Touchscreen NAV/COM/GPS.

Additional mission equipment includes the Fargo 21-US gallon (80-liter) auxiliary fuel

tank; Onboard Systems Talon LC Keeperless 3,600-pound (1,630-kilogram) cargo hook and Colorado Helicopters side hook bracket; high visibility main rotor blades; and wire strike protection.

"Helicopters utilizing a working platform to perform construction, maintenance, and inspection services can complete work faster and more efficiently than a ground crew," said David G. Hill, general manager of aviation services, Tennessee Valley Authority.

"The ability to deliver linemen directly onto the structure allows the work to be completed without impacting the surrounding environment."

TVA's service area covers most of Tennessee, portions of Alabama, Mississippi, and Kentucky, and small slices of Georgia, North Carolina, and Virginia.

TVA will take delivery of its new MD 530F in the fourth quarter of this year.

## RotorBits

### FAA approves R66 cargo hook

The Federal Aviation Administration (FAA) has approved Robinson Helicopter Company's R66 cargo hook installation.

The optional cargo hook carries external loads up to 1,200 pounds (544 kilograms) and, for external load operations, the R66's maximum gross weight increases from 2,700 to 2,900 lb. (1,225 to 1,315 kg).

The cargo hook installation includes an Onboard Systems hook, right- and left-seat controls (allowing for solo flight from either seat), a left-seat hydraulic switch, and a left-seat start button.

A load weight gauge and a second set of engine power gauges (torque and gas temperature) are located in the left door sill allowing the pilot to monitor engine operations while keeping an eye on the external load.

Skip Robinson Photo



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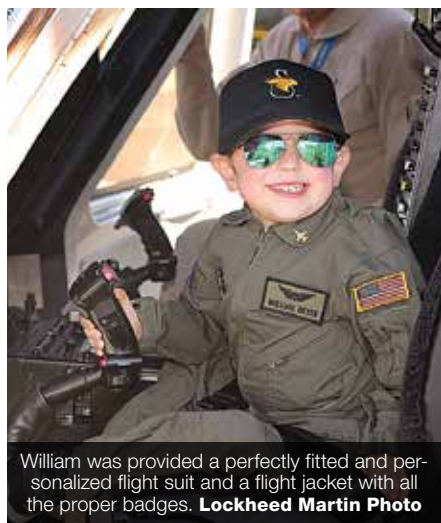


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# Sikorsky makes young boy's wish come true



John McGonagle, director of flight operations and chief pilot at Sikorsky, said their day with William was one the staff will never forget.  
**Lockheed Martin Photo**



William was provided a perfectly fitted and personalized flight suit and a flight jacket with all the proper badges. **Lockheed Martin Photo**

Sikorsky has on-boarded a new honorary test pilot. William Beyer from Collegeville, Pennsylvania, suffers from serious heart problems and has dreamed about being a pilot for all six years of his young life.

Sikorsky partnered with Make-A-Wish for the first time to give William and his family a "pilot for a day" experience on Sept. 5 at the Lockheed Martin Rotary & Mission Systems facility in Stratford, Connecticut.

William was provided a perfectly fitted and

personalized flight suit, a flight jacket with all the proper badges, and of course, shiny new aviator sunglasses, before taking to the sky in a Sikorsky S-76 helicopter with his parents Wes and Michelle and younger brother Jake.

Make-A-Wish is a national non-profit organization that creates life-changing wishes for children with critical illnesses. William was born with a rare heart defect called Hypoplastic Right Heart Syndrome. At 10 months of age, he underwent a heart transplant and continues to work with doctors to prevent organ rejection.

In addition to the helicopter flight, William and his family toured the manufacturing facility, raced in the S-97 Raider simulator, and enjoyed lunch with Sikorsky pilots as they shared their stories.

"Thank you for making his wish come true," wrote Wes Beyer on Sikorsky's Facebook page. "His mom and I were especially moved by all the workers who showed him support and gave him the great welcome as we toured the factory. William is truly blessed."

John McGonagle, director of flight operations and chief pilot at Sikorsky, said their day with William was one the staff

will never forget and was impressed with William's questions and how he manned the controls during the flight.

"We were all-in from the start," said McGonagle. "We were thrilled to partner with a great organization like Make-A-Wish. It was just amazing to see our entire company come together in support of a young child who wants to learn more about aviation – that's what our company is all about."

Kim Smith, director of corporate and community giving with Make-A-Wish Connecticut, said Sikorsky's involvement was inspirational. "They honored William and his family in a way that words can't describe. William's wish day at Sikorsky was a wonderful day filled with incredible moments that gave William and his family unforgettable memories."

Along with McGonagle, Sikorsky pilot Mark Ward made sure William had the proper gear and instructions to learn the basics of flying a helicopter. He also presented William with an honorary test pilot certificate. "To have a child's top wish be for the job you do every day, really puts your own life into perspective."



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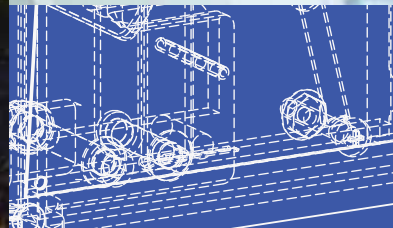
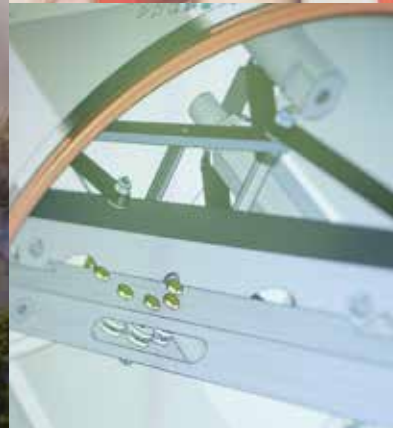
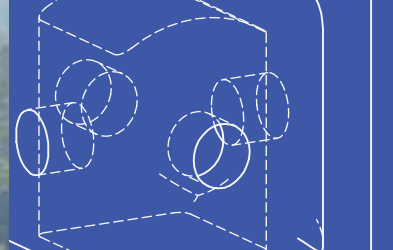
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## VHA composite Bell 206L main rotor blades STC'd



The VHA 206L LongRanger main rotor blades use the same carbon fiber materials and construction methods as the company's 206B JetRanger main rotor blades. **VHA Photo**

Van Horn Aviation (VHA) has received a supplemental type certificate (STC) from the Federal Aviation Administration (FAA) for composite main rotor blades installed on the Bell 206L LongRanger helicopter.

Loosely based on VHA's composite 206B JetRanger main rotor blades, which were certificated in 2016, the new VHA LongRanger main rotor blades have been approved with a 16,000-hour service life, which is four times the life of the current OEM metal blades.

"Our LongRanger main rotor blades reflect several design changes over the JetRanger blades due to inherent differences in the transmission suspension," said VHA's CEO James Van Horn. "Besides being 22 inches longer than the JetRanger blades, the LongRanger blades also use different carbon fiber layup schedules and leading edge/tip weight distribution."

## Bell selected for 2020 NASA UAS demo



Bell has entered a cooperative agreement with NASA for an Unmanned Aircraft Systems (UAS) flight demonstration in the National Airspace System (NAS), expected to be conducted in 2020.

The cooperative agreement outlines the goal of progressing toward routine commercial UAS operations in the NAS.

Bell and its collaborative teammates Textron Systems, Xwing, and the

University of Massachusetts Amherst's Center for Collaborative Adaptive Sensing of the Atmosphere (CASA), plan to demonstrate end-to-end commercial mission operations with Bell's Autonomous Pod Transport 70 (APT70), which will include integrated command and control (C2) and detect and avoid (DAA) technologies.

Collectively, they will explore requirements as they relate to commercial transport missions for medical, law enforcement/parapublic and offshore missions.

## RotorBits

### Bell 525 completes hot weather testing



**Bell Photo**

The Bell 525 program has completed hot weather testing in Yuma, Arizona, at temperatures up to 120 F (49 C), as well as high altitude operations to density altitudes of 14,000 feet.

Earlier this year, the Bell 525 completed cold weather testing at temperatures down to -37 F (-38 C) in northern Manitoba.

The Bell 525 flight test program has now accumulated over 1,000 hours of total test time with speeds exceeding 200 knots at maximum gross weight limits. Bell said the aircraft's performance continues to meet or exceed all design specifications.

The Bell 525 is preparing for Federal Aviation Administration flight test participation in the fourth quarter of 2018 and continues to make strong progress towards planned certification in 2019.

### DART launches H130/EC130 Cable Cutter System

DART Aerospace has received certification from the Federal Aviation Administration (FAA) for its new Cable Cutter System for the H130/EC130 family of helicopters.

The new H130/EC130 Cable Cutter kit is an unobtrusive system with equivalent protection level to other options available. It is designed to offer protection to the airframe, occupants and dynamic components should the aircraft impact wires during forward flight.

DART said Canadian and European validations for the H130/EC130 kit are coming shortly.



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# FAA: 665 helicopter bird strikes over last 3 years

BY ED BROTA

The helicopter industry reported 665 bird strikes in the United States over the last three years, according to figures from the Federal Aviation Administration Strike Database. The data, provided by Phyllis R. Miller, a scientific data technician with the USDA Wildlife Services, span 2015 to 2017, and show an annual strike count of just over 200 — a consistent figure to the average since 2010.

Prior to that, reported strikes were considerably lower, but this was likely due to a lack of reporting. The number of strikes that remain unreported due to a lack of resulting damage or delays is unknown.

Of the total strikes reported, 77 were on government aircraft (including U.S. Coast Guard, U.S. Customs and Border Protection, and other government entities), and 12 privately-owned helicopters were struck. The vast majority of strikes were recorded on helicopters on business flights.

Bird strikes caused three fatalities (all from one incident) and eight injuries (from eight separate incidents) over the reporting period.

The fatal encounter occurred near Stuttgart, Arkansas, on Nov. 19, 2017. A Bell 407, being used as a medical transport, was responding to a call when it crashed, fatally injuring the pilot and two medical personnel aboard. Witnesses said the aircraft started spinning out of control before crashing to the ground and bursting into flames. Although still under investigation from the National Transportation Safety Board, it is believed to be a bird strike incident — and has been officially counted as such. Many geese frequent the area of the crash and several bird carcasses were found in the wreckage.

## AUVSI: nearly 2,000 Small UAS waivers granted by FAA

On the two-year anniversary of the Federal Aviation Administration (FAA) establishing regulations for operating small unmanned aircraft systems (UAS), the Association for Unmanned Vehicle Systems International (AUVSI) said the regulator has granted nearly 2,000 waivers for UAS operations beyond the scope of the Small UAS Rule.

AUVSI's analysis finds that nearly 92 percent of the waivers grant permission to operate UAS at night, which is not permitted under the FAA rule. The report also shows that first responders around the country are embracing expanded UAS operations, with close to 200 having received waivers.

Of the eight injuries reported, four were to pilots, and four were passengers. The incidents typically involved medium to large birds, with some penetrating into the aircraft. The more minor injuries were typically the result of flying debris caused by the strike — particularly broken glass.

In terms of the impact on the aircraft, 79 strikes (12 percent) resulted in at least some damage. Of these, 41 (six percent) produced "substantial damage" — defined as damage to an aircraft's structural integrity, performance, or flight characteristics, normally requiring major repairs or the replacement of the entire affected component.

In all, 28 incidents resulted in over \$10,000 in damage/repair costs, four of which exceeded \$100,000. For the three-year period, bird/wildlife strikes to helicopters resulted in a total of over \$3.7 million in repair and damage costs — not including the revenue lost to an aircraft being out of service while in repair.

The most damaging strikes are from larger birds, with vultures being particularly troublesome — but smaller birds can be dangerous if they are in a flock.

The vast majority of bird strikes continue to occur while helicopters are enroute — as opposed to fixed-wing aircraft, which are typically struck on takeoff, approach or landing.

Most bird strike precautions are taken at and in the vicinity of airports, doing little to protect helicopters traveling enroute. Pulsing exterior lights are one technological advance that may help helicopters, as they seem to warn birds away. Recent tests have shown that aircraft with pulsing lights are hit less often and suffer less damage when struck.

## RotorBits

### Enstrom certifies Appareo Vision 1000

The Federal Aviation Administration has certified Appareo's Vision 1000 in the Enstrom 480B turbine helicopter. The certification for the Vision 1000 was granted in June followed by approvals from the European Aviation Safety Agency and the Brazilian DAC.

Approval is in process with the Civil Aviation Administration of China and the CAA of Argentina.

The Vision 1000 is Appareo's cockpit recording device that captures attitude data, WAAS GPS, cockpit imaging, and ambient audio.

"It is a self-contained design that is a perfect fit for the Enstrom 480B," said Dennis Martin, director of sales and marketing at Enstrom Helicopter. "The fact that it can capture so much information and it can be installed in a day in new or older aircraft has made it a perfect option for our customers."

### VFS Student Design Competition winners announced

A team from the University of Maryland and Nanjing University of Aeronautics and Astronautics took top honors in the graduate category of The Vertical Flight Society's 35<sup>th</sup> Annual Student Design Competition, while the University of Maryland's undergraduate team took first place in the undergraduate competition.

Each year, the competition challenges students to design a vertical take-off and landing (VTOL) aircraft that meets specified requirements, providing a practical exercise for engineering students at colleges and universities to promote student interest in VTOL engineering and technology.

Academic teams from around the world submitted entries in this year's event, with a total of 10 proposals from four different countries.

The U.S. Army Research Laboratory (ARL) sponsored the competition this year, with a total of \$13,000 in prize money.



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# Era Group and Bel Air Aviation enter teaming agreement

Bel Air's fleet includes two Leonardo AW189s and three AW139s. It operates offshore flights to oil-and-gas installations, vessels and wind farms in the North, Black and Baltic seas. **Bel Air Photo**



Era Group has announced a teaming agreement with the Danish company Bel Air Aviation that will strengthen the companies' ability to compete for contracts in and around the North Sea.

The agreement, announced on Sept. 12, will see Era contribute fleet and support to the

partnership, with Bel Air providing operational and technical services for customers in Europe. The companies said their combined strengths and expertise will allow them to offer customers "high flexibility, a very strong helicopter capacity, and a reinforced base ensuring high expertise and

know-how within the helicopter industry."

"We are excited to announce this new commercial partnership with Bel Air Aviation, a company that shares Era's core focus on safety and quality," stated Chris Bradshaw, Era's president and CEO, in announcing the agreement. "We look forward to working together with Susanne [Hessellund] and her team to deliver flexible helicopter fleet solutions to customers in Europe."

Hessellund, Bel Air's owner and managing director, stated, "We are really happy and excited that this teaming agreement has been made possible and we are convinced that this collaboration with Chris and the entire Era team will result in even more opportunities and higher flexibility to our customers, since both our companies share the same fundamental values and prioritize safety, flexibility, and reliability to ensure dedicated and customized service."

Bel Air was established in 1994 and describes itself as the only Danish-owned offshore helicopter company servicing the oil-and-gas and wind sectors. The company has its main base at Esbjerg Airport, Denmark, and operates offshore flights to oil-and-gas installations, vessels, and wind farms in the North, Black, and Baltic seas.

Bel Air currently operates two Leonardo (formerly AgustaWestland) AW189 and three Leonardo AW139 helicopters. In an email to *Vertical*, Hessellund said that the cooperation with Houston, Texas-based Era Group "will give us strengthened fleet opportunities supported by the largest civilian fleet of AgustaWestland helicopters in the world, and a robust new order book for AW189 and AW169 helicopters."

She added, "Bel Air is fleetleader on the AW189 and can bring knowledge into the cooperation too. In addition, Era has one of the strongest balance sheets in the industry, and the financial flexibility to support helicopter fleet solutions demanded by our customer base."

According to Hessellund, the conversation with Era around the teaming agreement "really started with mutual respect" based on the companies' shared values.

"We are committed to a long-term partnership and expect that our level of cooperation will only grow over time," she told *Vertical*.

**If you would like to submit a press release or if you have a new product or service that you believe is newsworthy, please email our news editor at [news@verticalmag.com](mailto:news@verticalmag.com).**

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# Q & A

Andrea & Marianne Pelletier

interviewed by Oliver Johnson



Andrea (left) and Marianne (right) are a pilot and AME, respectively, at Slave Lake Helicopters in Slave Lake, Alberta.

*Andrea Pelletier is a pilot with over 10,000 flight hours, and she also spent seven years as an inspector at Transport Canada. Her daughter, Marianne, recently gained her aircraft maintenance engineer (AME) license, joining Andrea at Slave Lake Helicopters in Slave Lake, Alberta — creating a mother-daughter team that's rarely seen in the helicopter industry.*

## **VERTICAL: You must have grown up around the industry.**

**MARIANNE PELLETIER:** Pretty much! My mom, being a pilot, was always bringing us around, and showing us her job, and my dad is an AME as well, so it was kind of a family thing. I have a younger brother and a younger sister, but they are not interested in aviation.

## **V: Did you always know this was the career for you?**

**M.P.:** Honestly, seeing my parent's lifestyle — my mom being gone all summer, my dad having to take care of us, it was something that pushed me from aviation. I didn't really want that lifestyle when I was younger. But I worked for George [Kelham — owner of Slave Lake Helicopters] just as a summer student, and I fell in love with it. It was just the best thing ever, and I've found an interest in it that wasn't there before — suddenly it was what I wanted to do.

## **V: What did you do that summer?**

**M.P.:** I was helping with inspections, but mostly cleaning, keeping the helicopters tidy,

and a lot of operations things, too. By the end of the summer, it was a lot more of showing me what I should be looking for in inspections, showing me how to do a lot of the visuals. I learned quite a bit that summer.

## **V: And you decided to go to AME school?**

**M.P.:** No, I already had enrolled in school in Quebec, and I had studies to finish there. I kind of pondered the idea of going to school in aircraft maintenance, but I was still unsure. I had a lot of other things going on, and George called me. He had hired someone in the winter, but they left, and he couldn't find anyone on short notice, so he called me back because I already knew what was going on. George and Debbie [his wife, and co-owner of Slave Lake Helicopters] are actually the ones who kind of nudged me, "Hey, maybe you should look into this. Go to school — do something with this."

## **V: What did your mom think?**

**M.P.:** I'm not too sure. She didn't really believe it was something I wanted to do. I had never shown an interest in it, so she thought it was just maybe a passing interest. And she tried nudging me into going through school. She was very helpful, but she wasn't pushing me into aviation.

## **V: Where are you now in terms of your career? Are you finished your apprenticeship?**

**M.P.:** I got my license in December — it was my Christmas present to myself! It was quite

the wakeup call. This summer, I got to go out a lot more on my own, and I still have all the support I need, from management and from the office, and hangar. But I get to explore what it's like to be on my own, and to figure things out for myself, and I really like that aspect of the job.

## **V: What's it like working with your mom?**

**M.P.:** Generally, I love it. She guides me in a way that I wouldn't have with any other pilot. It was definitely very helpful for my career, and she showed me tips and tricks — how to deal with people, and deal with clients.

## **V: How much are you doing out in the field?**

**M.P.:** In the summer, it's kind of hit and miss. This summer, I was traveling quite a bit — just doing a lot of day trips. So, it's nice as I still get to be home. But most of July I was in the hangar.

## **V: Do you have any desire to eventually become a pilot yourself?**

**M.P.:** No, not really. I don't really like flying that much! But I love fixing. I like test flights, but long flights don't agree with me.

## **V: What do you enjoy about your work?**

**M.P.:** I like fixing things, and I'm working towards the troubleshooting aspect of it. George has a lot of newer machines, but some are getting old, and the problems that are coming up, I have to figure out what's going on. What's wrong and how did it happen? And I like the fact that I can turn to a book, and the book will guide me.

## **V: Have you come across many other young women in the industry?**

**M.P.:** I've met some. There's one girl that I went to school with, and one girl I met on a type course who was tiny, but she worked on the biggest helicopters. I've kept in touch with them, and when I need them, we have a conversation. I think when you do meet another girl in the industry, it's important to stick together.

## **V: What would you like to achieve in your career?**

**M.P.:** For long term goals, one thing that I would like to do is travel a little bit. But, at the same time, there's this huge decision I have to make in terms of if I want to have a family or

not. I wouldn't be able to keep going with my career and travel like that if I want to have kids in the next few years. On a professional level, I'm all about learning. If I don't learn something each day, I feel like I haven't done much.

.....

**VERTICAL: What's your role at Slave Lake?**

**ANDREA PELLETIER:** Project manager. I am lead pilot on two major programs we have developed and implemented. The first was the AStep platform, which we use to transfer linemen on top of power lines. The other project was the Human External Cargo [HEC] program, where we sling people with AStars for firefighting work. Slave Lake Helicopters is the first and only Canadian Operator using HEC for fighting fires — as part of an operation rather than for rescue work. It took us three years to develop and we implemented it in May. It's a two-year pilot project for Alberta Agriculture and Forestry. We also have jobs like tree planting; infrared, corona and LiDAR inspections; and many others. This is the best job I ever had!

**V: How did you get into the industry?**

**A.P.:** When I was young, I wanted to be a doctor, but I didn't have the school marks. I wanted to save lives. Then, when I was 14 or 15, I saw a documentary on TV on the Coast Guard in the States, saving lives. That was when I started to think about flying helicopters — but I didn't have the confidence. I met my future husband when I was 18, and he helped push me into my dream.

**V: Was it always going to be helicopters?**

**A.P.:** Clearly helicopters. I had no interest in fixed-wing whatsoever. For me, fixed-wing travel is to be in the back and drinking a good wine, talking with the other passengers. I started my fixed-wing license to know if I could be comfortable in the air, and then I started my helicopter license.

**V: What were you learning in?**

**A.P.:** I was learning on the [Robinson] R22 and the Bell 206 — I took 40 hours of turbine time to have a better chance of being hired, and it paid off.

**V: Was Marianne's career choice something of a surprise to you?**

**A.P.:** Absolutely. We tried to discourage her because you're away most of the time in aviation. It's quite demanding to have a family and children. For me, I was very fortunate

because of my husband. He had a steady job and he was willing to be actively involved in the family. We have three kids and he took his role seriously.

**V: What advice did you have for her when she started her career?**

**A.P.:** As a woman, I told her to stay herself, and never doubt herself. I told her, "If you don't succeed, don't think it's your fault — there's always a chain of events that leads to an unsuccessful mission or into a mission failure." The advice she gave me... When we started to work together, I used to call her "Sweetie" and I would say, "Dress up warmer than that." One day she called me in my office and said, "Mom, if this is going to work for us, you have to treat me as another colleague — never as your daughter." I respected it and it's perfect — it works so well.

**V: Have you been deployed in the field together on a project before?**

**A.P.:** Very often — 50 percent of her time in the field is with me. She's the main mechanic on the AStep program.

**V: What is it like working with your daughter?**

**A.P.:** To see my daughter happy and become a woman excelling in aviation for me is... I can't ask for better. It also gives me hope that other women will join the industry.

**V: Why do you think women are underrepresented in this industry?**

**A.P.:** It's really hard to say. I think women don't know how feasible it is. I think there's still this concept out there that it's really hard. You see a helicopter on TV or in a magazine, it's fighting fires, it's in the bush, it's moving

drills — it looks tough. I think it's more the environment that we operate in that doesn't attract women. There are two difficult things in this business: being away all the time, and finding a job. I have talked to two ladies in the last year and encouraged them to take their license, but once they found out how hard it is to get a job, they gave up.

How do we attract more women? Showing them that it can be done. More publicity of those that have made it would certainly help to get more in. Here in Canada, only four percent of pilots are women; it goes up to seven percent in fixed-wing. When I started in 1988, we were below one percent.

**V: Was that intimidating, coming into that environment?**

**A.P.:** It was, because of the perception I had, but then I started to let go of my perceptions and I just took things the way they were. I could not have been more fortunate, because I've always been very, very spoiled with everybody. Male pilots would help me — I would get on a job and they would give me the tricks. They cautioned me on areas to avoid or the radio frequency to use. I was just treated as another guy in the industry, with respect and with fairness all the time. Sometimes I even felt that it was a privilege to be a woman because I felt like I had special treatment by clients.

Helicopter operations in Canada are seasonal, which allowed me to be at home all of my career during the winter. The sacrifice was that in the summer I would be away from my kids. They always accepted that. I didn't want to give up my flying career. It is possible to do it.

*This interview has been edited and condensed.*



Andrea and Marianne frequently worked together in the field this summer.

# CRITICAL ISSUES

AN APPARENT LABOR  
SHORTAGE WILL BE ONE OF  
THE KEY AREAS OF FOCUS AT  
THE HELICOPTER ASSOCIATION  
OF CANADA'S ANNUAL  
CONVENTION IN VANCOUVER,  
BRITISH COLUMBIA.

**BY ELAN HEAD**

The Canadian helicopter industry's escalating labor shortage promises to be a key topic of discussion at this year's Helicopter Association of Canada (HAC) annual convention, according to HAC president Fred Jones.

"It's a critical issue," Jones said of the human resources "crisis" associated with a lack of skilled helicopter pilots and engineers. "I get a growing number of calls each year from operators looking for drivers during the peak months of demand, particularly this year with the fire season being so busy. Many of our operator members had aircraft grounded because they couldn't find pilots to operate them that met the requirements."

At HAC 2018, scheduled to run from Oct. 31 to Nov. 4 in Vancouver, British Columbia, Jones said he hopes to hear more dialogue on "how to bridge that gap between low-time pilots and ones that are experienced enough that they can be launched without restriction." Jones emphasized that solving the labor shortage is not simply a matter of recruiting more people to the industry. Instead, it will require bridging the experience gap and finding new ways to make helicopter career paths financially viable for new pilots and engineers, given the high costs of training and typically low entry-level wages.





The lack of skilled pilots and engineers is beginning to take its toll on the Canadian helicopter industry. **Heath Moffatt Photo**



Collaboration between operators is key to improving safety, said HAC's Fred Jones. **Mike Reyno Photo**

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That, he said, could require a wholesale realignment of the Canadian helicopter industry to allow operators to raise wages at all levels inside their companies.

"We've had a long history in our industry of very competitive rates between operators," Jones explained. "The rates are so low generally out there in the industry that it makes it difficult to increase wages inside any operation until the rates recover to some extent."

And while a recovering economy could help push rates higher, it is also likely to exacerbate the labor shortage in the near term, he said: "The industry was slow there for a while, so operators didn't have to look so far out. They had a shortage of work, and they had a shortage of pilots and it wasn't too bad. But as demand starts to increase and the fire season or the economy starts to pick up, and the oil and gas sectors start to pick up again, it's just going to aggravate the current scenario."

Jones expressed optimism that HAC's air taxi and human resources committees can begin working on industry-wide initiatives to address the staffing crisis. And pushing the Canadian helicopter industry toward collaborative solutions will be a theme of HAC 2018, particularly when it comes to safety. A significant portion of this year's program will be devoted to



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Much of the Canadian utility industry was kept busy fighting fires in 2018, but some operators reported difficulty in finding enough pilots to staff their aircraft. **Coldstream Helicopters Photo**



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a safety forum with speakers including Gretchen Haskins from HeliOffshore, who will specifically address how to evolve the culture of the industry from one of competition to collaboration on areas of common interest.

"We saw some progress on that subject where HAC's committees developed best practices, which was a promising first step," Jones said. "But the next big step forward will be on issues related to data sharing and collaborating on a national accident and incident database so that we can all learn from the mistakes of others. We're getting many similar accidents occurring from operators across the country, and we can all really benefit from sharing information."

Jones also pointed out some other areas of potential collaboration for HAC members, including the creation of a common audit standard to reduce the number of redundant audits.

"[Operators] spend a lot of time and effort shadowboxing with multiple audits in the course of a year from a variety of different customers — all to different standards," he explained. "It complicates their lives and it's expensive in terms of the focus it can take away from other projects [and] other company-specific safety-related programs, too."

Jones said that HAC 2018 will boast an impressive line-up of internationally renowned speakers, including the popular lecturer Scott Shappell, department chair and professor of human factors at Embry-Riddle Aeronautical University. The keynote speaker will be Laval St. Germain, an airline pilot and endurance athlete whose claims include being the only Canadian to have climbed Mount Everest without the use of supplemental oxygen, and the holder of the record for fastest crossing of the North Atlantic Ocean, from mainland North America to



UAVs remain a hot topic within the helicopter industry — particularly with the anticipated start of operations beyond visual line of sight.

mainland Europe, by solo row boat.

The opportunities and challenges associated with unmanned air vehicles (UAVs), which may soon be conducting widespread beyond visual line of sight (BVLOS) operations throughout Canada, will also be covered. Additionally, Transportation Safety Board (TSB) representatives will give presentations on recent helicopter accidents of interest, emerging safety trends, and the TSB's study of air taxi accidents.

As ever, the event will include an hour with Transport Canada's director generals, where attendees will have the opportunity to discuss regulatory topics including pending flight and duty time regulations, which Jones said could do even more to aggravate the Canadian helicopter industry's pilot shortage.

The convention will also include a presentation by attorney Steven Williams of Emond Harnden LLP, who will discuss how to develop company policies for marijuana use. Jones predicted that this will become "an important issue in aviation" as marijuana becomes legal nationwide in Canada starting in October — especially since random drug testing in Canada, unlike in the United States, can open employers to legal challenges.

"It's certainly not going to be as simple as alcohol to manage the risk," Jones said. "I think operators are looking for some cover from government for random testing, because right now that's the most contentious element in the equation."



**Elan Head** | An award-winning journalist, Elan is also an FAA Gold Seal flight instructor with helicopter and instrument helicopter ratings, and has held commercial helicopter licenses in Canada and Australia as well as the U.S. She is on Twitter @elanhead and can be reached at elan@mhmpub.com.

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An Airbus H125 and Bell 407 operated by Hillsboro Aviation fly in front of Mount Hood in northern Oregon. Now celebrating 38 years in operation, the company continues to evolve alongside the industries it serves.



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STORY BY OLIVER JOHNSON

# BUILDING BEYOND ORDINARY

HAVING SOLD ITS FAMOUS FLIGHT SCHOOL FOUR YEARS AGO, **HILLSBORO AVIATION** IS EMBARKING ON A NEW ERA IN A SPARKLING NEW HEADQUARTERS. *VERTICAL* VISITED TO FIND OUT WHAT'S NEXT FOR THE MULTIFACETED COMPANY IN THE PACIFIC NORTHWEST.

**PHOTOS BY HEATH MOFFATT**

Having spent more than 30 years turning a single-helicopter company into one with a fleet of 90 aircraft, with charter operations joined by a service center, aircraft sales and management, parts sales, a fixed-base operator (FBO), and one of the largest helicopter schools in the world, you'd perhaps have excused Max Lyons and his team at Hillsboro Aviation for being satisfied with their lot. But it's clearly not a company that's content with merely maintaining the status quo. So, within the last four years alone, it has sold its flight school, built a brand new 51,000-square-foot headquarters, and, with a view to capitalizing on a whole new branch of aviation services, launched a UAS division. These are hardly the signs of a company that's resting on its laurels.

A visit to Hillsboro Aviation's spectacular new headquarters, located on the northern edge of Portland-Hillsboro Airport, is a visual treat. Built to accommodate environmentally friendly designs, including plans for solar panels, electric vehicle charging stations, and LED lighting, the facility includes a 32,000-square-foot hangar with white floors, radiant heat, and 5,000 square feet of adjoining shop space; four acres of ramp and parking space; and a 14,000-square-foot office and FBO facility.



The Hillsboro Aviation senior management, from left to right: Rekha Lyons, director of marketing and communications; Danny Yazzolino, FBO and facilities manager; James Kapalski, director of maintenance; John Miller, director of sales and service; Ryan McCartney, general manager; Franz Bergtold, director of operations; Max Lyons, owner and CEO; Patrick Goodman, controller; and Seth Hansen, director of business development.

"I've visited around 300 different aviation companies, lobbies, hangars and FBOs around the world, and I take notice of what makes them special," Lyons, president and owner of Hillsboro Aviation, told *Vertical*. "I thought, 'How do you build an environment that employees take pride in and love coming to work, and a place that customers are in awe of; a place leaving a longlasting impression of international flare and genuine warmth?'"

The answer was found through architect Aron Faegre, aviation facility specialist Centrex Construction, interior designer Kathy Wharton, and Lyons' wife Carol, who helped select furnishings and artwork. Their combined efforts resulted in the building winning an award from Varco Pruden — one of the leading suppliers of steel building frames in the U.S. — as "Best of Category" for a transportation facility.

Combining cutting-edge design with high-end finishes, the facility exudes both luxury and an easygoing warmth. It incorporates Douglas fir finishes, a fireplace, and floor-to-ceiling windows that bathe the interior with natural light — and provide an unobstructed view out over the ramp to the dramatic Pacific Northwest landscape beyond. Beautiful artwork and artefacts from around the world are displayed throughout, most of which were purchased in their country of origin by Lyons and his family, who are avid and enthusiastic travelers. (This also means that there is a story behind everything you see.)

"This building emulates who we are," said Ryan McCartney, the company's general manager. "It's very clean, very organized, very



Hillsboro moved into its new 51,000-square-foot headquarters in 2016, following a speedy 10-month construction process. The facility won an award from Varco Pruden for its design. **Hillsboro Aviation Photo**



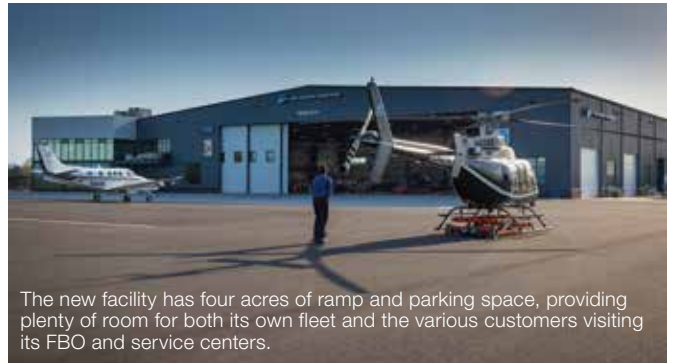
high-end — that's the culture that we have. At the same time, it's a family-owned business, and we're very much a family here."

The company broke ground on the new facility in August 2015, and a rapid construction process resulted in Hillsboro being able to move into its new home just 10 months later.

As an FBO, Hillsboro sells Avfuel, offers hangar space, aircraft detailing, courtesy cars, catering, maintenance and avionics services. The amenities it offers include a private ramp, flight planning, an exercise room and shower, a pilot lounge and use of a conference room.

"We've had a number of high-net-worth individuals fly in here with Gulfstreams and other aircraft that have walked in and said it's the nicest FBO they've ever been in," said Lyons. "That's what we were looking for."

Today, the FBO is one of five core business units at Hillsboro, joined by contract and charter services; aircraft sales and management; a service center; and parts sales. Woven into the fabric of all five is the secret to Hillsboro's success over almost four decades — the importance of developing and maintaining long-term relationships with its customers.



The new facility has four acres of ramp and parking space, providing plenty of room for both its own fleet and the various customers visiting its FBO and service centers.



Floor-to-ceiling windows give visitors a spectacular view out over Hillsboro's ramp towards the natural landscape beyond.

**Hillsboro Aviation Photo**



High-end finishes are supplemented by art and artefacts from around the world, giving the space a luxurious warmth.

**Hillsboro Aviation Photo**



Hillsboro has 13 rotary- and fixed-wing aircraft in its fleet, including four Bell 205 A-1++. These aircraft are well-suited to the aerial firefighting work they perform over much of the summer.



## FROM STUDENT TO CEO

The company was founded by a former Robinson Helicopter production test pilot in 1980. Then known as Hillsboro Helicopters, it operated as a single-helicopter flight school using one of the first serial number Robinson R22s.

Lyons, a fourth-generation logger, began what would become a lifelong association with the company as a customer in 1983. After learning to fly with Hillsboro Helicopters and gaining his license, he returned in 1988 to join it as a flight instructor, while also flying utility

**“WE’RE SERIOUS ABOUT SAFETY. ANYBODY CAN SAY THAT, BUT I THINK OUR HISTORY AND SYSTEMS PROVE THAT IT’S PART OF OUR CULTURE AND OUR EVERYDAY LIFE HERE.”**

**—RYAN MCCARTNEY, HILLSBORO AVIATION GENERAL MANAGER.**

operations. Shortly afterwards, he was appointed head of the company’s Japanese pilot training program. With a particular affinity for Asian culture, he developed key business partnerships in the continent, bolstering the company’s training program.

But it was the enrollment of another student pilot that would fundamentally shape the future for both Hillsboro Helicopters and Lyons himself. Ed Cooley, who had led Precision Castparts to

become a Fortune 500 company, arrived at the school as a student pilot. Lyons taught him to fly, and in 1992, Cooley decided to turn his newfound passion for helicopters into a business, by purchasing the company — and appointing Lyons as general manager.

Cooley adopted a mentorship role with Lyons, and the two brought a new business philosophy to the company, emphasizing the importance of developing relationships with customers.

“Ed brought the Fortune 500 financial mentality to us, helping us really understand what our costs were and developing strategic business plans,” said Lyons. “But his greatest gift was building relationships — keeping your promise and commitment to the customer. At times, even when you have to accept a loss, you keep your promises.”

The company became Hillsboro Aviation in 1996, reflecting the growth in its operations that had taken place, with fixed-wing operations augmenting its rotary-wing work in a variety of sectors, along with the addition of sales and service divisions.

The Lyons family purchased the company from Cooley in 1999, and Hillsboro Aviation continued its growth, becoming an operator, service center, sales agent and FBO that, at its peak, employed 285 people, had a fleet of 90 aircraft, and worked with customers from more than 75 countries.

Then, in 2013, Lyons was approached by Renovus Capital Partners of Pennsylvania, who made an offer with Graycliff Partners of New York for Hillsboro’s flight training business. Sensing an opportunity to shift its sole focus to its charter, sales, and service divisions — expanding its service offerings, international reach, and

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Hillsboro Aviation has now amassed more than 1.2 million flight hours since the company began in 1980. Its employees also share a vast depth of experience in the industry, with pilots having an average of 18 years' experience.

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customer experience — Lyons said the timing was right. He split the company, selling the flight school in late 2014.

Despite the changes to its business, diversification is still core to Hillsboro's strength and a key part of its strategy going forward. Its wide-ranging expertise is reflected in its various certifications and approvals, under Federal Aviation Administration parts 135 (airplane and helicopters services), 133 (external load operations), 137 (agricultural operations), and 145 (repair station); and it is a U.S. Department of Defense Commercial Airlift Review Board (CARB)-approved air carrier.

An early adopter of safety management systems, Hillsboro is also qualified at stage 2 of the International Standard for Business Aircraft Operations (IS-BAO).

"With the volume of flying that we've done in the past 38 years, and the volume of maintenance we've done on outside customer aircraft, we're proud of our safety record. It's truly ingrained in our culture," said McCartney. "We're serious about safety. Anybody can say that, but I think our history and systems prove that it's part of our culture and our everyday life here."

## VARIED OPERATIONS

Having flown over 1.2 million hours since its founding, Hillsboro has vast experience in its work. Its 65 employees (rising to 85 during the fire season) also bring an enormous amount of experience to their roles, with those in management having an average of 18 years in the industry, pilots averaging 20 years, and mechanics and aviation technicians, 21 years.

The company's key operating sectors are firefighting, search-and-rescue, aerial construction, LiDAR, powerline and pipeline surveys, scientific support, seismic and exploration, executive charter, aerial cinematography, and burgeoning UAS operations.

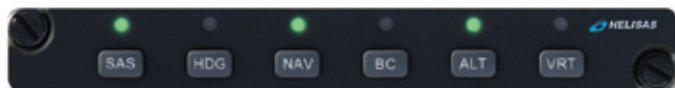
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Its 13 rotary- and fixed-wing aircraft include four Bell 205 A-1++ aircraft, two Airbus H125s, three Bell 407s, two Bell 206B-3s, one Bell 206L-3, and one Beechcraft King Air C90. All are owned by Lyons, who operates the company with a philosophy of maintaining as low a debt as possible.

Hillsboro's operations take it right across the United States. Along with its headquarters in Hillsboro, the company operates from different remote bases throughout the year. The number and location of these vary based on contractual requirements, but have recently included a pilot and aircraft contracted to Teton County Search and Rescue of Jackson, Wyoming; an aircraft on a Department of Defense contract in Fort Irwin, Texas; construction, heli-skiing, and lift projects; and numerous aircraft on government contracts during firefighting season.

This year's fire season was a particularly busy one for Hillsboro — as it was for much of the aerial firefighting fleet in North America. "At one point, we had 10 of our 12 helicopters out on fires. We thought 2017 was an anomaly; 2018 is busier — our busiest ever," Seth Hansen, Hillsboro's director of business development, told *Vertical*.

However, while the glut of firefighting work is definitely a positive in terms of keeping the aircraft busy, Hillsboro is keen to not be reliant on it as a source of revenue.

"We've been trying to diversify into other parts of the business," said Hansen. "There are lots of infrastructure projects going on in the U.S. right now. I think there are opportunities for us to get involved in that and it's the direction we want to move going forward."

Franz Bergtold, Hillsboro's director of operations, alongside an enormous main rotor blade belonging to a Bell 205.



Hillsboro Aviation avionics technician Ron Beery speaks with Bell 205 pilot Michael Stephens.



Mechanics Kerry Denman and Ron Seberson look over some paperwork in Hillsboro's hangar.



Mechanic Joshua Knowlton at the computer during a visual inspection of a Bell 206.



Hillsboro's hangar spans 32,000 square feet, and has radiant heat flooring to make life comfortable on cold winter days.

An Airbus H125 AStar and a Bell 407 fly together with Mount Hood in the background. The AStars are the latest additions to the Hillsboro fleet, and Lyons said the aircraft have been very well received by customers.



In years gone by, seismic work was a significant source of revenue for Hillsboro, occupying six or seven helicopters year-round. Today, with the mineral exploration sector having endured a downturn alongside that of the oil-and-gas industry, the situation is quite different.

"Historically, our goal was to have about 40 percent of our work be government, with 60 percent being 'other,' " said Lyons, "but with the recession and downturn in the economy, it's heavier on the government side."

It was Hillsboro's diversification that made it possible for the company to remain profitable throughout the recession, said Lyons.

"Our diversification has helped us weather economic storms. Our government contracts and aircraft sales have provided stability during these downturns," he said. "As the economy starts to improve, our portion of government revenue will stay the same, I believe. It may go up a bit . . . but I think where the growth will be is on the private sector side."

The newest branch of the company's operating division is its UAS work.

"If you think that the UAS industry could negatively affect 10 to 20 percent of your future revenue, which I think it can . . . you need

to build a UAS division to try to offset that," said Lyons. "Staying relevant means staying open to new opportunities in emerging markets. That's been our philosophy since day one, and the UAS business is a great example."

Hillsboro's UAS operation uses the DJI Inspire and the DJI Matrice for various data collection jobs — primarily for companies working in construction and agriculture.

"The equipment is important, but it's the sensors that create the capability of the aircraft," said Hansen. "So, we have a diverse range of sensors that collect data in different ways, and we can apply the sensors to other platforms that we use."

Hillsboro is seeing a whole new customer group for its UAS service, rather than finding existing customers are switching to UAS from manned aircraft.

"We're finding customers that were using other avenues to collect data that may have been less accurate, and this new technology allows them to go out and acquire more accurate data at a much lower cost," said Hansen.

### EXPANDING OTHER DIVISIONS

Beyond its role as a fleet operator, Hillsboro has developed an international reputation as an aircraft broker, recording over 1,000 sales of fixed- and rotary-wing aircraft. According to Lyons, the goal is to expand this side of the business with more fixed-wing sales for aircraft such as King Airs and Cessna Citations.

In 2016, Hillsboro became the first — and to date, only — commercial sales agent in the U.S. for Airbus Helicopters, with responsibility for Alaska, Colorado, Idaho, Montana, Oregon, Washington, and Wyoming.

"I really like Airbus — I'm impressed with their product lines; I'm impressed with the aircraft," said Lyons. "We've added some

Airbus helicopters to the fleet, and they're very well received. We're very excited and optimistic about the relationship."

Aircraft sales is another area in which the company feels the benefit of developing and maintaining relationships with its customers. Through its years as the owner of one of the largest helicopter flight schools in the world, it established connections with pilots at their entry point into the industry, many of whom have subsequently gone on to leadership roles throughout the U.S. and around the world.

"Most people purchasing an aircraft want to work with someone they have a relationship with," said Lyons. "I think the root of our success lies in the honesty of our handshake. We keep our promises. People call us and we respond — even if it's on a Sunday at 5 o'clock. We really try to go the extra mile to take care of our customer."

Parts sales has been one of the more rapidly-growing parts of Hillsboro's business, spurred by a renewed focus on the division as the company purchased the tooling and equipment of Heli-Trade Corporation in 2012. Heli-Trade was known for its repairs, service, and aftermarket upgrades for the Bell 205/UH-1, and the

In addition to its work as an operator, Hillsboro has sold over 1,000 fixed- and rotary-wing aircraft, and this is an area of the business that has seen an uptick over the last year.



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Michael Stephens flies a Bell 205 to a longline bucket practice area just outside of Hillsboro. Firefighting work has kept the company extremely busy over the last couple of summers.

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purchase brought 12 supplemental type certificates for performance enhancements on the Bell 205 and UH-1 (turning a standard 205 into a 205 A1++), as well as "a building full of parts for Bell mediums" under Hillsboro's roof.

However, its parts inventory is certainly not limited to the 205 — or even to Bell — as it spans more than 50 manufacturers, vendors and suppliers.

This variety is also reflected in Hillsboro's maintenance and avionics services, where it has the expertise to work on helicopters, jets, turboprops and piston aircraft, and is an authorized service center for Bell, Cessna, Cirrus Aircraft, Robinson Helicopter, Lycoming, and Goodrich.

According to John Miller, Hillsboro's director of sales and service, the company is currently seeing a boom in its avionics work. "Our service center is busy with the ADS-B [2020] mandate. And with the turn in the economy, we're seeing more and more people investing in and upgrading their avionics panels — we've seen an uptick in the last 10 months."

He said this has been mirrored in new aircraft sales. "There are a lot of positive signs right now," said Miller. "When the oil and gas prices went down, it put a lot of extra helicopters into the marketplace and brought down prices, but we're seeing some of that inventory start to move and

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Lyons believes the company's diversity, and its focus on the importance of building and maintaining relationships with its clients, have been the keys behind its continued success.



starting to see some first time buyers getting into the helicopter market, which is pretty exciting.”

Lyons also highlighted the potential of international CARB business for bringing in new work, “but we have to find the right opportunities to do it,” he said.

When the right opportunity for growth does appear — whether in the form of CARB work or another sector — Hillsboro has the capability to physically expand with it, with a total of 425,000-square-feet of property available for long-term development potential.

Hillsboro Aviation also includes the next generation of Lyons, through Max’s daughter Rekha. Having joined the company as director of marketing and communications, she has spearheaded a rebranding of the company that launched earlier this year.

“We’ve spent the last few years refreshing Hillsboro Aviation’s brand,” she said. “Not only have we been expanding — we’ve been

expanding with intent. Our brand is one built on the notion of doing business differently. Our rebrand, complete with a new website and brand video, tells our story: we are people first, and always will be.”

As for Max, he continues to find fulfillment in the challenges presented in running a 21st century aviation company — and building the relationships that have laid the foundations to its success.

“Aviation attracts high quality, dynamic individuals: pilots, mechanics, management, and customers. I like the relationships you build with those people,” he said. “To me that’s exciting stuff, and that’s what drives me — doing something that you’re proud of.”



**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](mailto:oliver@mhmpub.com). Follow him on Twitter @orjohnson\_



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In the past 40 years, Sikorsky has delivered more than 4,000 members of the Black Hawk family, with that fleet collectively logging more than 14 million flight hours. **Ted Carlson Photo**



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AS THE SIKORSKY S-70/H-60 BLACK HAWK CELEBRATES ITS 40<sup>TH</sup> ANNIVERSARY, WE LOOK AT HOW THE AIRCRAFT HAS EVOLVED OVER THE LAST FOUR DECADES — AND FIND OUT WHAT THE FUTURE HAS IN STORE FOR THE ULTIMATE MULTIMISSIION MACHINE.

BY KENNETH I. SWARTZ

# THE BLACK HAWK AT 40

FOUR DECADES OF THE BLACK HAWK





On Oct. 31, 1978, the now iconic Sikorsky UH-60A Black Hawk first entered U.S. Army service. In the 40 years since, the manufacturer has delivered more than 4,000 of the type across a range of variants, with that fleet collectively logging more than 14 million flight hours. The S-70 has served within every branch of the U.S. armed forces (in which it is designated the H-60), flown for the defence forces of many other nations, and has become an increasingly common sight in civilian colors as it proves its capability in firefighting, policing, search-and-rescue (SAR) and utility roles.

Conceived in 1972 as the YUH-60A, the helicopter was designed to meet the Army's UTTAS (Utility Tactical Transport Aircraft System) requirements for a twin-engine successor to the Bell UH-1 "Huey." Designated the "Black Hawk" following the Army's tradition of naming military helicopters after Native American warriors and tribes, the aircraft would ultimately prove its worth in all five branches of the U.S. armed forces (Army, Navy, Marine Corps, Air Force and Coast Guard), as well as with more than 40 civil and military organizations in more than 30 allied nations.

Throughout the aircraft's first 40 years, the one constant has been its ongoing evolution, with the current production Black Hawk family — the UH-60M "Mike," naval MH-60R "Romeo," and the S-70i built by Sikorsky's subsidiary PZL Mielec of Poland — vastly more capable than the original versions of the type. Later this year, the new-generation HH-60W "Whiskey" combat SAR (CSAR) will join an expanding portfolio that also includes a new-generation armed Black Hawk and the S-70i Firehawk for aerial wildfire suppression.

Sikorsky's record production year for the S-70 family was in 2014, when 186 of the type were delivered to U.S. government and foreign customers. In 2018, the company plans to deliver 107 S-70 family models.

With the Army planning to operate the rotorcraft through 2070 (after the future vertical lift joint-multi-role medium rotorcraft

enters service), and former military Hawks finding a new lease of life in the civilian sector, the longevity of the Black Hawk family appears assured.

## SIKORSKY MILITARY HELICOPTERS

In 1943, the two-seat Sikorsky R-4 became the first military helicopter to enter production, with the U.S. Army Air Force (USAAF) placing an initial order for 29 aircraft. The R-4 was the first helicopter to serve with the USAAF (later USAF), Navy, Coast Guard and the United Kingdom's Royal Navy and Royal Air Force.


Sikorsky's military helicopter sales steadily increased after the Second World War, with the debut of the piston-engine S-51, S-52, S-55, S-58 and S-56, and the turbine-powered S-61, S-62, SH-3, HH-3, CH-53 and CH-54.

The Vietnam War was the first American conflict where helicopters were used extensively to move troops and weapons across the battlefield, with almost 12,000 deployed between 1965 and 1975. More than 5,000 of these were destroyed — and the majority of these losses were Bell UH-1 Hueys.

Conceived in the late 1960s to develop a faster, better-armored helicopter, the UTTAS program had extremely demanding requirements for performance, maneuverability, maintainability, reliability and survivability.

The primary mission was to transport a fully-equipped infantry squad of 11 men (weighing 240 pounds/110 kilograms each), plus a gunner, pilot and co-pilot on a two- to three-hour mission at high altitudes (4,000 feet/1,220 meters) and hot temperatures (95 F/35 C). It needed to fly at a minimum cruise speed of 145 knots, climb vertically within the range of 450 feet/140 meters per minute to 550 feet/170 meters per minute at maximum weight, and be able to operate in any likely theater of war.

In addition, the UTTAS had to be capable of transporting four stretcher cases internally, along with medics and medical



The US Army and US Air Force perform Special Operations missions with a fleet of highly modified Black Hawks, featuring an advanced avionics suite and aircraft survivability equipment, along with enlarged internal and external fuel tanks.

**Staff Sgt. Osvaldo Equite Photo**

equipment. It also had to be able to sling a 105-mm howitzer (weighing 8,000 lb./3,630 kg) on its external hook and carry the weapon's five-man crew and 50 rounds of ammunition.

Many at Sikorsky believed that winning the UTTAS competition was essential for the company's long-term survival, since most of its U.S. military production contracts were drawing to a close and the Army hadn't ordered a Sikorsky helicopter since the last CH-54 Tarhe was delivered.

The Army issued its request for proposals for the UTTAS in 1972. It shortlisted Sikorsky and Boeing, with the manufacturers called to produce three prototype YUH-60s and YUH-61s, respectively, to take part in a multi-year fly-off competition.

### **SIKORSKY INNOVATION**

The prototype YUH-60A first flew on Oct. 17, 1974, powered by a pair of 1,500-shaft-horsepower General Electric T-700 turboshafts specified by the Army. The heart of the UH-60's versatility was its rotor system — the most efficient such system that Sikorsky had ever developed. It had a fully articulated rotorhead with flexible elastomeric bearings attached to four composite main rotor blades, which had titanium spars.

The Vietnam War had highlighted the need for the next generation of military helicopters to be capable of high-speed nap-of-the-earth (NOE) terrain following to survive modern threats, such as the shoulder-fired surface-to-air missiles carried by Soviet air defenses in Eastern Europe.

It was this that led to one of the Army's most challenging performance requirements: a 1.75 g turn throughout a forward flight distance of 1,100 feet, followed by a pushover to 0 g while terrain following. It was the UH-60's rotor that allowed it to perform this exacting maneuver.

The low disk loading of the rotor also provided the UH-60 with good autorotation characteristics, and it was significantly quieter than the Huey system, which was audible six miles (10 kilometers) away.

A variable incidence horizontal stabilator was later added to production aircraft to optimize the fuselage attitude for various cruise speeds. Another technological innovation was a bearing-less cross-beam tail rotor. Spanning a diameter of 11 feet, it was canted by 20 degrees to produce 400 lb. (180 kg) of lift at the tail in normal flight. This design allowed a 14 percent reduction in the size of the main rotor diameter (to 53 feet, 8 inches/16.36 meters) and produced a better center of gravity range, which allowed the passenger cabin to be shifted rearward under the rotor and the fuselage to be shorter than would otherwise have been possible.

Sikorsky also invested a lot of time to meet the Army's rapid air transport requirement, which sought an aircraft that could easily fit in a cargo aircraft without being disassembled. The UH-60's key features included the shorter fuselage, a rotor mast that could be lowered, folding main rotor and tail pylon, kneeling main landing gear, and a removable horizontal stabilator.

Because of this, the UH-60A could be prepared and loaded into a cargo aircraft in less than 1.5 hours, and unloaded and test flown in less than 2.5 hours. One UH-60A could fit in a Lockheed C-130 Hercules, the C-141 Starlifter could accommodate two, and six Black Hawks could be carried in a C-5A Galaxy.

Building in combat survivability and crashworthiness also

required a lot of innovation. The UH-60A's airframe and dynamic systems were specifically engineered to protect the aircraft's occupants from ballistic threats and accidents, with a redundant flight control system, a triple redundant hydraulic and electrical system, and ballistically tolerant cockpit, cabin, rotor blades, drive shafts and critical systems.

The crashworthy features of the aircraft included energy absorbing landing gear and seats that together could withstand an impact at 42 feet per second, a robust airframe that kept high mass components (such as the transmission) retained in 20/20/10 g crash conditions, and self-sealing fuel tanks and lines to reduce the risk of post-accident fires.

## THE BLACK HAWK ENTERS SERVICE

The UH-60A met the Army's challenging targets, and was declared the winner of the UTTAS competition on Dec. 23, 1976. It became the first major Army weapon system to be awarded a multi-year production contract in 1981, resulting in tremendous cost savings to Sikorsky and its customers. More than 1,000 UH-60A Black Hawks were delivered to Army and Army National Guard units between 1978 and 1989, on the basis of 15 UH-60As replacing every 23 UH-1s.

To expand the Black Hawk's capabilities, Sikorsky quickly developed a series of upgrades. The first was a deicing system for the main and tail rotors, followed by countermeasures to reduce the threat of infrared-seeking surface-to-air and air-to-air missiles.



Introduced in 1989, the updated UH-60L "Lima" had a 20 percent increase in power and could carry 1,000 lb. (450 kg) more payload than the last UH-60As Sikorsky built. They were widely deployed to Afghanistan and Iraq. **Graham Lavery Photo**



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The hover infrared suppressor subsystem reduced the aircraft's engine exhaust signature during all phases of flight by mixing cool air with the exhaust plume.

The battlefield capabilities of the Black Hawk were greatly enhanced when Sikorsky developed the external stores support system (ESSS) for carrying auxiliary fuel tanks and various weapons systems. The ESSS was qualified to carry 5,000 lb. (2,270 kg) per side, including two 450-US gallon (1,700-liter) tanks on the inboard pylons and two 230-US gallon (870-liter) tanks on the outboard pylons, which combined to give the Black Hawk an impressive range of 1,100 nautical miles (1,770 kilometers), allowing it to self-deploy over great distances.

The ESSS was subsequently qualified to carry various weapon systems externally, including the Hellfire, Stinger, Maverick and Sidewinder missiles, and 2.75-inch unguided rocket pods.

The first combat missions for the UH-60A were Operation Urgent Fury in Grenada in 1983 and Operation Just Cause in Panama in 1989. The first large-scale deployment of Black Hawks to the Middle East was during Operation Desert Storm — the first Gulf War in 1991 — when approximately 400 Black Hawks flew more than 44,000 hours between them.

Desert Storm introduced a number of field upgrades, including the enhanced ballistic armored subsystem to protect occupants from small arms fire; blade erosion protection kits designed to protect main and tail rotor blade leading edge surfaces; APU inlet particle separators; the climate heat aircraft protection system to reduce blade and airframe surface temperatures; environmental

aircraft protection covers to protect windscreens and avionics bays from heat buildup; and enhanced tactical air navigation and GPS.

## GOING TO SEA

Winner of the LAMPS III (Light Airborne Multi-Purpose System) competition to replace the Kaman SH-2F onboard the Navy's destroyers, cruisers and frigates, the SH-60B Seahawk was designed primarily for anti-submarine warfare (ASW) in the outer zone surrounding an aircraft carrier battle group. Its secondary roles included anti-ship surveillance and targeting, SAR, medical evacuation, and logistics support.

The SH-60B had 83 percent commonality with the UH-60A. The major points of difference were more powerful 1,690-hp General Electric T700-401 engines, an uprated 3,400-hp transmission, and a change in position of the tail wheel — it was brought 13 feet forward to reduce the aircraft's footprint on small ship decks, and allowed the tail to swing over the side of an aircraft carrier to save deck space.

The SH-60B also received additional sealing and corrosion protection, incorporated a single crew door on the right side of the fuselage, and had a 25-tube sonobuoy launch system on its left side. It had single oleo landing gear to save weight, an automatic electric blade folding system, a folding stabilator system for compact storage, external pylons to carry fuel and weapons, and a 600-lb. (270 kg) capacity rescue hoist.

Warships operating the SH-60B LAMPS III were also equipped

The Black Hawk was designed to transport a fully-equipped infantry squad of 11 men, plus three crew (pilot, co-pilot and gunner) on a two- to three-hour mission.

**DVIDS Photo**

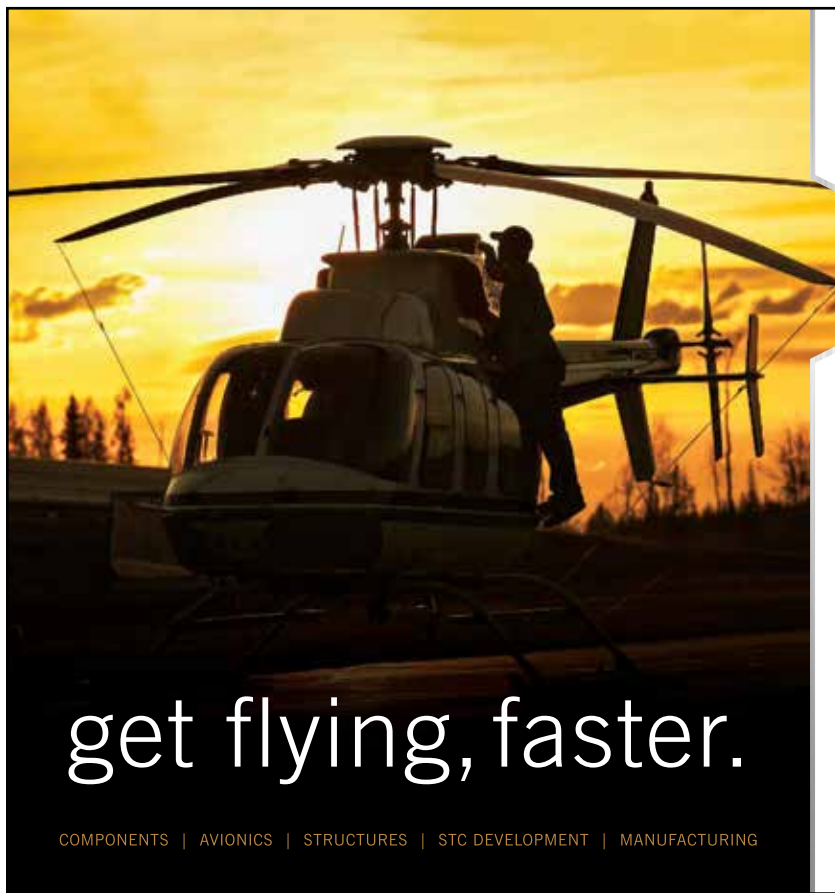


From hurricanes to floods, Black Hawks have saved many lives during the response to natural disasters. **DVIDS Photo**

More than 1,000 UH-60A Black Hawks were delivered between 1978 and 1989, on the basis of 15 UH-60As replacing every 23 Bell UH-1s.

**Skip Robinson Photo**





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# SIKORSKY BLACK HAWK

## 40 YEARS OF LEGENDARY SERVICE



Prototype  
Black Hawk  
first flight

1974

Black Hawk  
emblem  
unveiled

1977

EH-60 and  
MH-60  
Special  
Operations  
H-60 variants  
developed

1981-  
1997

Delivery of  
1,000th  
UH-60A to  
U.S. Army

1988

Operation  
Desert Storm  
in Kuwait  
and Iraq

1991

Task Force  
Ranger  
in Somalia

1993

1972

The U.S. Army  
announces it  
is looking for a  
new helicopter  
to replace its  
UH-1 Huey

1976

Sikorsky wins  
Utility Tactical  
Transport  
Aircraft  
System  
(UTTAS)  
competition

UH-60 Black  
Hawk produc-  
tion begins

1978

First flight of  
production  
UH-60A, and  
first produc-  
tion model  
delivered to  
the U.S. Army

1983

Operation  
Urgent Fury in  
Grenada

1989

Operation  
Just Cause in  
Panama

Last UH-60A  
delivery

1992

Operation  
Restore Hope  
in Somalia



1976



1978



1983

with the Canadian-made Curtiss Wright (originally Daf Indal) Recovery Assist, Secure and Traverse system to simplify landing and handling of the SH-60B in conditions up to Sea State 5 (33 knot winds, 13-foot swells, six degrees of pitch and 15 degrees of roll).

The first production SH-60B LAMPS III flew in February 1983 and became operational in 1985. Following its success, the Navy ordered the SH-60F CV Helo to replace the SH-3 Sea King used for ASW in the acoustically "noisy" inner zone surrounding an aircraft carrier battle group. The SH-60F was equipped with a Bendix AQS-13F dipping sonar, a Teledyne ASN-123 tactical navigation computer, 1553B databus, six sonobuoys and could carry two 800-lb. (360-kg) M150 torpedoes.

The Navy acquired 18 HH-60Hs in the late 1980s to replace the Sikorsky HH-3 in the CSAR role, and the Bell HH-1K in the Special Warfare Support role. The aircrew survivability systems on the HH-60Hs included a radar warning receiver, chaff dispenser, infrared jammer, night vision goggle (NVG) compatible lighting, M60D machine guns, and engine exhaust suppressors.

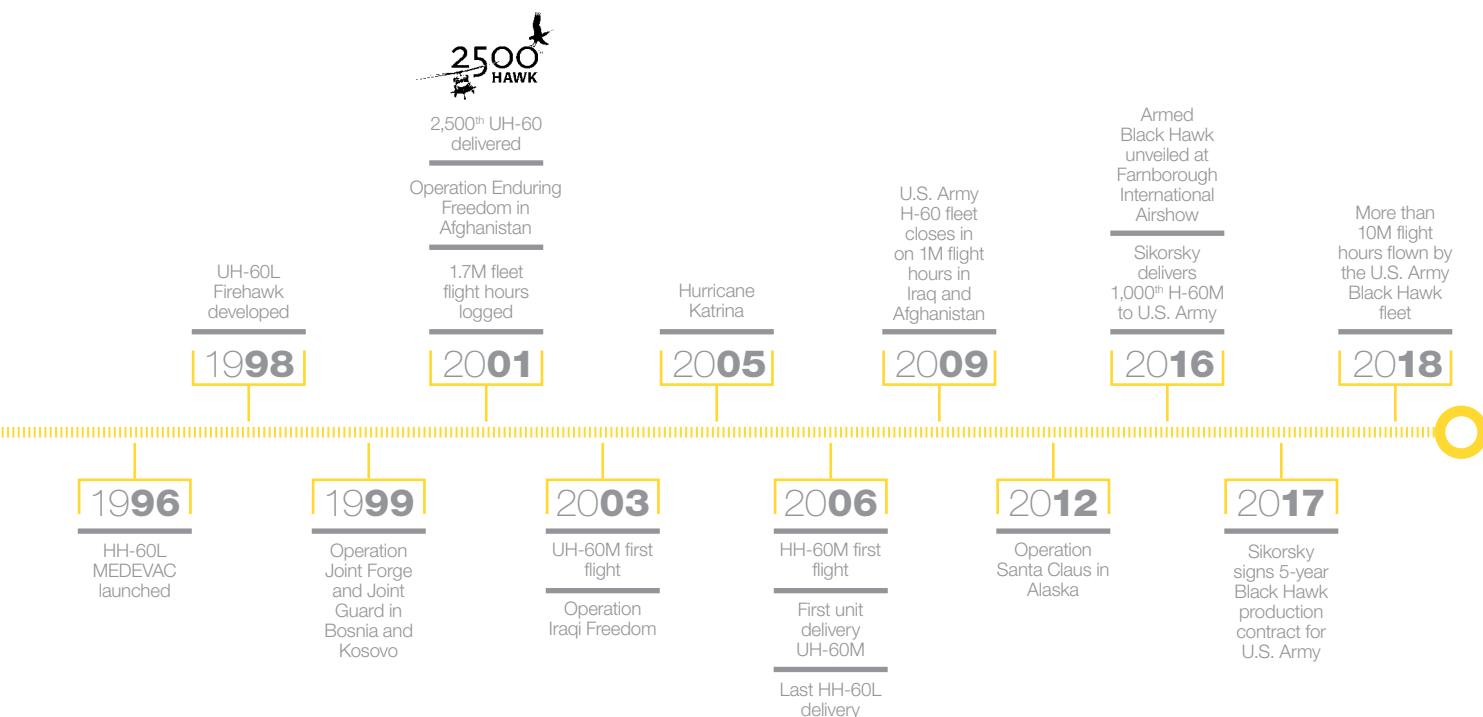
When the LAMPS III contract was awarded, IBM Federal Systems (later Loral Corp and now Lockheed Martin) became the prime contractor on the program. Sikorsky supplied the airframes and IBM was responsible for the systems integration of the sensors and mission systems, which took place at the dedicated helicopter systems integration facility 170 miles (270 km) northwest of Stratford in Oswego, New York.

In November 2015, Lockheed Martin bought Sikorsky from United Technology Corp., bringing the Stratford and Oswego helicopter facilities under the same ownership for the first time.

### SECOND GENERATION HAWKS

In 1989, the UH-60A was replaced by the uprated UH-60L "Lima" on the Sikorsky production line. The Lima had a 20 percent increase in power and could carry 1,000 lb. (450 kg) more payload than the last UH-60As off the assembly line.

The goal of the upgrade was to restore the Black Hawk's operational performance, which had been degraded by weight growth over a decade in service with the introduction of various technologies and



kits. The performance improvement was achieved by adopting the Seahawk's more powerful 1,857-hp General Electric T700-701C engines, a 3,400-hp uprated transmission, and strengthened flight controls.

One of the additional benefits was that the maximum external load increased from 8,000 to 9,000 lb. (3,630 to 4,080 kg). This allowed the UH-60L to lift the M1036 High Mobility Multipurpose Wheeled Vehicle, which weighed 8,750 lb. (3,970 kg).

The UH-60L became the foundation for new Black Hawk derivatives for the Army, including the UH-60Q for medevac missions and the UH-60K for special operations — as well as the HH-60G Pave Hawk for the Air Force.

The UH-60Q, also known as DUSTOFF (Dedicated Unhesitating Service To Our Fighting Forces), had an advanced medical suite developed by Air Methods. This included integrated suction and oxygen systems; defibrillation, ventilation and incubation equipment; equipment for monitoring vital signs; and crashworthy Simula medical attendant seats.

The aircraft was also equipped with a mission management system by Canadian Marconi; a second-generation FLIR Systems

SAFIRE thermal-imaging system mounted in a chin-turret with a 360-degree field of view; Breeze Eastern external electric rescue hoist; Telephonics Starcom communications system, and an improved MILSPEC data modem that was interoperable with marine, civil and law enforcement frequencies.

In the summer of 2007, AHS International's *Vertiflite* magazine reported that in combat in Iraq, the UH-60 performed more than 13,914 medevac missions from Oct. 1, 2005, to March 15, 2007, transporting more than 20,287 patients.

The MH-60K was developed for the Army's 160<sup>th</sup> Special Operations Aviation Regiment, known as Night Stalkers, to perform clandestine, deep penetration airlift missions under adverse weather conditions, day or night, over all kinds of terrain.

The MH-60K featured an integrated avionics subsystem that was drawn from the Air Force HH-60D Night Hawk Combat SAR development program and the SH-60B Seahawk. This included a mission management system and advanced avionics suite with four multifunction displays and communications; and navigation, identification and aircraft survivability equipment, such as a missile warning receiver, chaff dispenser and radar warning receiver.



In January 2007, the USCG launched a nine-year program to upgrade its HH-60Js to MH-60Ts, which feature a digital glass cockpit, a modern electro-optical/infrared sensor system, and light weapons. **Skip Robinson Photo**

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Other systems included terrain avoidance radar, forward-looking infrared, enlarged 360-US gallon (1,360-liter) internal fuel tanks, aerial refueling probe, ESSS, external fuel tanks, and defensive systems.

A small number of VIP versions of the UH-60L, known as the VH-60N, are operated by Marine Helicopter Squadron One (HMX-1 "Nighthawks"), based in Quantico, Virginia, to fly the President of the United States and other senior government officials.

More than 1,000 UH-60Ls were delivered between 1989 and 2007, when production shifted to the new all-digital UH-60M "Mike."

## THE NAVY'S HELICOPTER MASTER PLAN

In the 1990s, the Navy developed a Helicopter Master Plan that called for the replacement of seven different types with two helicopter configurations. The SH-60B and SH-60F were to be replaced in the ASW and anti-ship surveillance and targeting roles by the MH-60R "Romeo"; while the Sikorsky UH-3H Sea King, HH-60H, Boeing CH-46D Sea Knight, and Bell HH-1N would be replaced by the MH-60S "Sierra" in the vertical replenishment, CSAR, SAR, and transport roles.

The MH-60R was originally conceived as a remanufacturing program for the

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SH-60Bs and SH-60F Seahawks, but in 2001, the Navy opted for an all-new production program. The first MH-60R test article made its first flight on July 19, 2001, with an initial requirement for 243 helicopters.

The MH-60R is the most capable ASW and anti-surface warfare helicopter in the world today, equipped with an integrated AQS-22 airborne low frequency sonar with expanded littoral and deep-water capability, including concurrent dipping sonar and sonobuoy processing capability. Other upgrades included a second-generation integrated AAS-44 forward-looking infrared system for expanded night vision, Hellfire targeting capability, and a new APS-147 multi-mode radar with long/short-range search inverse synthetic aperture radar imaging and periscope detection modes. The MH-60R also has an enlarged fuel system, a single door on the right hand side of

the aircraft, and a folding rotor and tail pylon.

“One of the biggest advances [in] the MH-60R is the increase in underwater ASW detection ranges,” explained Jeff Hanke, Sikorsky vice president of quality and aviation safety, and a former Navy pilot. “The helicopter now has four weapons pylons to carry four torpedoes, whereas the SH-60B and SH-60F could only carry three.”

The MH-60S has a blend of UH-60M and MH-60R attributes. It has two doors on each side, a tail wheel, and an MH-60R rotor head and avionics to achieve as much cockpit commonality as possible.

The H-60 made its debut in a new service — the U.S. Coast Guard (USCG) — in 1990, in the form of the HH-60J Jayhawk. The service ordered 42 of the type, which was based on the SH-60 Seahawk, to replace its fleet of HH-3F Pelicans for SAR operations. Over the years, that fleet grew to 45 with the addition of remanufactured



The updated MH-60S “Sierra” replaced the SH-60B and SH-60F in U.S. Navy service, and is equipped with dipping sonar and sonobuoys for ASW missions.



The MH-60S has a blend of UH-60M and MH-60R attributes. It has two doors on each side, a tail wheel, and an MH-60R rotor head and avionics to achieve as much cockpit commonality as possible. **Skip Robinson Photo**

The MH-60R is the most capable ASW and anti-surface warfare helicopter in the world today, equipped with dipping sonar and sonobuoy processing capability. **Daniel Rude Photo**



former Navy SH-60Fs. In light of the USCG's post 9/11 requirements, the service's Deepwater Implementation Plan approved a major upgrade to Jayhawk capabilities. In January 2007, the USCG launched a nine-year program to upgrade the HH-60Js to MH-60Ts.

The MH-60T features a common avionics architecture system, including digital glass cockpit instruments similar to those installed on the USCG's fixed-wing aircraft. It has a modern electro-optical/infrared sensor system that allows aircrews to locate, identify and track surface targets day or night — capabilities critical for SAR and law enforcement missions — and received use-of-force capability in the form of a 7.62 mm machine gun and a .50-caliber rifle, which can be used to disable engines on noncompliant go-fast vessels. The MH-60T is in service at eight Coast Guard units across the U.S.

## THE "MIKE" IS BORN

In the late 1990s, the Army contracted Sikorsky to develop an upgrade for the UH-60A and UH-60L to restore performance losses resulting from weight growth.

"The weight issue for the 'L' came about as a result of the growth of the useful load carried during the primary assault mission, rather than the growth in the empty weight, which was the case with the 'A' model," said former Sikorsky engineer and historian Ray Leoni. "The growth was caused by an increase in the number . . . and unit weights of the crew and troops as equipped for the air and land warrior roles and capabilities."

First, the Army added a second dedicated gunner to the Black Hawk crew complement for better self-protection. Then, the average weight for a member of an 11-man infantry squad increased from 240 to 290 lb. (110 to 130 kg), primarily due to the increased weight of body armor, communications, NVG, GPS and other individual equipment.

"The RAH-66 Comanche design team was the first fully integrated product development team at Sikorsky that included industrial engineering, manufacturing engineering and the factory," said George Mitchell, Sikorsky vice president of operations. "The UH-60 engaged the same people and engineers . . . and we took the same spirit and approach and applied it to the Black Hawk to produce a more robust product."

The first new-build UH-60M was delivered to the Army on July 31, 2006, and featured upgraded 2,000-hp GE T700-701D engines, new rotor blades, digital avionics, digital flight control components, modular open architecture systems, and integrated diagnostics.

"The main rotor blade has 89 percent commonality with the S-92 blade, but the UH-60A/L Black Hawk has a common cuff mount, unlike the S-92's composite cuff," explained Mitchell.

The Mike also features the rotor brake from the Seahawk. "That makes it easier to

get in and out of the aircraft safely," said Hanke. "On the UH-60L, as soon as you hit the starter button on, the rotor started to turn."

Additionally, the UH-60M has a smoother ride, thanks to the installation of an active vibration control system, eliminating the need for passive spring-mass units and saving weight. Other upgrades include a Rockwell Collins Common Avionics Architecture System (CAAS) integrated glass cockpit with new avionics, including a flight director, an autopilot to decrease pilot workload and provide digital management, a fully coupled flight director system, and a health and usage monitoring system.


The 1/159<sup>th</sup> Combat Aviation Brigade was first Army unit equipped with the UH-60M, receiving all 30 of its aircraft by mid-2008. These aircraft saw active service in 2009.

In addition to UH-60Ms for regular Army units, the service

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The MH-60T features a common avionics architecture system, including digital glass cockpit instruments similar to those installed on the USCG's fixed-wing aircraft. **Skip Robinson Photo**

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ordered 70 MH-60Ms for use in special operations. The aircraft are equipped with CAAS and special mission equipment, air-refueling booms, and more powerful 2,600-hp General Electric YT706 turboshaft engines. Further refinements of the MH-60M are known to exist, but details of these highly-modified aircraft remain classified. The most high-profile use of these was on the May 1, 2011, raid that killed terrorist Osama Bin Laden in Abbottabad, Pakistan.

The MH-60Ms have been flown at gross weights up to 25,000 lb./11,400 kg (versus 22,000 lb./9,525 kg for a UH-60L with an internal load), but the high weights impact performance, accelerate component retirement, and result in higher operational and support costs.

Ten years after Sikorsky delivered the first Mike, the 1,000<sup>th</sup> UH-60M was scheduled for delivery as *Vertical* went to press in October 2018.

### **BUILDING BETTER HAWKS**

Step inside the Sikorsky factory on the west bank of Housatonic River in Stratford, Connecticut, and you'll see hundreds of skilled technicians assembling the third-generation UH-60M Black Hawk.

"From the outside, the basic UH-60M Mike air vehicle looks like the Black Hawk that we started producing in 1978, but on the inside

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The Army has been flying specialized medevac Black Hawks for more than 30 years. The HH-60M features an advanced medical suite, including integrated suction and oxygen systems; defibrillation, ventilation and incubation equipment; and equipment for monitoring vital signs. **Ted Carlson Photo**

essentially everything has changed, including the main rotor blades and aircraft structure," said Hanke, who was once UH-60M program manager. The method of production has evolved, too.

"We have a monolithic airframe that is produced from one piece of metal using high speed machined parts, which takes less time to build, has a lot less parts, and has a corrosion treatment," said Hanke. "We simplified the construction and reduced the weight as a consequence."

The use of monolithic components eliminated about 2,200 parts from the original cabin and introduced tighter tolerances, while the introduction of a composite folding stabilator reduced the parts count by more than 60 percent and eliminated 1,400 fasteners.

The launch of UH-60M production coincided with the introduction of a new computer-based manufacturing system.

"The computerized system allowed us to capture a lot more statistics regarding the work we're doing and how it was being done," said Hanke, adding that the digital factory also made it easier for Sikorsky to update manufacturing processes based on the analysis of data from the field.

Today, there are eight people at each of the six positions on two final assembly lines, working one of three eight-hour shifts each day. This results in a production time of about 42 days per Black Hawk.

When Sikorsky embarked on UH-60M production, "we focused on ergonomics, efficiency and cleanliness as we 'leaned out' the factory," said Mitchell, who oversees the manufacturing organization. "We created a brighter, cleaner, and safer factory, while reducing labor hours and costs and achieving a better flow on the floor."

As of the summer of 2018, one of the Mike assembly lines was producing the medevac version (HH-60M), with the other producing the utility version.

The HH-60M features a clinical interior with a litter system for up to six casualties, an oxygen generator, and modified accessories and avionics.

The standard Army version is offered as part of a Foreign Military Sale. Some exports require customization, which is usually done by Sikorsky in Connecticut or at its West Palm Beach facility in Jupiter, Florida. Bahrain was the first UH-60M export customer.

Sikorsky has a long tradition of making all critical flight systems, including rotor blades, gears, gearbox housings and flight controls for the Black Hawk and all of its other helicopters.

The main UH-60M cabin is integrated at Sikorsky's historic Bridgeport plant, then trucked to Stratford for final assembly. Airframe production today is much less vertically integrated than in the past, with 40 percent of the main cabin now produced by Sikorsky subsidiary PZL Mielec in Poland, and Turkish suppliers providing some of the tail pylons and tail cones as part of a dual sourcing agreement.

Production of the legacy MH-60R Romeo is also a multi-site enterprise, with the airframe assembled at the Sikorsky factory at the Troy Municipal Airport in Alabama, final assembly in Stratford, and mission systems installation and integration centered at Lockheed Martin in Owego, where the MH-60R cockpit is also produced.



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The last of 277 MH-60S Sierras was delivered in 2016, and the last of 324 MH-60R Romeos ordered by the Navy is scheduled to roll off the assembly line in 2020, but the maritime helicopter is still available for export sales, which are expected to extend production well into the mid-2020s.

Following close on the heels for the MH-60R, the Stratford factory is now tooling up to assemble the new generation HH-60W “Whiskey” CSAR helicopter for the Air Force and the new heavy-lift CH-53K King Stallion for the Marine Corps.

### NEW GENERATION HH-60W WHISKEY

In the early 1980s, the Air Force began developing the HH-60D Night Hawk — a sophisticated CSAR and special operations aircraft based on the UH-60A. The program didn’t result in a production aircraft, so instead, 10 Air Force UH-60As were upgraded to “Credible Hawk” CSAR configuration. This included an inflight refueling probe, a 117-US gallon (440-liter) auxiliary fuel tank in the rear cabin, a fuel management system, hoist and two crew-served (or pilot-controlled) 7.62 mm miniguns or .50-caliber machine guns for self-protection.

Beginning in the late 1980s, the Air Force upgraded and added to this fleet, ultimately requiring 112 HH-60G Pave Hawk CSAR helicopters, based on the UH-60L.

The HH-60G was an evolutionary program that left the Air Force with a fleet of aircraft built over a 20-year period that were upgraded in piecemeal fashion. Since the terrorist attacks of 9/11, the HH-60Gs have also been one of the most deployed aircraft in the Air Force’s inventory, which has compounded the need for a replacement.

The Air Force attempted to replace the fleet with the CSAR-X program, but it was cancelled in 2009, forcing it to restart the effort.

In June 2014, the Air Force awarded Sikorsky and Lockheed Martin a \$1.3 billion engineering, manufacturing and development (EMD) contract to develop a new CSAR helicopter based on the UH-60M.

As an interim measure, the USAF took delivery of the first of 21 UH-60Ls converted to HH-60Gs in 2016. These aircraft are to replace helicopters lost on deployed combat operations since 9/11, and return the fleet to its original strength of 112 HH-60G helicopters.

Tim Healy, Sikorsky’s Combat Rescue Helicopter program director, said Sikorsky and Lockheed Martin are drawing on their combined knowledge to design a robust helicopter — known as the HH-60W “Whiskey” — that can fulfill the Air Force’s demanding CSAR mission profiles.

“Some of the biggest challenges of retrieving a downed airman is that they are often a long distance away in a hostile area that has just proven its capability to shoot down a fighter jet,” he said.

“It’s a time sensitive mission where the crew must gather as much information as possible while flying en route to the target, and the mission systems must be able to provide situational awareness of the area around the downed aircrew, including the location of friendly and hostile forces.”

The sensor suite includes FLIR and radar, and the HH-60W is equipped with two kinds of data links. All the sensor and mission data is displayed in the back of the aircraft on three displays that can be seen by the Pararescue team leader and gunners sitting sideways.

### AN INCREASED RANGE

One of the key design challenges was how to increase the range of the HH-60W without filling the cabin with auxiliary fuel tanks, as had occurred on the HH-60G. The normal internal fuel capacity of the UH-60M is 360 US gallons (1,360 liters), but the fuel capacity of the Whiskey is 660 US gallons (2,500 liters).

“We developed a larger fuel tank that is installed in the aft transition area of the airframe where the cabin starts to narrow,” said Healy. “The aircraft structure and materials in this area were changed to accommodate the new tank, which was expanded upwards, forwards and backwards to optimize the space.”

This was a big engineering challenge because the location of the fuel tank had to have a minimum impact on cabin space, maintenance access and the center of gravity, said Healy.

Careful placement of the refueling probe, weapons, radar, sensors and avionics at the front of the aircraft helped balance the larger fuel capacity, and the entire HH-60W airframe has been strengthened to address the new load paths and improve its structural life.



The new generation HH-60W Combat SAR helicopter has advanced avionics and mission systems and an internal fuel capacity of 660 US Gallons, (2,500 liters) — double the internal fuel capacity of earlier models. **Sikorsky Image**



The new tank provides more cabin space than an HH-60G with auxiliary fuel tanks, while providing a similar amount of fuel for the long-range CSAR mission.

The Whiskey features the UH-60M drivetrain, General Electric T700-GE-701D engines, and wide-chord rotor blades that provide better overall performance and maneuverability in the terminal area (where the helicopter is picking up downed aircrew), including much better sustained turning and quick approach capability.

It is also outfitted with a pair of externally-mounted gun systems built into the side of the fuselage. These can fit three different kinds of weapons (the GAU-2 six barrel .30 caliber gun, and the GAU-18 and GAU-21 — both .50 caliber guns) that can be fired in a fixed-forward mode or be used by the door gunners.

The HH-60W has dedicated crashworthy seats that fold into the cabin roof and dual litter system with upgraded life support systems.

The deal for 112 HH-60Ws, outfitted with Lockheed Martin mission equipment, included funding to outfit nine pre-production HH-60W helicopters: four for engineering management, focused on structures and performance; and five system demonstration test articles. Two of those test articles will be allocated to avionics development, and three for aircrew and maintenance training.

Sikorsky began assembling the first HH-60W Whiskey for the Air Force in Stratford in early 2018, while initial flight testing of the HH-60W will begin in early 2019 in West Palm Beach, Florida. The testing will then transition to Duke Field within the Eglin AFB test range in northwestern Florida.

The initial EMD contract also covers six aircrew and maintenance training devices, and instructional courseware.

Another development in the works is the Army's improved turbine engine program (ITEP), to provide current and future Army Black Hawks and Boeing AH-64 Apaches with significantly more power, payload and range.

The plan is to have a new centerline 3,000-hp-class engine with 50 percent more power, 20 percent longer engine life, a 25 percent improvement in specific fuel consumption, and 35 percent lower costs compared to the T-700.

The ITEP engine is designed to be a "drop-in," allowing the T700 engine to be replaced on new and in-service UH-60s without needing a redesign of the engine compartment or cowlings.

General Electric (offering the GE3000 turboshaft) is competing against the Advanced Turbine Engine Company (ATEC), a Honeywell and Pratt & Whitney joint venture (offering the HPW3000 turboshaft) for the program, with the Army selecting the winner in 2019.

## THE S-70i INTERNATIONAL BLACK HAWK

The S-70 became a European aircraft when Sikorsky bought PZL Mielec of Poland in 2007, investing almost \$75 million to modernize the company's facility in Mielec. Originally, the facility built UH-60 cabins, but this was supplemented by assembly of the third-generation S-70i Black Hawk in 2010.

Leon Silva, director of engineering for global military and systems and services at Sikorsky, said the move to build the S-70i in Poland was driven by the low cost and high quality of manufacturing in the country.

"[It was] an opportunity to win more international sales from Europe and worldwide where customers were more price sensitive and more comfortable purchasing from a European manufacturing facility," he said.



Sikorsky produces two versions of the Black Hawk for the U.S. Army today: the UH-60M for troop transport and HH-60M for medical evacuation. **Cherie A. Thurlby Photo**



A small number of VIP versions of the UH-60L, known as the VH-60N, are operated by Marine Helicopter Squadron One (HMX-1 "Nighthawks"), based in Quantico, Virginia, to fly the President of the United States and other senior government officials. **Ted Carlson Photo**



The Army's 160<sup>th</sup> Special Operations Aviation Regiment used highly modified Black Hawks on the raid to capture or kill Osama Bin Laden. **Duane Hewitt Photo**



The Air Force's aging fleet of HH-60Gs will be replaced by the new-generation HH-60W. **Skip Robinson Photo**

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*Life Flight Program Manager at Geisinger Health System*

The S-70i is based on the UH-60M, featuring General Electric T701D turboshafts with an integral particle separator, wide chord main rotor blades, and a glass cockpit with a digital automatic flight control system.

So far, the facility has built more than 40 S-70s for eight customers. These include foreign government sales to customers to customers in Brunei, Chile, Columbia, Poland, and the Middle East; and to Firehawk customers in the U.S.

"We have not had a Firehawk in Europe, but believe there are opportunities for the aircraft in France, Spain, Portugal, and Greece," said Silva.

The S-70A Firehawk has been operational with Los Angeles County Fire Department since 2000, and has proven its worth in almost two decades of firefighting. Based on the UH-60L, the aircraft was configured for missions including airborne firefighting (with a 1,000-US gallon/3,785-liter belly-mounted Aero Union, later Simplex, tank), SAR, emergency medical transport, and fire crew and cargo transport. L.A. County's three S-70As were joined by two S-70i Firehawks earlier this year.

The S-70i was customized for firefighting operations by United Rotorcraft, which has partnered with Sikorsky to offer a turnkey package for customers.

The aircraft shares its DNA with its third-generation UH-60M sibling, with a few differences in customer-specific equipment, including a simplified engine inlet and exhaust design, and a more civilian-suitable radio package.

The S-70i has a maximum gross weight with external load of 23,500 lb. (10,660 kg), a 9,000-lb. (4,080 kg) hook capacity, and hover-out-of-ground-effect (HOGE) gross weight of 18,000 lb.

The S-70i Armed Black Hawk features a fully integrated weapons system. Qualified in 2017 by Sikorsky, the weapons system gives the utility platform a sophisticated medium attack mission capability, enabling high targeting accuracy.

**Ted Carlson Photo**



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PJ Helicopters is one of several civilian operators to have purchased Army-surplus Black Hawks and put the aircraft to work in a range of utility operations. **Skip Robinson Photo**



L.A. County Fire Department has been operating the Firehawk since 2000. The department bolstered its Firehawk fleet by adding two S-70i Firehawks earlier this year. **Anthony Pecchi Photo**



Brainerd Helicopters was the first civilian operator of the Black Hawk, ultimately launching an operation that carried the Firehawk name. **Dan Megna Photo**

(8,165 kg) at 11,000 feet density altitude. Compared to the S-70As operated by L.A. County, Sikorsky said the S-70i has an increase in payload of 850 lb. (385 kg). This is due to the higher available torque from the General Electric T701D engines, and the increased efficiency of the i model's wide-chord blades.

Once assembled by Sikorsky, the aircraft are modified by United Rotorcraft with a new-design 1,000-US 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. United Rotorcraft is also working with Kawak Aviation to develop a new tank for the S-70i.

In addition to L.A. County, recent Firehawk customers include Cal Fire (up to 12 over the next five years), San Diego Fire (one, delivered in July 2018), and Ventura County Fire Department, which contracted United Rotorcraft to convert two former UH-60Ls into Firehawks in August 2018.

The S-70i is also the basis for Sikorsky's new military-qualified armed Black Hawk, which features a comprehensive weapons system fully integrated with the existing digital avionics. It represents the first time Sikorsky has offered a weaponized S-70 directly from the factory, and is marketed to nations seeking to replace older Soviet helicopters with a fully digital helicopter that can be quickly modified to perform a number of different missions.

## THE CIVILIAN HAWK

The Black Hawk first entered the civilian realm through Brainerd Helicopters of Leesburg, Florida, with the operator needing to perform an international search to secure its first Hawk — a former demonstrator model in England — over 20 years ago. After extensive refurbishment, the aircraft proved such a success that the company formed Firehawk Helicopters, and it bolstered its fleet with additional former international S-70s as they became available on the market.

A partnership with Brown Helicopters broadened the number of civilian S-70 owners slightly, but it wasn't until 2012, with the launch of the Army's Black Hawk Exchange and Sales Team (BEST) program, that the aircraft became easily accessible to the civilian market. The program aims to divest 600 to 800 A and L model Black Hawks from the Army's inventory. The aircraft are first offered for sale or exchange to federal and state government agencies, then to Sikorsky, and finally are offered for auction by the General Services Administration.

These auctions have seen a relative flood of the Black Hawks appear on the market, having been refurbished and put to work in various restricted category utility roles by operators including PJ Helicopters of Red Bluff, California; Timberline Helicopters of Sandpoint, Idaho; and Helinet Aviation of Van Nuys, California.

Representing the company's longest production run since founder Igor Sikorsky pioneered the helicopter industry with the first flight of the historic VS-300 in 1939, the S-70 family of helicopters has become not only Sikorsky's most successful program, but the most popular military helicopter type of the 21<sup>st</sup> century. And with a wave of first- and second-generation Black Hawks now retiring to finding new roles outside the military, the adaptable aircraft is set to bolster its reputation as it establishes a whole new legacy in the civilian world.



**Ken Swartz** | Ken has spent most of his career in international marketing and PR. An award-winning aviation journalist, he runs Aeromedia Communications, and can be reached at [kennethswartz@me.com](mailto:kennethswartz@me.com).

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# THE FINNISH WAY

Coptersafety hopes to refresh the market with its holistic approach to helicopter simulator training.

**STORY BY JON DUKE**

**PHOTOS BY LLOYD HORGAN**

It was Mikko Dahlman's own experience in flight simulators that would ultimately prove to be the inception of Coptersafety, the helicopter flight training company that he leads as CEO. His subsequent experience flying Airbus Bo.105s, EC135s, and the H145 over 20 years as a helicopter air ambulance pilot in the demanding conditions of Finland crystalized his thinking.

"During my own training, it was clear that there could be a better way [of using simulators]," Dahlman told *Vertical* during a visit to Coptersafety's facility in Vantaa, near Helsinki, Finland. "But most important was to train the correct attitude to safety from the beginning. The aim of the company is to make the industry safer through better training."

This mindset has clearly resonated in all corners of the industry. Since its foundation in 2011, Coptersafety has secured contracts with major players in all sectors and is now one of the fastest growing training providers globally.

In contrast to many of its larger competitors, Coptersafety's race to success was run from a standing start, without the luxury of buying an existing facility or having an extant customer base.

Aware of an empty slot opening up in national carrier Finnair's simulator facility, Dahlman acquired a CAE Series 3000 unit to simulate the AW139 with Phase 5 avionics, and certified at EASA Level D. The choice of aircraft proved shrewd, coming at the start of a succession of sales for the type around the world.

With fresh investment coming on the back of its continued success, Coptersafety moved into a new, custom-built facility next door to its former Finnair premises in 2017.

The author in Coptersafety's H145 simulator, flying over Rovaniemi in northern Finland.

## FROM THE GROUND UP

Keen to capitalize on the opportunity, Coptersafety designed its new facility around the company philosophy of a holistic approach to training, encompassing all of the activities prior to flight, and many more on the periphery. The attention to detail in the building architecture means that student pilots are taken from the reception area to the recreation spaces, and the route to the sim has a natural direction, through teaching, studying, briefing and flight-preparation areas. This elimination of a need to “shuttle” between different areas was designed specifically to reduce cognitive dissonance and increase focus, but also reduces the likelihood of distraction to the student or instructor from administrative tasks immediately prior to entering the simulator. Reducing stress was also a key design consideration, and of course this being Finland, there is a sauna built in to the recreation area.

The facility was also clearly planned with confidence about future expansion. The sim hall has room for six simulator bases, and at the time of *Vertical's* visit was home to three of Coptersafety's operational units, as well as part of its latest H125 simulator, which was then under construction. There are also foundations in place to extend the building by two more simulator bays.

In the center of the sim hall sits a well-appointed gymnasium, which seemed a little out of place until the company's concept on pilot performance was explained by its in-house aviation physiotherapist, Sampsa Kautto — whose passion and enthusiasm were apparently boundless.

The fact that helicopter pilots experience a great deal of vibration and typically have poor posture will come as a surprise to few, but Kautto is determined that a little knowledge delivered early enough can reduce the negative health effects of flying, along with the costs in terms of the individual's healthcare and the operator's recruiting budget.

Placing the gym in the sim hall reinforces its importance as part of the working environment, and encourages students to treat their physical preparation with the same attention as they do their flying. Each newly type-qualified pilot leaves Coptersafety with an app detailing various exercise regimes that can be done in the typical helicopter operating environment, or even in the aircraft.

“The helicopter is a demanding mental environment, but it is also very demanding physically,” Kautto explained to me after demonstrating some neck-strengthening exercises that can be done while still in the aircraft. “Pilots prepare themselves mentally before every flight. We encourage them to also prepare their body.”

This all-encompassing and highly integrated approach is reflected in the relationship that Coptersafety fosters with its customers.

“Our aim was always to improve safety in the industry,” Dahlman said. “By training the pilots — but also the operators — in safe practices, we can improve both [the] safety and efficiency of their operations.”

## FROM TINY ACORNS

As a company growing from humble beginnings, Coptersafety's ability to be flexible in training approaches was a strength that it wished to capitalize on from the start, but as sales director Hannu Marjoniemi explained, this also involved something of a mindset change for some of their customers. “When we first met customers, they would often ask about the standard program, and I would reply that we didn't have a standard program — we could tailor it to their specifications. Some customers were not used to this approach and we learned that it takes time to build a customer's

The H145 (right) and AW139 (left) simulators at Coptersafety's facility. The H125 assembly is visible in the background, and there is room for another two modules.



The logo says it all. Safety is at the heart of the company's ethos.



trust in your capability, and of course that's understandable."

The ability to customize the customer's training regime is clearly considered core to the company's offer, as it has been built into Coptersafety's new facility, with its selection of the TRU Simulation and Training Odyssey H Level D platform that supports cockpit modules that can be swapped out in a matter of hours. With integration by now a familiar theme, it was no surprise to find TRU engineers on site to perform routine maintenance and rectification where necessary, yielding a 99 percent serviceability rate.

Currently installed modules include an H145 with Helionix Step 2 avionics (the first simulator in the world to be so equipped), as well as an AW139 with Phase 7 avionics, most of which are common components with the aircraft rather than emulations.

These modules incorporate direct projection from a Rockwell Collins EP-8100 image generation system, which delivers a 240x80-degree field of view, 4k resolution image through 11 Barco projectors that can simultaneously project a visible and night vision imaging system (NVIS)-compatible image, bringing the maximum training fidelity.

This system allows Coptersafety to offer a completely bespoke scenery and scenario generation service that is once again

carried out in-house by a Coptersafety team. Visual modelling expert Markus Vuorinen demonstrated the scenery generation system, in which the generic world map was overlaid first with a custom geographic mesh that included accurate ground features such as water features and woodland. After that, custom 3D-modelled buildings and objects are added, bringing even greater fidelity to areas such as landing sites and airfields.

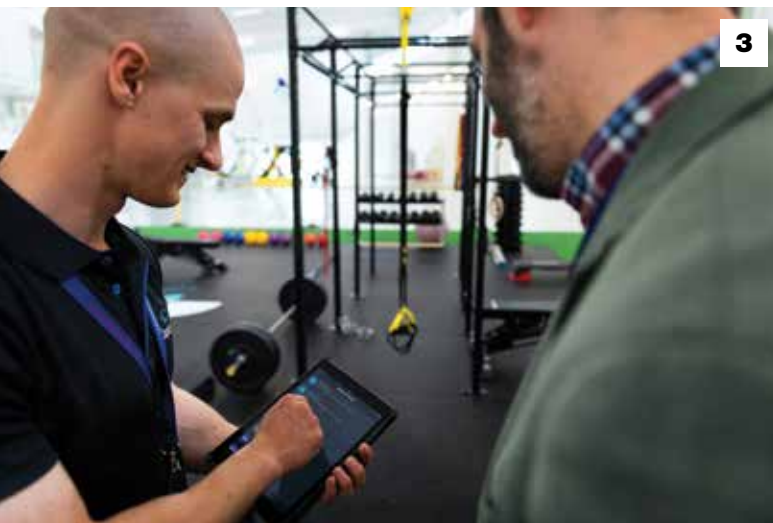
"A lot of our customers want to fly in their own environment, so they can do their OPCs [operational procedures checks] and use the procedures that are specific to their operating environment," said Christiaan Schlepers, chief theoretical knowledge instructor and type rating instructor and examiner on the AW139.

This was demonstrated later when accompanying a crew in the H145 simulator who were training to operate from a specific landing site that has vertical obstructions in the immediate vicinity. Careful consideration, planning and briefing were clearly necessary to ensure a safe approach or departure.

## CHANGE OF SCENERY

Having scenery databases that closely match their customers' own operating locations also allows Coptersafety staff to design

1 // Christiaan Schlepers, chief theoretical knowledge instructor and type rating instructor/examiner on the AW139. 2 // Typical of most simulators, an instructor station is positioned behind the cockpit module from which the crew's life can be made increasingly difficult as required. 3 // Sampsa Kautto talks the author through a typical pre-flight physical regime on the company's proprietary app. 4 // Schlepers demonstrates the AW139's handling to the author.



scenarios that mirror those most likely to be seen by customer pilots — or those that will pose the greatest threat in their specific locale. Training exclusively within the customers' expertise is not always desirable though, as Schlepers explained. "It's possible with in-house training to only see your own viewpoint, so while sometimes customers need specialized training, they can also learn a lot from looking at situations from other operational perspectives," he said.

**INVESTING IN ITS FUTURE SUCCESS IS NOT SOMETHING THAT COPTERSAFETY SEEMS NERVOUS ABOUT, AND GIVEN ITS ALREADY ENVIABLE REPUTATION, THIS IS UNDERSTANDABLE.**

Those other perspectives are offered by Coptersafety's extensive network of instructors, spanning every sector. They are all required to be current operators with commercial or state organizations.

Scenarios presented to trainees will therefore have been vetted by instructors well acquainted with the subject operation, and account for the applicable regulations. The company also provides evidence-based training, drawing data from various operators globally and from the customer's own safety management system, which in some cases Coptersafety has helped implement. These data are then used to produce a training matrix on a three-year cycle.

Having been given the opportunity to see some scenarios in action and to fly both the AW139 and H145 simulators, there is obvious appeal for both evidence-based training and a customized terrain to suit an individual operator. Smaller VIP charter operations can draw from a much wider pool of knowledge than their own, with external scrutiny of their procedures likely to bring more efficiencies as well as increased safety. Likewise, larger commercial operations will benefit from the ability to gain insights from outside their own field and avoid "group-think."

Particularly impressive among Coptersafety's portfolio is its capability to deliver realistic and challenging NVIS training. Those with plenty of "goggle time" will recognize the paradox; the limits for live training are often so restrictive that they fail to provide



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The front of Coptersafety's modern newly-built facility.

Markus Vuorinen demonstrates how he and his team can generate highly detailed bespoke scenery to customer requirements.



lessons applicable to operational minima. While simulator training is recognized as providing high value in this arena, this is often offset by the difficulty in getting NVIS equipment to the simulator — particularly if it involves crossing national borders, as many systems are subject to ITAR controls (or at the very least are problematic at check-in).

Coptersafety's solution is the in-house provision of ITT AN/AVS-9 goggles and Gentex helmets so that customers are spared the inconvenience and cost of having to bring their own. While a seemingly simple answer, it shows the company's confidence that it can provide a return on the investment in time and money that such a facility must have incurred.



The author wearing a Gentex Alpha Eagle helmet and NVIS system, as available for customer training.

## FORWARD VISIBILITY

Investing in its future success is not something that Coptersafety seems nervous about, and given its already enviable reputation, this is understandable. There are plans for two further Odyssey H bases that will house AW169 and AW189 modules, and its latest simulator was under construction at the time of *Vertical's* visit. This will be an H125 module, with the company having identified single-engine commercial operations as a sector that is currently not well supported by synthetic training.

Given the H125's ubiquity, this facility is likely to be very popular, not least with European alpine operators with whom the H125 is a popular workhorse that is much in demand. With a shortage of high-fidelity simulators, training in these roles often requires an aircraft that could otherwise be employed on a revenue task. Moreover, many malfunctions are almost impossible to realistically portray in the aircraft.

Further ahead, Coptersafety is hoping to help pioneer predictive training — using usage monitoring systems and other cockpit monitoring tools to generate data, from which a machine learning algorithm could be trained to predict the most likely failure modes or incidents. However, this long-term goal will require a change in

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The author positions the H145 simulator to land at Oulu hospital over terrain designed for FinnHEMS.

mindset not only among a pilot fraternity that is instinctively suspicious of “Big Brother” cockpit monitoring systems and routine post-factum analysis of their decisions, but also among operators who are used to seeing retrospective data supporting their training delivery decisions.



Coptersafety's H145 module in use.

That said, Coptersafety has already proven willing to approach old problems with new ideas, embracing the cultural shift required to advance its own philosophies of integration and individualization of its product.

“Our ultimate aim is to uplift or enhance the safety standards within the industry and bring some ideas and culture that until now have not existed,” said Marjoniemi.

Dahlman’s vision in founding Coptersafety was to challenge the industry, and the team around him seems to share his enthusiasm for fresh perspectives, epitomized by an instructional cadre with the breadth and currency of expertise necessary to share knowledge from across the operational sectors.

But despite the enthusiasm for new methodologies, the focus on integration and the obvious attention to the customer experience, there is no better evidence of intent than the company name itself. To the casual observer the organization provides flight simulation training, yet these words have been eschewed in favor of Dahlman’s driving philosophy. No potential customer could be in any doubt of the highest priority at Coptersafety.



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An Airbus AS350 B3 and AS332 C Super Puma belonging to Norwegian company Airlift AS. The utility operator has 14 AStars in its fleet, but just one Super Puma. **Anthony Pecchi Photo**



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BY HOWARD SLUTSKEN

# POWERED UP

Airlift AS keeps Norway's electrical grid humming.

Airlift's Super Puma — Obelix — is the first ever produced, in service since 1981. It is mainly used for aerial heavy-lift operations. **Tom Andreas Østrem Photo**

Norway is a ruggedly beautiful country that stretches 1,550 miles (2,500 kilometers) from the North Sea towards the North Pole. This westernmost country in Scandinavia is home to just five million people; one million of those live in the urban areas of Oslo and Bergen, with the rest spread out all over the country.

For over 30 years, utility helicopter operator Airlift AS has helped to connect Norway from its base in Forde, in the country's southwest.

"We are busy with powerline construction, because you need power to every house in Norway," Borre Eimhjellen, the operator's chief commercial officer, told *Vertical*.

"We have a very long coastline, rough terrain, high mountains and deep fjords. It's very challenging to get roads built, powerlines installed and have communication between cities and small towns."

Airlift began in 1986, when local businessman Torbjørn Lie established the company at Forde Bringeland Airport.

Lie recognized the opportunity for helicopter operations to support the construction and maintenance of the numerous hydro-electric powerplants in the region.

Construction company EEG Henriksen held 95 percent of the shares of the new venture, which started with a single Bell 206 JetRanger.

Just a year later, the fleet had expanded to include a Bell 205, a Bell 214, and the first of Airlift's Airbus Helicopters, an AS350 B1.

Now, more than 30 years later, Airlift has focused on the AS350 B3 as its "go-to" helicopter. It has 12 of the utility machines in its fleet, along with two AS350 B2s, three Leonardo AW169s, and an Airbus AS332 C Super Puma.

Two of the company's AS350s are currently dry leased to another operator, leaving Airlift with an even dozen machines.

The fleet is spread throughout a number of bases in the region. Four AS350s and the heavy-lift Super Puma are at Airlift's main base in Forde, three AS350s are in Kinsarvik, and one AS350 is in Stranda — with four more machines working at nearby project sites.

Airlift's three AW169s are tasked specifically with marine work. The crews fly sea pilots to vessels and perform crew changes for the TeeKay Corporation's fleet of shuttle tankers that transfer oil from offshore production platforms to the mainland.

Two of the bright-yellow AW169s are based in Hammerfest, on Norway's far north coast, with a spare on the southern coast in Bergen.

## POWERED BY POWERLINE WORK

Although the offshore work is an important diversification for the company, it has stayed focused on its work over Norway's rugged terrain.

"Airlift is a specialist in constructing hydro power towers and stringing electrical lines," said Eimhjellen. "We have worked together with our customers for a long time to specialize [in] this operation."

The towers have been engineered in Norway and are designed to meet the lifting and handling capabilities of the AS350 B3.

"The way we build the towers in Norway may differ from how





Norway's deep fjords and mountains are famous around the world, but provide a challenging environment in which to operate. **Tom Andreas Østrem Photo**



The AStar is the mainstay of the Airlift fleet, with the operator flying 12 of the type and leasing two out to another operator. The fleet is spread out across southwest Norway. **Anthony Pecchi Photo**



Equipped with a hoist and with fixed provisions for a stretcher, the Super Puma can be used for limited search-and-rescue (LIMSAR) missions when needed. **Anthony Pecchi Photo**



Airlift has three Leonardo AW169s, which are specifically used for marine work off Norway's northern coast. **Tom Andreas Østrem Photo**

it's done by other operators around the world, where they require docking," explained Arvid Holen, one of Airlift's experienced powerline pilots.

In a docking installation, guides are attached to the tower's components. It's up to the pilot to maneuver the bulky load into position and use the guides to slide the pieces together.

But Airlift has honed its assembly process without docking, according to Holen.

"We're actually flying the towers piece by piece," he said. "There are workers standing in the towers receiving the part and mounting it.

That way, we can use the AS350 instead of a heavier helicopter.

"They manually insert and tighten the bolts or attach sections to pulleys until the section is stable enough for the pilot to release the load. It still requires a steady hand, but having proficient personnel in the tower makes the job a lot easier, as this is really a team effort."

Once the towers are in place, stringing the powerlines is the next challenging operation. To reduce the workload for the pilots, Airlift has equipped two AS350s with a side-mounted hook to pull the pilot lines.

"This is a known, but not widespread method of pulling lines.

The pilot has more control of the line, can see the line better and the helicopter has more line-pulling capacity, so we can pull longer lines more safely, efficiently, and faster," said Eimhjellen.

With Norway's weather extremes, the electrical grid's powerlines are subject to icing. It's critical to remove a significant buildup of ice before the weight damages or breaks the lines. Airlift has come up with two ice removal systems, each deployed depending on the type and severity of the ice accumulation.

Developed by Airlift in collaboration with the Norwegian state-owned power company Statnett, the IFIS system is deployed on a line under the helicopter. The unit is dragged along transmission lines, scraping the ice away, and has an integrated, pilot-controlled electronic vibration system to tackle heavier buildups.

But the other system uses a brute force approach.

"We have had quite a lot of success with something as simple



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as a wooden pole that is attached to the long line. You just knock it gently into the conductor or pull it alongside, and the ice drops off. It's kind of like a wooden hammer," said Eimhjellen.

About 50 percent of the revenue generated by the AS350 fleet is related to powerline construction and maintenance. The machines, along with the Super Puma, are also deployed to support construction of new hydroelectric dams.

## ARTIC OPERATIONS

Other AS350 assignments include work for Norway's telecommunications companies, such as placing cell phone and emergency communication grid antennas and repeaters on mountaintops.

The AS350s and the Super Puma have also been deployed on Arctic and Antarctic expeditions for the Norwegian Polar Institute, and ecological projects including polar bear and bowhead whale counts.

The company's helicopters have been based as far north as Svalbard, the Norwegian island group located just 1,000 km from the North Pole.

Film and photoshoots used to be important to Airlift, but those projects have been "declining every year, so that it's almost close to nothing," said Eimhjellen. "Drones have taken over this part of the business."

**"HERE IN NORWAY, YOU DON'T HAVE A BIG, FLAT SURFACE, YOU HAVE LOTS OF MOUNTAINS, AND THAT IS CHALLENGING WHEN IT COMES TO DRONE OPERATIONS. IF WE CAN MAKE IT WORK IN NORWAY, WE CAN PROBABLY MAKE IT WORK ANYWHERE."**

**- BORRE EIMHJELLEN, AIRLIFT AS CHIEF COMMERCIAL OFFICER**

That's not to say that Airlift sees the increased use of drones to solely be a threat to the company's bottom line. In fact, Eimhjellen explained that Airlift is being proactive in developing a strong relationship with Norway's drone operators.

"We're planning to have conferences and training courses to make sure that drone operators are aware of how the helicopter business is working," he said. "We want to help the drone industry adapt to the aviation industry, so that we don't have any conflicts. We must make sure that safety is not compromised."

Eimhjellen sees the potential of drones augmenting Airlift's helicopter operations. "Our plan is to operate drones in the future, to inspect and make condition reports on the power grid system."

He expects that Airlift will focus on line-of-sight drone operations, but is keeping an eye on beyond-visual-line-of-sight (BVLOS) initiatives in other countries.

"Here in Norway, you don't have a big, flat surface," he said. "You have lots of mountains, and that is challenging when it comes to drone operations. If we can make it work in Norway, we can probably make it work anywhere."

While drones might be in the company's future, Airlift's 105 employees, including a cadre of 48 pilots, continue to support and fly utility missions all over the country.



The company has a cadre of 48 highly-trained pilots, with a total of 105 employees across the organization. **Anthony Pecchi Photo**



A technician takes a look at one of the company's AStars during a maintenance overhaul. **Anthony Pecchi Photo**

Airlift's loadmasters are an integral part of the operator's crew, ensuring that external loads are properly attached and helping the pilots in the flight operations area. **Tom Andreas Østrem Photo**





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New pilots are generally promoted from within the company, having previously served as a loadmaster. It can take years before they begin the company's pilot training process. **Tom Andreas Østrem Photo**

Airlift has become a specialist in constructing powerline towers, with the towers in Norway designed to meet the lifting and handling capabilities of the AS350 B3. **Anthony Pecchi Photo**



New pilots are primarily recruited from within the company, having gained experience with Airlift as a loadmaster. Although loadmasters join the company with a helicopter pilot's license, it can take years before moving into Airlift's pilot training process, and then to be a fully capable pilot-in-command.

Similar to other operators, Airlift's loadmasters ensure that external loads are properly attached to the helicopters and assist the pilots in safely clearing the flight operations area.

During ferry flights, loadmasters are an integral part of the crew, handling the radios and navigation, and helping the pilots.

"They have a pilot's license when they come to Airlift, and it will take a lot of time before we can call them a pilot," said Eimhjellen. "But they will get a lot of high-value experience before they start their pilot training."

## A SAFETY FOCUS

Flying missions over Norway's inhospitable terrain and through its ever-changing and challenging weather requires a strong safety culture, managed by Tom Østrem, AS350 pilot and safety manager.

"My job is overseeing and maintaining the safety management system [SMS]," said Østrem. "It's important that it is a system that isn't just something you have on the books, it has to be a system that actually works. I'm ensuring that that is a living system that is facilitating all the functions within an effective SMS."

The company's work takes it right across Norway, helping ensure the entire country is connected to the power grid. **Anthony Pecchi Photo**



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Østrem recognizes the importance of sharing safety information between operators worldwide and is proactive in creating incident summaries for Airlift's pilots.

"On the global scale, we're a small company, so to compensate for that we have to learn from the mistakes of others as well as our own," he said. "If we are not able to learn by our own mistakes, we have to learn from the mistakes of others. It's important for us to gather information about incidents that have happened globally that share similarities with our operations to raise awareness and help us identify hazards.

"What we're trying to convey to the pilots and technicians is that the SMS relies on everyone. It's critical that they understand the vital roles they play in SMS and as a part of a healthy safety culture and are able to report [incidents] without fear of retribution."

After spending years with Airlift, moving from loadmaster to pilot, crews understand the company's focus on safety, and have the training to handle more and more challenging assignments.

"We get to shape pilots with 'the Airlift Spirit' from the get-go, and mold them into the pilots we need them to be," said Østrem.

Like many small operators, pilot training at Airlift takes place in the company's machines. However, Norway's Civil Aviation Authority (CAA-N) and Norwegian operators are now focusing on the availability of an AS350 simulator in Scandinavia.

"What has been communicated from the CAA-N is that once the simulator is available, all operators will be required to use it," said Østrem. "Hopefully within the next year [we will] be able to do training and proficiency checks in the simulator, and to

be able to do things we can't fully train for in an actual aircraft, like critical failures inside the height-velocity diagram and doing full-down autos. Getting those motor skills should be a great safety enhancement."

And while there may be friction between operators and regulators in other countries, that isn't the case in Norway, according to COO Eimhjellen.

"We find it very friendly," he said. "We like strict regulations, because we want to operate with a high level of proficiency and with a high focus on safety. We benefit from having a very good relationship with the air authorities in Norway."

Going forward, Eimhjellen expects to maintain Airlift at its current size, but acknowledges that it may be a struggle.

"I believe that the future is challenging, because the market is pushing prices downwards," he said. "Customers are asking for an hourly price and a per-minute price, and they don't ask questions regarding competence and safety. We have to somehow train the market that higher proficiency and education is beneficial to the customer. That is very challenging, and we face it every day.

"Airlift is a company with long traditions, and we're always 'safety first.'"

And while the future unfolds, Airlift pilots like Tom Østrem will keep flying over a remarkable country.

"My base in Kinsarvik is really scenic," he said. "You're flying down four waterfalls on your final approach. Even after flying the same approach for the past 10 years, only last week I was flying into base and thinking to myself, 'This is awesome!'"



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# INDIE

OVER THE LAST 15 YEARS, AERONAV AVIONICS HAS PUNCHED WELL ABOVE ITS WEIGHT IN PROVIDING BESPOKE AVIONICS SERVICES FROM ITS FACILITY IN PITT MEADOWS, BRITISH COLUMBIA.

**STORY BY DAYNA FEDY | PHOTOS BY HEATH MOFFATT**

Working with a small business has an undeniable appeal, with an intimacy of service that is hard for larger companies to match. In Pitt Meadows, British Columbia, Aeronav Avionics has been maintaining and repairing the electronic equipment in aircraft for 15 years, and although it's a small company, its combination of hard work, experience and passion have made it successful.

John Carinha, founder and owner of Aeronav, compares the larger companies offering avionics services to big box stores like Home Depot — versus the mom and pop shop he's happy to label his company as. “Are you going to get more variety at Home Depot? For sure. But you're going to get a much more concentrated service with us.”

As a private pilot, Carinha was flying and fixing aircraft straight out of school, but decided the technical side was more conducive to a family environment. Nearly two decades ago, while working for Erickson Inc. on contract from Helipro (now StandardAero),

Carinha saw an opportunity to branch out into his own business.

While at Erickson, he noticed the company had a UV laser wire marker — which was “all the rage at the time,” he said. That particular model, the Tri-Star M-100L, had not yet been introduced in Canada, so when Carinha started Aeronav, it became the first company to bring the M-100L laser wire marker to the Canadian market.

Aeronav operated out of Carinha's garage for its first year, then moved into a facility on a six-year lease at Pitt Meadows Airport, and then, about seven years ago, Carinha building his own facility in Pitt Meadows. The company has just three employees today, with Carinha being the owner as well as one of Aeronav's technicians.

Aeronav Avionics' aircraft maintenance engineer Brent Butowski works on a wiring bus on a Bell 212 at Victoria International Airport.



John Carinha is the founder and owner of Aeronav, and has always had a passion for the technical side of aircraft. Aside from running the company, he's one of Aeronav's technicians.



The Bell 212 is time consuming when it comes to rewires, compared to light aircraft like the MD 500. "For our shop size, the Bell mediums, for sure, are a decent size project," said Carinha.

"I'm not the guy that's going to sit behind a desk and push pencils," he said. "I've had clients wonder, 'Why are you under the helicopter?' And I say, 'Because this is what I enjoy.' And as long I've got the health to do it, I'll keep doing it."

Aeronav works with both fixed- and rotary-wing aircraft, but Carinha said roughly 80 percent of the business is rotorcraft.

Aside from laser wire marking — which includes high-volume wire marking for other shops or competitors — Aeronav specializes in avionics maintenance, installation and sales; 24-month recertification on altimeters and transponders; and emergency locator transmitter (ELT) recertification. The company also has major avionics OEM authorization to operate as a dealer, which comes with warranty services and out of warranty services, where products can only go back to companies like Honeywell or Garmin Ltd.

## NO AIRCRAFT LEFT BEHIND

Aeronav has worked on roughly 150 helicopters over the last 15 years. Carinha said the company's "bread and butter" is the MD 500 and the Airbus AS350 AStar, but right behind those types are the Bell 407, 206, 212, 214, and 412. These aircraft are the most common visitors to Aeronav's shop, but the company is capable of servicing avionics for any helicopter.

"We'll take everything and anything," Carinha said.

There's no specific concentration on aircraft from a particular sector in the industry, but the bulk of helicopters that the company's techs work on are in utility operations. "It's not a focused effort," said Carinha, "it's just what happens to come in the door."

Of all its services, the most extensive and time-consuming project for Aeronav is a complete tip-to-tail rewire, with the simplest being service calls for ELT recertification or altimeter transponder checks.

The MD 500 is a simpler rewire process, with Aeronav's average lead time on the project being four to six weeks for a finished product.

"But with the Bell 212, depending on the avionics package on top of the electrical, you could be upwards of eight to 10 weeks," said Carinha. "For our shop size, the Bell mediums, for sure, are a decent size project."

Away from the work on utility aircraft, Aeronav has branched out into working with the Philippine military with an ongoing, annual, month-to-month rotation of rotatables and instruments — shuffling parts back and forth.

And while July and August are typically slower months for the company, Carinha expects business to really pick up with fall approaching — especially as the busy fire season for the helicopter industry winds down. "We'll hopefully see increased business when we're fixing all the [firefighting] helicopters and upgrading them."

Carinha told *Vertical* he may even see a need for hiring a few additional technicians come fall, as Aeronav is in the midst of a large, 2.5-year project for a Boeing Company affiliate, known as the Boeing 737 conversion program, which involves creating environmental disaster relief air tankers.

"The 737s that no longer meet noise abatement rules are getting outfitted with multiple fluid tanks and associated electrical controls," Carinha explained. "It's a massive system; it literally goes from cockpit bulkhead to tail bulkhead."

"And we were commissioned to do R&D [research and development] work along with the design and control of the dispersion of the fluid, and balancing the COG [center of gravity] aspects of



A wire bus board for an MD 500, which Aeronav can rewire from tip to tail in four to six weeks.



Aeronav's Carinha spools a 22 AWG wire into the company's laser wire marker. The wire will be used for a Sikorsky S-61N helicopter's ELT system.



Aeronav promotes the ability to dispatch a technician anywhere in North America within 24 hours of a service call. But the company's technicians have gone as far as Bahrain on that notice.

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When Carinha started Aeronav 15 years ago, it was the first company to bring the Tri-Star M-100L laser wire marker to the Canadian market.



Aeronav offers high-volume wire marking for other shops and competitors that don't have wire-marking capabilities.

both ground filling and in-flight draining of the tanks.”

With Aeronav having already delivered the first aircraft to to the end user, the company was starting on aircraft two when *Vertical* went to print. And although Carinha said this project will keep himself and another Aeronav technician busy, the company will continue to provide timely service to any customer that needs help during the project.

### HELP IS JUST A CALL AWAY

“We do everything the big [companies] do, just on a very different level of delivery,” Carinha said.

Aeronav’s approach to customer service is one that’s quite

uncommon, but never fails to please aircraft operators — especially those on a time crunch.

“[A customer] can call me at two o’clock on a Friday afternoon, and they’re not getting an answering service, they’re not getting a secretary, they’re getting me,” Carinha said. “I can make an immediate call. . . . We make a decision and I’m on site within hours.”

And while the company promotes the ability to dispatch a technician anywhere in North America within 24 hours, it has gone above and beyond this promise numerous times. Carinha said Aeronav has gone as far as Bahrain on that notice, which is a 26-hour flight spread over three different legs.



Aeronav is in the midst of a 2.5-year project known as the Boeing 737 conversion program, which involves creating environmental disaster relief air tankers. The company has finished the wiring on this fire control panel for the diesel engine pump of a 737 aircraft.



The company's travel has taken it from Manilla in the Philippines to Canada's Northwest Territories.

"I was building a house with literally rollers and paintbrushes in my hand when I got a call from Windward [Aviation] out in Maui, [Hawaii], and I was on a plane that night," Carinha said.

"I'm looking at my tool bag right now in the back of my truck, and it pretty much follows me wherever I go. At a moment's notice you could be doing a workout at the gym at seven o'clock and get a call when you're done saying come to Langley, [for example], and do some work."

And right next to the company's dedication to customers are the skilled troubleshooting abilities of Aeronav's technicians — which Carinha says is "truly an art." It takes years to learn and master this art, so having technicians who can effectively and efficiently solve a problem within a given timeframe is something that can be hard to find — even within a group of 20 technicians at a larger company.

Carinha said Aeronav's noteworthy dedication to its customers is what has sold the company for the last 15 years, and there are no intentions of scaling back the commitment moving forward.

"Fifteen years is enough of a litmus test to understand what we're not good at, what we are good at, and what pays the bills," he concluded. "It's really a marriage of all those things together and trying to evolve, but also staying true to what we know. . . . We're going to keep doing what we do best."



Carinha works on a wire bus board for a MD 500 helicopter at Aeronav's facility in Pitt Meadows, British Columbia.



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

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WATCH VIDEO



Bell has now delivered more than 100 505s to customers around the world. It expects to deliver 150 of the type in 2019 alone. **Bell Photo**



# THE ACADEMY

We visit the Bell Training Academy in Fort Worth, Texas, to find out what's involved in the manufacturer's training program for its new 505 Jet Ranger X.

**STORY & PHOTOS BY GUY R. MAHER**

It's been roughly a year and a half since the Bell 505 Jet Ranger X went into service, and the company has been busy pumping out ships and adding capability to the helicopter so as to reach additional market segments.

Some of the certifications and improvements presently approved include increased length of the standard skid tubes, emergency floats kit, forward and aft hard point to allow the installation of a camera and searchlight, floor protectors, bear paws, full-length trainer shoes, and approval for flight with doors off. Some of the kits in development are high skid gear, headliners, tinted windows, tail rotor gearbox cover, and an emergency medical services litter installation.

Other changes have been to address early teething problems. For example, it quickly became apparent during line use that the electronic power supply unit (EPSU) wasn't creating a strong enough starter field for a battery start. The starter would continue to demand more amperage from the battery until the battery just quit and dropped offline — at times causing a hot start. So, for a period of about six months, the 505 was restricted to battery cart, start stick, or ground power unit starts only.

A software change to the EPSU corrected this, and now starts are approved once again using the ship's battery. (In fact, due to the software change, the only approved way to start a 505 is by using the ship's battery. This will be the case until additional testing is done to determine if the start will go too quickly on external power.)

Since certification, Bell has delivered just over 100 copies of the 505 globally, of which only about 15 were delivered in 2017. The demographics have been split pretty evenly between North American and international sales. North America has dominated the sales for the first half of this calendar year, while the second half of 2018 will see more international sales. Bell expects to deliver 150 units in calendar 2019.

Steadily increasing deliveries of the 505 means a steadily increasing demand for pilot and mechanic training. So, this past July, *Vertical* visited the Bell Training Academy (BTA) in Fort Worth, Texas, to sample what's new in the 505 training program.

## STARTING WITH THE SIM

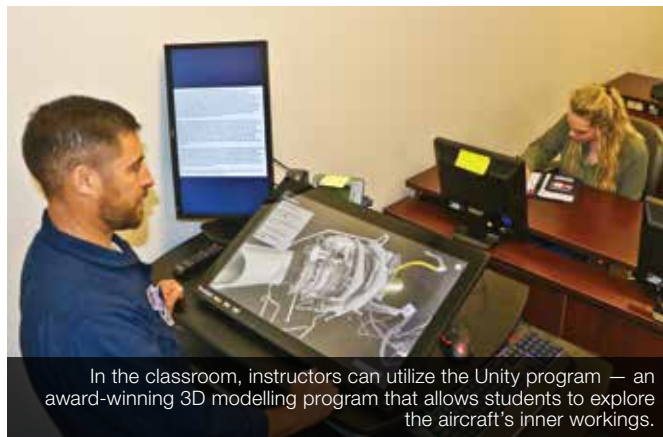
My guides for my visit to the BTA were Joe Decapite, the facility's supervisor of flight training; and Jonathan Luttmann, 505 lead instructor.

We began with an opportunity for me to fly the brand new 505 simulator. Although the sim is considered a flight training device (FTD) — meaning non-motion — this sim actually goes a little beyond that and incorporates what they like to call “mini-motion.” And quite honestly, having spent a lot of time in many full motion simulators, this FTD does a pretty good job of giving you that “seat of the pants” feeling.

With Luttmann sitting in the left seat next to me, and Decapite at the instructor's station, we started off with the full engine start procedure. I know this seems logical, but sometimes during sim sessions, you can jump past that part if time is critical and get right to the important tasks at hand. Thankfully for my visit, time wasn't an issue.

During the start procedure, the first demonstration of the “mini-motion” kicked in. The sim began to rock fore and aft in sync with the two-per beat of the main rotor spinning up. In fact, this feature was so new that Luttmann wasn't aware of it and was pleasantly surprised when it happened. And once the blades came up to idle speed, there was a small — and very realistic — two-per shuffle in the cabin.

Selecting the “Fly” position on the throttle brought the rotor up to operational rpm. As in most sims, this one was very sensitive laterally. And sure enough, as I pulled up into my first hover, we scooted to the right of the runway, stopping about halfway between the centerline and the runway's right edge. After a few more oscillations, I finally got things settled down into a decent hover.



In the classroom, instructors can utilize the Unity program — an award-winning 3D modelling program that allows students to explore the aircraft's inner workings.



The 505's cockpit is dominated by the Garmin G1000H avionics suite.



A student takes the controls in the Bell 505 flight training device. The device was created by Textron sister company TRU Simulation & Training, and went into operation in July 2018.



The 505 FTD has “mini-motion,” enhancing the feel of realism during training.

## AN INTERESTING FEATURE OF THE 505 THAT I RECALLED FROM MY FLIGHT OF THE REAL AIRCRAFT WAS THE THROTTLE CONTROL SWITCHING WHEN IT COMES TO CONTROL TRANSFER BETWEEN PILOTS.

The control touch felt much lighter than I remember from the real 505 — not near the texture gradient. The feedback was much more sensitive.

Hovering up to the runway thousand-foot markers, I performed some pedal turns and sideward flight. I decided it was time to do my first landing from the hover, and it actually went better than I thought it would. The next pick-up to the hover was rock steady.

I should mention that the visuals are stunning. To me, the quality of the visuals drives the level of realism more so than having full motion. Certainly, a high-quality combination of both is most desired, but this “mini-motion” FTD had me drawn in to the realism within minutes.

An interesting feature of the 505 that I recalled from my flight of the real aircraft was the throttle control switching when it comes to control transfer between pilots. Normally, one of the throttle controls on the collective is switched to “Idle” with dual controls installed. In the sim, when it was time to transfer control from me to Luttmann, he switched his throttle to “Fly,” at which point we were shown to be in the “Dual Fly” mode on the crew alerting system (CAS) display. Once Luttmann took the controls, he had me switch my throttle to the “Idle” position.

# Vertical PHOTO CONTEST

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"That's important so that if there is an emergency and I needed to go to the 'Idle' position, I'd be able to go there," he explained. This means that during training, the one doing powered maneuvers has their collective throttle switched to the "Fly" position, with the other switched to the "Idle" position. "The aircraft was designed so that only one throttle is switched to the 'Fly' position," said Luttmann.

However, for teaching full touchdown autorotations, the student has his throttle switched to "Idle," and the BTA instructor's is in the "Fly" position. This way the instructors are in charge of going to "Idle" to start the maneuver, and they have ultimate control to go back to powered flight if necessary.

It's important to point out that either pilot can command the 505 to "Fly," but both pilots have to command it to "Idle." It sounds safeguarded well enough in principle, but I know how humans can mess things up. I think I'd want the dual controls removed anytime they weren't necessary for the task at hand.

I shot a couple of autorotations and was reminded of how you really have to work at it to get rid of rotor RPM in the 505. This makes sense, of course, because it's the Bell 206L rotor system. In spite of the different (meaning higher vantage) sight picture at touchdown from the real 505, the sim will still be a

great tool for teaching autos to new 505 pilots.

We had been flying all this time in the "smooth" air setting, so Decapite give us a little light chop, which actually made the helicopter feel even more realistic. I was then introduced to a number of emergency procedures, including engine control unit failures and various tail rotor control failures. This is where these FTDs really shine — by offering the opportunity to explore a multitude of emergency procedures safely and in great detail.

## A GROWING PROGRAM

The BTA has two 505 helicopters on the flight training line (the first two production ships, incidentally). The time on them is pretty evenly split at about 500 hours per ship, with very good dispatch reliability. "We are never down long for maintenance," said Decapite. "The majority of our downtime comes from applying the changes that have been made to the helicopter."

The normal curriculum for 505 pilot training is two hours in the FTD, and three 505 flights for the initial course. "The FTD has been really helpful to see how the systems operate, especially if [students] haven't had any glass cockpit experience," said Luttmann. Up until July, the sim was not available, so it required an extra 505 flight period.

North America dominated 505 sales for the first half of 2018, but Bell expects the second half of the year will see more international sales.

**Bell/Ned Dawson Photo**



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Bell has now taken more than 55 pilots through the initial training course for the Jet Ranger X. As with the production numbers for the aircraft, this figure will quickly snowball over the coming years. **Skip Robinson Photo**

A game changer for the BTA is its new Unity program that anchors its 505 ground training curriculum. The program is based on 3D modeling, and required nine months to develop. The team behind it won a Textron award for the program, and I could see why.

With Luttmann at his instructor station in the classroom, he demonstrated how the program allows him to move around the virtual crew compartment, allowing the instructor to show the area in discussion on the screen. He started from the pilot's seat perspective looking at the panel, and then changed the field of view as if the pilot had turned their head up to the cabin ceiling and towards the rear. The instructor can talk about the various displays and highlight specific items as they are discussed. All of this is shown on a large flat-screen monitor, but can be seen on the student's individual monitors at their workstations, as well.

Although the tour through the cabin and details on the avionics systems were impressive, what really caught my attention was the discussion of systems and components. Over almost 30 years, I've been to the BTA many times for a variety of training programs. One of the major plusses of going to the academy is the ability to walk out to the maintenance training section that houses the many airframes and components available as visual aids.

Now, however, you don't have to leave the classroom, because the Unity program takes systems and component training to a

Hoping to capitalize on the growing market in Asia, Bell recently shipped a 505 to Singapore to embark on a three-month tour of the continent with the aircraft. **Skip Robinson Photo**





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The BTA has two 505s on its flight line, with about 500 hours recorded so far on each. Students typically record three flights in the aircraft for the initial type rating. **Bell Photo**

Bell continues to add options for the aircraft through new kits and enhancements. Kits in development include high skid gear, tinted windows, and an emergency medical services litter installation. **Bell/Ned Dawson Photo**




whole new level. You can start on the drive train system, for example, where the instructor can zoom in on each individual component. That component can be spun around on any axis, as though you were turning it in your hand to look at it from different angles.

And if that's not enough, the instructor can then journey to the inside of those components, providing a level of training that's not even possible in the maintenance lab. To demonstrate, Luttmann peeled back the layers to the inner workings of the main rotor transmission.

This program will certainly be a boon in the quality of training that can be brought to not only BTA attendees, but to international customers who aren't able to make the trip to Fort Worth. The instructors can take Unity with them on their laptops whenever they need to head out into the field, bringing this exceptional tool beyond the boundaries of the BTA. Besides negating the need to invade a customer's aircraft, the quality of the training will be improved exponentially. (Of note to 407 pilots and mechanics, Unity is now up and running for Bell's training programs for that airframe, too.)

Further enhancements are already in development. "[Bell] is actually working on the next step, which is animation," said Luttmann. This will allow instructors to show what a component or system looks like when in motion. "That's where we are going with this, but we are not quite there yet," said Luttmann.

Bell trained 55 Jet Ranger X pilots last year, and is looking to double that for 2018. Understandably, all of these pilots have been completing initial training. But it won't be long before the first batch of recurrent training customers will start showing up. Whether for initial or recurrent training, in the U.S. or for foreign markets, the BTA is making sure it's up to the task of providing innovative and comprehensive training to these customers. 



**Guy R. Maher** | Guy has recorded more than 16,000 flight hours as a dual-rated pilot and flight instructor with helicopter, airplane and instrument ratings. He runs Lanier Media Aviation Services, a company he founded in 1978. He can be contacted at [guy@verticalmag.com](mailto:guy@verticalmag.com)

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Getting on and off Air Zermatt's helicopter — an Airbus AS350 B3 — while it was in hover flight was the very first and most essential exercise in the company's alpine HEMS training course.

# MOUNTAIN RESCUE SCHOOL

From its training center in the Swiss Alps, Air Zermatt shares the experience it has gained over five decades of mountain rescues in some of the most challenging conditions on Earth. *Vertical* joined one of its courses to find out more.

**STORY & PHOTOS BY TOMAS KIKA**





A longline was used for training and to efficiently transport instructors and attendants to remote parts of the Swiss Alps, where the team practiced evacuations using Tyromont rescue bags.

The steep train ride to the car-free mountain village of Zermatt, high in the Swiss Alps, is perhaps the first indication that the air medical mountain training course provided by Air Zermatt is going to be very much the real deal. Celebrating its 50<sup>th</sup> anniversary this year, Air Zermatt has become renowned for its alpine rescues, pioneering new techniques in some of the most challenging conditions in the world. The award-winning business is led by iconic pilot Gerald Biner. With a fleet of nine aircraft, it has bases in Zermatt and Raron, and in 2011 it helped establish a rescue station in the Himalayas.

Through the Air Zermatt Training Center, it shares the knowledge and skills it has developed over its decades of rescues in the high mountains over various training courses. Earlier this year, I took part in one such program — the company's Alpine Helicopter Emergency Medical Service and Alpine Flight Crew Emergency Survival (AHEMS-AFCEST) course.

There are usually two course dates, in late spring and early fall. I opted for the June course. The six-day program is designed for groups of six to nine people, and is led by two paramedic instructors, Oliver Kreuzer and Patrick Wenger. Both are very experienced Air Zermatt crewmembers with strong international backgrounds and excellent teaching skills.

After a warm welcome, the necessary housekeeping and a base introduction, we hit the topic of helicopter air rescue in a comprehensive way. "Today is the key day of the whole training," said Kreuzer. "We'll cover pretty much everything that is being done in helicopter emergency medical services [HEMS]."

Initial theory boxes guide students through the essentials of helicopter rescue and duties in the HEMS role, regardless of medical background or skill. My group had a good mix of experience and a range of perspectives, including doctors, a mountain guide seasonally flying air rescue in the Himalayas, and some paramedics — all eager to learn or refresh their basic knowledge of high alpine helicopter rescue skills.

Focusing mainly on technical aspects and processes, the initial session saw Kreuzer give a visual explanation of the key rescue techniques used in HEMS. This was followed by a group lunch, and then, in the early afternoon, practical skills training — approaching, and getting in and out of the helicopter while it is hovering.

"As simple as it may seem, this is definitely the most intricate moment of interaction with the helicopter," said Kreuzer in excellent English. "Both the machine and the rescuer are most vulnerable just in the moment of transferring the bodyweight from and into the helicopter cabin. There [are] so many factors to take in account, yet the rescuer is not attached either to the helicopter, or to the terrain at the very moment of getting in or out."

Those who would be expecting lots of theory and light simulation in mild terrain would be terribly mistaken. The students were flown to the steep rocky slopes of Mettelhorn in an Airbus AS350 B3, forming two groups. After the instructors got out, we started practicing the proper technique of getting out and in. There was no illusion — you were simply there in the middle of the action, with the accompanying noise, cold mountain air, steep terrain and downwash. As the session progressed, the terrain became steeper and the helicopter stopped touching the terrain with its skid tips.

Going higher and higher, angled snow fields suddenly replaced grass slopes, adding another element of difficulty. Individual tips and tricks from the instructors, enhanced by experience gained through practicing on the spot, helped hone the technique. Air Zermatt conducts the courses under all weather conditions — as long as its helicopters can fly. After landing back at the heliport there was a group roundtable debriefing, and an overview of the days to come.

## **PRACTICING WITH THE LONGLINE**

The following days were no less interesting, exciting or valuable in terms of gaining experience. The theory classes covered topics such as crew resource management training, weather, navigation, communication, mountain rescue techniques, moving from an air to a terrestrial rescue, and crevasse rescues on a glacier. Practical exercises in the hangar were planned before each in-flight training session.

Proper patient management and longline flying was a day-long project, run through a series of

After mastering the longline with human external cargo, students practiced the rescue of victims from a vertical wall — one of the highlights of the course.





1



scenarios in a valley under a massive glacier. With time a stressing factor, patient care and proper rescue equipment usage were the main skills to master. Two people joined the group to simulate patients during the exercise. Everybody practiced clipping in and out of the longline, and performed marshalling signals until it became a fluent routine, and received individual debriefing.

Real-life scenarios marked the afternoon program. Mine was a call for a girl who had fallen from a hiking path, breaking both arms and severely injuring her back. Even though I am a flight paramedic, I was assigned the role of a doctor, and had to conduct the patient treatment and rescue while my two crewmates (doctors in real life) acted as paramedics.

There was no “we would do” in terms of treatment — we acted as though the injuries were real. We repositioned and loaded the patient into a Tyromont rescue bag using all the instruments and medications from the rescue backpack — no demos, no pretending. The time was counting down, the patient was in pain, the weather was getting worse.

As well as manage the casualty, I had to let the pilot know about the pickup time, and manage the airlift and further routing of the patient. Many very obvious steps became a bit awkward in changing the roles, making the experience even more essential. The cargo hook came to my hand, I clipped in with the patient and an Air Zermatt supervisor, and we lifted off.

Another comprehensive block of theory, given by Air Zermatt's head of pilot training, covered aerodynamics, the physics of helicopter flight, and aircraft performance, payload and navigation. Even for participants who were learning this information from scratch, it came in digestible portions that built a full mosaic of what a HEMS crewmember should know before a mountain rescue mission. A full morning in the hangar was dedicated to common helicopter systems, especially radios, refuelling, and the principles of hoist operations. Hands-on navigation software practice was led by the pilots.

## PERFORMING A VERTICAL WALL RESCUE

The fourth day was the highlight of the course. A longline rescue

**1 // ALL ABOVE** Detailed training of all the technical aspects of HEMS crewmembers' duties, such as longline rescue, winch operation, and rope techniques, were conducted in Air Zermatt's hangar and at the heliport with real helicopters on duty. **2 //** The vertical wall rescue was as real as it gets. Under the supervision of local mountain guides, students released a casualty from an overhanging rock, having spent the previous three days preparing for the event. **3 //** The authenticity of all the topics covered was supported by real life explanations and examples alongside the Bell 429 — the rescue machine on duty.



2

of a climber from a vertical wall is one of the most difficult tasks a mountain rescuer can perform, requiring skill and good knowledge of rope technique. The weather for our training session looked promising, and we were joined by Thomas Grichting and the legendary Bruno Jelk, two Air Zermatt mountain rescue specialists and mountain guides.

All the participants received a piece of rope, and using two carabiners we started preparing a simple load transfer system tool to safely extract a casualty from a vertical wall. Two maintenance cranes in the hangar served as helicopter longlines, and everybody rotated through the roles of rescuer and casualty.

Shortly before lunch, we moved to some rocks right above the heliport, and came as close to the real-life scenario as possible — in steep terrain, but not too high above the ground. The load transfer



3

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The cold air and high altitudes of the Swiss Alps provided great authenticity to the training missions.

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**- OLIVER KREUZER, AIR ZERMATT PARAMEDIC INSTRUCTOR.**

system was a simple tool made of a piece of rope and two carabiners, allowing for the fluid transition of weight from the rock to the longline through a Munter hitch, secured with another knot. Cutting the patient off the rope in the rock is certainly a widespread and secure technique, but the load transfer system is the most comprehensive and suitable exercise to release the casualty from a vertical wall in order fly them to a secure location.

After a briefing with our pilot, we were offloaded in two batches under the Gronergrat ridge, and our mountain guides were flown to their vertical wall locations to prepare them for the exercise. A longline was attached under the AStar, and then we each took a turn to fly on the fixed rope to free our friend from the rocks. Even though everything happened under the close supervision of the mountain guides, the panorama, altitude, and solitude on the rope made for a very real atmosphere. There was excitement and a reasonable amount of adrenaline among the students after an exercise done well — but this would be cooled down in what we thought would be the “easy” last day of the course.

The next day of a week spent speaking, living, and even dreaming of helicopters, we were at the base for a later start. With survival kits ready, we boarded the AS350

B3 for survival training in the mountains. Despite the beautiful weather down in the valley, a water-proof down jacket proved vital when we arrived at our destination a couple of hours later. The helicopter left us on a mountain plateau and we discovered it wasn't coming back — at least not that day.



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The program included a fully-simulated rescue mission, from the arrival of the medical team, through taking care of the patient, up to calling the helicopter for pick-up.



A rock outcrop right above the heliport was the perfect location for vertical wall and rope technique training.



The AStar was the students' primary means of transportation throughout the week-long course.

Patrick Wenger conducted the survival training, with no prior theory class. As the sun set and a warm 70 F (20 C) fell rapidly towards zero, we would have to learn by experience — and quickly. Building an emergency shelter required improvisation. We estimated the best location and while we attempted to start a fire, one of our teammates let out a wild scream as he accidentally cut his leg with a knife while getting wood ready. Although only well simulated, the moment of surprise combined with the difficulty of the conditions made it feel like a real call for action. Many interesting problem-solving scenarios made our night of training in the mountains extremely intense, from sleeping in blizzard bags in freezing temperatures, to preparing food and managing water supplies.

The final day of the course was a question-and-answer day, made particularly challenging with having spent the previous evening under the stars in survival training. Using Air Zermatt's rescue Bell 429, we saw the hardware and procedures the operator uses on a

daily basis — not only for technical rescues and its primary mission, but also for secondary missions and transport flights.

The students were given their certificates, and we said a final farewell to each other. I then used the generous opportunity of Biner to spend the rest of the day with the crew of the rescue aircraft on duty, observing a glacier rescue of a patient with an injured leg.

Spending a week under Swiss Matterhorn with Air Zermatt helicopters is a once-in-a-lifetime experience. It won't turn someone into an experienced mountain air rescuer in six days, but it will provide them with the absolute essentials of knowledge and skills needed to provide HEMS in the most challenging of environments. ❖



**Tomas Kika** | A helicopter pilot and rescuer, Tomas draws on his hundreds of hours spent rescuing and training at the end of a line to provide instruction in helicopter rescue techniques.



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The three Sikorsky S-51 helicopters purchased by Helicopter Air Transport (HAT) at the Sikorsky Plant in Bridgeport, Connecticut, in 1946. These aircraft represented Sikorsky's first commercial helicopter sales. **Sikorsky Archives Photo**

On April 8, 1946, the two-place Bell 47B secured approval from the Civil Aeronautics Authority (CAA), becoming the world's first type certified commercial helicopter (type certificate "H-1"). Bell Aircraft Corporation, of Niagara Falls, New York, was just one of a number of pioneering companies rushing to get a foothold in this newly-established branch of the aviation industry, all eager to secure the delivery of the very first commercial rotary-wing aircraft.

Sikorsky Aircraft, of Stratford, Connecticut, was not far behind Bell, with its four-place S-51 type certified (H-2) on April 17, 1947 (it had received its airworthiness certificate the previous March, just a few weeks after the Bell 47B). Both companies anticipated immense civilian sales of their new rotorcraft, but for this to materialize, the nascent commercial sector needed the first operators to form.

British airline pioneer Norman Edgar, owner of Western Airways in Bristol, U.K., had seen Sikorsky R-4 helicopters flying in England during the latter stages of the Second World War while he was in the Army. During the war, Edgar had travelled to the U.S. as the British Transport Auxiliary Service contact to recruit American female civilian pilots, with the aim being that they would ferry military aircraft back to England.

Edgar quickly saw a new industry for the helicopter after the war was over, and in 1945 he helped form Helicopter Air Transport (HAT) in Philadelphia, Pennsylvania. The company was to commercially operate helicopters — when they became available for civilian use. The president of HAT was Jonathan Wilford, with Edgar becoming the executive vice-president.

## THE FIRST OPERATOR

In 1946, as the first commercial helicopters prepared for certification, enterprising industry pioneers established Helicopter Air Transport to begin the first commercial flights.

Funding for this first helicopter operator in the U.S. came from several Philadelphia businessmen with no background in aviation. They were, however, very astute, and they hired the best ex-military United States Army Air Forces helicopter pilots for HAT. Peter Wright, a former Second World War pilot with the "Flying Tigers" in China, was hired as the sales manager.

The new chief pilot was Major Frank T. Cashman, a former Army Air Force chief instructor pilot on helicopters at Wright Field in Dayton, Ohio. Other early former military pilot hires included Lou Leavitt (previously a helicopter test pilot for the Platt-LePage XR-1 rotorcraft), Henry Eagle Jr., Jack Connelly, Roy Beer and Frederick Feinberg.

On July 29, 1946, Sikorsky Aircraft became the first to deliver a helicopter — the S-51 — for commercial use. The aircraft had its airworthiness certificate, and would be operated on a temporary type certificate until the official one was awarded the following year. Sikorsky general manager B.L. Whelan presented the new aircraft to HAT president Wilford in Bridgeport, Connecticut. HAT had two more S-51s on order for general and charter use, at a cost of \$48,500 per aircraft. As it turned out, HAT received the S-51s at a bargain price, as the type later sold at \$70,000.

HAT established its new base for helicopter operations at the Camden Airport in New Jersey, across the Delaware River from Philadelphia.

Bell Aircraft delivered the first of three Bell 47Bs to HAT on Dec. 31, 1946. Each one cost \$25,000, taking HAT's investment in its first six helicopters to over \$220,000. However, its ambition reached even further, and it purchased a surplus experimental prototype Platt-LePage XR-1A with plans to use it for crop dusting and utility work.

## THE FIRST COMMERCIAL DELIVERY

On Aug. 30, 1946, the last of the three S-51s was delivered to HAT. The following week, all three landed in a park next to the Franklin Institute in Philadelphia, watched by over 200 guests. Among the passengers was Igor Sikorsky, who brought greetings to Bernard Samuel, the mayor of Philadelphia, from the mayor of Bridgeport. HAT planned to use the three S-51s to transport passengers, freight, and mail to nearby airports.

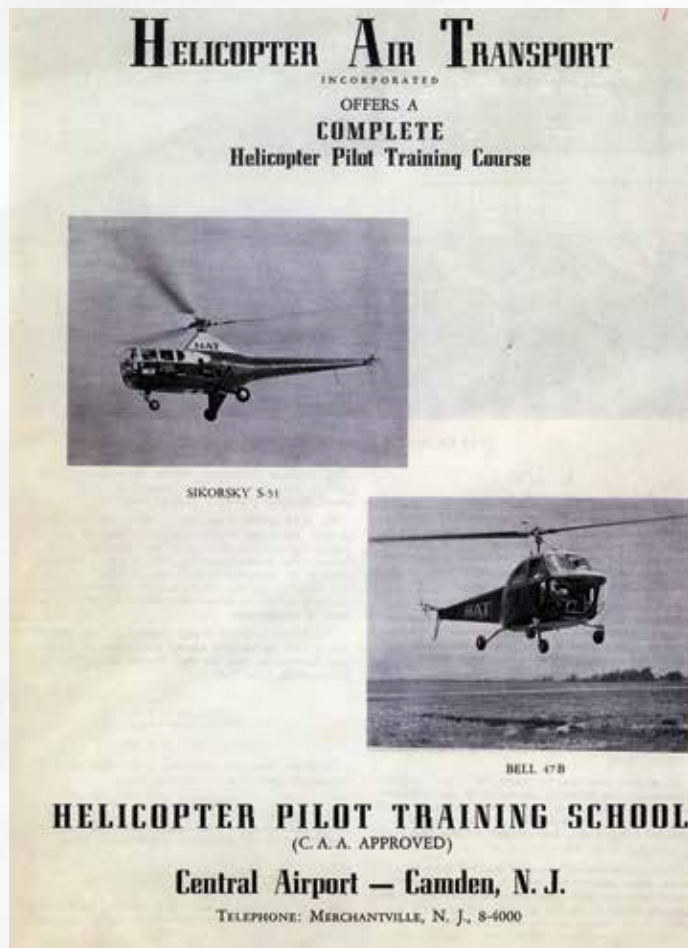
"For numerous months, Helicopter Air Transport was finding its own answers to questions concerning the future of the commercial helicopter," stated a Helicopter Air Transport early brochure. "They carried out survey flights, transporting passengers and executive charters, plus flying the U.S. mail. These very successful operations resulted in international recognition of HAT as a leader in the field of helicopter transportation."

In order to publicize and educate the public about the versatile new form of transport, HAT began a series of demonstrations to show off its rotary-wing aircraft. Wilford realized that much of this publicity would be carried out either at cost or free. While Edgar was firm in his belief that the helicopter was there to stay and that the company was building for the future, it was not long before HAT could see that there was a very high cost to operating them and a lot of maintenance to keep them flying.

New helicopters were very expensive to purchase and were capable of only carrying two to four passengers at the time. The cost to rent a Bell 47B was about \$75/hour and around \$125/hour for the larger S-51. This was a considerable amount of money in 1946. The passenger rate per mile (one way) was estimated to be about 35 cents.



The cover of a pilot training brochure for HAT. **Bob Petite Collection Photo**



During the fall of 1946, all three S-51s were put to work. They moved commuters and executives, inspected powerlines and pipelines, carried out water surveys, helped police departments, performed experimental forest fire patrols, and completed some limited crop dusting and spraying of crops and pesticides. They also offered simple helicopter rides, flew publicity flights at baseball and football games, served as aerial taxis from Philadelphia to the Atlantic City racetrack, transported politicians on campaigns, performed aerial photography, and even transported Santa Claus over the holidays. HAT tried any practical use for their helicopters they could think of. The work took them around New York, Washington, Pennsylvania, Connecticut and New Jersey.

Among the S-51 demonstration flights was an air rescue near a beach in Ocean City, New Jersey. The S-51 carried a lifeguard from the beach and dropped him by a swimmer needing rescue. A line was lowered to the lifeguard and swimmer from the hovering S-51, which was grasped by the two men in the ocean. To complete the rescue, they were towed through the water to the beach.

### THE BELL 47B ENTERS OPERATION

HAT's fleet grew further in January 1947, when it received its final two Bell 47Bs. It leased more Bell 47s from Bell due to an increased work load, and Leavitt ferried the XR-1A to HAT later in the spring.

During the winter of 1946/47, HAT made a noteworthy move by delivering department store packages in Boston, Massachusetts,

An *Air Trails* Magazine cover from February 1948 shows the HAT S-51 and Bell 47B helicopters.



and Hartford, Connecticut. It also performed rescue operations during a blizzard in the Adirondack Mountains, and flew air mail tests in New York City, Boston, and Philadelphia — becoming the first commercial operator to carry the U.S. Mail by helicopter. It even flew lighthouse keepers to their lighthouses, performed at numerous air shows, and flew photographers with motion picture cameras to document horseraces in the summer and bobsled races in the winter months. It also became the first company of any kind to receive a non-scheduled air carrier certificate.

Through all this work, HAT demonstrated the versatility and utility of the helicopter, and their operating experience was unequalled.

One of the teething issues for the early helicopter industry was a lack of trained commercial pilots — in terms of training, both Bell and Sikorsky had their own in-service flight training schools, but they were for owners of new helicopters. In the fall of 1946, HAT decided to start a flight training and mechanics school for new helicopter pilots, led by the experienced military instructor Cashman.

The HAT pilot training school was recognized and authorized by both Bell and Sikorsky, and it was also approved by the CAA. Applicants required a minimum of 500 hours in fixed-wing aircraft and a commercial rating for the Sikorsky S-51 course, and 200 hours in fixed-wing aircraft and a commercial or private rating for the Bell 47B course.

The S-51 course cost \$2,000 for 20 hours, and the Bell 47B course cost \$1,500 for 25 hours. A complete transition course, with 20 hours on the S-51 and five hours on the Bell 47B cost

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The HAT fleet at Camden airport, following the operator's purchase of Sikorsky S-51s and Bell 47Bs.



A HAT Bell 47B overflies a flock of sheep. The company was looking at all kinds of work for the helicopter in its early days, including herding sheep.



A rare color photo of Helicopter Air Transport's third purchased S-51 at Camden Airport in 1947.

\$2,300. A typical class size was 25 students, and before long, there was interest from all over the U.S. and Canada. The French Air Ministry even sent several students to Camden for pilot training at the school.

During 1947, HAT looked at purchasing even more helicopters. These included the agricultural dusting and spraying Bell 47B-3s, and it watched with interest as Frank Piasecki undertook his pioneering work with much larger tandem-rotor helicopters that could carry many more passengers.

It also continued to look for new ways to use its helicopters. Sales manager Peter Wright thought about the oil industry exploration in the Gulf of Mexico off Louisiana, and the problems companies were having traversing grassy wet marshes and swamps with marsh buggies. He convinced Robert H. Ray — a geophysical exploration company from Houston, Texas — to try using a helicopter, pointing out that it would have little impact on the environment.

Wright planned to use one of HAT's Bell 47Bs on floats to move crews around, as well as carry the gravity meter instrument and its battery. Bell followed the operation in the Gulf with interest.

The HAT Bell 47B assisted on an oil exploration project for Standard Oil from May 11 to by Aug. 12, 1947. They discovered that using the helicopter was a third of the cost of performing the same work with a marsh buggy, as it could accomplish in one hour what would take an entire day with the land vehicle.

The operation — the first use of a helicopter for oil exploration in the U.S. — turned out to be a great success. And the legacy of this work continues to this day, with helicopters playing a crucial role in oil exploration around the world.

## A SUDDEN ENDING

In the summer of 1947, having flown over 2,000 hours with no accidents, everything looked great for the first commercial helicopter company. But things were about to change.

That September, an S-51 was destroyed in a training accident. Around the same time, HAT's financial problems began to be a serious issue. There was simply not enough cash coming in to cover the costs of running a helicopter company. As a result, on Oct. 21, it filed for bankruptcy. HAT's books showed assets of \$234,875 with liabilities of \$178,831. It was given 30 days to reorganize, but unfortunately it was forced to shut down.

Sikorsky repossessed HAT's two S-51s, and later sold them to the U.S. Coast Guard and to the French government. The three Bell 47Bs were taken back by Bell, and sold to Rick Helicopters and New England Helicopter Service.

HAT's assets were sold in a public auction at the Central Airport in Camden on April 2, 1948. The XR-1A was sold to Frank Piasecki, and was flown to the Piasecki facilities by Leavitt.

Helicopter Air Transport may not have lasted long, but it played a large role in establishing commercial helicopter operations, proving the new technology's versatility and setting the stage for an industry to follow.



**Bob Petite** | Bob is a member of the Twirly Birds, AHS International, the Canadian Aviation Historical Society, the American Aviation Historical Society and the Bell 47 Helicopter Association, Inc. He is the author of *The Bell 47 Helicopter Story*.



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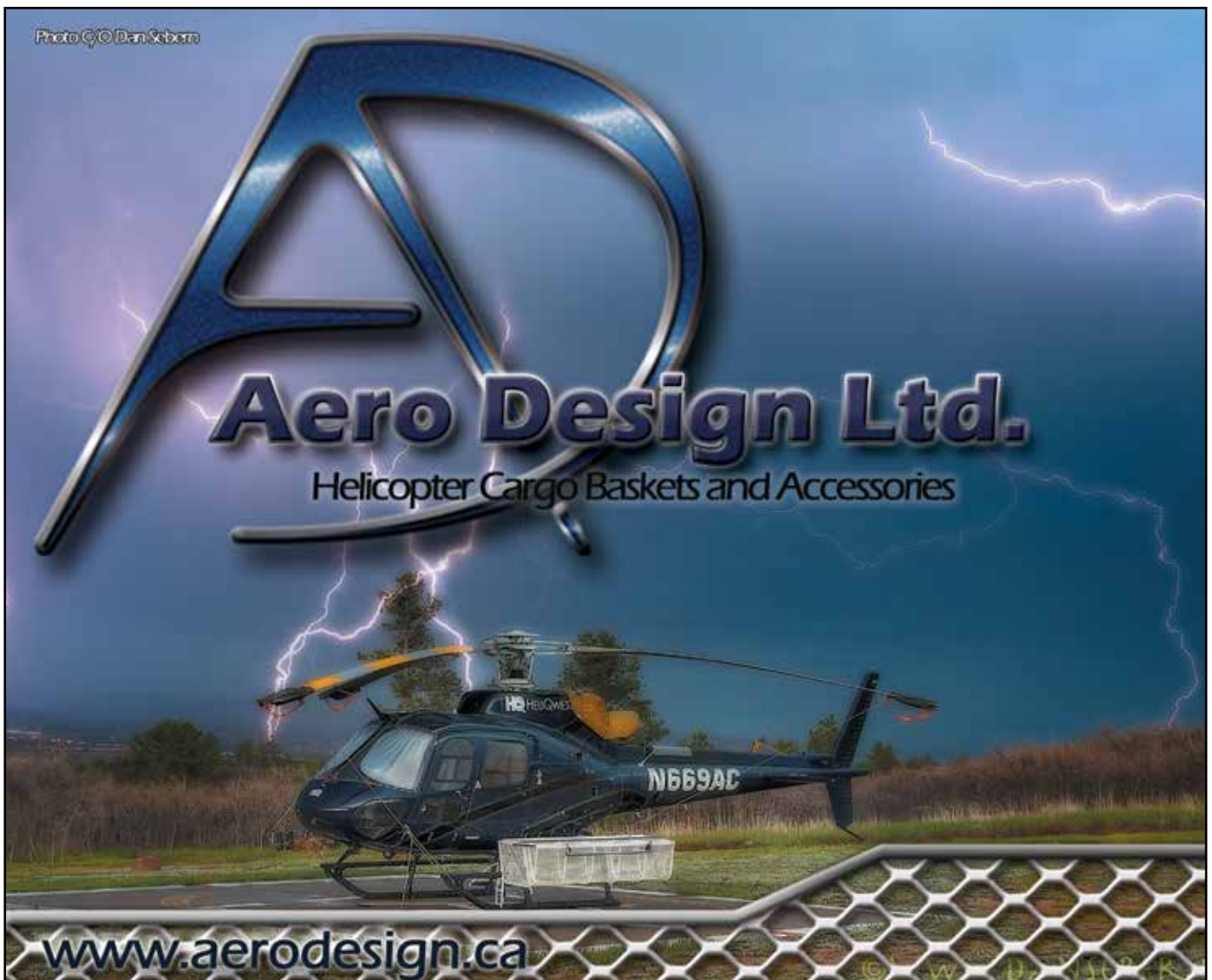


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The advertisement features a large, metallic, blue and silver stylized letter 'A' logo. Below the logo, the text 'Aero Design Ltd.' is written in a bold, blue, sans-serif font, followed by 'Helicopter Cargo Baskets and Accessories' in a smaller, black, sans-serif font. At the bottom of the ad, a black helicopter with yellow rotor blades is shown on a grassy field, with a white cargo basket hanging from its side. The background is a dark, stormy sky with bright lightning bolts. The entire ad is framed by a white, diamond-shaped mesh pattern at the bottom.

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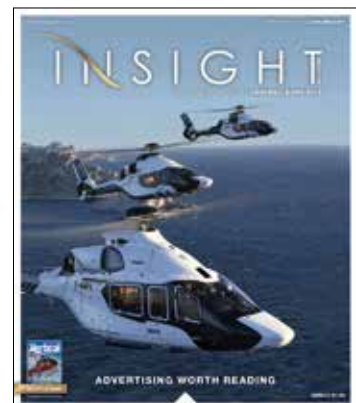
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# There I Was...

written by Dorcey Wingo

Smokejumpers Vs Rappelers

A recent move from California to southwest Oregon has happily returned me to my old stomping grounds in the Illinois Valley. I first came here 38 years ago to man a helicopter rappel program on a three-year fire contract with the U.S. Forest Service. The job was based at a small county airport that had been home to the Siskiyou Smokejumpers since 1943. The jumpers didn't particularly want our helicopter — nor our “rope sliders!”

I flew a brand-new Bell 212 to the base, and from the moment we arrived, I got the feeling we were not wanted. Oh, the jumpers smiled and shook our hands, alright — but I saw the smirks and I heard the grumbling. One jumper “figured out” how much the Bell cost the government for every rotor “wop.” “Twenty-five cents!” he shouted. We were in competition, after all, for any wildfires that popped up in the adjacent Kalmiopsis Wilderness.

The trees are majestic in that area. Should their parachutes hang on a treetop, the smokejumpers needed 250-foot let-down lines to reach the ground. Our rappellers used 250-foot lines, as well. This allowed us to hover-deploy a crew of six into the gaps between Douglas fir and redwood, send down their equipment, drop the ropes — and go for the reserve crew, if needed.

On any distant wildfire, it was a given that jumpers were the fastest and cheapest way to attack. We rappellers figured we were quicker at getting our guys on the ground on fires up to 25 miles away. Beyond that distance, the jumpers' twin-turbine airplanes could get there first and start throwing their streamers. 200 vs 100 knots — Aesop's *Tortoise and the Hare*!

My logbook reminds me that we fought only a few fires on the Kalmiopsis our first summer, netting a paltry 35 flight hours in 150 days. My relief pilot fared about the same. Over half of the time logged was our once-a-week practice rappels.

Things were so slow that I illustrated a highly detailed, full-color smokejumper cartoon book on the side, which grew to 14 pages. I drew and we practiced. The action was sparse, but I was confident in my rope sliders — er, rappellers — knowing we could compete with the best.

Before the summer was over, the Siskiyou Smokejumpers and rappellers would come head to head on the biggest fire of the year. There was a story here. But in order

to document the event fairly, however, I needed more than the rappellers' version.

As I began researching, I was righteously called upon to be a docent for tourists at what is now the Siskiyou Smokejumper Base (SSB) Museum. Between visitors, I chanced upon a three-ring binder titled “SSB Annual Operations Summary” in the old admin building.

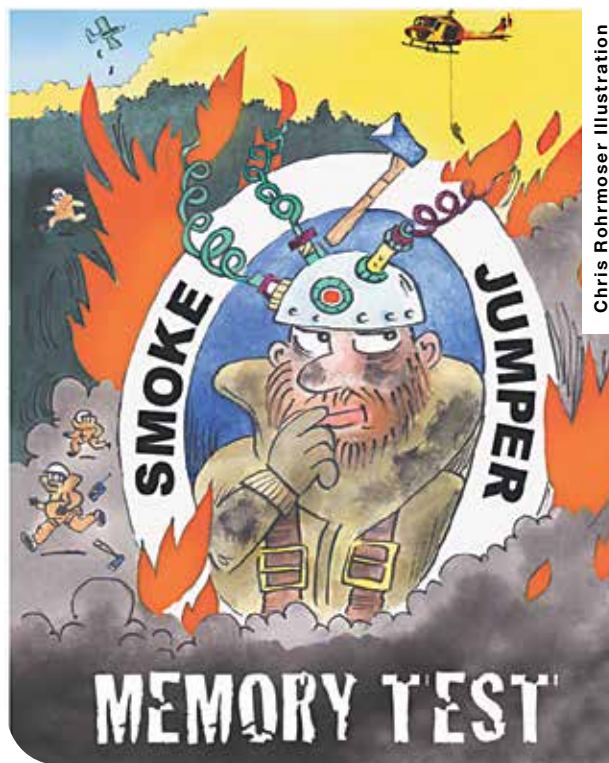
I peeked: the Aug. 11 fire was there, alright. Such luck! The fire was written up as *The Super Bowl of Fire Fighting* confirming that it was attacked by 14 smokejumpers and our 12-man helicopter rappel team. They misspelled my name!

The fire was 40 miles to the northwest, originating in a logging operation and fanned by 20-mile-per-hour winds. Its ominous black smoke column was visible for many miles. The jumpers managed to get both of their teams on the ground before I arrived, came to a hover, and threaded six rappellers into a small clearing on the right flank of the fire. Off I went for more rope sliders.

The report went on to say that the smokejumpers “almost lost one jumper” who landed beside the fire. Another jumper hurt his back, striking a stump as he landed. Eleven other jumpers smote the ground safely and quickly unsuited. Double-timing, they stashed their gear nearby and went to work on the fire. According to veteran Gary Cote, one jumper floated over the landing spot.

Few knew it at the time, but before I deployed the second rappeler team, the jumpers had summoned the first crew of rappellers to hustle over to the left flank. The wind had shifted unfavorably and their cache of jump gear was in peril!

What I do remember is seeing my long-faced, ash-coated smokejumper friends following the event, seated in the local eatery having some humble pie. They had managed to stop the “Shasta Fire” in two days, then they were bussed back to town



Chris Rohrmoser Illustration

with mere remnants of their gear. A 12-man smokejumper team had been flown in from Redmond as cover.

All these years later, I had hoped to locate other now-retired jumpers in the valley who might give me their account. I yearned for an interview that might make for a decent narrative.

One of my reliable jumper buddies said he had heard that the fire had burned some equipment, but he didn't recall jumping it. Feeling a good story slipping away, I double-checked that operations summary — and sure enough, Mr. Reliable was on the jump list, the afternoon in mention. He had sailed over the landing zone!

All 14 jumpers had bailed, but my contact steadfastly remembered nothing. Bottom line, the blaze was held to approximately 600 acres. The rappellers returned uninjured — and with all their gear. On the airborne side, one jumper was sent to the hospital with a back injury. Ten custom-made jump suits and 12 parachutes had melted into a nylon booger. Oh, the synthetic stench!

Maybe forgetting is nature's way of dealing with such trauma, and having to call the deplorables for help? For a proud smokejumper, it might have been his worst day in hell — only cooler.



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