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TABLE OF CONTENTS 😥 AUGUST/SEPTEMBER 2017



WHO'S IN CONTROL? Canadian industry stakeholders Reflect on the impact of Airspace privatization. By Jen Boyer

666 THE ROBOT CO-PILOT SIKORSKY'S PLAN TO USE AUTONOMY TO MAKE HUMAN-PILOTED HELICOPTERS SAFER. BY ELAN HEAD



HELP FROM ABOVE HOW THE ROTARY-WING WORLD IS HELPING FIGHT AFRICA'S RHINO POACHING PROBLEM. BY BEN FORREST



COTTAGE COUNTRY SUPPORT HELI MUSKOKA HAS DEVELOPED SOME INTERESTING OPERATIONS AS IT ADAPTS TO ITS UNIQUE ENVIRONMENT. BY OLIVER JOHNSON



FLYING THE FLAG HOW PHILJETS IS AIMING TO IMPROVE MORE THAN JUST AVIATION ACCESS ACROSS THE PHILIPPINES. BY OLIVER JOHNSON



NEXT-GEN SIMS WHAT CAN WE EXPECT FROM THE NEXT GENERATION OF SIMULATORS? BY HOWARD SLUTSKEN



52 Th

THE MOVIEHAWK HELINET BEGINS A NEW CHAPTER OF FILM-MAKING WITH SIKORSKY UH-60A 'MOVIEHAWK'. BY OLIVER JOHNSON

114

VERTICAL'S GLOBAL SIM DIRECTORY

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INNOVATION THROUGH COLLABORATION

BEHIND THE SCENES AT CARGO BASKET AND BIKE RACK MANUFACTURER AERO DESIGN. **BY BEN FORREST**

130

GROWING PAINS

HOW CHANGES IN THE WEATHER AFFECT THOSE WORKING IN AGRICULTURAL OPERATIONS. BY ED BROTAK



In Every Issue

- **10** Focus On Safety
- 12 Focus On Training
- **14** Focus On Maintenance
- 16 Field Ops Photos
- **20** RotorBeat
- 144 Vertical Rewind
- 151 Marketplace
- 168 There I Was...

WHAT'S ONLINE? 🔁 AUGUST/SEPTEMBER 2017



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Two of Helinet Aviation's newest aircraft take flight together over the mountains near the operator's base in Van Nuys, California. Helinet took delivery of both the Sikorsky UH-60A Black Hawk (dubbed the "Movie Hawk") and the Airbus Helicopters AS350 B2 in July 2017.

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OPEN LETTER TO THE HELICOPTER INDUSTRY

We at Coptersafety are passionately developing helicopter simulator training. By opening a brand-new training centre next to Helsinki Airport and with five full flight simulators entering our fleet, we will be one of the biggest helicopter simulator training providers in the world. But that's not enough.

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Looking forward to hearing from you!

Mikko Dahlman H145 Pilot Founder & CEO of Coptersafety PS. Meet us at Helitech! Booth #L81.







We work in an interesting industry, in which we utilize precision-built aircraft and execute operations with proven procedures and processes. All very fit and proper. But more often than not, we do this stuff in a completely uncontrolled and unsupported environment. Sort of a city-mouse-meetscountry-mouse type environment.

To bridge the gap and ensure mouse compatibility, we can use checklists. While written checklists are essential for sophisticated aircraft, we sometimes commit to memory the checklists for aircraft from a simpler time. But checklists can prove useful for operations as well.

For some years, I have had the privilege of conducting peregrine falcon surveys on Labrador's coast. It is demanding but rewarding flying, and at the risk of sounding immodest, our team's efforts played a role in downlisting the species' status from endangered to threatened. In small measure, it is an environmental success story.

And as a story, it started to gather public interest. In due course, our team leader, a provincial government biologist, was contacted by the producers of CBC's *Land & Sea* about the possibility of doing a show on the peregrine surveys in Labrador. Public awareness of efforts on the peregrine's behalf would be most welcome, so it did not take long to come to terms on doing a show. Their team would accompany our team on a survey. A great chance for us to strut our stuff!

Plans were made, meetings conducted ... and not a checklist between them. Indeed, as seasoned professionals, none were required. The big day finally arrived, and team plus team stuffed their gear into an AStar and off we went. It started as a great trip. The weather cooperated, the birds appeared on cue, and the *Land & Sea* crew were getting some great footage.

At the end of day one, we decided to cease operations on an island off the north coast of Labrador, and we set up camp. No hotels for this veteran crew. The CBC team advised us that despite all the variations on their show's themes, one constant that delighted *Land & Sea's* viewers was meal preparation time. It did not matter if you were chasing polar bears or fishing for caplin, the one thing that viewers liked the most was watching people eat! Go figure.

Having been duly advised, the biologist and I took steps to ensure that this segment of the shoot would not disappoint. Fresh Arctic char was on the menu, to be cooked over an open fire by yours truly. This effort represented a significant sacrifice on my part, as my wife of some years was about to find out in very public fashion that I could indeed cook and did not require to be served at every meal. I took a hit for the team.

Utensilgate became the central theme of the show, and as we all sat around eating with our fingers, the pilot became the victim of choice — in very public fashion. It makes one rather self-conscious when being filmed by a professional crew while you are trying to cook food. However, I made every effort to extend the "I know what I am doing" deportment of a pilot to the less certain arena of food preparation. All was going perfectly: the char was prepared with lemon, butter and white wine; rolled in protective tin foil; and baked to perfection on the hot embers. The cameraman got a shot of steam in backlight as we unwrapped the foil. Visual art meets culinary art. You could smell this meal on TV!

Then it came time to serve. While all this was being filmed, and as the whole show reached its mouthwatering peak, you could hear one person rummaging through the equipment box muttering, "I could have sworn it was here!" He was referring to eating utensils. For five hungry people, we were reduced to one plate, one fork, a spoon and a cup. You would think they would edit out such a minor occurrence. But no! Utensilgate became the central theme of the show, and as we all sat around eating with our fingers, the pilot became the victim of choice - in very public fashion. It was announced with great flourish and emphasis that I had left the box with the utensils back in Goose.

They say such events build character, but I do not recommend public humiliation as a character-building tool. There are a couple of lessons here. One key lesson is that had we had a loose checklist to refer to before we left the ramp, my public flogging could have been avoided. The other lesson is more germane to safety investigations. We found out upon our return to Goose that the utensils had been left in St. John's by Air Canada! I had absolutely nothing to do with causing our collective sacrifice. The lesson: always let an investigation run its course before drawing conclusions. Eat well and have a safe summer!



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FOCUS ON TRAINING | ANDY ROE

Although the term sounds innocuous, mast bumping can be a serious hazard to helicopter flight. Two-bladed helicopters, such as the early light and medium Bells and the three Robinson models, are most susceptible to it. The condition occurs when the rotor blades exceed their normal flapping travel up and down and begin to contact the rotor mast.

But what causes such a condition? A forceful low-g pushover of the nose will send the helicopter into a weightless state, within which the rotors lose all lift and thrust and are no longer able to control the orientation of the fuselage below. The airframe will respond to the now excessive anti-torque thrust of the tail rotor and begin to roll to the right and yaw left under its influence. The correct recovery is to ease aft on the cyclic to restore lift and thrust in the rotor system, and then correct for the yaw and roll and resume normal flight.

If the pilot does not understand what is happening to the helicopter in the weightless condition, the instinctive reaction to the right airframe roll is to apply left cyclic, probably until maximum travel is reached. Because the rotors have no lift or thrust authority to control the airframe, the right roll will continue. However, the rotor disc will respond to the pilot's cyclic input and begin rotating to the left until full left cyclic is achieved. The airframe, which is still continuing to roll right, will then force the blade grip rotor stops to contact the mast and begin chipping away at it, in the same way a beaver cuts down a tree. The pilot is surely in a complete state of panic as the rotor stops continue cutting into the mast until it separates in two and the airframe falls to the surface on its own.

An unanticipated catastrophic failure

of a helicopter component in flight is an unthinkable event over which the pilot has no emergency control. Good maintenance practices and the use of factory approved parts and components, coupled with good common sense flying practices, help to keep the helicopter safe in the air at all times. However, an avoidable pilot-induced catastrophic event such as mast bumping and eventual mast separation is a preventable tragedy that need not occur.

Imagine a mountain climber hanging by a rope fastened to a steel piton hammered into a crack in the rock face above. All is fine, but what if a bird arrived and started pecking at the rope above the climber? The integrity of the rope would become compromised, and if the pecking continued, the rope could fail and send the climber to the depths below. Mast bumping, if left unchecked, could compromise the integrity of the rotor mast in the same way — and also send the pilot and passengers plunging.

A low-g pushover better describes the cause of the hazard, whereas mast bumping focuses on the result. A low-g pushover into a weightless condition and the resulting airframe roll has a recovery procedure to re-energize the rotor system before mast bumping occurs — as long as the pilot is aware of what is happening and knows what to do. A pilot thoroughly trained on the topic of low-g pushovers and dangerous mast bumping would probably not allow the low-g condition to occur in the first place.

Mast bumping is caused by erratic pilotinduced cyclic movement along the pitch axis, and is exacerbated by a sudden lowering of the collective (intentionally or not) at the same time. Other causes during normal flight operations are sudden turbulence, strong updrafts, downdrafts or wind gusts, and attempts to land on an excessively inclined slope. But why, as with the first situation, would a pilot force the cyclic forward so abruptly?

All pilot control inputs in flight should be smooth and carefully controlled — not erratic or abrupt. Two situations that could lead to erratic control are careless display flying and fear or panic. A pilot who feels the need to show off in the air by scaring everyone on board is bound to get into trouble at some point. A helicopter is never forgiving. Pushing forward to give everyone a sense of weightlessness is a thrill I suppose, but really just a fool's errand.

Some airplanes, such as the venerable Pitts Special, are designed and certified for aerobatic flight. The aerobatic pilot skillfully subjects the airframe to positive and negative g-forces during maneuvers. There are, however, no specificallydesigned aerobatic helicopters as far as I know. Throughout my commercial career, I have always found that just getting the required work done smoothly and safely each day is enough satisfaction, never mind the temptation to clown around in the air. Any helicopter's rotor system is an intricate and complex rotating apparatus that does not respond well to sudden control inputs. Erratic control movement is not good airmanship, nor is it good flying.

The thought of a rotor system and airframe parting company in flight is shocking, but it has happened. Every pilot should know what mast bumping is, how it can occur, and what to do about it before it becomes a tragic event. Low-g pushover training must be taken seriously.

3

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Age and experience are pretty much synonymous when it comes to gauging one's career. The early days of pushing pencils in trade school and cramming for exams that tested more memory than knowledge brought about more frustration than it did insight. I recall wondering aloud with my peers why we needed to learn and understand what at that time seemed like useless knowledge. Logic gates? Ohm's law? It all seemed overwhelming and mind numbing. The part I missed amid all the theory and lesson plans was that I was being given the building blocks for a foundation of learning that would span years and arguably decades; a foundation that I would come to pull from and eventually deem very purposeful.

A couple of years ago, my company went beyond our regular general aviation and helicopter projects, and spanned into specialized systems. We became involved with a jetliner program that involved fitting holding tanks for a chemical dispersant, as well as fitting all the related system controls to operate the filling and discharging of the tanks. As the system was truly one of a kind and an unproven technology, we had vetted many a problem and/or issue to get the system functional and operational. One of our more pressing issues involved the filling and discharging of the onboard tanks and having to do so sequentially so that the center of gravity (C of G) envelope was maintained. We used logic circuits to



achieve this, incorporating them in tank fluid level switches. Logic circuits are essentially electronic devices into which two or more inputs are fed to control an overall output. For example, a series of leak detect switches may be tied to one logic device. When any one switch is tripped, it can result in a logic output (i.e. a ground/ negative signal), which is then used to drive another portion of the circuit. Equally, a series of inputs may all have to be at the same potential or state before an output is achieved.

At any point in time, the system has a built-in safeguard that detects a leak or malfunction and promptly sends a logic command to close all tank valves; this, of course, was not happening as planned. As we combed over the system's design, it became evident that the logic circuit reset input was seeing a voltage drop across an inline isolation diode (think electronic oneway valve), which was used to prevent the back feeding of a signal to another part of the circuit. In other words, by design, we were not allowing the system to reset each of its tank valves. We quickly surmised that we needed to provide a dedicated logic signal through an independent relay that would be controlled by the existing isolated diode line. Given there are over a dozen tank valves, the theory needed to be proven first.

Over the course of the next couple of days, we built a test circuit employing all

On paper, the plan was foolproof — how could it possibly have failed? I silently wondered if I should have paid more attention during my digital theory training.

the parts and pieces we deemed necessary to achieve the desired result. Upon arrival the one morning, I was met with faces (including that of the FAA Design Approval Representative) that screamed of a late night and utter defeat. Something was amiss. I was briefed that the circuit design had failed. The intended idea of providing an un-isolated reset function to each valve had not worked. My brain didn't compute what my eyes and ears were telling it. On paper, the plan was foolproof how could it possibly have failed? I silently wondered if I should have paid more attention during my digital theory training.

As I combed over the mess of wires and interconnected parts laying on a makeshift desk, I asked aloud if the circuit was continuity checked to ensure all connections were sound and as they should be. Their technician indicated that yes, they had been. As I probed the circuit with my meter, I too agreed that all was in order technically. But the behavior of the circuit was illustrating that something was still very wrong and pointed to an open circuit or, in our case, a pushed or unseated contact on one of the relay modules. Normally, when probed with a meter, continuity is achieved. However, the only means to truly confirm and arguably detect this fault is to physically and visually confirm it by inspecting the various connection and termination points. Ultimately, the resolution was a simple one

— and the system performed as intended. We are often inundated with information and education that filters through us or sits idle until we need to call upon it. Much like riding a bike, some skills and knowledge are never truly lost. Sometimes it takes certain contexts and circumstances to build that mental bridge between memory, awareness and understanding, which ultimately lays another brick in our foundation of experience.



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FIELD OPS PHOTOS FOP PHOTOS FROM THE FIELD

Pilot **Mark Watson** captured this phenomenal shot of a Helicopter Transport Services Skycrane in the dip while flying on the Whitewater Fire in Oregon. Mark was overhead in a Croman Sikorsky S-61 along with pilot Mike Redman.



A scene from the Hanceville Fire west of Williams Lake, British Columbia. Discovered on July 8, the Hanceville Fire combined with the Riske Creek Fire to scorch an estimated 134,000 hectares (330,000 acres) by the end of July. **Colin Pelton Photo**



An initial attack helicopter crew on the Detwiler Fire near Yosemite, California. Started on July 16, the fire consumed more than 80,000 acres (33,000 hectares) and destroyed more than 60 homes. **James MacTaggart Photo**









Scenes from the Spokin Lake Fire in British Columbia. Darren Keast Photos

An L.A. County Fire Department Firehawk makes a water drop on the Rodeo Fire near La Verne, California, on July 23. **Trent Bell Photo**

A Bell 205 rests at the Mariposa-Yosemite Airport in California in between cycles of bucket work. **Chris Creamer Photo**









A Helicopter Transport Services CH-54B after putting in a good day's work. Dan Sebern Photo

Bell resumes 525 flight test program

BY OLIVER JOHNSON

INDUSTRY // OPERATOR // OEM // UAS // INTERNATIONAL

ell has resumed flight test activity on the 525 Relentless program after the Federal Aviation Administration (FAA) renewed the program's experimental certificate.

The 18-seat super medium aircraft returned to the air July 7 — one year and one day after the fatal crash of the first flight test vehicle (FTV1) had grounded the program. The National Transportation Safety Board (NTSB) investigation into the crash on July 6, 2016, is ongoing, but FTV1 is believed to have been performing tests at or near Vne (never exceed speed) when the aircraft broke up in flight near Italy, Texas, about 35 nautical miles (65 kilometers) southeast of Bell's Xworx facility in Arlington, Texas. The resulting crash killed test pilots Erik Boyce and Jason Grogan.

"Bell Helicopter has worked with the NTSB and FAA since the accident and we are confident in the resumption of flight test activity," said Mitch Snyder, president and CEO of Bell Helicopter, in a statement marking the aircraft's return to the air. He said the flight tests were "a key element" of the 525 program.

"The team is focused on certification in 2018 and we are committed to bringing this innovative and high-performing helicopter to market," he said.

Before the accident, Bell had been targeting the end of 2017 for certification of the 525, which has a 20,000-pound

> Bell has resumed flight testing of the 525 Relentless, with the second prototype returning to the skies on July 7. Bell Helicopter Photo

(9,070-kilogram) gross weight, and a typical cruise speed of 155 knots for distances of over 500 nautical miles (926 kilometers). When certified, it will also be the first commercial fly-by-wire civil part 29 helicopter.

Earlier this year, Larry Thimmesch, vice president of the Bell 525 Relentless program, told press during a media tour of the facility that the second and third flight test vehicles were undergoing a variety of modifications while the program was grounded. He said the majority of those were production maturity changes typical of an aircraft development program, but that some were "corrective actions" related to the accident.

"The NTSB and Bell Helicopter have focused the investigation on a sequence of events for which corrective actions are being implemented," he said. "Obviously, we need to wait until the NTSB comes out with a summary of the findings to talk about what goes on; what we're doing as a corrective action process."

Thimmesch said Bell had been "integrally involved" with helping the NTSB with its investigation, and had taken the opportunity to forensically examine its own processes.

"It's a perfect opportunity for us to look at process improvement, just to validate everything that we're doing so that when we go back to the air, we're completely certain that we'll provide a safer, more reliable aircraft as a result of that," he said.

Some of the aircraft modifications were also to enable FTV2 and FTV3 to complete

FTV1's remaining flight test program, said Thimmesch.

While the program was grounded, testing continued in the manufacturer's Relentless Advanced Systems Integration Lab (RASIL) at the Xworx facility. The RASIL contains three integration labs — for the Garmin G5000H avionics, the fly-by-wire flight controls, and for the electrical system.

Aircraft four and five — the last two in the 525's certification program — are being built in full production configuration, and will be used to certify the majority of the aircraft's kits, including oil-and-gas and search-and-rescue mission equipment kits.

Bell has also been working on the technical support program for the 525, with maintenance manuals and flight manuals in development, and 10 of the 13 maintenance training group meetings required for certification slated for completion by the end of this year.

A Bell 525 Level D full-flight simulator is also being installed at the Bell Training Academy.

The 525 Relentless first took to the air on July 1, 2015, at Bell's aircraft assembly center in Amarillo, Texas. At the time, the manufacturer said it anticipated logging around 1,500 flight test hours across the five prototype aircraft. Before the resumption of flight test activity on July 7, the program had recorded around 200 flight test hours. Bell is believed to hold about 80 letters of intent for the aircraft.

When certified, the 525 will become the first commercial fly-by-wire helicopter. Bell Helicopter Photo



BITS CANADA RELEASES DRAFT UAS REGULATIONS

The Canadian government has released draft regulations for unmanned aircraft systems (UAS) operations for public comment in Canada Gazette Part One — a concrete step towards establishing a regulatory environment for UAS operations within visual line-of-sight (VLOS).

Over the past decade, some 10,000 special operating certificates have been issued by Transport Canada for commercial UAS operations under regulatory guidelines, with a rapid increase in approvals over the past four years.

This year, the Canadian UAS industry is expected to generate revenues approaching \$1 billion.

"The announcement lays the groundwork for continuing to open up Canada's industry through our regulatory process," said a representative from Unmanned Systems Canada. "We encourage industry and other stakeholders to review the proposed regulations and submit comments, either individually or to Unmanned Systems Canada as part of a collective response."

H145 CERTIFIED IN CANADA

Airbus has announced certification of the H145 by Transport Canada. "We are pleased to enhance our customers' aircraft portfolios, through the availability of the recently Canadian-certified H145," said Romain Trapp, president, Airbus Helicopters Canada. "The H145 represents a major evolution in terms of flight performance, mission capability and flight safety for our operators."

Main missions for the H145 include law enforcement, emergency medical services (EMS), offshore oil-and-gas transport, business and commercial aviation as well as utility aerial work.

A wide range of rapidly interchangeable optional equipment, such as emergency floats, rescue hoist, searchlight and cargo hook is available for the H145. An alternate gross weight of 3,800 kilograms is also available as a selectable option and allows H145 operators to take off with up to 100 kilograms more useful load.

ROTORBEAT (RB) INDUSTRY NEWS

Airbus takes fresh look at manufacturing



BY THIERRY DUBOIS

irbus Helicopters' new rotor blade factory in Paris Le Bourget is not a futuristic facility crammed with automated assembly lines, machining robots and autonomous carts. Or at least, not yet. For now, it gives the company the right infrastructure to adapt production processes

to the ongoing downturn. But it is also ready for future manufacturing needs more complex blade shapes, propellers for multi-rotor vehicles and, yes, a dose of automation. Within the bigger picture, the new manufacturing site is part of a reorganization of Airbus Helicopters' entire production system.

In 2010, the manufacturer, then known as Eurocopter, began talking about moving blade production from an old site in La Courneuve, North of Paris, to a neighboring area — a former naval air base next to Le Bourget airport. The history of the facility in La Courneuve can be traced back to 1917, when Adolphe Bernard founded a company to manufacture Spad fighter aircraft used in World War I. When Airbus decided to move, the site had become a "patchwork of buildings," head of plant Sebastien Ricci told *Vertical* during a recent visit. It was incompatible with today's requirements in terms of production flow optimization and was rather "a spaghetti flow," said Ricci. There was no room for expansion.

The move to the new site took six months and the factory has been fully operational since April. Some 500 rotor blade experts, from research engineers to repair technicians, work within the same surface area as in La Courneuve — 40,000 square meters (one acre) — but it is spread over fewer buildings, making circulation of materials, components and products more straightforward. The site's overall surface of 18 hectares (44 acres) also leaves space for expansion.

"We moved 400 industrial assets — ovens, autoclaves, machines, molds etc." said Laurent Prat, head of industrial site. The rotorcraft manufacturer had created buffer inventories before the move, so deliveries were not interrupted during the six-month production hiatus.

Workers have been encouraged to reflect on the way they work and innovate. They can customize their workstation and design their own trolley. Such empowerment has an effect on safety and quality, according to Prat. It is also in line with younger workers' worklife desires. "The new generation has different expectations, they want autonomy and quality of life; we have to give them freedom," said Prat.

As at every Airbus Helicopters facility, the blade factory has had to cope with the overall industry downturn. The production rate — including repairs — stands at an annual 3,500 blades, whereas the facility is sized for 5,000. The proportion of repairs — 40 percent — is unusually high. "We want to be adaptable and build resilience into our workshops," said Prat. This can be done by making workers more versatile, he added.

Over the next few years, Airbus Helicopters will arrive at a crossroads in terms of blade technology. Will automation be introduced at the Le Bourget factory? Will new projects, like the X6 (a Super Puma replacement) and the Racer compound demonstrator, adopt Blue Edge blades, like the H160? Will the company make or buy the propellers for the wouldbe new generation of vertical-takeoff vehicles, like CityAirbus?

On the first question, Prat said he believes that blade manufacturing is largely a manual job. It will stay so, he said, for the placement of a foam or honeycomb core. Nevertheless, Airbus is experimenting with robots for better quality and reduced cost. In lieu of the hand lay-up of pre-impregnated carbon fiber (around a glass-fiber sandwich spar), automated fiber placement or filament winding are being considered. Automation is mulled, too, for sanding and painting.

Vertical understands the first blade to benefit from the factory's first steps in automation may be the X6 main rotor blade. Such automation may then be retrofitted to H160 blades.

Coming in September is a "manufacturing execution system" for improved sharing of information. Tablets will help workers with digital instructions (including video) and more direct communications with the support desk. Displays on the production floor will give a synthetic view of work progress. "I will be able to spend more time in my office, which I need, while keeping posted on what is going on on the manufacturing lines," Ricci said.

Blue Edge swept blades, with their distinctive shape, have demonstrated better efficiency and lower noise on the in-development H160 medium twin. Although early artist renderings suggest the X6 will have similar main rotor blades, Prat said there is "no one-size-fits-all solution" and design engineers are looking at different solutions. As for the Racer, a dedicated mold would be expensive and it could thus reuse blades from another helicopter.

Meanwhile, future autonomous flying vehi-

cles, like CityAirbus, may use vertical lift from horizontal rotors, but these are closer to straightforward propellers than a complex arrangement of variable-pitch blades and equally sophisticated hub. Therefore, Airbus may choose to buy the rotors from a supplier.

In any case, Airbus Helicopters has already made decisions on a new production organization at the company level. Each site will be specialized. While Marignane, France, will be responsible for dynamic components (including gearboxes), Donauwörth, Germany, will be in charge of airframes, and Le Bourget will focus on blades. "We concentrate assets and skills," Prat said. Each site makes its own "make or buy" decisions. The specialization will happen gradually, however. For instance, the current blade manufacturing activity in Donauwörth will not be moved to Le Bourget, but all future models will have blades "made in Le Bourget."

The specialization will not be the only activity. Almost every site will be responsible for a main component assembly — a section of the helicopter, fully equipped with its hydraulic lines, fuel system and electric harness. The front fuselage will be made in Marignane, the central fuselage in Donauwörth, and the rear fuselage in Albacete, Spain.

Final assembly lines will remain in Marignane and Donauwörth. The latter site puts together the H135 and the H145 light twins, while the rest of the civil product range is assembled in Marignane.



BELL 407, 429 & 412EPI EXPAND PERFORMANCE APPROVALS

BITS



Three popular Bell types have received certification for expanded performance specifications from various regulatory authorities.

Among the approvals is Federal Aviation Administration (FAA) and Transport Canada certification of the light twin Bell 429 at an external gross weight of 8,000 pounds (3,629 kilograms) — an increase of 500 lb. (226 kg) from the previouslycertified figure of 7,500 lb. (3402 kg). Bell said it expects the European Aviation Safety Agency (EASA) to validate the certification approved by the TCCA, but did not provide a timeframe for the validation.

The FAA approval does not, however, affect the regulator's long-standing position against Bell's request to increase the 429's maximum gross weight in the United States from 7,000 to 7,500 pounds. The newly-announced expansion only impacts the external gross weight.

Transport Canada approved the maximum gross weight increase for the Bell 429 in January 2012, and this was followed by approvals from regulatory agencies around the world. The FAA, however, ruled that granting the increase — which required an exemption from section 27.1 (a) of the Code of Federal Regulations — would give the Bell 429 a competitive advantage.

Bell also announced that the Bell 412EPI has received FAA certification at an increased internal and external gross weight up to 12,200 lb. (5534 kg) — up from 11,900 lb. (5,398 kg).

Finally, Transport Canada has certified a weight increase for the Bell 407 cargo hook, from 2,646 lb. (1,200 kg) to 3,100 lb. (1,406 kg).

Kaman begins deliveries of new K-MAXs



The first of the "new" production K-MAXs at its delivery ceremony on July 13 at the Kaman factory in Bloomfield, Connecticut. **Kaman Photo**

BY OLIVER JOHNSON

K

aman has delivered the first new production K-MAX to Chinese operator Lectern Aviation Supplies Co.

That aircraft, delivered in mid-July, represented the type's entry into the Chinese market, and was soon followed by another, with Lectern receiving the second new production K-MAX a few days later. The third is slated for Rotex Helicopter AG of Lichtenstein, which already operates two K-MAXs.

Development of the heavy-lift single-seat utility aircraft, with its distinctive slender design and intermeshing counter-rotating main rotor blades, was led by Kaman founder and former CEO Charles Kaman, and it received type certification from the Federal Aviation Administration (FAA) in 1994.

The manufacturer delivered 35 aircraft during its first production run, which ceased in 2003. But following renewed industry interest — and the hugely successful deployment of two unmanned K-MAX aircraft, developed with Lockheed Martin, in support of the U.S. Marine Corps in Afghanistan — Kaman announced it was restarting production of the aircraft.

That announcement, in 2015, was for an initial production run of 10 aircraft over 2017

and 2018, but it was subsequently extended to at least 2019 for an undisclosed number of aircraft.

"All of the interest in the K-MAX — meaning the serious interest — gave us enough confidence to extend the production," Terry Fogarty, senior director of business development at K-MAX helicopter programs, told *Vertical*.

While Kaman has accepted deposits on more than the initial run of 10 aircraft, the company would not disclose how many beyond that run it intends to build.

"We have some internal goals that we need to meet to continue to add aircraft, but for all intents and purposes, we want to keep this line open for a very long time," said Fogarty.

However, not all the initial run aircraft are spoken for, with a delivery slot available in 2017 and "some" slots available in 2018. "But we are very confident that those will be filled very quickly," said Fogarty.

Production of the K-MAX is spread across several facilities, with Kaman's Jacksonville, Florida, plant creating the airframe, and its facilities in Bloomfield, Connecticut, producing components and serving as the final assembly line.

Going forward, the manufacturer expects to produce one new K-MAX every eight weeks. Fogarty admitted that the initial rate of production was "fairly pedestrian," but said the pace made sense for both Kaman and the market. He expects the process to speed up for future aircraft.

"The first aircraft was very heavily involved with the FAA," said Fogarty. "What that means is we get to a certain point and then we wait for them to inspect, and they check our paperwork and check our quality systems, and I would suggest by the time we get to about aircraft five, we really get into a rhythm."

Ultimately, he said it was about building the aircraft as efficiently as possible to make it as cost-efficient as possible, whether that takes six months or 12 months for each aircraft.

As of today, 22 of the "original" K-MAXs are believed to still be in operation, proving particularly successful in logging and firefighting work. Fogarty said the aircraft, which can lift up to 6,000 pounds (2,700 kilograms), was also seeing a surge in the amount of power line work it was completing, particularly in developing countries.

In terms of geographical spread, Fogarty said the arrival of the aircraft in China was the opening of a potentially huge market. Certification by the Chinese regulator is expected imminently. Beyond that, he said the manufacturer has seen interest from Indonesia, Europe, and across South America.

Concurrent to the production of the new aircraft, testing is continuing at Lockheed Martin on a civilian unmanned version of the K-MAX.

"The unmanned is not going away. It's coming, and it's going to come into the commercial market," said Fogarty. "Working with our partners, we continue to have discussions on how best to go forward, because the existing customers and the future customers all have some kind of interest in the unmanned K-MAX."

The most obvious applications for the unmanned version appear to be in firefighting and humanitarian missions.

"I think that firefighting is a great thing to do, because you can fly at night and not allow a fire to rekindle," said Fogarty. "Humanitarian is taking supplies in maybe some dangerous parts of the world and getting them flown instead of put on roads to get them to people who need them. There are lots of places that need that kind of help."

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ROTORBEAT RB INDUSTRY NEWS

Airbus unveils new compound demonstrator



Known as the Racer (an acronym for Rapid And Cost-Efficient Rotorcraft), the demonstrator clearly takes inspiration from Airbus's earlier X³ compound aircraft, but is essentially a cleansheet design. **Airbus Photo**

BY THIERRY DUBOIS

irbus Helicopters has unveiled a downscaled mockup of a new compound helicopter demonstrator as part of the Clean Sky 2 public-private research program, which is slated to fly in 2020.

Known as the Racer (an acronym for Rapid And Cost-Efficient Rotorcraft), the demonstrator was unveiled at the Paris Air Show on June 20. While it clearly takes inspiration from Airbus's earlier X³ compound aircraft, the Racer is essentially a cleansheet design. When Airbus built the X³ in 2010, it reused a lot of existing components and subassemblies, such as a Dauphin fuselage. This time, most components are optimized for use in the Racer.

Airbus is targeting a slightly slower cruise speed than the X³'s 220 knots optimum. At 190 knots, it is estimated the Racer will need less power than a conventional, similar-weight helicopter flying at 140 knots.

This is achieved through the use of wings, which provide part of the lift, helping to alleviate the main rotor's load. As the rotation speed is reduced, blade tip speed is no longer a problem, and the main rotor needs less power. Moreover, the mast sustains less bending strain. This is thanks to the side-mounted propellers — so the rotor no longer has to be pitched forward for the aircraft to gather speed. So, from both an aerodynamic and a mechanical standpoint, it is easier for such a design to fly at high speeds.

The X³ was flight-tested from 2010 to 2014. Lutz Bertling, then-CEO of what was then known as Eurocopter, was enthusiastic about the program, but his successor, Guillaume Faury, has had a more conservative approach about research and development spending. The X³ demonstration program was never used as a basis for a product. Nonetheless, it seems Clean Sky 2 has renewed interest for the idea.

The Racer will feature an optimized architecture, Tomasz Krysinski, head of research and innovation at Airbus Helicopters, told *Vertical*. The box wing brings a number of benefits. The upper wing has a masking effect over the lower wing and the downwash, therefore "sees" a smaller surface. For an equivalent hover performance, the main rotor may produce less thrust.

The main landing gear can be installed in the lower wing, and wheels can thus be located further apart. This gives more stability and makes retraction and extension mechanisms simple.

The box wing is also stiffer than a conventional one, so the transmission shafts therefore deform less. In turn, they can be made lighter. Both steel and carbon-fiber shafts will be evaluated, according to Krysinski.

The Racer's propellers, in a pusher configuration, are far from passenger doors. Moreover, downstream from the wing, the airflow is more favorable to a propeller's aerodynamics, and cuts its power need by 10 percent, Krysinski said.

A pair of Safran Helicopter Engines RTM322 turboshafts, in service on military helicopters like the NH90, will drive the rotor and propellers. A noteworthy feature will be a small but spectacular level of hybridization; in cruise flight, it is more efficient to use one engine at high power than two at medium power, so thanks to an innovative "stop and start" electric system, one turboshaft will be shut down or idled in cruise flight. The system will be able to restart the engine very quickly, if needed.

Final assembly of the Racer is planned for 2019, with flight trials scheduled for the 2020 to 2022 period, which could be extended. The goal of the demonstration is to bring the compound concept to technology readiness level six, meaning it will be ready for a full program launch.

Airbus Helicopters has a number of European partners, as is required in such a project. Aernnova, a Spanish specialist of composite materials, will supply the aft fuselage, while Avio, an Italian company that is part of U.S.-based GE, will collaborate on the gearboxes' design.

The total cost of the program is €200 million (\$220 million). Large companies — like Airbus Helicopters — see a maximum 40 percent of their share of the cost funded by the Clean Sky 2 program. Smaller partners receive up to 60 percent funding.

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ROTORBEAT RB INDUSTRY NEWS

Workhorse unveils SureFly personal VTOL

BY OLIVER JOHNSON

new entrant in the personal vertical takeoff and landing (VTOL) market was officially unveiled at the Paris Air Show, in the form of

the quadcopter-style Workhorse SureFly.

The SureFly features a two-seat cabin that more closely resembles an automobile chassis than a helicopter airframe, with lift provided by eight single-blade propellers — one above and one below each of four foldable arms that reach out in an "X" from above the center of the cabin. Underneath the cabin are two simple skids.

To enable ease of operation, the aircraft's controls are minimal, with buttons for up/ down altitude adjustment, and a joystick for forward, sideways and yaw. An on-board computer will automatically adjust throttle to maintain altitude as the aircraft is maneuvered, with speed of travel controlled by how far the joystick is pushed.

The SureFly is designed to fly up to 70 miles (112 kilometers) at a speed of approximately 70 miles per hour, with an anticipated empty weight of 1,100 pounds (500 kilograms) and a maximum takeoff weight of 1,500 pounds (680 kilograms).

The aircraft is being developed by Workhorse, a company that has been manufacturing electric pickup trucks for the last 10 years, and recently began designing and building carbon fiber delivery drones. The SureFly utilizes the company's electric propulsion and carbon fiber expertise from these products lines, with extensive use of carbon fiber in its construction and a fully redundant backup lithium battery system.

"We realized we could basically make a big drone, if you will," Workhorse co-founder and CEO Steve Burns told *Vertical.* "The battery packs are light, most of our trucks have range extenders, which are gasoline engines that extend the range for when the battery is exhausted, and carbon fiber is in everything we do — so we kind of had the chops to do it."

Burns said SureFly has been in development for about three years, with safety being the key driver in design choices.

"Every decision really comes across to first, safety — what's the safest thing we can make; and secondly, hitting the price point," he said.

Workhorse describes the SureFly as a hybrid aircraft, with a gasoline engine driving dual generators that provide power to the eight propeller motors. But, with safety top of mind, the aircraft has two backup batteries (each powering four motors) that guarantee five minutes' flight for an emergency landing should the main power source fail.

According to Burns, the aircraft will be able to maintain flight on just four propellers, and, if all else fails, the SureFly has a ballistic parachute.

The SureFly personal VTOL, unveiled at the Paris Air Show, is designed to fly up to 70 miles at a speed of 70 miles per hour. Its lift is provided by eight single-blade propellers. **Workhorse Photo**



The aircraft's design — with no transitional parts — was dictated by the need to keep everything about the aircraft as simple as possible, said Burns.

"I think Nirvana for everyone is [an aircraft that] goes up as a helicopter, transitions to a plane, and then goes back to a helicopter to land," he said. "But that transitional part is hard — it makes it harder to certify, harder to build, and harder to fly, so that's why [the SureFly] is fixed. It doesn't make for the most efficient machine while you're flying, but that's how we want to get to market — with a good, safe, economic machine."

Burns said the aircraft would be as simple to operate as a radio control unit for a drone, and said Workhorse is working closely with the Federal Aviation Administration (FAA) to establish both the Surefly's certification program and the credentials required to fly it.

"We're hoping it can be a light-sport aircraft type of license," he said. "We want to keep it minimal, and we believe it's easy enough to fly to do that."

In terms of the aircraft's development, Workhorse is currently testing different components, and is targeting first flight before the end of 2017, with certification by the end of 2019.

The company aims to bring the SureFly to market at a price of just \$200,000 — a level Burns said may create a whole new market for VTOL transport.

"When we realized the price point we were going to be able to make this at, with much lower maintenance [costs], much easier to fly and much safer, we thought we might be able to create a new class here," he said.

With that in mind, Burns believes the potential uses for such an aircraft are endless — far beyond the urban commuter typically envisioned by personal VTOL programs, with precision agriculture, military, and emergency responders listed as target customers.

Further down the line, Workhorse is already considering variations on the model, including a larger version and an autonomous model. "But to get it certified, it's got to be piloted," said Burns. "So, we want to get this one certified first, get our feet underneath us, and then determine what the next one might be."

U.K. & Norway CAAs lift H225 grounding

BY THIERRY DUBOIS

he latest improvements Airbus Helicopters has added to the H225 (EC225 LP) and AS332 L2 seem to have convinced

the civil aviation authorities (CAA) in the U.K. and Norway, with both announcing their intention in early July to reauthorize operations with the two Super Puma types. Operators will have to present a safety case proving they performed the required modifications and their technicians are trained and equipped for the new maintenance procedures.

"We would not have made this decision unless we were convinced that the changes to the helicopters and their maintenance restore the required airworthiness standards," John McColl, head of airworthiness at the U.K. CAA, said.

In October, the European Aviation Safety Agency had lifted the grounding that followed the fatal crash of an H225 near Turøy, Norway, in April 2016. The airframer had modified the inspection program for the main gearbox and, for one of the planet gears, eliminated a supplier. But the





Global Helicopter Service GmbH (GHS) has announced its latest fleet addition, with the delivery of a brand-new Airbus Helicopters H225. The H225 demonstrated its potential and performance during a ferry and demonstration flight through Europe.

The H225 is mission ready and utility configured, waiting for new challenges with GHS.

Norway and U.K. CAAs had not lifted their own grounding directives.

Among the new measures that will allow the helicopters to fly again in these two countries is the introduction of a new "full flow magnetic plug" to detect particles in oil. The new device is located at a critical point in the oil system — upstream to the oil cooler —and will contribute to ensure every particle is detected. It will "see" the entire oil flow and will prevent particles from being trapped in the oil cooler, as happened in the accident helicopter. The additional plug will simultaneously alleviate maintenance needs, which had been made highly time-consuming.

The global fleet of AS332 L2s and H225s (including military versions) comprises 346 aircraft, half of which are flying. However, out of the 160 helicopters in offshore oiland-gas operations, only 15 percent have returned to service, according to Airbus Helicopters' numbers.



ROTORBEAT (RB) INDUSTRY NEWS

Helitech to explore industry's hot topics

elitech International 2017, Europe's leading helicopter exhibition and conference in association with the European

Helicopter Association, will provide a forum for the discussion of key industry issues when it returns to London, U.K., from Oct. 3 to 5. Now in its 31st edition, Helitech promises to fill the halls of London ExCeL with the rotorcraft industry's latest innovations while offering a full agenda of free-to-attend seminars and panel discussions.

The keynote speaker during the seminar program will be Russian pilot Sergey Ananov. The five-time world record holder will discuss surviving a forced landing in the Arctic during an attempt to become the first pilot to circumnavigate the globe in a light helicopter. Currently attempting the feat for a second time, Ananov will share his story on day two of the conference.

Another highlight will be the panel discussing the evolution of search-and-rescue technology. This session, which will take place on day one, will provide an opportunity to learn about the technologies that will help optimize and improve safety on future SAR missions. Operators involved in the development and deployment of these tools, such as Roy Jenssen, operational advisor for Norwegian SAR and air ambulance operator Luftambulansetjenesten, will share their insights.

From evolving SAR technology to operations, a session on day two of the conference will see Hernan Lopez, a member of the Cooperativa de Trabajos Portuarios general management, and Ivan Blaffert, manager of the Cooperativa's Emergency Centre, discuss the establishment and operation of rescue facilities at the port of San Lorenzo in Argentina. The Cooperativa works with a professional group of doctors, paramedics and nurses and deploys two helicopters, six ambulances, two watercraft ambulances and two additional watercraft.

Further sessions will deliver business intelligence and mission experiences to help the rotorcraft community tackle the opportunities and challenges ahead in markets including unmanned aerial vehicles; search-andrescue; offshore oil-and-gas and wind farms; maintenance, repair and overhaul; and helicopter emergency medical services.

There will also be a series of technical briefings from OEMs and the supply chain, highlighting the latest advancements in rotorcraft technology and best practice for safe and sustainable operations.

The Safety Workshop, organized by the European Helicopter Association, will also return on the closing day of the event. The popular session will offer visitors an insight into the latest technology and training improvements and a chance to network with their peers.

The modular programme, new to 2017, has been designed to make it easy for attendees to drop in and out of sessions and combine them with visiting the exhibition, meetings and networking.

One such networking opportunity will be the Operators Forum, which takes place over lunch on Oct. 3. This session will allow operators to talk informally with their peers about the issues most relevant to improving their missions and their businesses.

More than 200 key players from across the rotorcraft industry are set to exhibit at the show, including Airbus Helicopters, Leonardo and Bell Helicopter, alongside some of the largest leasing companies in the civil rotorcraft industry. This year, exhibitors will also have the opportunity to showcase their latest products and services by taking potential customers on demo flights from right outside the venue.



NRC introduces anti-collision tech for drones



he National Research Council of Canada (NRC) has developed new technology that allows unmanned aircraft to detect oncoming aircraft more accurately than ever before in order to avoid collisions and enhance safety.

The Passive Intelligent Collision Avoidance Sensor (PICAS) allows unmanned vehicles to detect aircraft that are not able to communicate their position to other aircraft.

"In sense and avoid, the hard problem is the sensing problem," said Dr. Cyrus Minwalla, research officer in airborne research at the NRC. "You want to detect aircraft at long ranges and you also want a package that is light and low-power that can go on a UAV. This is exactly what we are working to create with PICAS."

PICAS uses cameras that have a large field of view while also having a microscope-like capability that can "see" oncoming objects at long ranges. The PICAS software algorithm is then able to examine the images and determine if the object is another aircraft on a collision course with the UAV. Crucially, it can detect an aircraft that is approaching head-on while it is still far enough away for the UAV to avoid.

According to the NRC, it is able to sense, in real time, Cessna-sized collision-course targets at a distance of up to eight kilometers. The box-like sensor is also small enough to be attached to the exterior of an unmanned vehicle.

Flight tests are currently being conducted to verify PICAS' accuracy, putting the NRC on course to make the first commercially viable sense and avoid system by 2018.

This project is part of the NRC's Civilian Unmanned Aircraft program.

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ROTORBEAT RB INDUSTRY NEWS

Shaanxi Helicopter signs monster Bell 407GXP purchase agreement



haanxi Helicopter Co. Ltd. has signed a purchase agreement for 100 Bell 407GXPs, with deliveries starting this year, in

connection with the framework agreement entered into with Bell Helicopter in 2016.

During a special signing ceremony in Xi'an, China, Mitch Snyder, Bell Helicopter's president and CEO, joined Xiaoning Yuan, president of Shaanxi Energy Group, along with leaders from Shaanxi Province and the U.S. and Canadian embassies.

"We are pleased to have reached an agreement for the purchase by Shaanxi Helicopter of 100 Bell 407GXPs, one of the most indemand helicopters in China," said Snyder. "Bell Helicopter has been developing its support and presence in China for several years and this further establishes our commitment to the region."

"We are very pleased to sign this purchase agreement with Bell," said Yuan. "The 407GXP meets the Chinese market's demand for a single light helicopter. It has



Shaanxi Helicopter has firmed up a purchase agreement for 100 Bell 407GXPs. The aircraft is an upgrade to the Bell 407 product line that provides an additional 50 pounds of payload capability. **Bell Helicopter Photo**

exceptional performance and has been widely used in a broad range of segments including EMS [emergency medical services], parapublic, tourism, and firefighting, among others. The gradual development of planned delivery, support, and training infrastructure will continue to promote the utilization of the 407GXP in China and provide Chinese operators with a total solution of product and technical assurance."

The Bell 407GXP, launched in 2015, is an

upgrade to the Bell 407 product line that provides an additional 50 pounds (22.5 kilograms) of payload capability, coupled with a new M250 Rolls-Royce engine that improves performance and fuel efficiency delivering class-leading hot and high performance.

The Bell 407GXP is also equipped with new avionics features such as hover performance calculator improvement, as well as transmission TBO extension of 500-plus hours that is designed to lower maintenance costs.



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Taking your Work Home

New company allows aviation fanatics to turn their passion into a piece of furniture.

BY SARAH GRANDY

f you've ever thought the cockpit of your favorite helicopter would make the perfect couch, the cabin looks like it was

destined to be a bunkbed, or the blades could be a conversation-starter as a coffee table, you may be able to find the furniture of your dreams in Mike and Carolynn Rancourt's new one-of-a-kind business.

The creative husband-and-wife duo run MR Airframe Ltd in Merrickville, Ontario, where they specialize in structural repairs, but they recently expanded their portfolio with the launch of Craviations — a company that turns aircraft parts into unique furniture pieces.

The idea was born around the same time as the couple's first grandchild, when Mike decided to build her a bunkbed out of a Bell helicopter.

"I thought he was crazy," Carolynn told Vertical. "A year into it, he was still working away at it and I realized "OK, well, he's crazy and he's not giving up on it — so I'm going to help him."

Three years later, Craviations was officially launched.

"We realized that there are a few people making furniture out of aircraft parts, and not really anybody making them out of helicopters," said Carolynn. "So we just started making furniture and we've ended up with a collection of some really cool pieces."

The bunkbed led to a variety of unique pieces, including a bar made from a tailboom, tables made from main rotors, chairs made from stabilizers, and other parts used to make clocks — and even a beautiful "time machine" art piece.

Most of the creations consist of parts from Bell helicopters, including the 204, 205, and 206 (A/B) models.

"We've primarily used Bell helicopters because that's what we work on and those

are the parts we have the quickest access to," said Carolynn.

Thanks to the support of its partners, Craviations can order parts from most helicopters or fixed-wing aircraft. "We will work with the customer to get the aircraft they like, or something very close to it," she said. "There's flexibility."

"We can even take the cabin of an aircraft and turn it into a flight simulator. We have a partner that we work with who does the controls part of it and we do the structural part of it." She added that full-flight simulators could be made upon request.

The turnaround time varies depending on each piece, but Carolynn says the couple can usually deliver within a month.

"If we have to locate parts it might take a little bit longer, depending on the size of the piece that they're looking for, type of aircraft, etc.," she said. "If they're looking for something that we actually have in stock, it could be as simple as building a crate and shipping it."





This bunkbed is also made from a Bell 206. Extra storage is available under the pilot and co-pilot seats, and in the aircraft's nose. **Craviations Photo**

The cabin can serve as a bottom bunk to fit a queen-size bed, or be used as office space. **Craviations Photo**



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When the Rancourts were ready to launch their new business, they turned to social media. What started out as a Facebook post, led to an invitation from the Canada Aviation and Space Museum in Ottawa, Ontario, to attend its National Science and Aviation Gala on May 17.

"We built a series of furniture specifically for that event," said Carolynn. "We chose to use the Museum Gala as the official launch for Craviations." The event was successful and the couple has already begun delivering some of their work.

Both starting in the aviation industry at a young age — Mike at his friend's dad's repair facility, and Carolynn in manufacturing — the couple has more than 50 years' experience working within the aviation industry with a variety of aircraft types.

Vector & RFS complete AS350 CRFT first flight

ector Aerospace and its partner Robertson Fuel Systems (RFS) have completed the first flight test with their Crash-Resistant Fuel Tank (CRFT) for the Airbus

AS350. The flight marks the second major

milestone toward Federal Aviation Administration (FAA) certification for the retrofittable CRFT. The first, just a few days earlier, saw the tank successful complete an FAA-certified 50-foot drop test that demonstrated its ability to withstand impact without any leakage, helping to prevent post-crash fires. The new CRFT has since been installed on two flight test aircraft, an AS350 B2 and an AS350 B3, with both undergoing extensive ground-testing as the program progresses.

"This milestone is a testament to the team here at Vector, which has been working hard to bring this product to market for our customers," said Jeff Booker, CRFT program manager at Vector. "As soon as the drop testing was complete we began the process of installation to move us into this new test phase. It's a great feeling to see this tank flying."

The CRFT will be a direct replacement for all AS350 models and the EC130 B4. The design features a robust crash-resistant fuel bladder, and uses several innovations including a magneto-resistive fuel quality transmitter to keep the tank from being compromised in the event of an accident.

Flight testing will continue on both aircraft as Vector and RFS work toward a late 2017 FAA supplemental type certificate (STC) target date.

Vector is also working closely with Onboard Systems to incorporate their industry proven cargo swing solutions as a compatible option, which can be used with the new crash-resistant fuel tank.



Robinson Helicopter Company has added the TB17 Lithium-ion battery to its R66 options. TB17 by True Blue Power, a division of Mid-Continent Instrument, offers substantial weight savings, improved starter performance and longer life.

At 16 pounds, the TB17 is significantly lighter than the R66's standard battery, which weighs 42 pounds, and the optional high-capacity battery, which weighs 52 pounds. Lithium-ion chemistry holds a higher charge voltage and provides a more constant discharge rate than leadacid delivering consistent, more reliable turbine starts.

The battery's internal heater enhances functionality in temperatures as low as -40 C (-40 F). Typical battery life is eight years with minimal required maintenance (visual inspection and capacity check) every two years.

The TB17 battery passed rigorous manufacturer and Federal Aviation Administration tests to ensure safety, the manufacturer said.

STANDARDAERO TO ACQUIRE VECTOR AEROSPACE

StandardAero is set to acquire Vector Aerospace, having entered into exclusive negotiations with the maintenance, repair, and overhaul (MRO) company's existing owner, Airbus.

Vector generated revenues of US\$704.8 million in 2016 and employs approximately 2,200 people in 22 locations across Canada, the United States, the United Kingdom, France, Kenya, South Africa, Australia and Singapore.

The acquisition is subject to customary conditions, including securing regulatory approvals, and is expected to close by the fourth quarter of 2017 or early 2018.



THALES DELIVERS CHINA'S FIRST LEVEL D FSS

Thales has announced the Level D qualification of the very first EC135 full-flight simulator (FFS) by the Civil Aviation Administration



of China (CAAC). The Thales Reality H EC135 helicopter simulator is housed in the aviation safety facilities, Haite Group's flight training center in Tianjin.

"This new Level D qualification of the Reality H full-flight simulator by the CAAC follows the qualifications by EASA [European Aviation Safety Agency] and CASA [Civil Aviation Safety Authority] in Europe and Australia," said Benoit Plantier, Thales vice president, training and simulation activities. "The fantastic demand for highly skilled pilots in China, the fastest growing helicopter market in the world, means there is a constant need for the best and most thorough training and simulation systems."

SIKORKSY FCOMs AVAILABLE THROUGH APPLE

Sikorsky's S-92A and S-76D iFly Sikorsky electronic flight bag (EFB) and flight crew operating manuals (FCOM) are now available from the Apple App Store.

Sikorsky officially launched its S-92A and S-76D FCOMs in March this year, following peer reviews in 2016. The new manuals help pilots understand the intent of each helicopter's system operations and are part of an effort led by HeliOffshore to enhance safety and build collaboration across the industry.

The S-92 and S-76D helicopter FCOMs and EFB applications complement the current flight manuals and add to the iFly Sikorsky suite of pilot applications on the Apple iPad.

Coptering purchases entrol H11/H135 sim



optering has purchased a new H11/H135 FNPT II MCC simulator from entrol, becoming the first flight school in Spain to have the simulator.

It will be equipped with Garmin's dual GTN 750, a fully integrated GPS/NAV/COM/MFD solution that will allow Coptering to offer training adjusted to current pilots' needs, providing the capability to learn to perform localizer performance with vertical guidance and lateral navigation (LPV/LNAV) approaches.

The simulator will also have an entrol vibration system that will improve the experience by providing feedback of different flight conditions.

The installation will be at Coptering's base located in Sabadell Airport, in Spain, about 15 minutes from Barcelona.

FAA certifies Aero Design AStar bicycle racks

he Federal Aviation Administration has certified Aero Design's Quick Release bicycle racks for the Airbus Helicopters

H125/AS350.

The bicycle rack allows the transport of three bikes per side, and will accept the shortest frame mountain bike with a 26-inch wheel to the current longest frame mountain bike with a 29-inch wheel — all up to four inches wide and with no modification necessary to the rack, the company said.

"The bicycle racks have been received with outstanding success both in Canada and throughout Europe and we are excited to be able to offer them now to U.S. operators and cycling enthusiasts," Aero Design president and Canadian M1/M2 AME Jason Rekve said.



Aero Design's bicycle racks can allow the transport of up to three bikes per side. Aero Design/Mat Melsness Photo
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TECHNISONIC Communications

Fishtail Air signs first HCare Smart contract in Nepal



ishtail Air has signed a contract with Airbus Helicopters to cover a fleet of two H125 helicopters for five years under the manufacturer's HCare service offer. The contract stipulates support for both sched-

uled and un-scheduled aircraft events, and entitles Fishtail Air for a full material management service backed by a parts availability commitment.

"After being the first company to introduce the H125 in Nepal, we will now be the first to benefit from the HCare Smart program in the country," said Suman Pandey, CEO of Fishtail Air. "We can

now focus on operations to answer the growing demand for helicopter services in Nepal, while also ensuring high maintenance standards together with Airbus."

Established in 1997, Fishtail Air Pvt. Ltd operates charter flights within Nepal, with occasional flights in neighboring Bhutan and India. From its base in Kathmandu, the company operates sight-seeing, rescue, medical evacuation, corporate transport, and support flights for heli-trekking to the region's most popular tourist destinations.

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Columbia Helicopters Inc. announces new president



Columbia Helicopters Photo

olumbia Helicopters Inc. has promoted Steve Bandy to president of the company following former president and

CEO Jim Rankin's resignation in June. Bandy previously served as senior vice president of operations of the Aurora, Oregon-based provider of heavy-lift helicopters services and maintenance, repair and overhaul (MRO) company.

"Steve has over 28 years with Columbia, and has done a remarkable job of leading our operational departments including flight operations, maintenance, and the QES group," said Columbia Helicopters' board chair Stan Wilson. "We can think of no one with more passion, drive, vision and dedication to our employees than Steve. We are confident with Steve at the helm, we will be able to be strategically positioned to continue to be the leader in our industry while continuing to exceed customer expectations."

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HAI OPENS SALUTE TO EXCELLENCE NOMINATIONS

Helicopter Association International (HAI) has announced that the nomination period for the 2018 Salute to Excellence awards is open. Due to a scheduling change, nominations for these annual awards will close early this year, on Sept. 25, 2017.

The awards recognize achievement within the helicopter industry in nine categories, and recipients are honored at a dinner held during the HAI Heli-Expo annual conference and trade show. HAI Heli-Expo 2018 will be held in Las Vegas, from Feb. 27 to March 1, with the awards dinner held on Feb. 28.

"We are excited to see the nominations again this year," said Dan Sweet, HAI director of public relations and communications and coordinator of the awards program. "However, I cannot stress strongly enough that we are working with an earlier deadline this year. As a result of a schedule change, Sept. 25 is a firm deadline, and there will be no extensions."

NORSK HELIKOPTERSERVICE AS CEASES OPERATIONS

HNZ Group Inc. subsidiary Norsk Helikopterservice AS (Norsk) ceased operations on June 30, 2017, the company announced.

"Norsk has encountered various challenges in the Norwegian market, and our investment in Norsk has not performed as we had hoped," said Don Wall, president and chief executive officer of HNZ, which held a 49.9 percent interest in the Norwegian entity. "After considering the results and prospects of this investment, we have decided to focus our efforts on other aspects of HNZ's strategic plan."

HNZ said Norsk implemented an orderly wind-up process including the termination of employees, the return of a leased aircraft to the lessor and settling of other matters, while Norsk's majority shareholder evaluated its options.

Donaldson Airbus IBFs approved in Canada

Donaldson's inlet barrier filters are now certified by Transport Canada for installation on Airbus H125s, EC130 B4s, and H130s. **BDN Aerospace Photo**



ransport Canada has certified Donaldson Aerospace & Defense's inlet barrier filters (IBFs) for installation on Airbus H125s, EC130 B4s, and H130s.

The IBFs keep contamination, including dirt, dust, salt and foreign objects, from degrading the performance and reliability of helicopter engines. Barrier filter technology applied to turbine engine inlets also has the potential to provide substantial return on investment for operators, the manufacturer said, along with performance improvements on many platforms. "These helicopters are doing important work across the country," said Matt Fortuna, general manager of Donaldson Aerospace & Defense. "Donaldson is proud to make superior IBF engine protection available to more Canadian operators."

Donaldson offers 16 Transport Canadacertified filtration systems for a range of Airbus, Leonardo, Bell, MD Helicopters and Sikorsky helicopters; 14 are certified to operate in falling and blowing snow conditions.

Eagle 407HP arrives at Air Shasta



ir Shasta has received its first Eagle 407HP, powered by the next generation Honeywell HTS900. The aircraft is the 10th 407HP delivered by Eagle Copters.

Air Shasta, located in Redding, California, has more than 30 years of experience in helicopter tours, sales, maintenance, and flight training and charter services.

"While operating in hot and high conditions in Northern California, increased performance becomes a requirement to fulfill missions," said Casey Ross, vice president of operations at Air Shasta. "We are confident that the Eagle 407HP will give us that competitive edge."

Air Shasta plans to take advantage of the increased payload in firefighting, wildlife, and utility contracting.

"We are finding that the demand for our Eagle 407HP conversion is continuing to grow," said Tyler Williams, regional sales manager, Eagle Copters.



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Bristow, Blade to provide cabin class service in New York



ristow has announced an alliance with Fly Blade, Inc. within the greater New York area to providing aircraft, crew and

maintenance for Blade's new cabin service, with Blade providing the ground support, passenger booking, on-the-ground experience and marketing.

"Bristow remains a proven leader for aviation services to our offshore clients," said

Samantha Willenbacher, Bristow's global director commercial strategy. "We are excited to fly with Blade to operate safe and fast helicopter service to passengers travelling between numerous Northeast locations, including all area airports."

Branded as Blade's Ultra service, Bristow is utilizing Sikorsky S-76 C++ aircraft for the flights.



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Vertical receives prestigious journalism award



John Slemp Photo

ertical Magazine, the civil helicopter's industry's leading publication, has been recognized with a prestigious award for outstanding aviation reporting.

Elan Head, special projects editor of Vertical and editor-in-chief of Vertical 911 Magazine, is the recipient of this year's Michael A. Dornheim Award from The National Press Club in the United States.

The awards committee found her stories were, "well-reported, well-written investigations that raised industry concerns, including new safety alerts."

The committee noted in particular stories on the need for more cockpit and flight data recorders in helicopters and the phenomenon of mast bumping.

"This is a huge honor," said Head, who is also a past recipient of Helicopter Association International's Excellence in Communications Award. "I'm so grateful to Vertical publishers Mike and Linda Reyno for allowing me to write the kind of stories that would make me eligible for this award."

"We are extremely proud of Elan," said Mike Revno, co-publisher of Vertical, "Her work is impeccably researched, meticulously written, and it is helping make the helicopter industry a safer place."

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A Cougar Helicopters Sikorsky S-92, specially equipped for search-and-rescue operations, takes off from St. John's International Airport in Newfoundland. **Mike Reyno Photo**

1111

Nav Canada Photo

With a proposal to privatize control of airspace sparking intense debate in the U.S., *Vertical* spoke to Canadian industry stakeholders to see what impact the 1996 privatization of Canadian airspace had on their operations.

Who's in

By Jen Boyer

As political debate on the issue of privatizing control of air space in the United States intensifies, eyes have turned north of the border to Nav Canada, Canada's private airspace management company. Named as a standard for U.S. airspace privatization by U.S. politicians, Nav Canada is a non-profit, non-share capital corporation that manages civil air navigation facilities and services in Canadiancontrolled domestic and international oceanic airspace.

In 1996, Nav Canada paid C\$1.5 billion to acquire Canada's air navigation services, including air traffic control (terminal and enroute navigation), flight information, aeronautical information, weather briefings, airport advisory services, and electronic aids to navigation.

Today, the corporation manages 55 flight services stations, 51 community aerodrome radio stations (land and sea), 41 air traffic control towers, 31 maintenance centers, eight flight information centers, seven area control centers, and a national headquarters.

THE BIRTH OF NAV CANADA

Nav Canada came into being as a solution for the country's troubled air navigation system (ANS). The second largest in the world after the U.S. in terms of traffic volume, Canada's system was previously managed by the national regulator, Transport Canada. It had maintained a strong safety record, but the system was plagued with outdated infrastructure as major projects fell behind due to budget cuts, while costs rose. Increased delays and decreased service levels reached a peak in the 1980s. In response, Canada's air carriers came together to study the problem and devise a solution that would update the Canadian ANS, ensure timely investment in updated technology, increase efficiency, and maintain high safety records. Nav Canada was born.

The composition of Nav Canada's board of directors was understood to be a key aspect in establishing how the organization would operate. Recognizing the dangers of board members with special interests, stakeholders included rules prohibiting elected officials, employees of government, active union officers, or officers, directors or employees of users or suppliers of Nav Canada from holding board positions.

There are 15 Canadian citizen members on Nav Canada's board, elected by designated groups: four by the National Airlines Council of Canada (NACC); one by the Canadian Business Aviation Association (CBAA); three by the Government of Canada; two by employee unions; four are independently elected by the board, and one chief executive officer. In addition, a 20-member advisory committee of aviation professionals is elected, which is tasked with analyzing issues and making recommendations directly to the board. The helicopter industry is represented in this committee by Fred Jones, president and CEO of the Helicopter Association of Canada (HAC).

COVERING THE COSTS

Nav Canada developed a fee structure for all users designed to cover the cost of operation, maintenance, and upgrades. With the understanding that airlines were the primary users of the system, the lion's share of fees are charged to commercial carriers, with fees decreasing for smaller aircraft. In the beginning, it wasn't perfect.

"I witnessed the birth and painful transition of Nav Canada," said Jones. "There were two issues right out of the gate for helicopter operators. First, they were concerned about what services they'd receive. And second, there was a lot of concern over the charging structure for services that previously were essentially paid for already through tax dollars. HAC was involved from the beginning to ensure fees did not negatively impact operators' business and fairly reflected helicopters' use. I feel both were resolved in a very elegant way."

While some back and forth took place in the beginning, a simplified and low-cost structure was designed for helicopters and propeller aircraft weighing less than 3,000 kilograms (6,613 pounds). Operators are charged between \$65 and \$217.04 annually per Canadian-registered helicopter, depending on weight, to fully access all Nav Canada services (including instrument flight rules enroute service, terminal services, weather briefings, and file flight plans). Foreign registered aircraft are charged 25 percent of the fee quarterly. Larger helicopters are charged a daily rate between \$40.16 and a maximum daily rate of \$80.32.

"When it came to setting fees for helicopters and general aviation aircraft, we didn't want per-use fees because we didn't want pilots and companies making safety decisions, like to not call in for a weather briefing, based on saving money," said Nav Canada spokesperson Ron Singer. "Helicopters are a very small portion of the traffic using the Nav Canada system, so they shouldn't be burdened with covering more then their share of the costs."

In addition, all helicopters under 3,000 kilograms (6,613 pounds) are charged \$9.56 a day when approaching or leaving one of seven specified international airports to help reduce congestion. Larger helicopters are charged between \$40.16 and \$80.32

NAV CANADA

depending on weight. Movement-based charges for the larger helicopters are less. Fees for the larger helicopters are waived in certain cases, such as medevac, training, maintenance, and search-and-rescue flights.

OPERATIONAL IMPACT

Canadian helicopter operators on a whole seem satisfied with the system. In most cases, fees are passed along to customers, or for the smaller operators, easily absorbed.

"The fees are very low for the amount of work we do," said Lyle Watts, chief flight instructor at Heli-College Canada in Langley, British Columbia. "We operate four [Robinson] R22s. That's something like \$260 a year to use all the services as much as we want. The fees are not going to stop us."

In Mississauga, Ontario, Chartright chief pilot Sean Carscadden said his company's Nav Canada fees are higher due to using medium helicopters for charter, but the company passes those increases along to the customer. "It's not much different than adding the tax to the customer's bill," he said.

In Fort McMurray, Alberta, where growth in the oil and mining industry led to an increase in aviation use, operators are experiencing a deal. Prior to the boom, the tower and weather briefing station had been closed. Due to increased operation, Nav Canada invested in the airport, opening a tower and redrawing routes to ease congestion.

"In our case, our fees didn't go up and we got a lot more for our money," said Paul Spring, president and operations manager of Phoenix Heli-Flight, which operates 10 helicopters from the airport. In Vancouver, B.C., Talon Helicopters provides film, rescue, transport, fire and utility services. "I'm a businessman, so I understand costs and the fact that once the government gets a hold of something, it gets more expensive," Talon president and operations manager Peter Murray said. "The conflict is when you have a private business run something that should be available for all. While I have to say our experience with Nav Canada has been fair, and they have a good process for sharing input, and they do listen, it's pretty clear that they're airline focused. I've had to work out several issues with them over the years because they just don't get helicopter operations."

> Nav Canada paid C\$1.5 billion to acquire Canada's air navigation service in 1996. Among its responsibilities, it manages 41 air traffic control towers. Nav Canada Photo

48 🎽 Vertical Mag

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When it comes to infrastructure investments, on a whole, those who spoke with Vertical didn't see much change for helicopters. "The devil really is in the detail," said HAC's Jones. "Nav Canada does engage with the helicopter industry on infrastructure concerns. We don't have the heliport facilities here that the U.S. does. However, we still require engagement on access to airspace, the IFR infrastructure, and approach development. There is some chaffing on where money is invested, though, but like any entity, investment is a balance of safety and efficiency. You have to make a business case, as you did in the old system, and business principles are applied. We've had civilized conversations and sometimes we get what we need. Sometimes not. I would argue, though, that Nav Canada is absolutely far more responsive than Transport Canada was able to be, particularly with respect to any safety concerns."



Jen Boyer | Long-time communications professional Jen Boyer is a commercial instrument helicopter pilot with flight instructor and instrument instructor certificates. A member of the Whirly-Girls, she runs her own aviation industry strategic communications business.

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52

The addition of a Sikorksy UH-60A Black Hawk to its fleet represents a new chapter in Helinet's storied movie-making career.

THE

Story by Oliver Johnson Photos by Skip Robinson

> In early July, Helinet Aviation took delivery of a Sikorsky UH-60A that will become the world's first Black Hawk to be dedicated to film and TV production work.

53



"

EVEN THOUGH [PRODUCTION] WAS JUST ONE PART OF HELINET, IT WAS THE PART THAT HE DID — IT WAS ALAN — IT WAS WHAT HE LOVED THE MOST, WITH THE ONE EXCEPTION OF WHAT WE'VE DONE FOR CHILDREN'S HOSPITAL.

- KATHRYN PURWIN, HELINET AVIATION CEO

Helinet Aviation has a longstanding reputation as a leader in the world of aerial movie and TV production, established and led by the high standards, skills, and creativity of founder and industry legend Alan Purwin. With Purwin at the helm, the company recorded a list of production credits that spanned hundreds of films and TV shows, working alongside directors including Michael Bay, James Cameron, Steven Spielberg, Ron Howard, and Wolfgang Pieterson, to become an established member of the Hollywood production scene.

Tragically, Purwin was killed in a plane crash in September 2015 while travelling as a passenger during a movie shoot in Columbia. Helinet lost not only its founder and CEO, but the driving force behind its film production operations.

While movie work is just one of five of Helinet's operational segments — which also include charter work, air medical transport (as the primary helicopter provider for Children's Hospital Los Angeles), electronic newsgathering (ENG), and technology — it was one that was close to Purwin's heart, according to his wife, Kathryn Purwin.

"Even though it was just one part of Helinet, it was the part that



he did — it was Alan — it was what he loved the most, with the one exception of what we've done for Children's Hospital," said Purwin, who now serves as Helinet's CEO. "He was happiest on a set, so it does seem like it's sort of in the bones of Helinet to have a production division."

Purwin said the production work understandably slowed in the wake of her husband's death, as the company and its employees adapted to their new reality. However, the hiring of Kevin LaRosa II as VP of aerial film production in March 2017 — and the addition of a Sikorsky UH-60A Black Hawk (dubbed the "MovieHawk" by Helinet) to the company's fleet in July 2017 — have represented the start of a new chapter in the company's storied history of work in the sector.

LaRosa, a third-generation pilot, has been involved in aviation since he was born. His



Among a host of customizations made to the aircraft was the addition of an aerial refuelling probe and a nose-mounted radome.



Six pilots are qualified to fly the MovieHawk at Helinet, including main lead pilot Alex Anduze and VP of aerial film production Kevin LaRosa II. **Robert Gluckman Photo**



father, Kevin LaRosa Sr., has forged a highly successful career as a stunt pilot and motion picture pilot over the last 40 years, and LaRosa II has continued in the same vein.

"It's a bit of a family business; when I grew up in the house, all I wanted to do was fly and my end goal was always to be an aerial coordinator and stunt pilot in the motion picture business," he told *Vertical*. And while he left the "family business" for a few years to gain valuable aviation experience in other sectors such as ENG, air medical, and corporate helicopters, he has spent the last six years establishing his own reputation as a highly talented production pilot and aerial coordinator.

"Hiring Kevin was our first step in refocusing on the movie work and . . . it's a new approach," said Purwin. "We have a much bigger drone base now, we're building up our drone department, and we've brought the Black Hawk in. Production is changing and we want to change with it."

Helinet president and COO Jim McGowan, who was appointed by Purwin in November 2016, was instrumental in bringing LaRosa to the company. He said LaRosa's expertise in coordinating large scale aerial sequences and flying for Hollywood's top films made him a great fit for the company.

"We took our time to find the right candidate to lead our production department and feel very fortunate to have Kevin on our team," he said.

A FULL-TIME MOVIE HAWK

LaRosa said the idea of getting hold of a Black Hawk dedicated to movie work had been on his radar for about a year and a half. Soon after joining Helinet, he pitched the idea to BHI Helicopters (a partnership between Brainerd Helicopters and Brown Helicopters) of Helinet taking the lead on marketing and contracting a BHIowned Black Hawk specifically for aerial production work.

"We like to think we are a bit of a powerhouse as far as the movie business is concerned, and they liked the idea of it and thought that would be the way to go," said LaRosa.

The aircraft, which arrived with Helinet in early July, is the first UH-60A Black Hawk in the world to be dedicated for use in the film industry. It has been outfitted to emulate the look and presence of a special operations MH-60M Black Hawk — a highly specialized version of the aircraft used by the U.S. Army's 160th Special Operations Aviation Regiment.

"We sat down and we made a list of items that our directors, producers and production companies would want to see, and basically gave our partner a wish list of how we wanted to see this bird made," said LaRosa.

That wish list has resulted in an impressive number of customizations to provide the maximum amount of authenticity on set. From the front, it carries an aerial refueling probe, and has a nose-mounted radome and inactive Wescam Matrix weapon system. Its External Stores Support System — wing-like stubs

The Movie Hawk is chased by an Airbus AS350 B2 camera ship as the sun sets over Los Angeles.









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The MovieHawk has a specialized military paint scheme to allow film companies to shoot films that look as realistic as possible.

When working on movie and TV sets, the MovieHawk will be flown in the experimental category.

protruding from the side of the main cabin - provide it with the capability to carry authentic inert rockets and gun pods (such as 19-tube rocket pods and AGM-114 Hellfire missiles), as well as external fuel tanks. The MovieHawk can also carry window and pod-mounted inert M134 Dillon miniguns, and is equipped with a fast-rope insertion and extraction system.

Finally, a specialized military paint scheme allows production companies to create the most realistic and missioncorrect scenes.

The MovieHawk is the fifth UH-60 that BHI has put into operation from purchase at U.S. Army military surplus auctions over the last three years (it has nine Firehawks/ Black Hawks operating in its own fleet). According to Bart Brainerd, president of Brainerd Helicopters, the addition of the Black Hawks from the General Services Administration (GSA) auctions has allowed the company to specialize the aircraft.

"We used to have to split the different missions on the existing airframes we had," he said. "So, the external lift, the movies, the firefighting and the R&D were all done on whatever aircraft we had that we could set time aside on, but with the arrival of the auctioned aircraft, it's given us the latitude to start to specialize the aircraft for different missions."

The conversion process from arriving from the military to civilian operation varies depending on the final mission, said Brainerd, with a firefighting mission that requires more modification taking more than six months, whereas a production conversion "is more in the months range."

The MovieHawk is type certified, and most of the time when it's being flown for film, it will be flown in the experimental category.

Brainerd said his prior experience of working with LaRosa and his father helped seal the deal for Helinet to take on the operational mantle for the MovieHawk.



BY BEN FORREST

When Helinet Aviation Services took delivery of a newly refurbished Airbus AS350 B2 helicopter in mid-July, it was an emotional event.

The former Canadian utility ship had been turned into a state-ofthe-art electronic newsgathering (ENG) aircraft that will also be used for movie production work.

But it is also a tribute to the late Alan Purwin, who founded and helped build Helinet into one of the premium helicopter operators in the United States.

The aircraft's registration number (N828AP) reflects Purwin's birthday (Aug. 28 or 8/28) as well as his initials; and a silhouette of Purwin appears on the engine cowl, a digitized version of a painting by his daughter Michaela.

All of that came as a surprise to Kathryn Purwin, Alan's wife and the company's chief executive officer. Her team kept it a secret until the delivery date, and she remembers crying when she saw it for the first time.

"It is a really beautiful tribute," said Kathryn. "It means everything to keep Alan's legacy alive in an industry he was extremely passionate about and dedicated to."

Helinet's new AS350 B2 will be the primary ship for the company's movie production work, and is expected to serve as a backup news-gathering ship for CBS, Fox and ABC stations in Los Angeles, as well as KMEX.

EuroTec sourced the aircraft in collaboration with Phil Antosh from AMC Aerospace and carried out the custom completion at its Canadian facility in Millgrove, Ontario.

The company added a Churchill Navigation augmented reality mapping system; a Troll Systems SkyLink high definition microwave



Helinet's new AS350 B2 contains state-of-the-art equipment to enable it to serve as the company's primary ship for movie production work and as a backup newsgathering ship for TV networks.

downlink; wiring for a Shotover gyro-stabilized camera; a Technisonic TDFM-9000 transceiver; an Eagle P139-HD audio system; Boland, Small HD and Pix high definition video monitors; an Aspen EFD1000H multi-function display; an L3 Lynx NGT9000+ ADS-B-compliant transponder; and mission-specific electronic news gathering equipment module. Finally, EuroTec refurbished the interior, and added new exterior paint and custom graphics to the aircraft.

"Everyone here put forth the extra effort to ensure that our work exceeded the client's highest standards and expectations," said Hoss Golanbari, vice president of EuroTec Canada.

Chad Decker, founder and president of parent company EuroTec Vertical Flight Solutions, said: "The unveiling of this aircraft was very special to everyone involved. We couldn't have been more pleased with the reaction the aircraft received from Kathryn and the entire Helinet team at the unveiling."

Helinet executives heaped praise upon the EuroTec crew.

"Our team had several changes that we made on the fly, as the scope of the project grew," said Jim McGowan, president and COO of Helinet. "They accommodated all of our requests and made it happen in a very timely fashion, so we're very pleased."

Paying tribute to Alan Purwin with an aircraft that will continue his life's work was a natural decision for Helinet employees, and it's a practice that runs deep in the Purwin family.

"Alan had, a long time ago, completed a helicopter with my birthday and my initials [in the registration number]," said Kathryn. "And he did one for each of our kids ... so it was kind of a tradition for him, and it feels really nice to return the favor."



The aircraft has a silhouette of Helinet founder Alan Purwin on the engine cowling, and its registration number reflects his birthday and initials.

The MovieHawk banks away from the camera ship for a dramatic shot. Helinet took delivery of both aircraft in early July, along with a new H130, bringing the operator's fleet to 19 aircraft.

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Hawks on productions. Robert Gluckman Photo





productions shot in the Southwest. Robert Gluckman Photo

"We've worked with them in the past on different productions with our aircraft, and they're just great people to work with and are at the core of this teaming arrangement," he said. "it's a good synergy between the companies, as far as opportunities go, as there's not really much overlap between us as far as what we do - we're in different markets. This leverages Helinet's contacts and experience with our background with the aircraft."

READY ON SET

Before the appearance of former military Black Hawks on the civilian market, operators like Helinet were reliant on being able to secure permission from the U.S. military to use a real military aircraft for film work. That permission would depend on approval of the film or TV show's script.

While the growing number of civilian Black Hawks provided another option over the last few years, securing use of those aircraft was not straightforward, either.

"We've been seeing the demand for them [from film studios], but we've also been seeing how challenging it is to get a hold of them," said LaRosa. "It's very difficult to get use of a Hawk for production work because the operators who have them need to get them on fire, utility work, or government contracts, which doesn't make them available. My dream was to bring one to California and have a movie Hawk specifically designed for the movie business available to our customers."

The fact that the MovieHawk is now hangared at Helinet's facility in Van Nuys, California, not only guarantees availability of the aircraft when it's requested, but also reduces costs to production companies through the elimination of ferry fees, said Purwin.

While the aircraft only arrived with Helinet in early July, it has already begun work on its first show - a new CBS TV series called Seal Team, being shot in Los Angeles. LaRosa said he expects the helicopter to work on between 15 to 25 shows or movies each year on average, some of which will likely be among the three or four big feature films Helinet works on each year.

The main lead pilot in the Movie Hawk is former Sikorsky experimental test pilot Alex Anduze, but the company has five other pilots that are also type rated on the aircraft - including LaRosa, who can fly as second in command if a shoot calls for it.



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U.S. Customs and Border Protection is an Equal Opportunity Employer **twitter.com/CustomsBorder** **APPLY NOW CBP.GOV/CAREERS** Text: **CBPVERT** to **94543** The MovieHawk is equipped with several inert weapons systems to provide it with maximum authenticity on film and TV sets. *Clockwise from top left:* A window-mounted M134 Dillon minigun sits in front of an External Stores Support System (ESSS); a pod-mounted M134 Dillon minigun is attached to the right ESSS; an inactive Wescam Matrix weapon system hangs under the aircraft's nose; rockets and gun pods are attached to the aircraft's left ESSS.







Safely maneuvering a helicopter to mimic a special operations mission for camera requires an extremely skilled pilot, said LaRosa.

"About three months ago, we had to do an operation where we had six very experienced stunt guys that were fast roping down the Hawk, at nighttime, on top of about a 60-foot obstacle. So as you can imagine, there was some precision involved with that, and lots of planning and safety precautions," he said. "Thankfully, Alex Anduze spent 11 years flying Hawks for the Army, so he's an extremely accomplished pilot. The other thing that makes our lead pilot so great is the fact that he can fly a picture ship correctly. Anybody can yank and bank a helicopter, but that's only half the battle. The other half of the battle is being able to fly the Hawk for the camera, which is a very different type of mission."

While he has flown many aircraft in front of the camera, LaRosa prefers to work behind the lens, either through flying the camera ship (Helinet typically uses an Airbus AS350 AStar or AS355 TwinStar in that role), or as an aerial coordinator helping a director or producer bring a scene they've visualized safely into life.

"What we do in the production business usually involves lower altitude, or night ops, so we can always expect that there's a greater risk," he said. "My job is to weigh all the risk, figure out



how to de-risk as much as possible, and still give the customer the product they're looking for. And one of the best qualities of a pilot or an aerial coordinator is the ability to say 'No.' "

The MovieHawk is one of three additions to the Helinet fleet this year, with an Airbus AS350 B2 arriving the same day as the Hawk, closely followed by an Airbus H130. The three take the operator's rotary-wing fleet to 19 aircraft. But despite the fleet growth, Purwin said the company remains focused on the markets in which it is already established.

"What we're all trying to do is to improve on what Alan was already doing so well," she said. "We're already very diverse, so it's difficult to imagine us adding other areas of work, but I certainly see us continuing to focus on keeping all of our departments strong while simultaneously finding the right opportunities for new growth."



Oliver Johnson | Editor-in-Chief of Vertical Magazine, Oliver has been covering the helicopter industry since joining MHM Publishing in 2012. He can be reached at oliver@mhmpub.com Follow him on Twitter @orjohnson





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The ROBOT CO-PILOT

When it comes to aircraft, autonomous doesn't have to mean unmanned. Here's how Sikorsky wants to use autonomy to make human-piloted helicopters safer.

By Elan Head

Any pilot who has spent much time in single-engine helicopters is familiar with the concept of flying from one forced landing zone to the next — constantly searching for clear areas to which a safe autorotation could be made should that single engine stop working. On long cross-country flights in good weather, spotting landing zones is one way that pilots stay engaged when there's not much else to do. But start ramping up the workload with traffic, radio calls, or other demands of the mission, and that diligent terrain scan can quickly be abandoned.

Imagine what it would be like if your helicopter was doing the scanning for you. While you focused on the task at hand, your aircraft would be searching the surrounding terrain several times per second, constantly identifying and evaluating potential landing zones as the flight progressed. Then, in the event of a sudden power loss, it would adjust its attitude, reduce collective, and begin guiding you toward a predetermined landing spot, all in the time it would take you to notice that a power failure had occurred. You could choose to override the aircraft, but its split-second reactions would have still put you ahead of the curve.

In fact, this capability is already being demonstrated on the Sikorsky Autonomous Research Aircraft (SARA), an S-76B helicopter that has been retrofitted with flyby-wire flight controls and a supercomputer capable of executing complex search and decision functions. Sikorsky Innovations

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"Imagine [an] engine failure resulting in an emergency landing," said Chris Van Buiten, vice president of Sikorsky Innovations. "We've been able to show that using autonomy, we can significantly improve performance in those emergency procedures."

While aviation may someday be dominated by fully autonomous aircraft, it probably won't reach that point anytime soon. In the meantime, however, manufacturers are exploring ways to integrate autonomy into human piloted aircraft, with the aim of improving efficiency and safety.

One of the most notable initiatives in this realm is the Defense Advanced Research Projects Agency's (DARPA's) Aircrew Labor In-Cockpit Automation System (ALIAS) program. Sikorsky has already completed two phases of the program using SARA, and was recently awarded a contract for the program's third phase, during which it will further refine its Matrix Technology autonomy kit in an H-60 Black Hawk. With the program moving toward a mature, certifiable product, we visited with Sikorsky and DARPA to learn what greater autonomy could mean for civilian as well as military helicopters.

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Sikorsky has been developing its Matrix Technology autonomy kit in SARA, an S-76 retrofitted with fly-by-wire flight controls. According to Sikorsky director of autonomous programs Igor Cherepinsky, the larger platform has been helpful in accommodating the supercomputer in the back of the aircraft: "We're not limited by payload or power, we can experiment all we want." **Ted Carlson Photo**



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A SHIFT IN THINKING

Mark Ward is a former U.S. Coast Guard pilot who spent two decades flying Sikorsky HH-60 Jayhawks and Eurocopter (now Airbus) HH-65 Dolphins before his retirement in 2008. Today, as Sikorsky's chief test pilot for SARA, Ward is leveraging that experience — as well as degrees in computer science and aeronautical engineering — as he explores the frontiers of autonomous flight.

According to Ward, when SARA's optionally piloted vehicle system, Matrix Technology, is engaged, "it really is flying the aircraft ... as a pilot I'm there as a safety pilot to ensure that the aircraft behaves in response to the inputs that are being given to it by Matrix. And if not, then I just take the controls away from the Matrix system and fly the aircraft manually."

Ward agreed that his role is similar to that of a flight instructor. "And in some ways too, when the aircraft is on its own and doing its flying, we are there critiquing its behavior and we can then feed that information back to the engineers and make adjustments," he said. "Rather than telling a student in the debrief that you need to add a little right pedal, you can actually tell the engineers and they code it up so the right pedal gets added."

A key difference might be that Ward's "student" — unlike so many human pilots — reliably incorporates that guidance. SARA can now fly traffic patterns autonomously, and has demonstrated more complex autonomous missions, including an approach to a moving barge. Moreover, Ward said, "the aircraft takes off just fine on its own, and as a matter of fact it does a pretty darn good landing, too." When Sikorsky unveiled SARA at the Association for Unmanned Vehicle Systems International (AUVSI) show in 2013, it was presented as a significant step towards the company's long-term vision of creating an aircraft that could transition between dualpilot, single-pilot, and unmanned flight modes as simply as turning a switch. But the emphasis was squarely on its "unmanned" capabilities.

"Somewhere along the line the idea started to shift a little bit, to, 'You know, this type of technology is a great assistance to piloted aircraft, too,'' Ward recalled. So the Sikorsky team, led by director of autonomous programs Igor Cherepinsky, began to explore ways for human operators to take advantage of Matrix Technology. Among other things, they developed a simple, intuitive controller — similar to a 3D drafting mouse — as well as a tablet interface for the system. "When you had the ability to do the long-range planning and execution of a flight with the tablet, and short-distance hover work using the 3D mouse, the two came together really nicely," Ward said.

Around the same time, DARPA announced its ALIAS program. According to a DARPA press release, the program "envisions a tailorable, drop-in, removable kit that would promote the addition of high levels of automation into existing aircraft, enabling operation with reduced onboard crew." By leveraging recent advances in automation technology, ALIAS aims to reduce pilot workload while improving mission performance and enhancing aircraft safety.

DARPA awarded contracts for the first two phases of ALIAS to Sikorsky and Aurora Flight Sciences. In Phase 1, Sikorsky used

The ALIAS program aims to leverage autonomy to reduce workload for human pilots, allowing them to "use their cognitive capability to do much more than manage the systems on the aircraft and certainly more than moving sticks," said DARPA's Graham Drozeski. DARPA also wants to develop the ability for an aircraft to return to base in the event its human pilot becomes incapacitated. **Capt. Brian Harris Photo**



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SARA to complete a 30-mile autonomous flight that was planned and executed using its tablet device. In Phase 2, Sikorsky also integrated its Matrix Technology into a Cessna Caravan. Meanwhile, Aurora demonstrated its autonomy solution on a Caravan and a Diamond DA42, and also used a Boeing 737-800NG simulator to show how it could autonomously land that aircraft in the event of pilot incapacitation.

Late last year, DARPA awarded a contract to Sikorsky for Phase 3 of the ALIAS program. According to Graham Drozeski, a program manager in DARPA's Tactical Technology Office, Phase 3 will likely proceed into 2019 as it continues development of the ALIAS technology on fixed- and rotary-wing platforms, including the H-60.

"The main push for Phase 3 of the program is advancing it towards a transitionable technology that the [U.S.] Army may take charge of under the H-60 program," he said. "There will be some new capabilities demonstrated, and a major thrust is toward getting something that could possibly transition [to] widespread use across the Army."

NEXT-LEVEL SAFETY

In many ways, Ward said, systems like Matrix Technology are the "logical, almost inevitable progression" of the decades-long trend toward increasing automation in the cockpit. What makes them different from the sophisticated automatic flight control systems that exist today is the degree to which they are "aware" of their surroundings and mission objectives.

A contemporary autopilot can fly precise headings and altitudes across a series of pre-programmed waypoints. If it encounters another aircraft equipped with a traffic collision avoidance system, it can take measures to avoid it. But it can't maneuver to avoid unexpected obstacles or terrain, or identify an open landing area in the middle of a dense forest. Matrix Technology, said Ward, is "much more aware of the environment, aware of its mission, and what the operator is intending it to do in a mission sense, not just a waypoint-to-waypoint sense like an autopilot."

Achieving this level of autonomy is significantly harder than programming today's deterministic autopilots. Not only does it require a sophisticated array of external sensors — such as light detection and ranging (LiDAR) systems — it also calls for methods of artificial intelligence that can translate a fire hose of sensor data into safe, sensible flight control inputs. *(For more on the challenges associated with artificial intelligence and aircraft certification, see the September-October 2017 issue of Vertifite, the AHS <i>International Magazine.)* These are enormous technical challenges, but the potential rewards have inspired a number of helicopter manufacturers, not just Sikorsky, to invest heavily in tackling them.

"I think it's tremendous, I really do," said Ward. Speaking as a former search-and-rescue (SAR) pilot, Ward suggested that systems like Matrix Technology could greatly enhance safety by



After flying a full duty day with human crews, an autonomous Black Hawk could potentially be used for unmanned resupply or other missions. **Steven Kaeter Photo**



Ward said that autonomous capabilities will likely prove most valuable in "the night flying, and the heavy weather, and low-visibility conditions. That pucker factor is going to be much less." **Mike Reyno Photo**



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Sikorsky has demonstrated its Matrix Technology in a Cessna Caravan as well as an S-76. With the ALIAS program, according to DARPA's Graham Drozeski, "We're developing a toolkit that is intended to enable putting autonomy in the full spectrum of existing aircraft, and when I say full spectrum I mean from platforms that were built in the '50s without autopilots, through to the latest fly-by-wire aircraft." **Ted Carlson Photo**

reducing pilot workload during complex missions. On an autonomy-enabled SAR mission, for example, "you're not focusing on just flying the aircraft, you're thinking about everything that's happening in the mission: where you're going, what kind of survivor you're expecting to see when you get there — or even if you're going to see the survivor when you get there; how you're going to locate them. You're communicating with other assets in the area. You're doing those human decision things, while the system is taking care of the boring requirement of keeping the aircraft moving through the air in the right direction."

Drozeski, who is a former Army Black Hawk pilot, pointed out, "For years we've been adding more and more avionics and mission systems to the aircraft, and they've been driving us the wrong way in terms of the cognitive margin of the aircrew. ALIAS is a way to alleviate that. By pushing more of the burden of operating the aircraft into the autonomy, it enables the crew to focus on the tasks at hand and to look at the bigger picture."

While autonomous platforms could provide operators with new capabilities — such as the ability to fly more hours in a day with the same flight crew staffing levels — Drozeski said that there is "incredible opportunity" simply in reducing fatalities and mishaps caused by pilot error. "Imagine if no aircraft ever again had a gear-up landing because they missed a step in the checklist," he said. "Imagine controlled flight into terrain not being a leading killer of military aircrews. Those are huge, game-changing capabilities for the platforms."

And the appeal is just as great for the civilian helicopter industry, in which controlled flight into terrain remains a leading cause of fatal accidents. Van Buiten said that Sikorsky has been working closely with the U.S. Federal Aviation Administration (FAA) from the beginning of its Matrix Technology program to explore ways to transition the technology into civil-certified, human-piloted aircraft.

"This technology offers a real path to fundamentally changing the primary cause of fatal accidents for helicopters operating in obstacle-rich environments. I think the FAA is cognizant that there's a big opportunity in enabling this, and that has them showing some flexibility for working on this and basically making it successful," he said.

"Whether it's safety, or cost-reduction, or improved performance on the battlefield, I think we're highly motivated — in the commercial space, in the [military] space — highly motivated to advance this technology. And that's why you're seeing huge investment in the commercial sector. We've got a sense of the importance and the opportunity that's here."



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 can be reached at elan@mhmpub.com and is on Twitter @elanhead.
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The global helicopter community is rallying in response to Africa's rhinoceros poaching problem, sending pilots and aircraft to the front lines. Story by Ben Forrest





Somewhere in the sprawling South African countryside, a small crowd gathered around a white rhinoceros that lay with its mutilated snout in the dirt. Blood poured onto the red-brown earth as an aid worker carefully dabbed a small white cloth around the gaping crater of flesh where the animal's horn once was.

It had been taken by poachers in the kind of heist that is all too common in South Africa. Encouraged by high prices for rhino horn on the black market, poachers are using increasingly sophisticated equipment to track and kill rhinos, using a tranquilizer gun or rifle to bring the animal down and then hacking off its horn with a chainsaw or machete. The rhino is then left to slowly and painfully bleed to death.

Whether the animal survives depends on the severity of the injury and how quickly it receives aid. Thankfully in this case, rescuers found the rhino — named Vrystaat — in time. But hundreds of other white and black rhinos die from such attacks each year in South Africa alone.

Black rhinos were once found throughout sub-Saharan Africa, with the exception of the Congo Basin, according to the WWF, a conservation organization formerly known as the World Wildlife Fund. But relentless hunting saw their numbers quickly decline, with only an estimated 70,000 surviving in Africa by the end of the 1960s. A poaching epidemic then began in the early 1970s, and by 1993, only 2,475 black rhinos were recorded.

The total number of black rhinos in Africa has since grown to around 5,000, and while white rhinos have also rebounded from

the edge of extinction (from a population of less than 100 in the late 1800s to about 20,000 today), poaching remains a significant problem for both species. Poachers killed at least 1,338 rhinos across the continent in 2015, according to data from the International Union for Conservation of Nature (IUCN). This was the highest level since the current poaching crisis began to emerge in 2008, the IUCN reported on its website. Since then, poachers have killed at least 5,940 African rhinos.

According to the African Wildlife Foundation (AWF), powdered rhino horn is used in some countries as a treatment for hangovers, impotence, fever and cancer — though it has been proven to cure none of them. The high demand for rhino horn has pushed the price to nearly \$30,000 a pound — an irresistibly large return for those who see the rhinos as an easy target.

But there is hope. As Africa moves toward the goal of containment, the global helicopter community is moving with it, not only by raising money and awareness, but also by sending pilots and aircraft to the front lines of the rhino's fight for survival.

RHINO 911

Nico Jacobs wakes up every day knowing his heart may break again. But even with the horrifying things he has seen as a pilot for the anti-poaching charity Rhino 911, he still has hope helped by survival stories like Vrystaat's.

"I won't carry on like we are if there's no hope," said Jacobs, who lives in the North West province of South Africa and flies







a Bell 407GT on behalf of Rhino 911. "We wake up every day ... and face what we need to face with a lot of hope and anticipation."

Rhino 911 formed in 2016 after Jacobs met Fred Hees, president of BBM Inc., a defense systems and life support company based in Reno, Nevada. Hees was born in South Africa but moved to the United States more than 20 years ago, starting BBM in 2013. He met Jacobs on a business trip to South Africa, and Jacobs told him about the extent of the poaching problem.

"It just wasn't acceptable to me as a human," said Hees, referring to the poaching epidemic. "The problem has become so prevalent, so outrageous, that I was compelled. It's insane that in my lifetime these animals can disappear."

Hees put a marketing team on the problem, and after further research he brought Jacobs to the U.S. to get him certified to fly the Bell 407GX with night vision goggles.

Then Hees shipped a Bell 407GT to South Africa as a loaner for Jacobs to fly, and they set up Rhino 911. Jacobs estimated he spends between 20 and 25 hours a month responding to calls about poachers, working with partners who can operate the aircraft's forward-looking infrared (FLIR) system if poachers strike at night.

Every situation is different, but Rhino 911 can track poachers with the aircraft and get law enforcement involved, said Hees.

"I think we're making a huge difference," said Jacobs. "Not enough, and I don't know if it'll ever be enough. But we are trying our best, and with the capability that we've got, we are really making a difference."

RHINO AIR

Eric Rudzinski went to South Africa with a film crew in 2015 and met park rangers battling the country's rhino poaching problem. He quickly became concerned about their safety.

"They're really brave people," said Rudzinski, CEO of Rotorzen Helicopters in Chicago and founder of Rhino Air, an anti-poaching charity. "They love the land, and I kind of wanted to be like, 'I want to make sure you guys are safe. I want to have this helicopter. I want to make sure [I can] lead you there safely.' "

Rudzinski saw helicopters as an essential tool, something pilots could use to find poachers at night using advanced thermal technology and guide park rangers on the ground.

"I just saw the terrain would be really easy to use the FLIR, because there's a lot of open areas, tall grass," he said. "They do some night flights without night vision, which is kind of crazy. . . . I just thought it'd be a safety enhancement for the rangers and the aircrew."

He started Rhino Air as a way to contribute to a solution, providing aircraft, fuel, parts, mechanics and pilots trained in night flying who carry out patrols and respond to calls about poachers.

Rhino Air has two helicopters, including an Aerospatiale Gazelle, and two dedicated pilots who engage in anti-poaching efforts. And the cause is quickly gaining traction in many corners of the helicopter industry.

Night Flight Concepts, a Waco, Texas-based firm that provides night vision goggle consulting, training and maintenance services, has joined Rhino Air as a sponsor. So has Boulder, Coloradobased Churchill Navigation, a company that develops and supports an advanced mission management mapping system. *Vertical* Magazine also sponsors the charity, along with Rotorzen and Gyronimo, a media production company that specializes in aviation.



Kruger National Park in South Africa uses Airbus H125 and AS350 B3 helicopters to patrol an area of about two million hectares. **Maj Dei Enslin Photo**





South Africa saw a decrease in rhino poaching in 2015 for the first time in seven years, but the casualties were still staggering. **Rhino 911 Photo**

"Companies are coming on," said Rudzinski. "Things are coming up pretty fast for us."

While South Africa has suffered the bulk of poaching on the continent since 2008, Rudzinski sees the country as a beacon for the rest of Africa.

"They're a land of laws," he said. "They do have that tradition, and [applying the law] is kind of the path they're going on."

LEWA WILDLIFE CONSERVANCY

Mike Watson patrols an area of about 44,000 square kilometers in central Kenya with an MD 530, constantly searching for poachers and monitoring the black rhinos, white rhinos and other animals that roam the beautiful, rugged terrain. The area is so massive that a helicopter is a critical tool, used not only for antipoaching measures, but also to capture and translocate wildlife to other areas.

Despite significant successes in recent years, poaching remains a challenge in Kenya. On the Lewa Wildlife Conservancy, a UNESCO World Heritage Site northeast of Nairobi, 17 rhinos were lost to poachers between 2010 and 2012.

"[A] year later we got the helicopter, and we haven't actually lost a rhino since," said Watson, who serves as Lewa's chief executive officer as well as its only dedicated helicopter pilot. "And also, the numbers of elephant being poached across that broader landscape of 44,000 square kilometers has been massively reduced.

"Now, that's not only because of the helicopter. [There's] been a huge amount of effort and investment in intelligence-gathering and intelligence-based operations and prosecutions, etc. But the helicopter has definitely been a contributing factor to that — being able to deploy an asset like that across the area, with the capacity that it has. It has made a huge, huge difference."

Lewa imported the MD 530 from Flight Trails in Phoenix, Arizona, and hired Bedford, Texas-based Rebtech to make the cockpit fully night vision goggle (NVG)-compatible. A Rebtech technician spent about a week in Kenya in 2014, modifying every light on the aircraft.

"The lighting in the aircraft was modified to meet the Rebtech FAA [Federal Aviation Administration] STC [supplemental type certificate] for the MD 530, which includes all the instruments, displays, panels, annunciators and utility lighting," said Richard Borkowski, president and chief executive officer of Rebtech.

"We actually added additional lights to some of the instruments to make the lighting better than it was prior to the NVG lighting modification."

After the modification and testing was complete, the aircraft was approved and certified by the Kenya Civil Aviation Authority.

Rebtech completed the job for well below cost, Borkowski said, in part because of the picture Watson painted of the trauma animals face at the hands of poachers.

"You can't get that out of your mind," said Borkowski. "To know that people are doing that, not as a life-saving thing but just as a trade, to acquire funding and money, it really annoys you to a great extent."

Despite the cost involved, Borkowski said Rebtech would do it again.

"We can't do it all the time, or we would have about three aircraft left to do and then we'd be broke," he said. "But I think it's probably the most rewarding contract we've done in the last 10 years."

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Night Flight Concepts provided NVGs for the Lewa aircraft, selling them at cost and working with the U.S. State Department to secure licensing requirements at no charge, said company president Adam Aldous.

"It's humbling to even be able to be a part of that, to assist any way that we can," said Aldous. "It's not always about the money, it's what's fulfilling in your soul. ... I'm happy that there's people like that out there, doing what they're doing."

KRUGER NATIONAL PARK

Grant Knight came to Kruger National Park, the largest national park in South Africa, as a game capture student studying nature conservation. He saw how they used helicopters and decided he wanted to return as a pilot, imagining himself being in the air, counting game, doing game captures, being in the wilderness and enjoying the surroundings.

But the reality of his decade or so as chief pilot in Kruger has been brutal at times, marked on many days with people wounded and animals mutilated and killed in a poaching crisis that has become a constant struggle.

"You do get to a point where I think you — don't become hardened, but it's like a medic and an ambulance and all that," he said. "You've got to get to a certain stage where it can't affect you in your day-today work, because it's so often and it's what you're doing all the time."

Kruger has four pilots who patrol the massive, two million-hectare park using two Airbus H125 and two AS350 B3 helicopters.

"We use them specifically for when poachers are detected from those ground teams," said Knight. "We will then go in with the helicopter, specialist rangers, tracking dogs, and assist in the

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follow-up of tracking the poachers."

The helicopters also help redeploy ground forces and sometimes engage in armed contact with poachers. They're also used in a "medevac kind of role" if someone is wounded, said Knight.

"We see ourselves not only as pilots anymore, but more of an air ranger as the role that needs to be taken for conserving the rhino at this stage, which is under threat, and the elephant," he said. "So we have also implemented protections on the aircraft, the person and equipment to help facilitate in the event of being wounded during a contact."

Those protections include removable bulletproof materials for the helicopter floors and advanced medical training so aircrews can treat themselves.

"It's not something that happens every now and then; it's a constant, daily threat," said Knight, referring to poaching activity. "And we're going to [a] shift basis where [on] weekends we even have

one on standby to be able to deal with a threat."

South Africa saw a decrease in rhino poaching in 2015 for the first time in seven years, but the casualties were still staggering. According to National Geographic, 1,175 rhinos were poached in the country in 2015, compared with only 13 rhinos killed in 2007.

While the breadth and depth of the poaching crisis could be a source of despair, there is a sense for Knight, as there is for Nico Jacobs, that his efforts are making a difference. Where there is brutality and unspeakable suffering, there is also hope.

"I'm very sure we're making a difference, and that's what keeps driving us forward," said Knight. "I don't think anybody would do what we're doing unless they can see that it's making a positive effect. It does get demoralizing, the constant attack on the wildlife. I don't think any person can say it doesn't get to them . . . but [we] definitely are making an effect, and it's positive."



Ben Forrest Ben is assistant editor of *Skies* magazine. Before joining MHM Publishing in 2015, he spent the better part of 10 years in the newspaper industry, where he

worked as an editor, sports editor and general assignment reporter.





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SCOTTAGE COUNTRY

Heli Muskoka has been based in the rural retreat of Ontario's Muskoka region since 2015, where it has developed some unique operations to adapt to its environment.

Story by Oliver Johnson Photos by Mike Reyno

A land of over 1,500 lakes, hundreds of islands, vast maple and pine forests and sheer granite cliffs carved by ancient glaciers, the region of Muskoka, about two hours' drive north of Toronto, Ontario, has been attracting visitors from across Southern and Central Ontario for more than a century. Long a destination for palatial country retreats for Canadian captains of industry, Muskoka has also become a favorite second home for many Ontarians, with lakefront cottages passed down through generations of families, who spend long summer weekends playing and relaxing in the region.

But in recent times, the word about Muskoka has spread far beyond the province's borders. The region's three major lakes – Lake Muskoka, Lake Rosseau, and Lake Joseph – are now dotted with multimillion-dollar homes belonging not only to the super wealthy from Canada, but also those from south of the border, including many Hollywood celebrities and sports stars. Google "The Muskokas," and a couple of news headlines give a good impression of how the region is changing. *Muskoka becoming Hamptons of the North as cottage prices top \$25 million* says a *Bloomberg News* story, while a piece in the *New York Times* is simply titled, *Muskoka: The Malibu of the North.*

"The population grows by four or five times easily here in the summertime," Jay McMackin, chief pilot/operations manager of Heli Muskoka, told *Vertical*. Sitting in his office at the company's hangar at a very quiet Muskoka Airport on an unseasonably wet and cold midweek day at the end of June, he reflected on the drastic change the airport alone goes through during peak summer weekends.

"A lot of the Americans come up in their jets, so that southern ramp is chocked with private jets in the summertime. It's quite impressive."

As a playground for the wealthy and super wealthy, it's not hard to see why Heli Muskoka's owners chose the area as the location for their small helicopter company, along with a switch in operational

Heli Muskoka is based in the region of Muskoka, about two hours' drive north of Toronto, Ontario. Dotting the shorelines of its many lakes are some truly spectacular country retreats.

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Heli Muskoka's Airbus AS350 AStar performs the bulk of the company's work, proving particularly useful for lifting operations.



focus from agricultural spraying to utility and tourism work, completed under the watchful guidance of McMackin.

A UTILITY BACKGROUND

The company had previously been based in North Bay, about 150 kilometers further north, but moved south in 2014 soon after McMackin joined the company. A 22-year industry veteran, McMackin grew up in Muskoka before heading north to Sudbury the day after graduating high school to start work on his helicopter license. While he was always destined for aviation, he had originally planned to become an airline pilot, but a co-op course during high school with the Ministry of Natural Resources changed his career path.

"I jumped in a LongRanger with them one day to go to a forest fire in Algonquin Park," he said. "We went in and dropped a crew off at a site on an island, and the helicopter was doing its thing with the skids on a log. That was the first experience I'd had with a helicopter, and it had me hooked right there." After completing his training at Heli-North, McMackin stayed with the operator to learn a variety of utility operations on the job in Northern Ontario. His career then took him to Western Canada, back to Northern Ontario, and south to the Greater Toronto Area, building up his experience and gaining his instructor rating along the way. And when the opportunity came to help York Regional Police establish an air support program, he found the challenge too enticing to resist. He served as the pilot for the program — on a contract held by Silverline Helicopters — for three years, before deciding to join the police force as a constable. After three years on the ground, he returned to the air support unit as a tactical flight officer. All the while, he kept up his flying with the occasional freelance job, which also ensured he maintained currency on his ratings.

One such job was as the training pilot for Aerial Growth Management (AGM) Helicopters in North Bay — a helicopter spray company established in 2012. AGM's owners were fixed- and rotary-wing pilots who knew each other from the decades they had spent living in Yellowknife, Northwest Territories. Sadly, one partner passed away shortly after AGM began operations, with his wife, Jennifer Roth, and brother-in-law, Mark McDonald, taking his place alongside the other partners in the business.

When AGM was looking for a chief pilot in 2014, their positive experience working with McMackin as a training pilot meant his name jumped to the top of their list. McMackin hadn't considered leaving the police, but when the owners said they would move the company close to McMackin's home in Muskoka, he felt it was an opportunity he couldn't pass up. The first year, he worked part time while still with the police to get the operation set up at Muskoka Airport.

"To try and leave flying altogether just wasn't going to be an option for me; it's just too much in my blood," he said. "After that first year of part time, I decided that it was going to be OK to leave the police. You get pretty attached in that environment — you're safe and secure in the police, you've got a good job, you don't have to worry. And then you come back into aviation and it's a bit more of an unknown — but that's still where your passion is, so I had to follow that."





Heli Muskoka's Bell 206L-4 LongRanger. McMackin said the aircraft is popular with the Ontario Ministry of Natural Resources and Forestry for use in surveys.





The Astar holds a hover with a spectacular boathouse in the background. Muskoka is home to some very wealthy individuals, and Heli Muskoka is carving an operational niche in supporting the construction of some of their homes.

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McMackin said the move has been more than worthwhile.

"I hese people are phenomenal to work for. I just let them know what my interest is and what I want to go after, and I run it like it's my own, like it's my money in it, because it's my future. If I can make it succeed, I get to stay here!"

THE MOVE TO MUSKOKA

McMackin's arrival heralded a slew of changes, with the move to Muskoka, a rebranding and restructuring as Heli Muskoka, and a change in operations.

"My background isn't in spray, and knowing the area of Muskoka, it's very tourism-based, so I was hoping to go after more of the tourism side of things," he said.

The owners agreed that it was important for the company to diversify.

"The spray work is really intensive, personnel-wise and equipment-wise, and it's really stringent condition-wise. So, it's a difficult gig," Roth said. "There's just a lot to it, and it's such a short intense season, so you have to branch out, you can't put all your eggs in that one basket."

She said there seemed to be a gap in the market in Muskoka, and the perfect person to exploit it in McMackin.

"Jay's from that area, he knows it very, very well, and there didn't seem to be anybody else really strongly focusing towards the cottage-support industry. The partners thought maybe we could break into that little niche."

After initially renting hangar and office space at Muskoka airport, the company moved into a purpose-built 4,800-square-foot hangar with office space on a mezzanine overlooking the hangar floor in 2015. "

AFTER THAT FIRST YEAR OF PART TIME, I DECIDED THAT IT WAS GOING TO BE OK TO LEAVE THE POLICE. YOU GET PRETTY ATTACHED IN THAT ENVIRONMENT — YOU'RE SAFE AND SECURE IN THE POLICE, YOU'VE GOT A GOOD JOB, YOU DON'T HAVE TO WORRY. AND THEN YOU COME BACK INTO AVIATION AND IT'S A BIT MORE OF AN UNKNOWN — BUT THAT'S STILL WHERE YOUR PASSION IS, SO I HAD TO FOLLOW THAT.

- JAY MCMACKIN, CHIEF PILOT/OPERATIONS MANAGER AT HELI MUSKOKA





The company's fleet includes one AS350 AStar, one Bell 206L-4 LongRanger, and one Robinson R44. McMackin's role is allencompassing, from washing the hangar floor, to advertising the business, scheduling maintenance (completed by Skyline Helicopter Technologies in Sudbury), and working as the company's only full-time pilot. Two contract pilots join him during busier periods, such as during the summer.

While some of the work completed by Heli Muskoka is familiar to most utility operators (firefighting represented about 60 to 70 percent of its flying last year), the company has also developed some interesting niches that are fairly unique to its environment. Among these are the transport of "cottagers" from downtown Toronto directly to their property in Muskoka - and back - each weekend, and aerial construction for the multimillion-dollar homes and boathouses cropping up in the region. And with a wet spring resulting in a lack of firefighting work so far in 2017, the growth in these other markets - largely through word of mouth - is proving crucial.

"With Jay's background in the area, he knows some of the contractors, and word gets around there's a helicopter that can bring things right to them and put them right on site," said McDonald. "It's a market that I think the builders in the Muskoka area didn't have access to previously. . . . Once they've used this service, they can see that it's certainly a good option."

McMackin said he can move about 10,000 pounds of construction material an hour with the AStar, reducing the number of man-hours spent on site, and making the cost if not less overall, at least comparable. Moving expensive material for high-end homes is not without its stresses, but McMackin's origins in long

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Heli Muskoka's AStar in silhouette over a Muskoka lake as the sun sets in "cottage country."

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MOST OF THE TIME WE SEE ANIMALS IN THE PARK — IT'S NOT TOO HARD TO FIND A MOOSE. IN THE WINTERTIME WE'VE FOUND WOLF PACKS — YOU CAN SEE THEM RUNNING ACROSS THE OPEN MARSHES.

- JAY MCMACKIN, CHIEF PILOT/OPERATIONS MANAGER AT HELI MUSKOKA

Last year, 60 to 70 percent of Heli Muskoka's workload was in aerial firefighting, but this year, it has had to pursue other opportunities.

line work in Northern Ontario mean he is well qualified for such precision work.

"I did a pre-fab log cottage last week, where all the walls came in sections that were already built," he said. "They were standing them up vertically as I was coming in, so each time as I came back with another load, I had less and less space to work with as the walls were going up.

"I actually quite like it. I stress about it beforehand and the scenarios are playing through your mind, and then after the job is done it's, 'That was pretty cool, actually.'"

FOCUSING ON COTTAGE SUPPORT

The number of shuttle runs to Toronto is also growing, saving weary commuters not only a good deal of time, but also the stress of navigating through the clogged arteries of the highways leading in and out of the city on summer weekends.

"There are people out there that will spend the money to just charter a helicopter and fly them directly to the cottage on, say, Friday afternoon, and return them on Sunday evening or Monday," said McDonald. "That's one of the things that we'd like to develop



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more so that we can use it as a transportation taxi service almost."

As well as these custom charter operations, Heli Muskoka caters to the more general tourism market, offering sightseeing flights from the airport or resorts out over the region, or over nearby Algonquin Provincial Park.

"A lot of people want to fly around and see the Muskokas, the cottages and the lakes and stuff like that," said McMackin. "Normally I'll set it up that way, and tour around the lakes. And if they want to go off into where there's nobody around, you can go out towards the east here and it's all open rock outcrops, and there's a chance of seeing some wildlife. And depending on the time that they book, we're about 20 minutes to Algonquin Park. Most of the time we see animals in the park — it's not too hard to find a moose. In the wintertime we've found wolf packs — you can see them running across the open marshes."

Fall is also a popular time for helicopter tours, with visitors wanting to take in the beautiful fall colors.

In terms of future development, McMackin said he hoped to secure some exploration work as that market rebounds, and hasn't ruled out the possibility of offering training.

For now, the company's streamlined structure has allowed it the maximum flexibility as it negotiates the challenges of being a new company in an industry that's enduring a general downturn.

"The industry is kind of low at the moment, and there's not a lot you can do about that, so I guess the big challenge is just trying to find innovative ways to get around the stuff that we can control," said Roth. "Jay's got a good imagination and he's exploring different aspects of cottage support. We're still very much a young company trying to just find our way through."

> Launching a helicopter company in the current environment hasn't been easy, but Heli Muskoka's operational diversity means it is well placed for the eventual industry upturn.

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A PhilJets Airbus H130 flies over a picture-perfect piece of Philippine coastline.



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The owners of Manilla-based PhilJets founded the company to improve aviation access across the Philippines — as well as the country's reputation within the aviation industry.

Story by Oliver Johnson | Photos by Anthony Pecchi





Philipets currently has six aircraft in its neet (including three H130s), and manages one other

A sprawling archipelago of over 7,000 islands, containing densely-packed megacities, remote volcanoes, emerald rice fields and white sandy beaches — all separated by glistening turquoise seas — the Philippines would appear to be a perfect fit for helicopter transport. Yet, there are just 150 rotary-wing aircraft — private and commercial — in operation in the country. For one of the newest entrants in the market, Manila-based PhilJets, this represents a huge opportunity. The company hopes to fundamentally change the country's relationship with helicopters, democratizing their utilization with a leaseback-based management model that will soon see its fleet numbers reach double figures.

PhilJets was founded in 2013 by entrepreneur Thierry Tea. Born and raised in France to Cambodian-born parents, Tea told *Vertical* he had always wanted to become an entrepreneur. After completing an internship with Airbus Helicopters, he applied to work for the manufacturer at one of its overseas subsidiaries, ultimately securing a role in its Philippines branch. "It was a country I really didn't know about," he said, but the position would give him the opportunity to develop his skills and experience.

Tea quickly rose through the ranks, becoming a regional sales manager, then CEO of Airbus Helicopters Philippines, then coun-



try manager for Airbus Group. "In five years, I had achieved what I wanted to achieve," he said. "After being initially rejected from two positions to becoming the youngest CEO of a subsidiary in the group was quite a breakthrough."

Tea then received an offer to join an investment firm, but ultimately decided to start his own company — PhilJets — instead. The company was established with two key objectives: firstly, to become the leading carrier in the Philippines; and secondly, to promote aviation in the country. Regarding the latter, there was a European Union ban on Philippines-based carriers in place at the time (subsequently lifted in 2015), and the U.S. Federal Aviation Administration had downgraded the Philippines to a Category 2 rating for its aviation infrastructure and support (it was revised to Category 1 in 2014).

"There was basically some very negative images of Philippine aviation, which was something I thought there was a need to reverse and to really improve so that tourists and investors could appreciate the beauty of the country," said Tea. "I wanted to promote the image of the Philippines, promote aviation in the Philippines, [and] to show to the region and the world that it's safe to fly in the Philippines — that there's a good standard."



DIGITAL BONUS DB PHILJETS



The company has quickly grown its fleet utilizing a sale-and-leaseback model that was inspired by the airline industry. CEO Thierry Tea described it as a "win-win" situation for the aircraft's owners and the operator.



Corporate/VIP operations make up the bulk of PhilJets' charter flights, followed by tourism and utility operations.



PhilJets recorded just over 1,000 flight hours in 2016, but is well placed to grow that number having now established a presence in the Philippines' aviation industry.

Originally established to provide maintenance and to help third parties buy and sell aircraft, PhilJets soon expanded into operations after purchasing Zenith Air in 2013.

"We decided to buy it, develop it and to renew the AOC [air operator's certificate], which was expiring . . . and basically set it up at more of an international standard," said Tea.

"Because we did not have money to simply buy our own aircraft, we decided to look for aircraft owners to offer to manage their aircraft, and to lease some aircraft to be able to charter them out," he said. "This concept also helps aircraft owners maintain more of the value of their aircraft, with us providing good documentation, good maintenance, and good management planning."

Despite the sound business plan, owners were not easily won over. But the success of the first aircraft — which recorded just under 300 hours for the owner in the first year with PhilJets persuaded others of the benefits of the company's approach.

"Our first charter contract with the TV Show *Survivor* was a success, and once we got a few aircraft under management and under lease, we then got more interest from other owners and lessors," said Tea.

EXPANDING THE FLEET

Today, the PhilJets Group comprises PhilJets Aero Services, PhilJets Aero Charter, and its parent company Starline Global Industries. PhilJets Aero Services provides distribution and sales of components, spare parts, software and tooling to the aviation industry in the Philippines and Association of Southeast Asian Nations (ASEAN) region, as well as light maintenance repair and overhaul (MRO), sales, and investment in local start-ups.

Starline provides business and network development, strategic partnerships, aircraft sales and consolidates purchases for the PhilJets Group.

Finally, PhilJets Aero Charter Corp. is the group's air transportation company, providing chartering and management services to private sector customers and government agencies in the Philippines. This operational branch was previously known as Zenith Air, but was rebranded following its acquisition by PhilJets.

The company is based at Manila Domestic Airport, where it has both offices and hangars. It currently has six helicopters in its fleet, and manages one other. These include one Airbus AS350 B2, one Bell 407, and one EC130 B4, with the remainder being Airbus H130s. Two more H130s and an H145 are set to join the fleet before the end of the year. (The company also operates two business jets: a Cessna Citation XLS+ and a Bombardier Challenger 350.)

"We bought our first aircraft in 2013 and leased our first aircraft in 2014," said Tea. "We got inspired from the sale-and-leaseback scheme of the airlines. We decided to buy aircraft from the manufacturers with some partners who acquire the aircraft either with us or from us, and then we enter into a lease program — they lease it back to us, basically. . . . It is a win-win and a long-term mutually beneficial relationship."

A CORPORATE FOCUS

PhilJet's charter operations include corporate/VIP, tourism and special events, aerial filming/photography, mining, aerial survey, and sky shuttle to beat the hectic Manila traffic. It also provides emergency medical services (EMS) and search-and-rescue functions when required.

In terms of operational considerations, the weather conditions are always a challenge, said Tea. "Sometimes it's unpredictable:



You have typhoons, you have storms, and then you have a lot of water all around," he said. "Because we are in the Pacific, in the South China Sea, and because we fly a lot over water and in conditions that are not always calm and quiet, we have to always have the upmost vigilance."

The majority of the company's charter flight hours are recorded on corporate and VIP flights, with about 20 percent of the hours flown in tourism work, and 10 percent in utility. The company recorded more than 1,000 flight hours in 2016, and while Tea

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YOU HAVE MORE THAN 10,000 HELICOPTERS IN THE U.S.; IN THE PHILIPPINES, YOU HAVE ONLY ABOUT 150-PLUS HELICOPTERS. SO BASICALLY, THERE'S HUGE ROOM FOR IMPROVEMENT AND FOR HELICOPTER USE. admitted that this was a small number compared to some North American operators, he said PhilJets is well placed to grow its hours having established itself as a leading aviation company in the Philippines.

"Aviation is still seen in the Philippines as kind of a luxury, but we have been educating the market to try to basically democratize it a little bit and compare it with more mature markets like the U.S. and Europe, where flying a helicopter or a business jet is very common," he said. "You have more than 10,000 helicopters in the U.S.; in the Philippines, you have only about 150-plus helicopters. So basically, there's huge room for improvement and for helicopter use."

According to Tea, the company is looking to expand its EMS operations, and is in negotiations with a few suppliers about developing the level of EMS equipment it can carry.

"We don't have a dedicated aircraft for EMS," he said. "We are waiting for the 145, actually, because we have a few partners, including International SOS and local institutions, that require a twin engine. At the moment, we are limited by our aircraft types, as everything is single-engine."

From the initial staff of two in 2013, it now employs 55, including nine pilots (soon to be 11), and 25 maintenance and operations personnel.

Tea said that finding — and keeping — qualified staff was a challenge. "It's always difficult to find experienced, talented personnel, and pilots even more so, considering the fact we are in very strong competition with airlines, especially," he said. "This is also the reason why we train and try to grow our team members. Our first employee Matea Delen, is our co-founder and has grown to become our General Manager. Education and training is in our focus for the future."



Working within an archipelago means much a great deal of time over water. Tea said conditions could change quickly, so pilots need to have the upmost vigilance.



The company has about 25 maintenance and operations personnel, finding stiff competition from the airline industry for the country's talent.





Thierry Tea, PhilJet's founder, stands alongside an H130. Tea previously held several leadership positions at Airbus, becoming the youngest CEO of a subsidiary in the group.



REGIONAL GROWTH

In terms of future growth, Tea said he was looking at adding hangar space in Cebu and Davao, in the center and south of the Philippine archipelago, respectively; while offices may be added in Palawan — an important tourism destination — as that segment of operations grows.

But Tea is also eyeing expansion beyond the borders of the Philippines, with Cambodia, Thailand, Malaysia and Vietnam in his sights. However, he admitted that such a move is far from straightforward. "Yes, it is ambitious and challenging — it has been our plan for two and a half years already, and the reason why we have not done it yet is because it's challenging, so we have to change our plan," he said. While the original thought was to create a new company from scratch in each country, PhilJets now plans to partner with existing operators to grow their business with them.

"We can bring in pilots, we can bring in expertise, personnel,

documentation, planning, marketing and sales support, as well as even financial support with some financial partners," he said. "We are looking at different options, and at the moment we have some positive developments. We have not yet launched anything officially, but we are in a very good position."

Growing new business — rather than attempting to take existing business off other operators — has been the key to PhilJet's success to date, said Tea. It has also enabled the company to play its part in developing the reputation of the Philippines within aviation circles.

"Thanks to our innovation, productivity, persistence and through applying international standards, we have managed to grow business and become one of the leading operators in the Philippine market," he said. "We believe there is still more potential, to satisfy more customers and to add more aircraft types, so we are always looking out for new partnerships and for more collaboration with international carriers — and we definitely want to invite any aviation lovers to come flying in our region."



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An Entrol H15/EC155 FNPT trainer. The company, based in Madrid, Spain, produces a range of FNPT and FTD simulators, for both fixedand rotary-wing aircraft, used around the world. **Entrol Photo**

Next-Gen

What we can expect from the next generation of simulators? We spoke to the simulator manufacturers to find out. **By Howard Slutsken**

The designers of flight simulators are masters of illusion. Whether it's a procedures trainer or an "I-can't-believe-these-visuals," fullmotion helicopter simulator, a session in a sim can stimulate, or even overwhelm the senses. Invaluable for instruction and recurrent training, pilots train for things in a sim that they hope they'll never see in real life — and can come out of a simulated flight dripping in sweat.

Although the basic concept of a simulator hasn't changed for decades, the unrelenting advancement of visual and computing technologies have resulted in highly realistic training environments. Augmented reality (AR), virtual reality (VR), and mixed reality (MR) are the shiny new tech toys appearing in many sectors, and they may migrate to helicopter training.

VR is totally immersive, with a user wearing a visual display and having a method of interacting with the digital environment. AR users wear a see-through display, and the system overlays information on the user's field of view. A head-up display is an example of AR, with flight instrument data displayed while the pilot stays "eyes out." MR combines the two, where users can manipulate physical and digital elements in the real world.

Will this tech surface in sims? And what other interesting projects are underway? To find out, *Vertical* reached out to several simulator manufacturers.



The helicopter industry may have been slow to embrace the use of simulators in training, but their benefits are now appreciated across a huge variety of operational sectors. **Mike Reyno Photo**



Operating since 2005, Entrol manufactures simulators for machines from the Cabri G2 right up to the Bell 412 and AW139. "Each year we try to develop two new helicopter models," said Navacerrada. "We have focused on helicopter simulators and we offer flight training device [FTD] specific quality for the costs of flight and navigation procedures trainers [FNPT]. We entered the market without preconceptions — that way, our flight modelling and certification 'know how' are different from the standard approach. Our approach means a significant cost reduction and we have been able to pass the efficiencies to the end-customer."

Entrol has enhanced its simulators with the development of a spherical visual system that accesses high-resolution scenery databases, and a vibration system. "We have seen significant improvements in image generators and databases," said Navacerrada. "They are reaching the level of [the] gaming industry, there is plenty of satellite imagery, and environments are more realistic than ever."

IMPROVING THE VIEW

Last year, FlightSafety International celebrated its 65th year of operations. In addition to its wide-range of fixed-wing simulators, the company has 24 helicopter full-flight sims and advanced training devices in facilities from Dallas, Texas, to Stavanger, Norway, covering a diverse lineup of machines from all major manufacturers.

The view out the window has seen the greatest improvements over the past 10 years, said Scott Goodwin, general manager, simulation. "The biggest change is the increased simulation fidelity that is possible through advances in computer technology," he said. "Increased processing speed and storage make technologies such as photo realistic visual displays possible, vastly increasing the realism of the simulation."

To have the visuals look as realistic as possible, new processors have the capability to crank up the frame rate on the display equipment. "Most of our delivered systems now support 120Hz frame rates to deliver the highest, artifact-free resolution to critical dynamic training tasks," said Ed Koharik, general manager, visual systems. "We have shown that for the most critical training tasks, faster pixels beat more pixels and have configured our systems accordingly."

And as AR technology migrates to cockpits, there's a bit of wheelwithin-a-wheel process unfolding, said Koharik. "If AR gains a foothold in the real world, we will need to simulate it."
A Frasca AS350 Level 7 flight training device.

FlightSafety is keeping its focus on displays, and Koharik sees continued improvements in the technology. "After dynamic resolution, improved system contrast is probably the next area ripe for improved end user experience," he said. "We are working on a range of optical and digital techniques to improve system contrast. We are rapidly advancing our display mirror, dome, and screen configurations and manufacturing capabilities."

Hand-in-hand with the improvements in simulation technology, the company has introduced a new training methodology called Operational Day Flow, where pilots learn tasks and procedures according to phase of flight, rather than being introduced to them one system at a time.

REPRODUCING A REALISTIC HOVER

The team at Urbana, Illinois-based Frasca International have developed new innovations that address two limitations in helicopter simulators: the challenge of reproducing a realistic hover, and the tendency of pilots to "chase" the sim.

"We designed this system to increase the fidelity and the accuracy of simulating hover," said Randy Gawenda, business development manager for Frasca. "Since we are not moving a lot of weight — we are just moving the cockpit, not the motion base, frame, visual screen, and projectors — we are able to deliver









simulators. The system is designed to increase the fidelity and the accuracy of simulating a hover.





motion and vibration cues at a 60 Hz rate which provides the proper timing of onset cues, the seat-of-the-pants 'feel.' "

The company's SimAssist detects pilot-induced oscillations in a simulator and reduces flight control sensitivities, allowing pilots to quickly acclimatize to the sim. "It can also help ab-initio students. If you were to think of SimAssist as the instructor riding the controls while you fumbled around trying to hover, you would have the same thing, just via the software," said Gawenda. "The interesting feature is that the software is adaptive, so it will automatically adjust based on the changes in student performance that the system detects.

"For students doing self-paced learning, it can keep them 'in the envelope' and help them towards producing the muscle memory required to make controlled, minute inputs to the flight controls."

Frasca specializes in rotorcraft simulation, and has developed equipment from cockpit procedures trainers to Level D full-flight simulators for machines from the R22 up to S-92- and EC225sized aircraft, according to Gawenda. At TRU Simulation + Training, Troy Fey, vice president of technology, said improving helicopter safety remains a significant challenge. "I truly

believe simulator training needs to play a bigger role in the solution," he said. "Time will tell whether regulation changes support my belief."

While Fey doesn't see any specific new technology changing the fundamental nature of flight simulators, he does look to technology to improve the rate and effectiveness of learning. "I'd expect simulator standards and regulations to evolve as technology and industry demand warrant it. Before that, I expect we'll see more training in a wide variety of non-qualified devices; they'll provide cost effective opportunities to better prepare pilots."

TRU builds simulators for Bell, Leonardo and Airbus machines, and Fey says that the company's approach to sim development is a mix of art and science. "The 'secret sauce' is and always has been the way in which we develop and integrate complex physics based models with the simulator cueing systems — it's scientific methodology practiced by artisans."

And while TRU is evaluating AR and VR, Fey says that "we're not getting too caught up in them. We are exploring many other means to advance training and human performance."

EXPLORING NEW TRAINING CONCEPTS

Montreal-based CAE has been producing flight simulators since the mid-1950s. In 1982, CAE was the first to develop what is now known as a Level D simulator. Alongside its joint-venture partners, CAE has deployed over 20 full-flight simulators across its global civil aviation training network for

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CAE's Level D S-92 full flight simulator in Mount Pearl, Newfoundland, allows search-and-rescue crews to practice operations in the exact conditions and environment in which they operate the real aircraft. **Heath Moffatt Photo**



Bell, Airbus, Leonardo and Sikorsky helicopters.

Nick Leontidis, CAE's group president, civil aviation training solutions, said that the company is "monitoring" AR and VR technology, and is "exploring and testing a few concepts as we see potential in the areas of ground school training solutions. We are also leveraging technology advances from our healthcare division." That technology is the CAE VimedixAR, an ultrasound training simulator integrated with the Microsoft HoloLens, allowing learners to interact and move freely within a clinical training environment that is augmented with holograms.

Last year, CAE announced the launch of the validation phase of its Next Generation Training System in partnership with airline AirAsia. "The system uses the latest technology, big data and analytics in a process that provides instructors with opportunities to assess objectively, better read the data, and understand the strengths and weaknesses of each pilot," said Leontidis.

Recognizing the challenges facing the sector and helicopter training in particular, Leontidis says that "CAE will continue to monitor the market and evolve its strategy accordingly, leveraging technology advances in commercial, business and military aviation training."

There's little argument that safety and ongoing training are



simulator in 1982. It has deployed more than 20 FFS for helicopters. Heath Moffatt Photo

inexorably linked, an opinion shared throughout the industry.

"The main driver for changes in training within the helicopter industry is the increased focus and emphasis on safety," said Steve Phillips, FlightSafety's vice president of communications. "This is resulting in more frequent in-depth training using advanced Level-D qualified simulators as opposed to training in an actual helicopter."

Entrol's Navacerrada believes that advances in helicopter simulator technology can narrow the gap between fixed- and rotarywing pilot training. "Helicopter pilots can receive more training, similar to fixed-wing commercial training where the use of simulators is very standardized," he said. "We hope that helicopter pilots will get as much synthetic training as fixed-wing pilots. The key to this goal is to reduce operating and purchase costs of the helicopter simulators."



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

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Compared to its fixed-wing cousin, the helicopter industry may have been a little slow to embrace the use of simulators in training. But it's certainly making up for lost time. The number of helicopter simulators has mushroomed in recent years, growing in both longstanding centers and in brand new facilities that are springing up around the globe. To help you keep track of what's where, *Vertical* consulted with helicopter OEMs and sim manufacturers to create the definitive list of every full flight simulator and flight training device (down to Level 5 in capability) available for use by civilian pilots around the world.

Where in the world?

The location of facilities offering training in civilian helicopter simulators and flight training devices (above level 5).







_ 1 _

ABU DHABI AVIATION

Abu Dhabi, U.A.E. Leonardo Helicopters - AW139 (FFS D; EASA) Manufactured by: CAE Bell Helicopter - Bell 412EP (FFS D; EASA) Manufactured by: CAE

_ 2 _

ADAC HEMS ACADEMY

Sankt Augustin, Germany Airbus Helicopters - EC135 P2+/T2+ (FFS A; LBA, MTRF, ANACA, ANAC) Manufactured by: cueSIM

Airbus Helicopters – EC145 (FFS A; LBA, MTRF, ANACA, ANAC) Manufactured by: cueSIM

*Airbus Helicopters - H145 (FFS D; in development) Manufactured by: Reiser

— **3** —

AIR EVAC LIFETEAM

O'Fallon, Missouri Bell Helicopter - Bell 206L (FTD 7; FAA) Manufactured by: Frasca

- 4 -

AIR METHODS/FSI DENVER LEARNING CENTER

Denver, Colorado Airbus Helicopters - AS350 B3

(FFS D; FAA)

Manufactured by: FSI Airbus Helicopters - EC135 (FFS D; FAA, TC, ANAC) Manufactured by: FSI *Airbus Helicopters - EC130 T2 (FFS D; in development) Manufactured by: FSI *Bell Helicopter - Bell 407GX (FFS D; in development) Manufactured by: FSI

— **5** —

AIRBUS HELICOPTERS TRAINING SERVICES (AHTS

Singapore Airbus Helicopters - AS365 N3 (FFS B; FAA) Manufactured by: Thales

- 6 -

AIRBUS HELICOPTERS TRAINING SERVICES (AHTS)

Aberdeen, U.K. Airbus Helicopters - EC225 Super Puma (FFS B; EASA) Manufactured by: Indra

- 7 -

AIRBUS HELICOPTERS TRAINING SERVICES (AHTS)

Beijing, China Airbus Helicopters - EC225 LP (FFS B; CAAC) Manufactured by: Indra

- 8 -**AIRBUS HELICOPTERS TRAINING SERVICES (AHTS)**

Donauwörth, Germany Airbus Helicopters - EC135 P2+ (FFS B; EASA) Manufactured by: Indra Airbus Helicopters - H145 (FFS B; EASA) Manufactured by: Indra

_ 9 _

AIRBUS HELICOPTERS TRAINING SERVICES (AHTS)

Grand Prairie, Texas Airbus Helicopters - AS350 B2/3 (FFS B; FAA) Manufactured by: Indra

Airbus Helicopters - EC135 P2+ (FFS B; FAA) Manufactured by: Indra

Airbus Helicopters – EC145 (FFS B; FAA)

Manufactured by: Indra

- 10 -

AIRBUS HELICOPTERS TRAINING SERVICES (AHTS)

Kobe, Japan Airbus Helicopters – EC135 (FFS C; JCAB) Manufactured by: Indra



- 11 -**AIRBUS HELICOPTERS TRAINING SERVICES (AHTS)**

Kuala Lumpur, Malaysia Airbus Helicopters - EC225 LP (FFS B; JPAM) Manufactured by: Indra

- 12 -**AIRBUS HELICOPTERS TRAINING SERVICES (AHTS)**

Rio de Janeiro, Brazil Airbus Helicopters - EC225 LP (FFS B: ANAC) Manufactured by: Indra

- 13 -

AVIA TRAINING CENTER

Kremenchuk, Ukraine Mil Helicopters - Mi-171 (FFS D; EASA)

Manufactured by: Avia Mil Helicopters - Mi-17V-5 (FFS D; EASA)

Manufactured by: Avia Mil Helicopters – Mi-8 (FFS D; EASA)

Manufactured by: Avia

- 14 -

BELL TRAINING ACADEMY

Fort Worth, Texas Bell Helicopter - Bell 206B-3/L4 (FTD 6: FAA)

Manufactured by: Frasca

Bell Helicopter - Bell 407 (FFS B, STD 3 (rotary wing); FAA, EASA) Manufactured by: Frasca

Bell Helicopter - Bell 407 (FTD 6: FAA)

Manufactured by: Frasca

Bell Helicopter - Bell 407GX (FFS B, STD 3 (rotary wing); FAA, EASA)

Manufactured by: Frasca

Bell Helicopter - Bell 429 (FTD 6; FAA)

Manufactured by: Frasca

*Bell Helicopter - Bell 505 (FTD 7; in development) Manufactured by: TRU

*Bell Helicopter - Bell 412EPI (FTD 7; in development) Manufactured by: TRU

*Bell Helicopter - Bell 525 (FFS D; In development)



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- 15 - BELL TRAINING ACADEMY

Valencia, Spain Bell Helicopter — Bell 429 (FFS D; EASA, FAA) Manufactured by: TRU

— **16** —

BRISTOW GROUP

Aberdeen, U.K.

Airbus Helicopters — EC225 Super Puma (FFS B, STD 3 (rotary wing); EASA)

Manufactured by: Frasca

Sikorsky — S-76C++ (FFS B, STD 3 (rotary wing); EASA) *Manufactured by: Frasca*

Sikorsky — S-92A (FFS B, STD 3 (rotary wing); EASA) *Manufactured by: Frasca*

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Aberdeen, U.K.

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– 18 –

CAE BRUNEI MULTI-PURPOSE TRAINING CENTRE (MPTC) Rimba. Brunei

Sikorsky – S-92 (FFS D; EASA) Manufactured by: CAE

– 19 –

CAE DUBAI TRAINING CENTRE (EMIRATES-CAE)

Dubai, U.A.E.

Bell Helicopter — Bell 212/412 (FFS D; GCAA) Manufactured by: CAE

— **20** —

CAE MEXICO CITY TRAINING CENTRE

Mexico City, Mexico

Bell Helicopter — Bell 212/412 (FFS D; MDGAC) Manufactured by: CAE

- 21-

CAE NEW YORK CITY TRAINING CENTRE

Morristown, New Jersey

Sikorsky — S-76B/C+ (FFS D; FAA) *Manufactured by: CAE*

— **22** —

CAE OSLO TRAINING CENTRE Oslo, Norway

Airbus Helicopters — EC225 Super Puma (FFS D; EASA) Manufactured by: CAE

Sikorsky – S-92 (FFS D; EASA) Manufactured by: CAE

– 23 –

CAE SÃO PAULO CONGONHAS TRAINING CENTRE

São Paulo, Brazil Sikorsky — S-76C+

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Sikorsky — S-92 (FFS D) Manufactured by: CAE

– 25 –

CAE STOCKHOLM TRAINING CENTRE

Stockholm, Sweden

Bell Helicopter — Bell 212/412 (FFS D; EASA)

Manufactured by: CAE

Airbus Helicopters — AS332L/L1 Puma (FFS C; EASA, FAA) *Manufactured by: Thales*

Sikorsky – S-61N (FFS C; EASA) Manufactured by: Thales

- 26 -CAE VANCOUVER AT AIR CANADA TRAINING CENTRE

Vancouver, British Columbia

Sikorsky — S-76C+ (FFS B; TC) Manufactured by: cueSIM Sikorsky — S-76C++ (FFS B; TC) Manufactured by: cueSIM

– 27 –

CAE-LIDER São Paulo, Brazil Leonardo Helicopters — AW139 (FFS D; ANAC, FAA) Manufactured by: CAE/Leonardo

– 28 –

CARDIFF AVIATION TRAINING

Cardiff, U.K. Sikorsky – S-61N (FFS B; UKCAA) Manufactured by: Thales

— **29** —

CENTRAL OREGON COMMUNITY COLLEGE

Bend, Oregon **Robinson** — R44 (FTD 5; FAA) *Manufactured by: Frasca* - 30 -CESIFAMET HELICOPTER TRAINING CENTER

Colmenar Viejo, Spain

Airbus Helicopters – AS332 L1/AS532 L1 (FFS D; EASA) Manufactured by: Indra

Boeing — CH-47D (FFS D; EASA)

Manufactured by: Indra

Airbus Helicopters — EC135 T2+ (FFS D; EASA) Manufactured by: Indra

– 31 –

COPTERSAFETY

Helsinki, Finland Leonardo Helicopters — AW139 (FFS D; EASA) Manufactured by: CAE/Leonardo

*Airbus Helicopters — H125 (FFS D; in development)

Manufactured by: TRU

*Airbus Helicopters — H145 (FFS D; in development) Manufactured by: TRU



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*Leonardo - AW139 (FFS D; in development) Manufactured by: TRU

*Leonardo - AW169 (FFS D; in development) Manufactured by: TRU

*Leonardo - AW189 (FFS D; in development) Manufactured by: TRU

- 32 -

ECOCOPTER

Santiago, Chile **Airbus Helicopters** – EC135

(FTD 5: DGACC) Manufactured by: Frasca

*Airbus Helicopters - AS350B (FTD 5; in development) (April 2017) Manufactured by: Frasca

- 33 -

ERA TRAINING CENTER

Lake Charles, Louisiana

Airbus Helicopters - AS350 B2 (FTD 6: STD 2, FNPT2 MCC FAA, EASA) Manufactured by: Frasca

Leonardo Helicopters – AW139



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(FTD 6, STD 2; FAA, EASA) Manufactured by: Frasca

Airbus Helicopters - EC135 P2+ (FTD 6; FAA) Manufactured by: Frasca

- 34 -

FAASA AVIATION

Seville, Spain Bell Helicopter - Bell 412HP (FFS B; EASA) Manufactured by: Indra

- 35 -

FLYING DRAGON ACADEMY

Harbin, China **Robinson** – R44 (FTD 5; CAAC) Manufactured by: Frasca

- 36 -

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Bell Helicopter – Bell 412 (FFS D; FAA, EASA, TC, MDGAC, ANAC) Manufactured by: FSI

Airbus Helicopters – EC135 (FFS D; FAA, TC, ANAC) Manufactured by: FSI

- 37 -

FSI FARNBOROUGH LEARNING CENTER

Farnborough, U.K. Sikorsky - S-92 (FFS D; EASA, ANAC, MDGAC, FAA) Manufactured by: FSI

- 38 -**FSI LAFAYETTE LEARNING CENTER**

Lafayette, Louisiana Bell Helicopter – Bell 206B/L3 (FTD 7; FAA, TC, MDGAC, ANAC) Manufactured by: Frasca









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Bell Helicopter — Bell 407 (FTD 7; FAA, TC, MDGAC, ANAC) Manufactured by: Frasca

Sikorsky — S-92A (FFS D; FAA, TC, ANAC) Manufactured by: FSI

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Sikorsky — S-76C+/C++ (FFS D; FAA, TC, ANAC) Manufactured by: FSI

Sikorsky — S-92 (FFS D; FAA, TC, ANAC) Manufactured by: FSI

***Sikorsky** — S-76B (FFS D; in development)

- 39 -FSI NORWAY AS

Stavanger, Norway

Sikorsky — S-92 (FFS D; EASA) Manufactured by: FSI

- 40 -FSI SINGAPORE LEARNING CENTER

Singapore Sikorsky — S-76C+/C++ (FFS D; FAA) Manufactured by: FSI

Sikorsky — S-70i (FFS D; FAA) *Manufactured by: FSI*

- 41 -

FSI WEST PALM BEACH

LEARNING CENTER

West Palm Beach, Florida

Sikorsky - S-70

(FFS D; FAA, MDGAC)

Manufactured by: FSI

Sikorsky — S-76C+/C++ (FFS D; TC, EASA, FAA, CAAC, ANAC) *Manufactured by: FSI*

Sikorsky — S-76D (FFS D; TC, EASA, FAA, CAAC, MDGAC) *Manufactured by: FSI*

Sikorsky — S-92 (FFS D; TC, MDGAC, FAA, CABD, CAAC) *Manufactured by: FSI*

— **42** —

GAZPROMAVIA AVIATION

Moscow, Russia Mil Helicopters — Mi-171 (FFS D; MTRF) Manufactured by: Transas

Mil Helicopters — Mi-8MTV (FFS D; MTRF)

Manufactured by: Transas

Mil Helicopters — Mi-8T (FFS D; MTRF) Manufactured by: Transas

– 43 –

GULF HELICOPTERS Doha, Qatar

Leonardo Helicopters – AW139 (FFS B; EASA)

Manufactured by: cueSIM

Leonardo Helicopters – AW189 (FFS C; EASA) Manufactured by: Leonardo

_ 44 _

HATSOFF TRAINING CENTRE (CAE/HAL)

Bangaluru, India

Airbus Helicopters — AS365 N3 (FFS D; DGCA, EASA) Manufactured by: CAE

Bell Helicopter — Bell 412EP (FFS D; DGCA, EASA) Manufactured by: CAE

HAL – Dhruv (FFS D; DGCA) Manufactured by: CAE

- 45 -

HELI CENTER TOPLICE

Krapinske Toplice, Croatia Mil Helicopters — Mi-17-1V (FFS D; EASA) Manufactured by: Transas



Mil Helicopters — Mi-171 (FFS D; EASA) Manufactured by: Transas

— **46** —

HELI-UNION TRAINING CENTER

Angouleme, France

Airbus Helicopters — AS365 N3 (FFS B; EASA) Manufactured by: Thales

- 47 -HELICOPTER FLIGHT TRAINING CENTER, (METRO AVIATION)

Shreveport, Louisiana

Bell Helicopter – Bell 407/407GX (FTD 7; FAA, ANACA) Manufactured by: Frasca

Airbus Helicopters — AS350 B2

(FTD 7; FAA, TC, ANACA) Manufactured by: Frasca

Airbus Helicopters — EC135 (FFS D; FAA, TC, ANACA) Manufactured by: FSI Airbus Helicopters – EC145 (FFS D; FAA) Manufactured by: FSI

— **48** —

HELISIM CENTRE (AIRBUS HELICOPTERS/DCI/ THALES)

Marseille, France

Airbus Helicopters — H175 (FFS D; EASA)

Manufactured by: Indra

Airbus Helicopters –

AS332 L1 Super Puma (FFS D; EASA, FAA)

Manufactured by: Thales

Airbus Helicopters – AS332 L2 Super Puma (FFS D; EASA)

Manufactured by: Thales Airbus Helicopters –

AS365 N2 (FFS D; EASA)

Manufactured by: Thales Airbus Helicopters – H155

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(FFS D; EASA, FAA) *Manufactured by: Thales* Airbus Helicopters – H225

(FFS D; EASA, FAA) Manufactured by: Thales

— **49** —

HNZ GROUP, FTD/STD

Edmonton, Alberta

Airbus Helicopters — AS350 B2 (FTD 7; TC) Manufactured by: Frasca

Airbus Helicopters — AS350 B3 (FTD 7; TC) Manufactured by: Frasca

— **50** —

HORIZON INTERNATIONAL FLIGHT ACADEMY, FNPT II

Al Ain, U.A.E.

Bell Helicopter — Bell 407 (FNPT II/FTD 5; EASA) Manufactured by: Frasca

- 51 - INFINITY SUPPORT SERVICES

Riyadh, Saudi Arabia Sikorsky — S-92A (FFS D; GACA) Manufactured by: FSI

- 52 - KOREA FOREST SERVICE

Daejeon, South Korea Airbus Helicopters — AS350 B2 (FTD 7; FAA) Manufactured by: Frasca

- 53 - LEADING EDGE AVIATION Bend, Oregon

Robinson — R44 (FTD 5; FAA) Manufactured by: Frasca

- 54 -LEONARDO TRAINING ACADEMY, FFS

Stavanger, Norway Leonardo Helicopters — AW101 (FFS D) Manufactured by: CAE/Leonardo

- **55** - **LIFEFLIGHT HEMS ACADEMY** *Brisbane, Australia*

Leonardo Helicopters – AW139 (FFS D; CASA, EASA) Manufactured by: Thales

- 56 --LUFTHANSA AVIATION TRAINING Zurich, Switzerland

Leonardo Helicopters — AW109SP (FFS B, FTD 3 (rotary wing); EASA) Manufactured by: Leonardo

- **57** - **PANAMERICAN TRAINING CENTER SAS** *Bogota, Columbia*

Mil Helicopters — Mi-171 (FFS D; UAEAC) Manufactured by: Transas

- **58** - **PWN TRAINING CENTER** Subang, Malaysia

Leonardo Helicopters – AW139 (FFS D; EASA) Manufactured by: CAE

- 59 -

ROTORSIM Sesto Calende, Italy

Leonardo Helicopters — AW109E (FFS D; EASA, FAA, ANAC, TC, ENAC) *Manufactured by: CAE*

Leonardo Helicopters — AW139 (FFS D; EASA, FAA, ANAC, JCAB, CAAC)

Manufactured by: CAE/Leonardo

Leonardo Helicopters — AW169 (FFS D; EASA, ENAC, FAA) Manufactured by: CAE/Leonardo

Leonardo Helicopters – AW189 (FFS D; EASA, FAA, ANAC, CAAC, ENAC) *Manufactured by: CAE/Leonardo*

- 60 -

ROTORSIM ABERDEEN Aberdeen, U.K.

Leonardo Helicopters – AW189 SAR (FFS D; EASA) Manufactured by: CAE/Leonardo

– 61 –

ROTORSIM USA *Morristown, New Jersey*

Leonardo Helicopters — AW139 (FFS D; EASA, FAA, ANAC, TC) Manufactured by: CAE/Leonardo

- 62 - SAF TRAINING ACADEMY

Albertville, France

Airbus Helicopters — AS350 B3+ (FFS B; EASA, DGACF) Manufactured by: Thales

Airbus Helicopters — EC135 T2+ (FFS B; EASA, DGACF) Manufactured by: Thales



VERTICAL'S 🚯 GLOBAL SIMULATOR DIRECTORY

- 63 -SIM AVIATION TRAINING CENTRE/FSI

Johannesburg, South Africa Airbus Helicopters — AS332 M (FFS D; EASA)

Manufactured by: Thales

- 64 --SKY SAFARI GENERAL AVIATION Shanghai, China

Robinson — R44 (FTD 5; CAAC) Manufactured by: Frasca

- 65 -

THALES NORWAY TRAINING CENTRE Stavanger, Norway

Airbus Helicopters — EC225 Super Puma (FFS D; EASA, CAAN) Manufactured by: Thales

- 66 -IN DEVELOPMENTK TOKYO INSTRUMENT COMPANY

Tokyo, Japan

Airbus Helicopters – EC135 (FTD 5; JCAB) Manufactured by: Frasca

- 67 - TOLL HELICOPTERS

Sydney, Australia Leonardo Helicopters — AW139 (FFS D; CASA, EASA) Manufactured by: CAE

- 68 --XILIN FENGTENG GENERAL AVIATION

Guanghan, China **Robinson** — R44

(FTD 5; CAAC) Manufactured by: Frasca

Sikorsky — S-300 (FTD 5; CAAC) Manufactured by: Frasca

- 69 -ZHUHAI XIANG YI AVIATION TECHNOLOGY

Zhuhai, China Sikorsky – S-76C++ (FFS D; CAAC) Manufactured by: CAE

Sikorsky – S-92A (FFS D; CAAC) Manufactured by: CAE

- **70** - **AIRCREW TRAINING CANADA LTD.** *Sudbury, Ontario*

*Leonardo — AW139 (FFS D; in development) Manufactured by: Frasca

*Sikorsky — S-76C++ (FFS D; in development) Manufactured by: Frasca

*Bell Helicopter — Bell 407 (FFS D; in development) Manufactured by: Frasca *Airbus Helicopters – H130 (FFS D; in development) Manufactured by: Frasca

— 71 — Aero As

AERO ASAHI TRAINING CENTER *Tokya, Japan*

*Airbus Helicopters – H125 (FTD 5; in development) *Manufactured by: Frasca*

Note: * indicates a simulator in development

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GROWING PAINS

Weather extremes affect any aviation operation — but those working in agricultural operations have far more to consider than just the impact on their safety.

By Ed Brotak

A Hiller OH-23G fitted with a Simplex spraying system. Conditions need to be just right for the spray to have the right effect. **Skip Robinson Photo**

130

The mustering of cattle is one of the most challenging agricultural operations. Kari Greer Photo



Over the past three years, my articles have dealt mainly with safety concerns related to various weather conditions. But even when the weather isn't threatening, it still plays a major role in many helicopter operations. Some operations can be disrupted or prevented by the weather, even though it's still safe to fly, while others are completely dependent on the appearance of specific weather conditions.

Perhaps no sector has utilized the versatility of helicopters more than agriculture. From aerial spraying, to frost prevention, to the mustering of cattle — the list of potential applications goes on and on. And just about all of these jobs are weather dependent, with very specific requirements in terms of winds, temperature, and humidity. Weather conditions are crucial to get the job done. Aerial application — spraying chemicals such as pesticides, herbicides, and fungicides from an aircraft — has been the mainstay of agricultural aviation for many years. For more precise application, a helicopter is generally preferable to a fixed-wing aircraft, with temperature and wind speed critical for a successful operation.

Most of the chemicals used have a specific temperature range for application, typically given on the container. Temperatures approaching freezing are problematic for water mix solutions, for obvious reasons. "The higher temperatures — above 85 F [29 C] — also work against you, with the chemical water mix evaporating before it hits the ground," Tony Herby, chief pilot for Sky Aviation in Worland, Wyoming, told *Vertical*.

Plant processes can also be temperature dependent. "We normally don't start spraying [herbicide] before the temp reaches 50 F [10 C], because the plant isn't taking nutrients in through the leaves until the plant warms up," explained John Smith, pilot, coowner, and co-founder of J&R Flying Service in Alicia, Arkansas. "So, it would be hard to kill the plant if it wasn't absorbing the chemical properly." IF [THE WIND IS] LESS THAN THREE MILES PER HOUR, THERE IS THE CHANCE THE CHEMICAL COULD CLIMB AND DRIFT FOR MILES. THE MORE OBVIOUS UPPER LIMIT OF 10 MPH OR GREATER COULD BLOW THE CHEMICAL 'LINES' OFF TARGET AS WELL.

- TONY HERBY, CHIEF PILOT AT SKY AVIATION

At the other end of the scale, higher temperatures don't just bring the danger of evaporation. According to David George, pilot and owner of M&D Aerial in Spearman, Texas, when the temperature exceeds 92 F (33 C), plants can "close up" — meaning they will not ingest the chemical.

Turning to wind speed, George said some was needed for best product coverage, but that operators need to be aware of the drift of the spray. Too much drift will take the product to where it can do damage to different crops — which becomes particularly problematic if those crops are on another farm. He said that most aerial applicators have insurance in case this happens, and that the limited availability and high cost of this insurance is a major incentive to prevent drift from happening.

"If [the wind is] less than three miles per hour, there is the chance the chemical could climb and drift for miles," added Herby. "The more obvious upper limit of 10 mph or greater could blow the chemical 'lines' off target as well."

The amount of predicted rainfall is also a concern, as too much could "wash off" the product. "Most chemicals need from one to four hours' dry time before rainfall to make sure the plant has taken the chemical in," said Smith.

High humidity can be just as problematic. "Too much moisture [in the air] can dilute the product, or cause 'burns' on the plants," said Rick Throckmorton, director of operations for Aspen Helicopters in Oxnard, California. The droplet size within the spray



A Robinson R44 Raven II belonging to Great Lakes Helicopter of Kitchener, Ontario, completes spray work in the area. Mike Reyno Photo



is important for proper application and this is set on the spraying equipment. However, this will also be affected by the relative humidity, said George.

USING YOUR DOWNWASH

Various crops are susceptible to frost damage, or more specifically, to damage due to below-freezing temperatures, whether with or without a visible frost. There are specific weather situations in which helicopters can be used to prevent, or at least minimize, potential damage. In particular, these are situations when the surface temperature is below freezing, but some distance above this, the air is warmer. More technically speaking, a surface-based inversion exists. The goal is to bring this warmer air down and mix it with the colder lower air, thus raising surface temperatures above critical levels. The downwash from a helicopter can accomplish this.

For helicopter operators, this is an "as needed" situation.

Maria Langer, chief pilot and owner of Flying M Air in Malaga, Washington, told *Vertical* her helicopter is on standby from mid-February until mid-April for frost protection to the almond crop in the Sacramento area. If frost is in the forecast, a pilot is put on call. When the temperature drops below 40 F (4 C), the call to action is given. "The pilot will fly in low over the crop and then go up until the temperature starts to rise," Langer said. "Then [they will] just fly around, mixing the air until the rising sun warms everything up."

Reini Grauer, pilot and CEO of Charlotte Helicopters in Waxhaw, North Carolina, said frost occurs in calm winds. This presents no flight problem in itself, but Grauer warned to watch for "blade icing with visible moisture" in such conditions. Fog can also be a hazard. It's also worth bearing in mind that the mixing technique would not work if there are significant winds, as turbulent mixing would preclude warmer air aloft.

Among the more specialized agricultural services is cherry drying. Once a cherry ripens, it will lose quality and can even be damaged if water is absorbed. Helicopters are used as "blow driers," flying over the orchards to use their downwash to dry the fruit. This must be done within two to three hours of rainfall. Langer said she will station a helicopter near an orchard (paid on-call). When it rains, a pilot will be dispatched to perform the drying service. With low flying required, the wind must be carefully monitored, especially if thunderstorms are in the area.

Another unusual helicopter application that is entirely weather dependent is corn pollination. You may think that with large fields of corn, pollination wouldn't be a concern. But for new strains of corn, it is — and can lead to reduced yields. Calm winds don't provide the movement pollen needs to travel between plants, while high heat can damage or even kill it. According to Langer, when natural weather conditions are unfavorable for pollination, helicopters can do the job. "The downwash from a helicopter provides the wind to disperse the pollen," she said. It's part of her business in the Pacific Northwest, and the work is also completed in the Midwest.



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THE CHALLENGE OF MUSTERING

One of the most challenging of agricultural applications is mustering - the rounding up of cattle with helicopters. A major area for this is the rugged terrain of northern Australia. Mustering is challenging enough due to the intricate low-level maneuvering it requires, but weather conditions can raise the difficulty and risk even further. Dan Ward, operations manager of North Australian Helicopters in Darwin, Australia, told Vertical that his operational area sees high density altitude conditions with temperatures sometimes exceeding 110 F (43 C). "This makes power management critical when going low and slow over the timber looking for or moving cattle," he said. "You always have to know where the wind is, especially with full tanks of fuel, and have an escape route through the trees if power gets low." He said that the excessive heat can cause dry convection - resulting in bumpy conditions.

Helicopters can also be used to provide a general survey of farmlands. According to Grauer, this can include monitoring fencing conditions, finding lost livestock, surveying wildlife or flood damage, and looking for trespassers. Safe flying conditions with particularly good visibility is required.

All the operators Vertical spoke to for this story have their own favorite sources to check the current and forecast weather conditions before heading out into the field, be it a government weather service or those provided by private companies. And today, with custom-made apps available for mobile devices, this information is easily accessible en route or on site. Of course, weather conditions can always vary from home base to the job site. "The field always controls," said Aspen Helicopters' Throckmorton. Determining weather conditions on site is crucial, especially in terms of wind speed. Support vehicles often have wind and temperature monitoring instruments, but, in terms of local weather knowledge, "experience is a determining factor," said Throckmorton. "Some things just aren't in the book."



Ed Brotak | Ed Brotak, Ph.D., is a retired professor of atmospheric sciences at the University of North Carolina, Asheville. His specialties include weather effects on aviation,

marine operations, and ground transportation.

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The Aero Design team, with one of its signature cargo baskets. *Back row, from left:* Wanda Rekve, owner and office manager; Jason Rekve, owner and president; Jeff Clarke, owner and vice-president; Jeremy Tobie, shop hand; and Knut Rekve, driver. *Front row, from left:* Dave Martyn, welder; Doug Hammer, junior fabricator; Katie Craven-Rekve, office assistant; and Kody Bevans, junior machinist. Not pictured: Reagen Johnson, machinist; and Ken Eagle, quality assurance worker.





Aero Design's bicycle racks have created a great deal of buzz in the industry.





Aero Design offers a variety of fixed and quick-release step options.



136

Innovation through collaboration

We go behind the scenes at cargo basket and bike rack manufacturer Aero Design.

By Ben Forrest | Photos by Heath Moffatt

Ideas often come to Jason Rekve when he is in the shower. He is the kind of person who is always thinking, who stays awake at night pondering how things work, sometimes rising out of bed at 2 a.m. and going into the shop at Aero Design in Powell River, British Columbia, the helicopter accessories company where he is president and general manager.

But while an idea can come from virtually anywhere and at any time, it is always in response to a request from helicopter operators with real-world problems, and the work of refining it is almost always a collaboration between Rekve and Jeff Clarke, the company's vice president and quality assurance manager.

"We have a whiteboard in the office, so one of the two of us will come up with something and just kind of throw it up onto the board and see what sticks," said Rekve, an aircraft maintenance engineer with M1 and M2 ratings who bought Aero Design with his wife Wanda Rekve and Clarke in 2013.

"Generally what will happen is that basic idea, whether it's good or bad, will spawn something else. Somebody will have another little piece to add that maybe takes that and makes it a little bit better.

"And then the other person will have something else that they'll, again, throw into it that'll make it a little better again."





One of the company's innovations is a replacement cyclic friction control for Bell 206 and 407 helicopters.

That basic process, followed by making physical parts and design drawings and working through several iterations of a product on the way to certification, is how Aero Design has become a leading producer of unique, brilliantly-crafted helicopter accessories with customers around the world.

Founded in 1991 in Calgary, Alberta, Aero Design has been developing, manufacturing, and marketing approved cargo baskets for nearly two decades, introducing its simple quick release system 11 years ago, a staple product used by operators of Bell, Airbus, Robinson and MD helicopters.

The baskets attach to the outside of the helicopter — often to the landing gear, but sometimes to another available hard-point — adding cargo capacity and protecting passengers and the aircraft interior from dirty or potentially damaging items like chainsaws, shovels, and other work gear.

They're also used to carry skis, snowboards, poles and even food for VIP customers, allowing operators to consider new contract types and sources of revenue.

When Rekve and Clarke bought the company, they also introduced a larger mega basket for Bell 205 and 212 operators, and built on the company's existing line of quick-release steps.

Moving from Calgary to the southern coast of British Columbia allowed Aero Design to pursue expanded product lines and increase its manufacturing output, while providing an outstanding quality of life for its employees.

"We still have reasonable access to places like Vancouver, Whistler, Victoria and Mount Washington, and the company supports and has the support of the community and a growing supporting industry," said Rekve.

Rekve's first major innovation for Aero Design was a replacement

August/September 2017 🎽 **137**





Carke, Rekve and their employees create new products through a collaborative approach that gathers feedback and suggestions from operators. for the factory-supplied Bell 206 and 407 cyclic friction control, which uses a lever rather than a knob to stabilize the cyclic when the aircraft is idling on the ground.

He brought the idea to Aero Design in 2011, while owning and operating South Coast Heli Support Ltd., a company that provided contract maintenance and support in Western and Northern Canada, as well as in the United States and overseas.

Clarke was working at Aero Design as an engineering technologist at the time and helped fabricate some of the production tooling for the cyclic friction control. He wasn't involved in the original design process, but he's worked with Rekve on every product since.

"We hit it off right away," said Clarke, who grew up in Vernon, British Columbia, and is a graduate of the aeronautical engineering technology program at Southern Alberta Institute of Technology.

"I think we have very similar personalities," he added. "We both work very hard, we can focus on projects and come up with reasonable solutions.... We are good at what we do and we can bounce the things we are not as good at off of each other. It works really well."

While Rekve tends to build physical objects to work through an idea, Clarke is better at putting an idea on paper before the actual building begins, using a computer to create design drawings that can be printed out and guide the fabrication process.

"We are a little bit different that way," said Clarke. "But in the end, sometimes it's that much easier to see the finished part if you've got parts in front of you. If it's a little trickier concept, maybe getting it down on paper will show you — you know, is that an avenue we should go down or not?"

Their similarities and differences complement each other perfectly, but the design process is never about creating cool products for novelty's sake. It's about finding practical solutions to requests from real-world operators, and operator input is an essential part of the process as well.

Vertical

PHOTO CONTEST



Do you wrap up a long day in the field by breaking out your camera to get photos of your helicopter? Do you find yourself taking pictures of your rotary-wing "office" at every opportunity? Does your Instagram have more photos of aircraft than your significant other? If this sounds like you, it's time to look through your archives for your finest shots for the **2017 Vertical Photo Contest**.

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"We have always approached every product we've done by interacting with the people who are going to use it," said Rekve. "Our business model is not about sales. It is about communicating with the person on the other end. We actually care about who we're talking to."

A key example of Aero Design responding to the industry is its quick release bicycle rack set for Airbus H125/AS350 helicopters, which recently received Federal Aviation Administration approval.

The racks attach to helicopter skids using the same quick release system as Aero Design's line of cargo baskets and steps, and can carry three bicycles per side. The system accepts the shortestframe mountain bike with a 26-inch wheel to the longest-frame bike with a 29-inch wheel, all up to four inches wide and with no modification necessary to the rack.

Operators wanted a way to fly with bikes onboard and asked if they could fit them in a basket, said Rekve. The company went a step further and came up with an even better solution.

"Our quick release allows you to swap from a basket to a step to a bike rack in the span of a minute," he said. "So it's multi-mission capable, which is superefficient, and it's a new thing. It's a hole in the industry; it's a new industry in and unto itself."



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The Bell cyclic friction can be installed in less than a minute, the company said.





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Aero Design has plans to continue growing, but not at an overly quick pace. The company is wary of getting too big too fast, with the understanding that controlled growth has allowed it to provide exceptional customer service and quick turnaround times on existing projects.

"I can see us having some more engineering staff, I can see us having some more manufacturing staff," said Clarke. "But I think we will remain in that specialized, special equipment market, with [a] focus on things that are quickly removable and very, very, easy to use."

With that said, Aero Design is expanding into a new building in Powell River that will double its manufacturing and office space to just over 10,500 square feet. As it grows cautiously, it will be able to continue to complete all product design and fabrication in-house, with help from its small but dedicated crew of 10 full- and part-time staff.

"I've seen it before on multiple occasions in various parts of the industry where people are always trying to do the next big thing to try and stay relevant," said Rekve. "And what ends up happening is, you haven't recognized or realized the return on investment for the last thing first.

"So you're growing, you're growing, you're growing, and then all of a sudden you drop off, because you can get busy to a point where you start making mistakes, or you stop recognizing what the next good idea is.

"Our focus right now is to make sure what we have is sustainable. . . . We want to make sure we can support what we currently have on the go and to let the business grow organically with the industry."

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FLYING CRANE

The Omega BS-12 was one of the first twin-engined helicopters with four main rotor blades to be developed in the U.S., but it was ultimately overshadowed by the success of a contemporary — the much larger Sikorsky S-60. EXPERIM

By Bob Petite


Bernard Sznycer may not be the first name that comes to mind when you're thinking of helicopter pioneers, but the Polish-born engineer, writer and artist designed and built the first helicopter certified in the British Commonwealth. Perhaps his most ambitious plan was to develop a commercial flying crane aircraft, but the fate of this contemporary to Igor Sikorsky's much-larger S-60 flying crane was tied to his own, with its failure ultimately leading to Sznycer's retirement from the industry.

Born in the early 1900s in Warsaw, Poland, Sznycer grew up when aviation was in its infancy. Learning about the Russian designer Igor Sikorsky and his large four-engine aeroplane called the Ilya Muromets, Sznycer became fascinated by flight. He found summer work as a volunteer aviation mechanic in the early 1920s, and attended the Technological Institute of Warsaw, studying Mechanical and Aeronautical Engineering, in 1923. He obtained his degree in 1931, and found work as an engineering designer for a Polish airline.

Three years later, Sznycer started his own business as a consulting engineer, and also set up an experimental shop. Soon, he was manufacturing machine-gun turrets, automatic gun sights, skis for aircraft, and an internal stabilizer for aircraft skis. He sold his business in 1938 to the W. Szomanski Company in Warsaw, but stayed on as a consultant. Later that year, Sznycer went to the U.S. in the hope of developing interest in his ski patents, while honing his flying skills at Floyd Bennett Field, New York. He found work with the aircraft manufacturer Don Luscombe, and after the Second World War broke out in 1939, sold him his ski patents. In 1941, Sznycer convinced V.H. Frazier, president of Pitcairn-Larsen

Autogiro Company of Willow Grove, Pennsylvania, that he could build a flying glider (known as the "Prelude") in only five weeks. He achieved the feat within the narrow timeframe, with Pitcairn chief pilot Slim Soule flying the aircraft. Other talented glider pilots reported that the glider was exceptionally stable to fly.

Sznycer's next career move took him to work for Henry Kaiser, the ship builder in Philadelphia, Pennsylvania, who had become interested in helicopter development and was in the process of developing the Fleetwings Helicopter. While there, Sznycer had the opportunity to work for and learn from helicopter engineering pioneers Andrew Larsen and Joseph Pecker. However, Sznycer soon returned to his consultancy roots, establishing

a consultant engineering company with mathematician Selma G. Gottlieb and D.C. Watson carrying out studies of control, stability and vibration problems in helicopters.

MOVING NORTH OF THE BORDER

During the summer of 1945, Sznycer and Gottlieb signed a contract with the Intercity Airlines Company in Montreal, Quebec, to design and build a prototype helicopter in Canada. Design work commenced in the fall of 1945, and the first SG-VI research four-bladed helicopter was completed by October 1946. The aircraft took its first flight on July 9, 1947, with pilot Henry Eagle Jr. at the controls. The five-minute flight saw the helicopter hover about eight inches off the ground at the Montreal airport.

The SG-VI was dismantled after completing the test flight program, and the team completed a new three-place production version, called the SG-VI-D "Grey Gull." This first flew on Feb. 6, 1948, with U.S. Army pilot Jack Godsy at the controls. (Alan Bott and Robert Nields later flew the SG-VI-D, along with Canadian pioneering helicopter pilot Al Soutar.)

By January 1951, the Grey Gull was ready for Canadian certification tests, which it completed by Feb. 2. The Canadian Certificate of Airworthiness was issued for the first helicopter designed, built, and certified in the British Commonwealth.

However, Sznycer's hopes that the SG-VI would jump-start helicopter production in Canada were to be left unfulfilled. Intercity Airlines' backers cut future development funds, and there were no sales of the Grey Gull from Canadian interests. Sznycer also faced stiff competition from Bell,

VERTICAL REWIND VR THE OMEGA BS-12



inadian Flight



Hiller and Sikorsky, which all had civil helicopters readily available for sale. The engineer returned to the U.S. with the SG-VI, which he sold to the Canamerican Helicopter Manufacturing Company in Brooklyn, New York, in 1954. (This helicopter eventually made its way back to Canada, and is on display in the Alberta-Reynolds Museum.) Although disillusioned, Sznycer was soon back to doing what he did best: designing new aircraft. He started a new company, Allied Aero Industries, headquartered in New Bedford, Massachusetts, and he came up with a helicopter called the Omega Aircraft BS-12 — a four-place twin-engine utility flying crane rotary-wing aircraft for use in isolated terrain. He found new financial backers and was back in business.

The BS-12 was one of the first twin-engine helicopters with four main rotor blades to be developed in the U.S., and it was designed from the start for commercial use without the help of military backing. The aircraft had a tubular rear fuselage on tricycle landing gear, and was capable of hoisting cargo — which could be carried in a net or a special pod — at the helicopter's center of gravity aft of the cabin. The four articulating main rotor blades were similar to those of the SG-VI-D, and the aircraft had a main rotor diameter of 39 feet (11.9 meters).

The BS-12's power came from two Franklin 200-horsepower engines that were easily accessible for maintenance. While Franklin 210-hp engines were later installed, Sznycer was looking, from the very early stages, at ultimately switching to turbine engines when they became available.

The aircraft's cruise speed was estimated to be about 85 miles per hour (136 kilometers per hour) at 75 percent power. Its gross weight was 4,750 pounds (2,155 kilograms) and it had a 1,000-pound (450-kilogram) payload with one pilot and just over one hour of fuel. It had a range of 135 nautical miles (250 kilometers), and its service ceiling was 11,320 feet (3,450 meters), with a rate of climb of 1,200 feet per minute (365 meters per minute). Sznycer envisioned the Omega BS-12 as an executive transport four-place helicopter when not in the flying crane role, with a range of two hours of flight.

On Oct. 29, 1956, the prototype BS-12 flew for the first time, piloted by Slim Soule — who had become a long-time friend of Sznycer. "On my first flight, I found the helicopter had barely enough power to sustain hover at three feet with just me and ten gallons of fuel," Soule later recalled. The next day, Soule put on a demonstration flight, but

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he did not try to hover for too long a period. Flight-testing continued for some time working out the bugs.

Later, another pilot — Robert Nields — turned over the BS-12 beside the hangar. Thankfully, the helicopter could be repaired to fly again. Soule returned to fly the BS-12 during the certification trials, which took place over a period of a year-and-a-half. The Omega BS-12 received a Federal Aviation Administration type certificate in April 1961.

EVOLUTION OF AN IDEA

Over time, three more advanced versions of the BS-12 were manufactured. The Omega BS-12B had upgraded Franklin engines, while two BS-12D versions gave the helicopter a larger five-place cabin and upgraded engines.

The BS-12D-1 (N285B) came with two 260-hp Lycoming O-540 engines. "The Omega was a rugged helicopter with good performance after the Lycoming O-540s were installed," Soule recalled in a letter to Larry Milberry, the Canadian aviation writer and publisher. "It met the specs that Bernard had set and was certified as such."

The BS-12D-3 (N286B) had supercharged Franklin 6AS-335 engines installed.

There were numerous orders for the Omega BS-12 in the U.S. In Canada, Carl Agar of Okanagan Helicopters of Vancouver, British Columbia, ordered three Omega helicopters for use as aerial taxis. Unfortunately, the order was never completed.

Competition from Igor Sikorsky with his much larger S-60 flying crane prototype concept (which first flew in March 1959) loomed large. Sznycer and his dedicated staff attempted to do the best possible work in constructing and certifying the Omega flying crane, but by the early 1960s, his financial backers withdrew their support, and development soon came to a close. Sznycer's helicopter dream was shut down due to lack of financial support for the second time in his life. "We were so sorry for the way Sznycer's backers treated him," Soule said.

In his letter to Milberry, Soule recalled that Sznycer had told him, "'Let's forget my backers and build this new and improved helicopter that I have been developing.' That was Bernie - the finest," he wrote.

Despite Szyncer's optimism, it was the end for his dream of a personal commercial flying crane helicopter. He soon realized that he could not compete with the "Big Guns." And sadly, it appears that no Omega helicopters survived. (If you have any information on surviving aircraft or worked on the program, please contact the author at bpetite@telusplanet.net).

Left on Szyncer's drawing board were an upgraded turbine-powered version of the BS-12 that would use Allison T-63 or Boeing 502 engines, and an airliner version (the BS-17A) with a larger passenger cabin and a five-bladed main rotor system with turboshaft engines from either Allison or Boeing.

Following the failure of the BS-12 to make it into serial production, Sznycer left the helicopter industry, turning to his other interests in the arts. Sznycer had many talents, and was a skilled artist, writer, and sculptor. He later wrote several plays, and directed stage shows. Bernard Sznycer died on Nov. 30, 1970.



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.





Bernard Sznycer in front of the prototype SG-6VI in Canada in 1947. **Bob Petite Collection Photo**



The second SB-12 takes to the air. Jeff Evans Collection Photo

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COLUMN C THERE I WAS... THERE I WAS... | BY DORCEY WINGO THE BATTERY FROM HECK

Showing up for work at Inland Helicopters one fine morning, I saw the usual cluster of rotary-oriented aviators gathered around an Aérospatiale Lama on the flight line, instead of the customary coffee pot. A long line was laid out around their boots. What appeared to be an aircraft battery waited patiently at the far end of the long line. I saw an urgent look on a face or two. Something was up.

Turns out that our illustrious director of operations, Van Honeycutt, had flown the company's little five-seat FH-1100 helicopter — and a friend — to a remote lake near Grants Pass, Oregon, the previous afternoon, and shut down for a while.

Somehow, as the sun sank, Van's aircraft battery lost cranking power. And with no security for the Hiller, Van and friend were faced with spending the night in the cramped little turbine.

Suddenly stranded, Mr. Honeycutt used his radio to alert Inland's dispatcher as to his

predicament, but they were out of daylight by then. Word reached us pilots the next morning, as we showed up for work. There was a gassed-up Lama sitting on the ramp, all ready to go.

Van relayed that there wasn't a good place to land anywhere near the slumbering Hiller. A battery would have to be brought in on a long line and deposited close to the shoreline.

It should be noted that Van L. Honeycutt is a famous pilot. He was one of the medevac Bell-47 aviators who flew in the 1970 hit movie M.A.S.H., a cinematic farce about military life in a 1950s field hospital in war-torn South Korea. As Van told us, the producers liked his name so much, they renamed a character in the M.A.S.H. TV series "Honeycutt" in his honor.

A big fellow, Van was known to be rather flamboyant and seemingly always had a torpedo-sized Roi-Tan cigar clamped between

his lips. His manly fingers were like skin-covered bananas, making the cyclic control grip all but disappear when he wrapped his huge right fist around it.

Back to the situation at hand, I already knew from roundtable discussions that none of us pilots had received a lick of long line training. "Vertical reference" was a fairly new skill in those days. And I was the new guy in the flock, having recently hired on. I did, however, have an hour or so with a 100foot long line: transporting two bodies over the dark jungles of eastern Peru.

Inland's chief pilot was away on an assignment and out of touch. From the early discussions, it appeared that I had the high poker hand among the potential "rescuers." I figured I could get the job done, and volunteered to fly the battery to Van. No one stepped forward to challenge me. I soon had directions to the lake in mention.

While I strapped into the right seat, my peers saw to the attachment of the load to the long line's swivel hook via a couple of choker-straps, and we tested the cargo hook releases. Before you could say, "Aérospatiale," I was headed up and away with the rescue battery.

There I was, flying important cargo like a long-line professional! Elated from finally getting my second long-line mission, I must have been grinning like the Cheshire Cat. Added to that, it was a stunning day in heavily-forested southwest Oregon.

The sun was still on the rise as I navigated around a few outlying homes with my external load. The lake in mention soon came into view. I could discern a flaccid Hiller on the far shoreline, and two people standing nearby.

Within a hundred feet of the shore, I slowed to a hover. One of the individuals was a BIG guy, no mistaking Van. They both looked happy to see me, waving their arms like children and pointing to the ground at their feet as my battery's target.

I had been so preoccupied observing details ashore that I allowed my load to disappear under the Lama's belly. Then my rotor-wash hit the calm water underneath me, sending a squall of ripples into motion and disrupting my junior-birdman's vertical reference all to heck!

Pulling a little power to make sure I didn't get too low, I also added a little right cyclic to see if the load would come back into view. Boy, did it ever! The battery shot toward my two-party reception committee like a scene from Edgar Alan Poe's *The Pit and the Pendulum*.

The blasted battery swooshed menacingly over the heads of Van and company. They both did a "180" and took off running! My Battery from Heck scribed two threatening arcs in the atmosphere before I fought off my ripple-induced vertigo, regained control, and lowered the stupid battery to the ground.

I have to chuckle about my "scary" external load learning experience, but I gladly pass along what I learned that day — and more to pilots studying vertical reference work.





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