APRIL/MAY 2017

Vertical

www.vertica ag.com

THE PULSE OF THE HELICOPTER IN

CELEBRATING 15 years EST. 2002

FLYING THE 505

Does the new Jet Ranger have the "X" factor?

YOU ORDER.
WE DELIVER.

Delivering spare parts when and where you need them is the highest priority for Chauncey Mitchell and the Customer Support team at Airbus.

In recent years we have invested a lot of time, effort, and money to improve our service, and it shows.

We're delivering parts you order at a 97 percent on-time rate. For an AOG, the needed part ships within four hours 98 percent of the time. Our spare parts inventory exceeds $115 million, and more than 60,000 unique part numbers are in stock.

Our mission is to keep your aircraft flying. Our commitment is to meet and exceed your expectations. **WithYouOnEveryFlight.com**

AIRBUS

INCREASING WHAT'S POSSIBLE.

Milestone brings together a wide range of leasing, debt, advisory, and productivity solutions, allowing you to do more, do it better, and with less of your capital committed. Drawing on our deep helicopter expertise and the vast resources of GE, we work with you—for you—to solve problems and enable missions.

FIRST. AND RISING HIGHER.
MILESTONEAVIATION.COM

THE DECISION-MAKING TOOLS YOU NEED. IN THE AVIONICS AT YOUR FINGERTIPS.

Garmin GTN™ series for helicopters. Enhanced situational awareness. Mission effectiveness. Peace of mind. With GTN 750/650 and G500H avionics, you'll see all the benefits of faster, more intuitive access to the flight information you need. Plus, you can upgrade now with approved installations for a wide range of popular helicopters, including: most Bell 206 and 407 series, Airbus Helicopters' AS 350 B2/B3 and EC 130 B4. The GTN 750/650 series is approved for installations in the EC 130 T2 and MD Helicopters' 369E/F/FF models. And the G500H is approved for installation in the R44. To learn more, visit Garmin.com/helicopters.

Note: Options available for HTAWS, NVG, radar altimeter, and satellite data links (with additional equipment, sold separately).

GARMIN®

Excelling Together

AW TEAM UP
EXCELLING TOGETHER

Leonardo Helicopters is committed to serving your business - to enable the most demanding operations, worldwide.

A global network of over 1,800 dedicated specialists provide the highest-quality of customer support, advanced service solutions and a comprehensive customer-tailored range of training programs - collectively known as 'TeamUp' - ensuring mission success; anytime, anywhere.

Inspired by the vision, curiosity and creativity of the great master inventor - Leonardo is designing the technology of tomorrow.

leonardocompany.com

Helicopters | Aeronautics | Electronics, Defence & Security Systems | Space

LEONARDO
HELICOPTERS

Atlanta, GA 404-768-9090
Brisbane, AU
Long Beach, CA
Peachtree City, GA
São Paulo, BR
Vancouver, BC

Starter Generators
Wheels & Brakes
Accessories
Avionics
Hydraulics
Instruments

PHP
PRECISION HELIPARTS
A PAG Company

IS MRO
Inventory Supported
Maintenance • Repair • Overhaul

- 8 locations gives you just in time MRO support
- $32.5 million dollar inventory / 75,000 line items
- Largest rotable pool of fuel accessories
- OEM Authorized stocking distributor
- AOG Support teams available 24/7

"Others sell parts, WE SELL SUPPORT"

Time is money. Don't spend yours searching for parts.

Hard to find parts are easy when you know where to look. Precision Heliparts (PHP) is your worldwide source for accessory exchanges, overhauls and sales. Call today or visit us online at **www.heliparts.com.**

In Every Issue

WINNER

MARCH FACEBOOK PHOTO CONTEST | **@AFTERBURNERPHOTOS**

Have a great photo to share? We want to see it!

If you have a helicopter-themed photo you'd like to share, post it to our Facebook page at www.facebook.com/verticalmag, or tweet it to us @verticalmag, or share it on Instagram using the hashtag #verticalmag. In addition to receiving prizes, our weekly winners have their photos featured on our home page and in *Vertical Daily News*, our daily email newsletter.

Cover

The first of what will become an increasingly familiar sight in our skies: deliveries of the Bell 505 Jet Ranger X have begun with Scott Urschel, owner of Pylon Aviation, receiving the first. Urschel and Bell marked the occasion with a ceremony held at HAI Heli-Expo in Dallas, Texas, in early March.

SHELDON COHEN PHOTO

Subscribe to *Vertical News*
verticalmag.com/subscription

Read the Magazine Online
verticalmag.com/digital

Follow us on Twitter
Follow @verticalmag

Like us on Facebook
facebook.com/verticalmag

Follow us on Instagram
Follow @verticalmag

Watch videos on Vimeo
vimeo.com/mhmmedia

Shop *Vertical* Merch
shopcanada.mhmpub.com
shopinternational.mhmpub.com

Our Publications

insightmagonline.com | verticalmag.com | skiesmag.com

The Team

GROUP PUBLISHER
Mike Reyno ■ mike@mhmpub.com

GROUP PUBLISHER
Linda Reyno ■ linda@mhmpub.com

ASSOCIATE PUBLISHER
Derek Kast ■ derek@mhmpub.com

EDITOR-IN-CHIEF
Oliver Johnson ■ oliver@mhmpub.com

SPECIAL PROJECTS EDITOR
Elan Head ■ elan@mhmpub.com

ASSISTANT EDITOR
Ben Forrest ■ ben@mhmpub.com

JR. EDITOR
Sarah Grandy ■ sarah@mhmpub.com

SALES & MARKETING DIRECTOR
Tim Muise ■ tim@mhmpub.com

MARKETPLACE SALES MANAGER
Carla McKay ■ carla@mhmpub.com

CIRCULATION MANAGER
Leanne Willis ■ leanne@mhmpub.com

PRODUCTION MANAGER
Jen Colven ■ jen@mhmpub.com

GRAPHIC DESIGNER
Kaytlyn Wismayer ■ kaytlyn@mhmpub.com

SR. WEBMASTER
Christopher Zimmermann ■ christopher@mhmpub.com

WEBMASTER
Shawn Pieters ■ shawnp@mhmpub.com

CONTRIBUTING EDITORS:
Jen Boyer, John Carinha, Thierry Dubois, Geoff Goodyear, George Hill, Guy R. Maher, Mike Muench, Owen Peterson, Andy Roe, Howard Slutsken, Kenneth I. Swartz

CONTRIBUTING PHOTOGRAPHERS:
Ted Carlson, Sheldon Cohen, Niall Duffy, Øyvind Hagen, Guy R. Maher, Stefano Massini, Dan Megna, Simon Pryor, Mike Reyno, Skip Robinson, Wes Van Dell, Todg Williams

Vertical

In Canada:
500 Trillium Dr., Unit 23, Kitchener, ON N2R 1E5

In the United States:
701 S. Main Street, Fall River, WI 53932

***Vertical* is proud to be a member of**

MHM PUBLISHING

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

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

International Serial Number ISSN 1703-8812

Canadian Publication Mail Agreement Number: 40741549

Postmaster: If undeliverable, return mailing label only. Printed in U.S.A.

wouldn't it BE BETTER?

- If one provider covered your diverse fleet
- If your maintenance program transferred across models
- If your costs were stabilized and predictable

At JSSI, we never stop working to make things better for you. We want our name to be synonymous with lower maintenance costs, higher residual value and superior service around the globe. We provide Tip-to-Tail® coverage for virtually any make or model of turbine-powered helicopter, as well as business or commercial jets and turboprops. **JSSI. A better approach.**

JSSI

jetsupport.com

Call or email us at +1.312.644.8810 or info@jetsupport.com

COLUMN

TALKING POINT | **GEORGE HILL**

AERIAL FIREFIGHTING & DRONES

Aerial firefighting is a high-risk business. Flying a helicopter or a fixed-wing tanker over a fire, often during conditions of limited visibility over rugged, smoke-filled wildlands, demands a pilot's total focus — not only on the mission, but to avoid a collision with terrain or another aircraft. Now, the increasing proliferation of drones, or unmanned aerial systems (UAS), is adding another thing for pilots to look out for in an already crowded airspace.

The number of drones in the United States is staggering. No one knows the exact number in the country, but between Feb. 14 this year and Dec. 21, 2015 — when the Federal Aviation Administration's (FAA's) rule mandating online registration of drones weighing between 0.55 and 55 pounds went into effect — there were 730,285 UAS registrations. That includes 677,884 registered hobbyists, who each received a single ID number for all the drones they own. The remainder are commercial drones, which must be registered individually.

In a forecast issued in March 2016, the FAA estimated that 1.9 million small drones will have been sold to hobbyists during 2016, and projected that about 4.3 million sales would take place in the year 2020. As for small drones used for commercial purposes, such as news reporting and surveillance, the FAA forecast predicted potential sales of over 600,000 in 2016, with 2.7 million in 2020 — a year in which combined recreational and commercial drone sales could reach 7 million.

The FAA's estimate does not include very small drones — those below 0.55 pounds — nor does it take into account operators who are not likely to register their UAS, either through ignorance of the law, or noncompliance intent. Anyone wishing to learn what the FAA is doing with regard to UAS operations can find plenty of information at faa.gov/uas.

What all of this indicates is that the risk of a drone colliding with a manned aircraft engaged in aerial firefighting will only increase, given the numbers and downward pricing, which has made entry into the UAS community less cost-prohibitive for more people.

Irresponsible UAS operators have already impacted aerial firefighting to a noticeable degree. According to data provided by the US Forest Service (USFS), there were at least 40 documented cases of unauthorized flights by drones over or near wildfires in 2016, causing aerial firefighting operations to be temporarily suspended on 20 occasions. That was double the number for 2015, in which there were 20 documented unauthorized UAS flights in proximity to wildfires, with 10 temporary suspensions of activity. Most recently, firefighting efforts were disrupted near Fort Worth, Texas, when drones appeared close to a wildland fire.

Fortunately, to date, there has not been a collision between a UAS and a firefighting aircraft. Part of that has to do with the fact that the FAA imposes temporary flight restriction (TFR) zones in the airspace encompassing aerial firefighting operations, and that USFS regulations mandate that if a UAS is detected within the TFR area, firefighting aircraft must be grounded immediately. But, going forward, I believe that a collision between a UAS and a firefighting aircraft is inevitable. It's not if, but when.

Is there any way to prevent a UAS incursion in an area where pilots are at work on fires? To answer that, those of us in the aerial firefighting industry must understand that we are well past the point of total prevention, given the number of drones, and their constantly evolving technology. I think the real question is, how do we educate UAS enthusiasts to understand air space rules, specifically those involving temporary flight restrictions, along with the hazards they present when flying within or near airborne firefighting activity?

In that regard, the USFS, working with the FAA, and other federal, local and state agencies involved in wildland fire management, has launched its "If You Fly, We Can't" campaign, which is specifically targeted at UAS operators. Under that effort, the USFS has produced and distributed a series of information/education products, including an email to all FAA-registered drone owners, as well as news releases, public service announcements, social media posts, and posters. At the same time, the agency is working with the UAS industry to transmit information about wildland fire locations, for display on UAS hand controllers. The USFS says it plans to grow that program this year.

We understand that this will require an ongoing effort, especially as people enter the UAS market for the first time. It will also be difficult, if nearly impossible, to reach everyone in the UAS community. I would, therefore, suggest that the FAA require that any new drones be equipped with some type of technology, such as a transponder, that would enable pilots to see the location of drones, flying nearby, on their cockpit displays. All firefighting aircraft have traffic displays that work with transponders, and because of the small size of drones, the aircraft operators will more readily detect the presence of a drone on a display screen, than they would by looking out the cockpit window. Drones can be operated safely in conjunction with other firefighting activity as demonstrated by the Department of the Interior. Coordination and communication are the key elements of safe operations.

There are those who argue that imposing severe penalties on drone operators who interfere with aerial firefighting is the answer. Others say that software in the hands of law enforcement that allows them to take control of an airborne drone is another approach. I would suggest that in the final analysis, the solution to the problem is to get the UAS community to adopt a sense of responsibility and discipline, and respect the TFRs around the fires. Simply put, the drone operator must be made to understand that he or she does not belong there.

George Hill is the Executive Director of the American Helicopter Services and Aerial Firefighting Association.

MD HELICOPTERS™

MISSION PROVEN. CHALLENGE READY.

Building upon a tradition of excellence that is unmatched in the aerospace industry, MD Helicopters delivers iconic, American-made light-twin and single-engine helicopters to military, law enforcement, EMS/air medical, utility and VIP operators worldwide. A 'first-choice' manufacturer among discerning rotorcraft operators, MD Helicopters continues the Howard Hughes tradition of always leaning forward to develop and deliver the best-quality, best-value helicopters in the world.

MDHELICOPTERS.COM
MD HELICOPTERS, INC.
@MDHELICOPTERS
@MDHELICOPTERS

MD™ 500E

MD™ 530F

MD™ 530F CAYUSE WARRIOR

MD™ 520N

MD™ 600N

MD™ 902 EXPLORER

COLUMN

FOCUS ON SAFETY | **GEOFF GOODYEAR**

PLAYING TO PERSONALITIES

It is only natural to assume that personalities affect our behavior. But do they affect our safety performance? We have made valiant efforts to categorize and measure personalities and we waste no time in suggesting that an individual is a "type A" or of an impatient or aggressive nature. On the opposite side of that coin, we are pretty confident in suggesting that others might be of a passive or cautious nature. We would instinctively think that one's personality would play a major role in one's safety performance and behavior. Yup, that would fit nicely!

But research that has been on the go for quite some time suggests otherwise. Research conducted at Yale in the 1960s by Stanley Milgram begins to get to the root of the issue. He conducted a controlled experiment consisting of a "learner" and a "teacher." The teacher group included doctors, lawyers, priests, housewives and — to give it special relevance to us — pilots. Word pairs were recited by the teacher to the learner and then recited back. Whenever there was an error the teacher would administer an electric shock to the learner. This sounds kind of fun actually!

Now, unbeknown to the teacher group, the learners were confederates of Milligram's and the electric shocks were not real. At some point in the proceedings, the learner also informed the teacher that they had heart trouble and they were doing this because they really needed the money. The instrument panel in front of the teacher had varying degrees of amperage listed right up to the last level, which was simply noted as "XXX." As the level of error increased, so did the severity of the fake shocks. There was always a white-coated assistant with a clipboard present as an authority figure who never physically interfered, but always coached the teacher to get on with the process. The session could go on for quite a while, with learners writhing in their seats in mock pain while the teachers, including priests and pilots, were administering morally repugnant and what they assumed were life threatening levels of pain, simply because they were told to.

Despite the teacher group including people who would appear to have high moral character and above average intelligence, they all reacted to their work circumstance rather than exhibit the behavior that one would associate with their personalities.

If we needed any more evidence of the role that circumstance and operating environment play in determining one's behavior, consider the experiment done at a seminary in the 1970s. A group of theology students were asked to prepare a lecture on "The Good Samaritan" for presentation later that day to a congregation in another building on campus. After their sermons had been prepared, one group of students were told that they only had five minutes left to get to their venue, while the other group were told they had hours left.

While the priests in training were on route to their congregations it was arranged that they would all encounter an injured person requiring assistance. As you may have guessed, the folks with lots of time all stopped to render assistance which was certainly in keeping with the theme of "The Good Samaritan" parable. The folks with only five minutes to make it… well, that was a different story! In each of those cases, the priests-to-be blew by the injured party without a second glance.

As a safety manager, it came as a bit of a revelation to me that there was no need to leave everything to chance with our crews in the field. By asserting some control over the work environment (like firing the guy with the white coat and clipboard), one could positively affect behavior and improve safety.

I had an episode of my own some years ago which started innocently enough. A friend and his family were moving to a house close to our neighborhood and my wife and I offered to help. Had they known what was in store, I am sure they would have responded, "No, thanks! It will be difficult enough!"

Anyway, as the move progressed, it came time to hook up the family's washer and dryer. There was an immediate requirement for a Robertson screwdriver and none was to be had anywhere in the new house. Wait! I knew exactly where I could get my hands on one and I leapt into action! Time was of the essence, and here was an opportunity to impress all those in attendance. My wife and I had walked over so we were sans automobile. I quickly grabbed the keys to the new homeowner's car, jumped in, started up, drove the .002 kilometers to my house, left the car running, ran into my house, grabbed the screwdriver from the kitchen drawer, ran outside, jumped aboard my car, started it up… and promptly backed into the new homeowner's car — which was still running.

Albeit a shocking event, but thankfully there was no electricity involved. Just a perceived time crunch that affected my behavior and was then translated into a bumper crunch.

When things start moving too fast or contrary to our better judgment, take charge.

Have a safe summer.

MORE THAN 700 PILOTS ARE FLYING HeliSAS!

WHY AREN'T YOU?

HELISAS® LIGHTEST, MOST COMPACT AUTOPILOT AND STABILITY AUGMENTATION SYSTEM. PERIOD.

GENESYS HeliSAS®

There's a reason so many pilots are choosing HeliSAS. Hands-free autopilot and stability augmentation in the lightest, most compact package—ideal for Part 27 helicopters.

- Less than 15 pounds
- Safer, more confident command...even under demanding conditions
- Dramatically reduced pilot workload
- Auto-recover to a neutral attitude in situations where pilot may lose visual reference
- Pilots with no helicopter experience have successfully hovered a HeliSAS-equipped helicopter with little practice

Visit our website to see if HeliSAS is right for you!

GENESYS AEROSYSTEMS

PRECISE PERFORMANCE.
PROVEN EXPERIENCE.
PERSONALIZED ATTENTION.

Sign up on our website for the latest Email News & Updates! genesys-aerosystems.com | 1-817-215-7600

COLUMN

FOCUS ON TRAINING | **ANDY ROE**

GOOD FINANCIAL PLANNING

Regardless of whether automatons are going to take all our jobs in the future, the young prospective helicopter pilot, all revved up for an exciting new career, will not want to listen to a lecture on how smart it is for helicopter pilots to save for retirement just as he or she is packing up and heading for flight school. A young student of mine told me one day of his interest in buying an old car and restoring it. I told him he might be better off taking the money and investing it and he told me that he needed me to be his helicopter instructor, not his dad!

Pilots in their late 50s and 60s (most young pilot wannabes can't imagine ever being that old) could be faced with two situations not all career workers in general are; flight burn out and aviation medical issues. Both of these can lead to a premature retirement that may not have been planned for.

Young people understandably want to get on with life. Helicopter flying is a great career option to consider, but if you expect to be involved for a long time, you might do well to consider your life in your advancing years. These days, many people are working well past the age of 65, but helicopter pilots need a valid medical certificate to earn a living, and that certificate gets harder to hold onto with age.

Renewing your medical year after year becomes routine, but in later years it is not inconceivable that you could lose your medical certificate before you plan to stop flying. You can be in excellent physical shape and still develop a condition that may rob you of your pilot medical. If you smoke, drink excessively and/or have poor nutrition, your chances of being fit to fly in your later years could also be greatly reduced.

A 20-year-old helicopter pilot expecting to retire at 65 will have flown for 45 years, and that is an incredibly long time in the air in any flying machine — let alone a helicopter. I have flown steadily for 37 years, and quite frankly that's about enough for me thank you very much. Sadly, I see many pilots still forcing themselves to fly well into their 60s and sometimes 70s solely because they can't afford not to. Others in the same situation, but who have lost their medicals, could be left in financial disarray. Safety is always a concern in situations where pilots force themselves to fly for financial reasons. One pilot I flew with for many years was found deceased upside down in a helicopter in Northern Canada a few years ago, and no one has determined what happened to the 70-year-old.

Helicopter pilots relying on flight time to make a living would do well to consider a good retirement financial plan early in their career, even though the thought of having to do so is incredibly boring. The pilot aged 60 with a good investment portfolio built up over 30 or so years, who has lost his or her medical, or who has simply decided to stop flying, is in great shape for the future. The discipline needed to start a saving program early in life is difficult, and yet in my opinion a discipline that all of those interested in an aviation career should seriously consider. Those with a good saving discipline throughout a helicopter career are better prepared for the later years in life. It's that simple.

Saving money is difficult, if not impossible, for those young people struggling to make aviation a career. But good saving habits learned early on and practiced will last throughout a career. A retirement financial plan even with initially meager holdings is a start in the right direction. A helicopter pilot with the means to live comfortably in retirement is a pilot who has managed his or her long career in the best way possible. The 70-year-old who claims to still be flying because he loves it might be kidding himself/herself and not have the means to stop. Nobody knows!

Although far removed from training itself, young aspiring helicopter pilots might consider good financial management as an important part of their career process, so they can live comfortably in retirement and be proud of the career they chose.

Albert Einstein is famously believed to have said: "Compound interest is the eighth wonder of the world. He who understands it, earns it. He who doesn't, pays it." If you have a good investment portfolio later in life, much of the money you have accumulated is actually from other people.

If you are lucky enough to have a pension benefit where you work, this will certainly be a financial advantage to you at retirement. However, many working people are on their own in retirement, and helicopter pilots might face retirement earlier than they had expected compared with workers in other sectors. My own financial planner is in his early 70s and enjoys his work as much as he did years before. A career helicopter pilot in his 70s should be enjoying life without relying on a flying paycheck. To achieve this, start thinking about an investment and savings program early in life. And no, I'm not your dad!

Although far removed from training itself, young aspiring helicopter pilots might consider good financial management as an important part of their career process, so they can live comfortably in retirement and be proud of the career they chose.

SKYe SH09

The Swiss response to making a helicopter

The SKYe SH09 is equipped with the best baseline in the industry incorporating a full glass cockpit suite, a dual hydraulic system, a dual electrical circuit, and more.

Expect outstanding hot and high performance. This is not just your regular single-engine, this is a new class of multirole helicopter with the largest cabin/cargo volumes and modern ergonomics for your mission.

External Load

1'500 kg
3'300 lbs

Range

800 km
430 nm

Capacity

Up to 7 Passengers
with up to 10 suitcases

Speed

260 km/h
140 kts

Swiss Movement

www.marenco-swisshelicopter.com

marenco
swisshelicopter

COLUMN

FOCUS ON MAINTENANCE | **JOHN CARINHA**

RECONNECTING WITH ROOTS

It's been said you can take the boy out of the culture, but you can't take the culture out of the boy. As I write this column, I am 5,000 miles (8,000 kilometers) removed from where I've called home for the past 40 years of my life, but mere meters from my cultural roots, which surround the seaside town of Torreira in Murtosa, Portugal.

In the days leading up to our departure, I found myself immersed in a week of "on-boarding" — training — at our local technical institute. This is the 20th year that I have been working in the field of avionics, and it seemed fitting that I returned to where it all began. I was asked to consider a part-time instructor position to teach electrical and avionics systems, and having had prior teaching experience at the school's original campus, my interest was piqued.

The first couple of days were purely administrative and essentially about getting familiar with staff, the campus, policies and curriculum. I was anxious, as I am still very much engaged with my full-time avionics business, but equally curious about opening a door to a transition in my career that could one day include full-time teaching. If I have one wonder or concern about a full-time position, it has more to do with the aspects of no longer being self-employed, and instead having to answer to and perform for a new breed of clients — the paying students.

Well into the training, a couple of common themes were emerging. Some, if not most students come into these technical programs never having used a tool, and equally not always motivated to take a specific program. Further to this, at a career level, I would no longer be deemed a technician, but rather, a technical instructor. The latter brought pause to my thoughts and this summation: Imagine all the places you drive to on a daily basis without so much as a thought as to how you get there. Now imagine having to teach your routes to a novice driver, who has yet to put the car in "drive." It's no longer just about the where, but the how, why, and when aspects as well.

On my final day of training, I was tasked with shadowing an avionics class through an afternoon exercise. The task at hand was to simply check the power output of a basic VHF radio with a wattmeter. This is something I would do in minutes on my own, but found myself now with eight eager students before me, hoping to do the same, over the span of an entire class session. As they assembled around a Bell 206B trainer, they each took on a task and worked as a team; one gained access to the rear of the radio, one read the manual, another connected the wattmeter, and yet another tuned the VHF. I had many a flashback to my own initial training days, and smiled in amusement as to how truly ripe for knowledge we are as students, but how streamlined things eventually become with experience.

The students proceeded to measure the radio's power output and compared their readings with those listed in the technical manual. They then measured reflective power, which measures for any power being reflected back into the radio. Although this simple step involved turning the wattmeter's slug 180 degrees, it took several minutes to discover this before I became their living and breathing manual; possibly my patience was running thin, but then again I am very much still a novice in the transition of technician to teacher. The last step in their test was to do a basic radio check on the local airport ground frequency. They made multiple transmissions with no returned answer — nothing but a carrier frequency and some minor static noise. As confusion set in and time became a premium, we collectively took a step back. I and the full-time instructor smiled, as we knew the answer did not lie in any radio manual but rather in the theory of basic VHF operation itself, given the fact the radio was tied to a bottom-mounted antenna. I uttered three words: "line of sight," and with that, each and every one of their faces lit up. A lesson was learned. (VHF transmission propagation characteristics operate with a range limited to line of sight.)

Our lives are shaped by many things, not the least of which are our ties to our cultural and professional origins. It seems fitting that I took a step back in time to reconnect with my career roots just days before I will do much the same in discovering facets of my cultural heritage. In brings light to the fact that in life we truly never do stop learning.

I was asked to consider a part-time instructor position to teach electrical and avionics systems, and having had prior teaching experience at the school's original campus, my interest was piqued.

EST. 1968

MASCO SERVICE

Your Go-To Support Solution

INSTRUMENTS + AVIONICS + ACCESSORIES

Starter Generator MRO Specialists

817-481-8205 TX
337-364-0789 LA
www.mascoservice.com

Paolo Alfieri took this snap of an Italian ICH-47F Chinook practicing a pinnacle landing near Rifugio Torre di Pisa, Predazz, Italy. Who wouldn't want to see a Chinook land at their place in the mountains?

Under contract with Rokstad Power, a Sequoia Helicopters Bell 212 is used to lower a linesman on a hoist to a transmission tower that will feed power to the Brucejack Gold Project mine in northwestern British Columbia. At the height of the project there were 13 helicopters working on the 35-mile (56-kilometer) Brucejack transmission line *(see p.56, Vertical, August/September 2016)* that will power the mine 40 miles (65 kilometers) north of the town of Stewart, B.C. **Jacob Haley Photo**

A hangar full of trainers! U.S. Navy Bell TH-57B and TH-57C helicopters assigned to Training Air Wing Five (TAW-5) and operated by HT-8 "Night Ballers," HT-18 "Vigilant Eagles," and HT-28 "Hellions," are crammed inside a maintenance hangar at Naval Air Station Whiting Field in Milton, Florida, to weather out a major storm. **Antonio Gemma More Photo**

Bell Helicopter president and CEO Mitch Snyder introduces the FCX-001 concept helicopter to the industry at HAI Heli-Expo 2017. Bell brought a full-scale mock up of the aircraft to the show, which highlighted a range of technologies — some speculative, some in development — that Bell envisions in future vertical lift aircraft. **Sheldon Cohen Photo**

Heli-Expo: Texas-style

Photos by Skip Robinson

Helicopter Association International (HAI) Heli-Expo — the world's largest helicopter tradeshow and exhibition — made a welcome return to Dallas, Texas, for its 2017 edition, held at the Kay Bailey Hutchison Convention Center March 7 to 9. After a lukewarm industry response to its debut in Louisville, Kentucky, in 2016, the return to familiar surroundings this year saw a jump in visitor and exhibitor numbers (17,778 and 731, respectively), and a new record was set for the event with 322,800 net square feet of space used for exhibits and displays.

In addition to a bustling exhibition floor, various education and safety sessions and seminars were held throughout the duration of the show. According to HAI figures, more than 1,500 people attended its 62 "Rotor Safety Challenge" sessions alone.

Despite the industry enduring a general downturn, thanks in large part to a sharp reduction in oil-and-gas exploration, the show still provided the platform for some major order announcements and eye-catching product and concept unveilings. You can read more about those over the following pages, but to begin with, here's a selection of some of the sights from the show floor over those three busy days in Dallas.

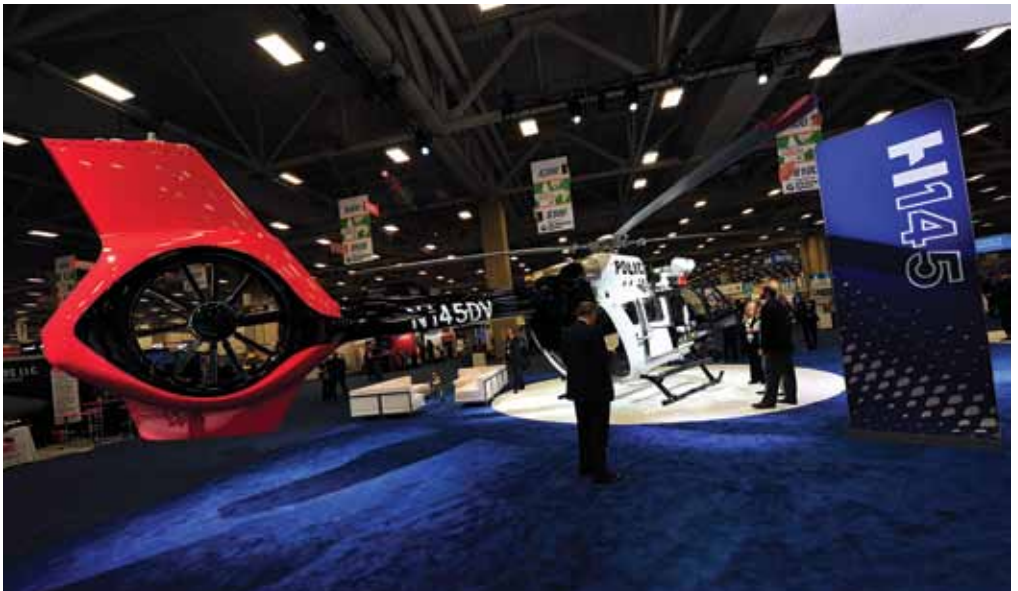
Thanks as always to those who took the time to visit the *Vertical* booth at the show. We look forward to seeing you all again at Heli-Expo 2018, which will be held Feb. 27 to March 1 in Las Vegas, Nevada.

Sikorsky presented Helijet with an award to recognize 30 years of safe scheduled airline and charter operations with S-76 helicopters.

Columbia Helicopters displayed one of its two Boeing CH-47Ds equipped with an FAS internal water tank. The operator, a heavy-lift specialist, is celebrating its 60th anniversary in 2017.

An Mi-24 Hind helped give the static display a slightly exotic flavor. The aircraft is owned by the Cold War Air Museum in Lancaster, Texas.

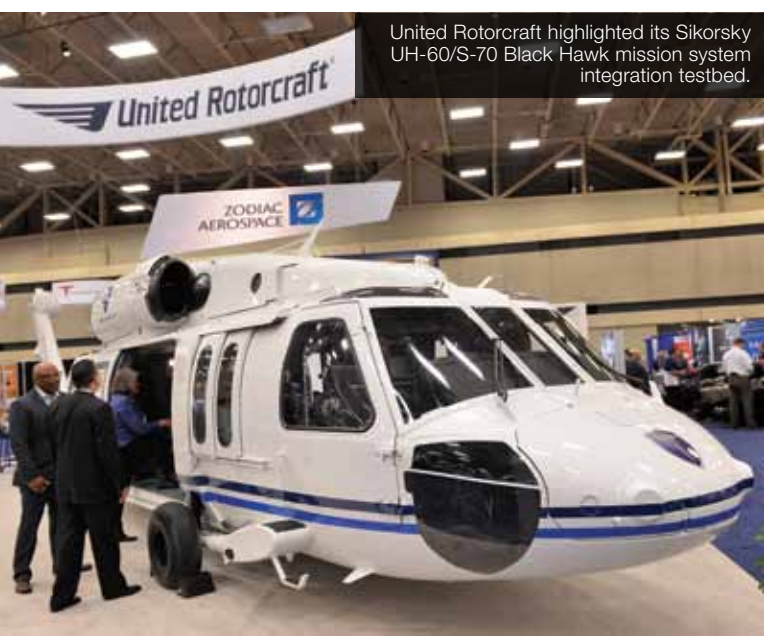
A Robinson R66 (near side) and an R44 Newscopter (far side) outside the convention center in Dallas.



Airbus had four aircraft on display on its booth, including the Las Vegas Police Department's new H145.

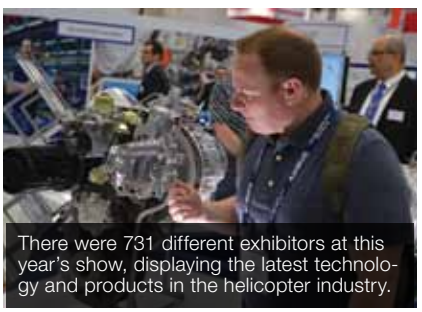
Helicopter Express's new Eagle 407HP made an appearance on the Eagle Copters booth.

Over 17,000 people attended this year's event, with more net square feet dedicated to exhibits and displays than ever before.



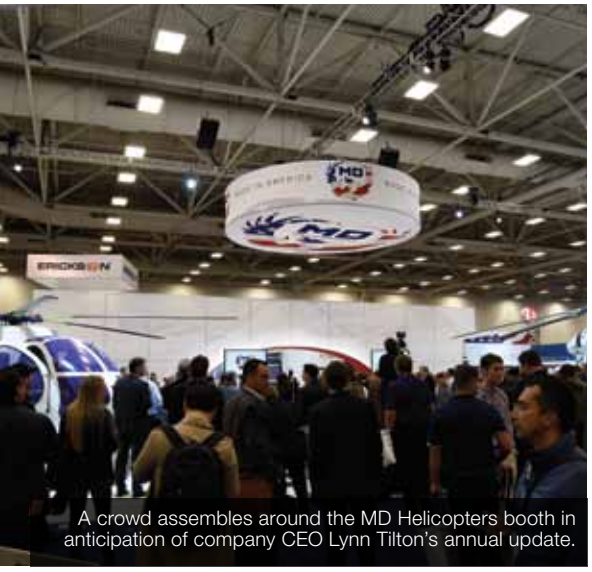
United Rotorcraft highlighted its Sikorsky UH-60/S-70 Black Hawk mission system integration testbed.

Axnes's Brett Gardner introduces the company's new MP30 wireless intercom.



There were 731 different exhibitors at this year's show, displaying the latest technology and products in the helicopter industry.

A Bell 407 main rotor hub on show at Lord Corporation's booth.



A crowd assembles around the MD Helicopters booth in anticipation of company CEO Lynn Tilton's annual update.

A visitor tries out an R22 flight training device from Elite Simulation.

The Korean Coast Guard's S-92 was the major presence on the Sikorsky booth.

Airbus Helicopters' president and CEO Guillaume Faury addresses the press and members of the public during a presentation at the show.

The Guimbal Cabri G2 received an order for up to 10 aircraft from Spitzer Helicopter Leasing.

MD unveils 6XX concept helicopter

The newly-unveiled MD 6XX was presented in an emergency medical services configuration at Heli-Expo 2017. **Skip Robinson Photo**

BY OLIVER JOHNSON

MD Helicopters, Inc. has unveiled a new 2.5-tonne eight-seater single-engine concept aircraft — the MD 6XX. The aircraft was first revealed as a program in development by MD CEO Lynn Tilton at Heli-Expo 2016, but little had been disclosed since then. Appearing at this year's show, Tilton said the unveiling of the aircraft on MD's booth was "a defining moment" for the company.

MD began development of the 6XX as a scout attack helicopter, but said it will also pursue certification of a civilian version that would likely have applications as a law enforcement or emergency medical services (EMS) aircraft — and it was in EMS configuration that the aircraft appeared at the show.

The MD 6XX follows on from the legacy of the MD 600N, but the change in name reflects the enormous differences between the aircraft.

"This is a completely new, redesigned aircraft, so it may look similar [to the MD 600], but everything is different," said Tilton. "This is start-to-finish a brand-new aircraft."

Rather than featuring the company's famous NOTAR anti-torque technology, the MD 6XX has a more traditional four-bladed tail rotor and an extended composite tail boom, which MD claimed will deliver 40 percent more anti-torque power. The use of the tail rotor is also said to provide a reduced noise signature.

Its six-bladed main rotor will utilize S411 blades from Helicopter Technology Company. The bonded blades have a three-section airfoil design, said to offer more efficient operation, a reduced noise profile, and better autorotation characteristics. Tilton said she believed the blades would provide a performance boost of about 10 percent.

In the cockpit, the 6XX will feature the Genesys Aerosystems IDU-680 avionics system — the same suite planned for the MD 902 as that aircraft evolves into the MD 969. It will also have boosted flight controls for a reduced pilot workload, digital three-axis autopilot, and will be instrument flight rules capable.

The aircraft will be powered by a Rolls-Royce M250-C47E3 engine, and Tilton said it would be fly-by-wire, as well as featuring several types of new technology in development. These include a "radar cocoon" — akin to the sensing capabilities provided in some automobiles — for use in degraded visual environment conditions, utilizing LIDAR, radar, and camera technology; as well as the capability to deploy and recover drones.

Tilton said her connections to the automotive industry were helping to streamline the development of some of the new technologies in the aircraft.

"You can't be in the [automotive] industry if you're not building an autonomous vehicle," she said. "We've been able to bring a lot of that technology to the aerospace industry. The cocoon technology that we're building right now, which is an incredible safety feature, is all done with automotive technology."

In terms of its projected performance, Tilton said the MD 6XX will have a 5,500-pound (2,500-kilogram) maximum gross takeoff weight; a 3,200-pound (1,450-kilogram) useful load; a 500-nautical mile range; a cruise speed of 140 knots with a maximum of 160 knots; and a 20,000-foot ceiling.

Tilton said MD is aiming to have the aircraft available on the market by the end of 2018, but didn't set a certification timeline for the civilian version.

"It's a pretty exciting project, and we think it's going to make people believe MD is really a new MD," she added.

Alpinlift is second SKYe SH09 launch customer

BY OLIVER JOHNSON

Swiss operator Alpinlift Helikopter AG has become the second launch customer of the Marenco Swisshelicopter SKYe SH09, after placing an order for two of the new single-engine 2.5-tonne aircraft at HAI Heli-Expo 2017 in Dallas, Texas.

Marenco now has more than 90 letters of intent (LOIs) and 10 orders for the SKYe SH09, and is working to translate more of those LOIs into firm commitments.

Buochs, Switzerland-based Alpinlift, which offers flightseeing, VIP, heliskiing and cargo transport flights, joins Air Zermatt as a launch customer for the SH09. As such, it will help guide the development of the aircraft as it approaches its certification configuration, and provide detailed feedback to the manufacturer once the aircraft enters service.

"We want to be able to deliver an aircraft to the market which is as mature as possible and it's the reason we are searching for partnerships . . . with operators who allow us to mature the aircraft in real environments, the most demanding environments," said Andreas Löwenstein, CEO of Marenco Swisshelicopter. "It's the reason we are very proud about Alpinlift. Like Air Zermatt, they are flying in probably the most complex environments, so if we manage to satisfy them we are sure that our aircraft is totally mature for normal missions."

In terms of the aircraft's development, the first two prototypes had logged 25 flight hours by early March, "but all the components have been turning hundreds of hours on test benches," said Löwenstein. A third prototype is due to start flight testing in the coming months, and it will be joined by a fourth "pre-series" aircraft early next year.

While the design of the second prototype required fairly substantial changes to the rotorhead and control cables, Löwenstein said the third prototype would not require any major evolution.

"We are stabilizing the configurations now," he said. "At one point you have to freeze the development, which is almost done. We have done some improvements on the aircraft recently, but it's not concerning the rotor system."

Concurrent to the development of the aircraft, Marenco is building the facility to industrialize the production and assembly of the SH09 in Mollis, Switzerland. Löwenstein said the work will be undertaken in several phases, with a pre-assembly facility already completed. The final assembly hall will be ready by September, and then a third phase to enhance the pre-assembly facility and production facility will be finished in 2020.

Ultimately, Marenco hopes to be capable of building more than 100 aircraft a year, but it will slowly build up to that from a platform of "several double-digit aircraft numbers" in the first few years, said Löwenstein. "What we will do is quite a cautious buildup," he added. "You cannot improvise a big serious buildup. Which means in the beginning we will do it quite slowly and surely."

The manufacturer is targeting certification in 2018, with first deliveries to start in early 2019.

Alpinlift was announced as the second launch customer for the SKYe SH09 at Heli-Expo 2017, so the aircraft was presented with a dual livery at the show, representing both Alipinlift and the other launch customer, Air Zermatt. **Marenco Swisshelicopter Photo**

Cabri G2 enters U.S. leasing market

Revolution Aviation CEO Mark Robinson (left) joins Hélicoptères Guimbal president and CEO Bruno Guimbal (right) in the cockpit of a Cabri G2. Revolution will operate one of the Cabris purchased by Spitzer Helicopter Leasing at Heli-Expo. **Mike Reyno Photo**

BY OLIVER JOHNSON

Hélicoptères Guimbal received an order for up to 10 Cabri G2s from Spitzer Helicopter Leasing at HAI Heli-Expo 2017 in Dallas, Texas — marking the type's entry into the U.S. leasing market.

The deal was secured through Guimbal's U.S. distributor Precision Helicopters, with the first aircraft to be operated by Revolution Aviation, based in Orange County, California.

Revolution currently operates three fixed-wing aircraft and nine helicopters (six R22s, two R44s, and one R66). When it takes delivery of the Cabri in June, the aircraft will become the first of the type in the Los Angeles area.

"For the career student, it's a mini [AS350] AStar, so it allows them to get into a counter rotating aircraft with a center cyclic and a couple of other mechanisms," said Revolution CEO Mark Robinson. "And we have a lot of [private] students who have already purchased an aircraft; we think it's a lot more relevant for them to be flying a three-bladed system with a center cyclic in order for them to have that transition [between the aircraft]."

Robinson said the Cabri's ability to take slightly heavier students than the R22 was another bonus, and praised the aircraft's handling.

"It's really comfortable, it's aesthetically pleasing to look at both inside and outside, and then flying itself is very smooth," he said.

Precision CEO David Rath said the two-seat training helicopter's entry into the leasing market was a "momentous" event.

"It takes some of the financial pressure off the small flight schools, allowing them to get the most advanced training helicopter in the marketplace," he said. "It's the most expensive two-seat helicopter, but you also get the most advanced two-seat helicopter."

Precision took delivery of the first Cabri in the U.S. in February 2014, and although the aircraft wasn't certified by the Federal Aviation Administration until February 2015, there are already 21 Cabris now flying in the country — making it one of the aircraft's biggest markets. Rath said he expects another 12 Cabris to come into the U.S. this year, and that by 2018, the U.S. will be home to more Cabris than any other country.

In addition to distributing the Cabri, Precision operates between four and five of the type in its flight training fleet, with the aircraft replacing the Sikorsky (formerly Schweizer) S-300. In the two years it has been operating the Cabri, Precision has already clocked up about 4,000 revenue hours on the type. Rath said the maintenance requirements had been minimal compared to the S-300.

"The man hours per flight hour is probably one-sixth of what it was with the Schweizer," he said. "The uptime has been 90 per-

cent versus 77 percent." He added that the 100-hour inspection on the Cabri took eight-to-10 man-hours, whereas with the Schweizer, it took 40 to 50.

Worldwide, the Cabri has now recorded over 120,000 flight hours, with the 200th aircraft set to be delivered in May. Over the last two years, it has been the best-selling two-seat helicopter in the world, with 52 aircraft delivered in 2016 alone. Bruno Guimbal, president and CEO of Hélicoptères Guimbal, said the growth in interest in the Cabri flowed from its performance in the field, with more and more customers attracted to what was becoming a proven aircraft.

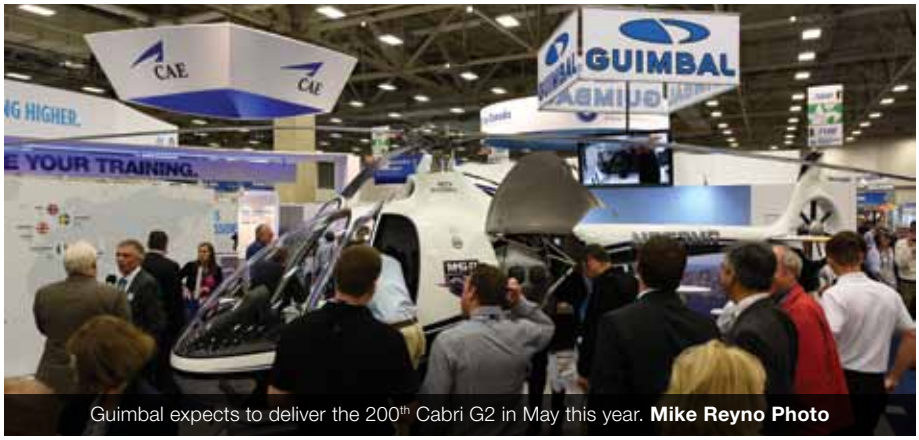
"It's a very good feeling for me to [have the Cabri] become a reference product, because we have been, for the last four years, a speculative product — the product people are gambling on," said Guimbal. "So it's very enjoyable to me to hear David [Rath] and other people saying that the Cabri is a proven product and [that] they buy it because it's making money. Until recently, it was mostly people saying that they are buying the Cabri because they have high expectations, and because they dream of beginning something new — not because they want to make money with a proven product."

Looking ahead, Guimbal said that many customers have asked him about a four-seat version of the Cabri.

"We have good ideas for what could be a bigger Cabri," he said. "We have made many different pre-designs and it's very exciting. I was working on the EC120 for years, so the intermediate between the EC120 and Cabri is very familiar to me and very exciting for sure."

However, he said his customer base appeared to be split as to whether such an aircraft should be powered by a piston or turbine engine (the company has made no decision as to which engine type it will use) and that he wanted to focus on establishing good customer support for the existing two-seater before pressing ahead with any new design.

"People want a four-seater, but they will never buy it if they are not perfectly happy with a two-seater," he said. "So, we have to take care of what we have in hand — they will not tell us if they get unhappy with a two-seater until it is too late."



Guimbal expects to deliver the 200th Cabri G2 in May this year. **Mike Reyno Photo**

Canadian pilots aim to make history

Three pilots from Ontario and Quebec hope to become the first Canadians to circumnavigate the globe in a helicopter later this year.

Bob Dengler (left) and his son Steven Dengler (right) aim to complete the first circumnaviation of the globe by Canadians in a helicopter later this year. The attempt will help mark the 150th anniversary of Canadian Confederation. **Skip Robinson Photo**

BY BEN FORREST

When Bob Dengler took delivery of the first Bell 429 Global Ranger in Canada back in 2010, he began thinking of using the aircraft to circumnavigate the globe.

Dengler, now 76 and retired from a successful career as a mining contractor, was upgrading from the Bell 206L-4 LongRanger he had flown since 2007, and he was impressed with the Canadian-built 429.

"It is such a fantastic helicopter, the 429," said Dengler, who lives in Aurora, Ontario, and is founder of Dynatec Mining Services.

"It's a twin engine, it's very fast, tremendous capability, and I've kind of wanted to do this, literally since the day I got the helicopter."

Dengler planned to join with his son Steven and Bruce Laurin, a former Bell test pilot, to become the first Canadians to circumnavigate the globe in a helicopter.

But Laurin passed away suddenly in September of last year, and Dengler had to take chemotherapy in the fall of 2016.

Steven and his wife Bruna stepped up, redoubling their efforts and putting in many long days to keep the trip on track. "This is a once in a lifetime opportunity," said Steven. "We weren't going to let anything stand in our way."

Their dedication paid off. "My chemotherapy is all over and I'm back to normal," said Bob. "We're on track for having everything ready to go for the first of July."

At HAI Heli-Expo in Dallas, Texas, the Denglers announced plans for the C150 Global Odyssey, a journey that will see them circumnavigate the top of the Northern Hemisphere, with stops in every Canadian provincial and territorial capital.

The journey coincides with the 150th anniversary of Canadian Confederation, and will draw attention to many important events in Canadian history, including the country's first airplane flight, the first transatlantic radio transmission, and the Battle of Vimy Ridge.

"Our country is such a wonderful place that's done so many amazing things, and it's not always top of mind," said Steven, 48, a renowned financial technology innovator, investor and startup mentor who is

co-founder of XE, the currency conversion site and app.

"We're a large country geographically, but we're a pretty small one in terms of population – but we punch way above our weight, and it's really worth remembering that," he said.

"We think that a flight like this … can help people remember, both inside of Canada and around the world, that Canada's a pretty important player on the international stage."

Joining the Denglers will be Rob 'Dugal' MacDuff, a retired Bell Helicopter test pilot and close friend of Laurin's.

"It's an honor thing," said MacDuff, who test-flew 12 different Bell models during his 20-year career with the company.

"Somebody had to take Bruce's place that has all this experience like Bruce and I have. I've flown all over the world and the 429, I'm very, very familiar with it."

The journey is a registered not-for-profit, raising money for True Patriot Love, a national charity that helps Canadian military and veteran families. It will also raise money for the Southlake Regional Health Centre Foundation in Newmarket, Ontario, home of a leading-edge regional cancer program.

"True Patriot Love is a charity that I embrace," said MacDuff. "If you're responsible in this world today, you have to try to support stuff that you feel is a good thing."

The C150 Global Odyssey begins July 1 in Vaughan, Ontario, near Toronto. Their first stop will be the nation's capital, Ottawa, for an official sendoff reception. They will then fly east to Montreal followed by stops in Canada's Maritime provinces.

The journey moves from there to northern Labrador, Nunavut, Greenland, Iceland, Scotland, Ireland, England, France, Germany, the Czech Republic, Poland, Belarus, Russia, Alaska, Yukon, British Columbia, Alberta, the Northwest Territories, Saskatchewan, Manitoba and back to Ontario, before finishing up at the Bell helicopter plant in Mirabel, Quebec.

Canadian astronaut Dr. Dave Williams and Hockey Hall of Famer Guy Lafleur are both scheduled to join up for portions of the journey. In total, the global odyssey is expected to last between 35 and 45 days.

"I know it won't be an easy trip," said Lafleur, who won five Stanley Cups with the Montreal Canadiens in the 1970s and has been a helicopter pilot since 1995.

"As soon as they go across the country, it's going to be something very special for them. And for me to be just a little bit, being part of it, I'm very excited about it."

Lafleur is scheduled to join the trip from Ottawa to either Halifax, Nova Scotia, or Goose Bay, Newfoundland and Labrador. He may rejoin when the 429 touches down in Anchorage, Alaska.

"I'm sure I'm going to have some times to fly it [the 429]," he said. "So I'm looking forward to that."

Bob and Steven believe this may be the first father/son circumnavigation of the world by any aircraft, though that detail could not be confirmed before press time. In any case, the trip already has special significance to them as father and son. They have always had busy careers, and both say that while planning this trip they've likely spent more time together in the last year than in the previous 10 years.

"There's a confluence of events that really are all kind of once-in-a-lifetime things," said Steven. "But I think the biggest personal draw for me is the chance to do this with my father."

As for the task itself — an ambitious journey that will take the three core pilots across the Atlantic Ocean and into the Canadian Arctic — no one seems daunted by it.

"Not a bit," said Bob, summing up a sentiment the other pilots share. "My life has been full of adventures. I've worked all through the Arctic. I've travelled to over 100 countries in the world. . . . You go to these different places and you face all sorts of unknowns and you deal with them.

"And I guess that was [what] my life was — I learned — I learned how to deal with adversity, and you just deal with it. You find your way around it. So doing something like this is just another adventure."

The Denglers plan to track the C150 Global Odyssey online, posting live updates through the handle 'c150go' on Twitter, Facebook, and Instagram. More information can be found on the journey's official website, c150go.ca.

ROTOR BITS

MILESTONE PLACES $290M AIRCRAFT ORDER

Milestone Aviation announced aircraft orders worth a combined €290 million (US$415 million) during HAI Heli-Expo in Dallas, Texas.

The total included a €200 million (US$285 million) firm order with Airbus Helicopters for an undisclosed number of H135, H145, and H175 aircraft. Deliveries are scheduled to begin in mid-2017, with the helicopters slated to be deployed into emergency medical services (EMS) and other parapublic segments.

"Milestone was very active in emergency medical services and other parapublic segments in 2016, and this order gives us near-term availability for H145 and H135 aircraft to support growing demand for new technology in these segments," said Milestone president and CEO, Daniel Rosenthal.

The leasing company also announced an order with Leonardo, valued at €90 million (US$130), for six AW139s and three AW169s. The aircraft are expected to be delivered in 2017 and 2018.

WAYPOINT ORDERS 16 AIRBUS AIRCRAFT

Waypoint Leasing announced an order for 16 Airbus helicopters at HAI Heli-Expo 2017 — including H135s, H145s, and H175s — worth €100 million (US$140 million). Waypoint said it will primarily lease the H135s and H145s to operators performing EMS and utility missions worldwide, while the H175 — the first of the type in Waypoint's fleet — will be available for oil-and-gas, search-and-rescue and public service missions.

"We are pleased to be growing our fleet with 16 new Airbus helicopters, including the H175, a cost-effective and reliable helicopter," said Ed Washecka, chief executive officer of Waypoint Leasing. "We are beginning to see sustained demand for heavy aircraft in the market, while at the same time recognizing and responding to the growing demand for interest in 'Super Medium' aircraft that are well-suited for a wide range of missions," he added.

Operators cautious about new purchases: Honeywell

According to Honeywell, interest in light single-engine helicopters such as the Bell 505 is particularly strong in North America. **Bell Helicopter Photo**

BY ELAN HEAD

For the second consecutive year, Honeywell has downgraded its five-year forecast of global helicopter deliveries by approximately 400 units in the face of slow economic growth and economic and political uncertainty.

In its latest "Turbine-Powered Civil Helicopter Purchase Outlook," released in early March, Honeywell predicts that 3,900 to 4,400 civilian-use helicopters will be delivered from 2017 to 2021.

That's a reduction of 400 aircraft compared to last year's forecast, which predicted 4,300 to 4,800 civil helicopter deliveries between 2016 and 2020. And it's about 850 fewer aircraft than Honeywell's 2015 forecast of 4,750 to 5,250 deliveries between 2015 and 2019.

According to Honeywell director of market analysis Charles Park, the decline in expected new helicopter purchases is global. Compared to the previous year's expectations, "each region in the world actually showed a decline, so it wasn't concentrated in one place versus others," he said.

On a positive note, the declines were relatively small in North America and Europe, where purchase plans only dropped by around two and three percent, respectively. Because North America and Europe account for "very, very substantial shares of the fleet," Park said, "the fact that they didn't go down much helps buffer the impact to some extent."

Honeywell's forecast is based on its annual survey of 1,000 helicopter operators, plus a separate analysis of large fleet or "mega" operators. According to Park, slow global economic growth and volatility in oil and gas markets contributed to the cautious attitudes that survey respondents expressed this year.

"Commodity price declines that we saw beginning in 2014, or late 2013, clearly put a damper on buying aircraft for oil-and-gas support," he said. He added, however, that many of the respondents in this year's survey — who were queried beginning in November 2016 — likely also had the U.S. presidential election front of mind.

"I would say it's more than economics," Park ventured, suggesting that the helicopter market, like the stock market, abhors uncertainty.

"What we're seeing, I think, is maybe a little bit of uncertainty in the respondents," he continued. "The more uncertainty there is about how things may progress in terms of ease of doing business, tax policies, trade policies… that can tend to stall the new purchase decision as people sort of sit on the fence, wait and see, and evaluate conditions."

Setbacks associated with specific platforms — such as last year's grounding of the Airbus Helicopters H225, and the fatal crash of a Bell 525 Relentless prototype during flight testing in July — may have also contributed to the decline in the market outlook.

"In general, if a program is launched and publicized, we pick up demand for it in our responses," Park said. "In the case where we see a delay, or an incident in flight test, or some kind of technical problem that has been publicized, you can actually watch the interest levels drop off until that situation is recovered."

By the same token, Honeywell is able to track growing interest in helicopter programs that are progressing well — such as the Bell 505 Jet Ranger X, Bell Helicopter's new short light single, which achieved initial type certification by Transport Canada in late December 2016.

"In the case of the 505, it looks like it's going to be a pretty successful program," Park noted.

Interest in light single-engine helicopters such as the Bell 505 is particularly strong in North America, where more than 75 percent of planned purchases in this year's survey were identified as light singles. Globally, the category accounted for just under half of planned new purchases.

By sector, Park said, interest in emergency medical services (EMS) aircraft was strong in Europe, but declined in the U.S. — possibly due to uncertainty about the future trajectory of the U.S. healthcare system. According to Park, EMS demand in other parts of the world, notably Latin America, remains fairly low.

Meanwhile, planned purchases of general utility aircraft increased, and interest in law enforcement helicopters was also up. With respect to the latter, Park observed, "That could be consistent with the expectation for greater law enforcement and border security, not just in the United States, but in other areas as well."

Despite the cautious outlook for new helicopter purchases, Honeywell found that helicopter fleet utilization generally increased over the past 12 months compared to the previous year. In 2017, Honeywell predicts that usage rates will improve significantly in North America and Latin America, but at a reduced rate in Europe.

"There is a little more optimism about the future in the U.S. operator base in terms of economic growth and business growth over the next couple of years," Park said.


YOU CAN'T
ENGINEER A RESCUE.
Technology doesn't save lives—people do. That's why ASU collaborates with operators to develop night vision products that really work for them.
If you want real-world night vision products designed for the way you really fly, ***turn to ASU***.
+1 (208) 426-8117
AVIATION SPECIALTIES UNLIMITED
www.ASU-NVG.com

X3 successor among Airbus innovation projects

Airbus is developing a successor to the X3 high-speed hybrid helicopter under Europe's Clean Sky 2 program. First flight is scheduled for 2020.
Airbus Illustration

BY THIERRY DUBOIS

Innovation activity has been intense at Airbus Helicopters as the company is studying a follow-on to the X3 high-speed compound helicopter demonstrator, while rethinking some component designs on in-production helicopters to reduce costs. Even less conventional is the use the airframer is considering for near-future electric propulsion technology, planning to fly the prototype of an autonomous urban air taxi by year-end. To achieve this aim, engineers have been using new research and development methods.

Developed under Europe's Clean Sky 2 public-private partnership in aerospace research, the compound helicopter demonstrator will have its preliminary design review this year. The critical design review is scheduled for 2018 and the first flight for 2020. The schedule has thus slipped by one year since Airbus unveiled the project in June 2016.

The target cruise speed is 190 knots. This is slower than the 220 knots that Airbus was referring to when the X3 was test-flown in the early 2010s but still higher than the usual 140-150 knot cruise speed for a conventional helicopter. Airbus's goal is to fly fast at reduced cost. Thanks to the better efficiency of the architecture, the increase in speed will go along with a proportionally smaller increase in hourly cost, Tomasz Krysinski, head of research and innovation at Airbus Helicopters, explained. The bottom line is an expected 25 percent lower cost per passenger-mile.

Compared to the X3, which was reusing components from other aircraft, the 2020 demonstrator will be "optimal," Krysinski said. For example, the shafts linking the main gearbox to the two propellers will use no bearing. Thanks to a high-voltage electric system architecture, cruise flight on a single engine — for better fuel efficiency — becomes possible. "A high-voltage electric starter can swiftly restart the dormant engine, if needed," Krysinski explained.

In electric propulsion, "there is not so long between now and an application," said Jean-Brice Dumont, then-executive VP of engineering (he has since moved to an equivalent role at Airbus Commercial Aircraft). "With a reasonable improvement in electric energy storage, we can aim at flying electric in the near future." This would be for limited durations, however.

Airbus Helicopters is thus supporting Project Vahana, a self-flying air taxi concept revealed last year by Airbus Group's Silicon Valley outpost A^3. It is one of three urban vertical takeoff and landing (VTOL) projects Airbus Group is working on, with the other two being the CityAirbus project to develop a multirotor "urban taxi" capable of carrying four people, and the Skyways project to develop cargo delivery drones.

Do seasoned engineers in Marignane and Donauwörth have to give reality checks to their new Californian colleagues in Project Vahana? "Some people in my team would put it that way; but the intent is to bring disruption. Guys from a different environment can bring new ideas. We have chaired Vahana's critical design review and we respect their work — these two ways of innovating complement each other very well," Dumont answered.

Perhaps less demanding a project — as it is only required to carry small, non-human payloads — the Skyways joint project with the

National University of Singapore is scheduled to begin operations by year-end. A parcel delivery system with four or five stations on the campus, it will use small unmanned air vehicles (UAVs). Two prototypes have been flying in Marignane.

The idea is to test a last-mile delivery system at a small scale. The UAVs will draw from the aerospace sector, for its safety standards, and the toy market, for its low costs. A profitable system at the scale of a large city would require 200 UAVs flying 18 hours per day for a combined 15 million flights per year, according to Airbus' estimate. "We believe we will take something out of this, maybe not carrying parcels," Skyways project leader Tristan Serretta said.

Finally, Airbus Helicopters president and CEO Guillaume Faury gave further details of the company's CityAirbus project at HAI Heli-Expo 2017 in Dallas, Texas.

"This is a very exciting one for us," said Faury. "It's propelled by electric motors and batteries, so no CO2 emissions [and] lower noise. It's an aircraft which is designed for up to four people on board for short distances, but clearly well suited for being operated in cities downtown."

In addition to low noise and zero emissions, Faury said CityAirbus would need to have high reliability and high safety.

"So, it's a segment which is not far from helicopters, but different," he said. "There are similarities with the light drones that we see popping up, but in terms of safety, in terms of regulations, in terms of certification, in terms of availability and reliability, we are really in the world of helicopters."

The manufacturer is developing technology for the demonstrator with its fixed-wing sister company in a joint lab. He said the project was benefitting from the legacy of the E-fan electric trainer airplane demonstrator developed and flown by Airbus Group in 2014.

Progression looks to be rapid, with Airbus targeting tests this year, and first flight by the end of 2018 or early 2019.

"It will fly first in unmanned, so it will be an accelerated flight test phase, then it will be a manned prototype that will then lead to certification and entry into service," he said. "We are not in a hurry because we need regulation to evolve [and] we need stakeholders to be prepared. But we see the potential being very serious and we are already discussing with cities in some parts of the world which are willing to pioneer these kind of technologies and these kinds of solutions."

He said these are the "innovative cities of this world," and that Singapore was among them.

Meanwhile, innovation is also finding its way into in-production helicopters like Airbus' light helicopter range. A composite-material Fenestron shrouded tailrotor will soon be produced as a single component. An aft transmission shaft has been redesigned and a new manufacturing process is being considered. Therefore, the shaft will require a single bearing, instead of the current six bearings.

Joint work with external researchers may help find new ideas. A university in the neighboring city of Marseille is looking at bio-inspired engineering and Airbus Helicopters is keeping an eye on it for future mechanical component design. "When we look at the functionalities of our mechanical parts, we can see nature has a different design for the same functionalities," an Airbus engineer said.

CityAirbus is one of three urban multirotor VTOL projects Airbus Helicopters is working on, in the hope of developing the next generation of inner-city transport. **Airbus Illustration**

Robinson developing unleaded fuel compatibility

BY OLIVER JOHNSON

Plans to allow the Robinson R44 and R22 to operate with unleaded fuels, the development of a cockpit video recorder across the Robinson range, and the long-awaited certification of the R66 cargo hook were among the developments discussed by company president Kurt Robinson at the manufacturer's annual update at HAI Heli-Expo 2017 in Dallas, Texas.

Robinson is one of the members of the Federal Aviation Administration's (FAA's) Piston Aviation Fuels Initiative (PAFI) — a program to help reduce lead emissions from small aircraft and steer the industry to a more environmentally friendly future.

"We have that program running right now on both the 22 and the 44 with the unleaded fuels," said Robinson. "The fuels are slightly heavier, they're slightly more costly, and you don't get quite as many miles per gallon. But . . . it's unleaded. And it is time for our industry to move on."

Robinson said one of the things the company was looking at was ensuring that an aircraft could be able to switch between fuel types — a necessary requirement if unleaded fuels aren't immediately widely available.

"Our testing isn't that far along with it," he said. "It'll run for us all through the rest of this year and then into next year to hopefully do all that different testing that they [the PAFI program] have asked for."

Robinson said the cockpit video recorder in development for the R22, R44 and R66, would be available this year. He praised the technology's capability to enhance training, as well as the safety benefits of being able to better understand accidents.

Also available this year will be a data recorder for the R22 and R44 — similar to the electronic monitoring unit used in the R66. It will monitor items such as rotor RPM, engine RPM, and oil temperature, allowing the aircraft to comply with European Aviation Safety Agency regulations for commercial operation in Europe.

"It will also be another tool that will be useful in accident investigation and for us to enhance things down the road," said Robinson.

The R66 cargo hook has been in development for several years, but Robinson said it looked likely to be certified this year. The manufacturer performed high altitude testing in the summer with the hook, which will have an external load capacity of 1,200 pounds (545 kilograms). "We're going to modify the total gross weight to allow the 1,200 pounds on the hook," said Robinson. He added that the results from the testing were very positive.

Another major program in the development pipeline is the FAA certification of a lithium battery by Mid Continent Avionics for the R66 — expected in the next two or three months. Robinson said the starts it provided were much stronger than a standard battery, and it was just a fraction of the weight — 16 pounds (7.2 kilograms) as opposed to the standard 36 pounds (16.3 kilograms).

Finally, Robinson said the R66 HD Newscopter and a wire strike protection kit from Magellan Aerospace were both "very close" to certification.

In terms of deliveries over 2016, Robinson recorded a total of 234; and 60 percent of those sales were outside of the U.S.

"2016 was a good year, not a great year, but a good year. Our sales and production was less in 2016 than it was in 2015," said Robinson. "Over the last nine months or so, we have started to see the economies of some of our key markets have started to recover . . . so we're very positive about that and it leads us to think our overall production this year will be higher."

MD switches to Genesys for 902 upgrade

The MD 902 was presented at Heli-Expo with a new avionics suite featuring the Genesys IDU-680. **Skip Robinson Photo**

BY OLIVER JOHNSON

MD Helicopters, Inc. is continuing the program of development that will see the MD 902 transition into the MD 969, with a major component — the new cockpit featuring the Genesys IDU-680 avionics suite — set to be certified in June.

MD's CEO, Lynn Tilton, provided details of the program during an overall company update to media and HAI Heli-Expo show attendees on the first day of the convention in Dallas, Texas.

"We've been talking about the 902 for a very long time: it is an amazing aircraft that we did not keep up with in terms of the necessary innovation and the eradication of obsolescence," said Tilton. "The 902 was just too great an aircraft to let move by the wayside. So, there's been an extensive and expensive investment in the 902 which we are transitioning to the 969 when its finished."

The selection of the Genesys IDU-680 electronic flight instrumentation system represents a change of plans for the long-awaited avionics upgrade for the 902, replacing the Universal Avionics Integrated Flight Deck that had been in the works since HAI Heli-Expo 2013.

"We've made the decision with the Genesys cockpit — it was just the timing, the availability and the open architecture [informing the decision to switch]," said Tilton. "This was speedier to market for us, as well as the open architecture was something for the future that would not make us upgrade again any time soon."

The Genesys system, on show in the 902 at HAI Heli-Expo 2017 in Dallas, Texas, utilizes three IDU-680 6×8-inch high-resolution displays; two serving as dual primary flight displays (PFDs), and the third as a multifunction display.

Capabilities include dual air data, attitude, and heading reference systems (ADAHRS), dual GPS, an engine-indicating and crew-alerting system (EICAS), integrated audio/radio/ICS control, and an enhanced helicopter traffic awareness and warning system (EHTAWS).

The system also offers a moving map, worldwide 3D synthetic vision, highway-in-the-sky (HITS) navigation, weather radar integration, ADS-B weather, EO/IR video display, and is compatible with class A and B night vision imaging systems.

Including all this functionality within the IDU-680 results in large cost and weight savings, said Jamie Luster, director of marketing and sales at Genesys, with a single IDU-680 unit-weighing just 11.5 pounds. She added that the key to the system's utility is in its flexibility.

"It can be a conventional basic PFD for somebody who may be transitioning from a basic six pack instrument panel and moving to an EFIS for the first time, so it allows them to get used to the electronic version of it in a format that they're used to seeing — and then they can move to things like synthetic vision," said Luster.

The system's hover view mode allows pilots to utilize the display to hold a hover without ground reference — especially useful when hovering outside of ground effect.

Tilton said MD had held "very open and honest and transparent" discussions with Universal about the switch to the Genesys system.

"If [Universal] are able to put a cockpit together that is certified and ready to go, we will certainly offer that to our customers," she said. "But we are moving in a different direction right now. . . . We need to make certain that this aircraft has what it needs."

The Genesys system will also be included in the MD 6XX — a newly-unveiled eight-seater single engine aircraft — and eventually in the MD 530G and 530F.

In addition to the new avionics suite, which will be available in the third quarter, Tilton said the 902 is to receive a four-axis autopilot (to be certified by the end of the year); increased power to the NOTAR anti-torque system; and a power upgrade to its Pratt & Whitney Canada PW207E engines.

MD is also in the process of moving production of the 902's fuselage back to its headquarters in Mesa, Arizona; a process Tilton said would save about 35 percent in terms of costs — and this will be reflected in the cost to customers.

"We're trying to replicate the success that we've known with the single-engine aircraft by bringing so much of the production in house, by believing in vertical integration as a cost protector and something that has allowed us to price our aircraft well," she said.

In other news at the manufacturer, it is making plans to grow its training services to capitalize on a market it is largely outsourcing at the moment.

"We're making a huge push into our training, so we keep people close to us and on premises," said Tilton. "We are going to have specialized police training and rescue training, military tactical and weapons training, NVG [night vision goggle] training . . . and specialized mission and specialized mechanic training as well. And that will be both on premises and exportable when need be."

The New
TDAP-611
Audio Controller

Available Summer of 2017
TSO Pending

The ALL-NEW TDAP-611 analog audio panel leapfrogs analog audio into the 21st century. Based upon new thinking and new technology. The TDAP-611 offers the clean clear sound you expect from Technisonic, while doing away with unneeded size and complexities.

Enhanced Mission Focused Capabilities

- COMS (8) Switched
- Directs (3)
- Alerts (3)
- NAVS (6) Switched
- PA's (1) Switched
- ICS Tie (2) Switched

TECHNISONIC
Communications

240 Traders Blvd. Mississauga • www.til.ca • Sales: (612) 231-9020 • General: (905) 890-2113

New Garmin G500H cockpit for H125 & H130

The G500H avionics upgrade for the Airbus H125 and H130 is said to reduce pilot workload, and comes without any weight penalty. **Airbus Photo**

BY THIERRY DUBOIS

Since January, Airbus Helicopters has been fitting all new production H125 and H130 Ecureuil family light singles with a Garmin G500H avionics suite instead of analog instruments, a major upgrade aimed at improving safety. It is based on a primary flight display, which includes synthetic vision and accompanying terrain awareness and warning system, and a navigation display. In addition, a touchscreen improves the human-machine interface for navigation preparation. The existing vehicle and engine management display remains unchanged.

Airbus designed the upgrade with visual flight rules pilots in mind — the displays should not distract the pilot from looking outside, Thierry de Boisvilliers, marketing product manager for light singles, emphasized. "The G500H brings reduced pilot workload," he added. Some aerial work operators were a bit reluctant, expressing concerns about the reliability of such a glass cockpit, but were ultimately convinced, according to Boisvilliers.

A G500H modification was already available as a Federal Aviation Administration supplemental type certificate. "It is now EASA-certified, fully integrated and comes without any weight penalty," he said. The first delivery is understood to be imminent.

The upgrade adds approximately $50,000 to the price of an H125 or H130. There is no plan to offer it as a retrofit.

Meanwhile, a maintenance cost reduction program is underway for the H130 and all preceding versions of the EC130. The elimination of the 12-year calendar check is a major factor, as it was translating into a four- to six-month downtime. Some of the inspections that were part of the 12-year check still have to be performed, under a different schedule and regrouped with other tasks.

Similar benefits will be available in one or two years for the H125, Airbus said.

Donaldson IBF for R66 certified

BY OLIVER JOHNSON

A Donaldson inlet barrier filter (IBF) for the Robinson R66 Turbine has been certified by the Federal Aviation Administration as an addition to the R66's type certificate.

The IBF is available as an option in new aircraft or as a kit for retrofit, and replaces an existing Robinson filter.

With an installed weight of less than seven pounds, the performance of the oil-wetted Donaldson IBF is said to be comparable to the Robinson filter with respect to pressure drop, while providing an enhanced separation efficiency of more than 99 percent.

"Low pressure drop improves the efficiency of the engine — so you get better fuel efficiency as well as getting the turbine to run cooler, so you get better altitude performance," said Peter Riedl, VP of engineering at Robinson Helicopter. "The efficiency in getting the dust out of the air, that's the other part [to extend the life of the engine] — and I think that the Donaldson filter does a very good job of both."

The two companies worked closely together to develop and certify the product, with work beginning in earnest at Donaldson about two years ago.

"We had it on our radar screen as an STC project initially," said Tom Newman, engineering director at Donaldson, "but in talking and dealing with Robinson, they had a customer request [for it and] I think that drove our relationship to get this going."

The potential market for the filter is enormous, with over 800 R66s now in operation around the world.

Riedl said operators in Australia, in particular, had been calling for the IBF. Newman said he expected wider adoption after the first wave of users found the benefits of the product.

"We've seen adaptation of the Donaldson IBF systems initially with customers flying in austere environments, and have the potential to ingest a lot of fine particulate contaminates that cause engine erosion and glazing in the hot sections," said Newman, "but after we get those early adopters satisfied, we do tend to see a lot of broader adaptation — just because the aircraft owners/operators realize the efficiency inlet protection provides to their bottom line in terms of maintenance and overall on the engine."

Newman added that Donaldson has also been doing a lot of work in substantiating the effectiveness of its IBFs in removing airborne salt — a major benefit for those operating in a maritime environment.

"The filters are very efficient at doing that as well — we're in excess of 94 percent removing laden salt from the airborne environment, and obviously keeping salt out of the engine prolongs engine life and reduces overhaul cost," he said.

The install time for retrofit is less than eight man-hours, according to Riedl, although he said he hoped to reduce that time in future. To begin with, the filter will be available through Robinson and any Robinson Service Center, but plans are in place for Donaldson to eventually offer the retrofit directly to customers, too.

Honeywell focused on 'connected helicopter'

BY ELAN HEAD

Constant connectivity is something that many working professionals have come to take for granted. When your office is a helicopter, however, connectivity becomes more of a challenge.

Mobile networks are rarely able to ensure reliable coverage for fast-moving rotorcraft — and that's assuming that an aircraft is actually within range of cell towers. For the many helicopters operating in remote environments, connectivity is synonymous with satellite networks, yet a helicopter's rapidly spinning main rotor system can be a daunting barrier to higher bandwidth satellite data transfers.

Now, Honeywell believes it has overcome many of these technical challenges with its Aspire 200, a compact satellite communications system that uses interleaver waveform technology to enable robust connectivity almost anywhere in the world. Already certified for the Leonardo Helicopters AW139, with supplemental type certificates (STCs) for a number of other helicopter models expected this year, the Aspire 200 is a centerpiece of the "connected helicopter" that Honeywell promoted at HAI Heli-Expo 2017.

"The Aspire's main capability is the ability to put an L-band signal through a rotor blade and get the system to provide everything — voice, data, video — from a helicopter to a ground station, or to a ship, or a land-based vehicle, and allow that communication to happen in real time," said Honeywell's Tom Neumann.

To do so, the Aspire 200 transmits the signal through gaps between the spinning main rotor blades, similar to how some airplanes in the First World War fired machine gun bullets through the arcs of their spinning propellers.

"As that rotor blade spins above the helicopter, it acts basically as a signal shield that prevents signals from going up and down towards the satellite," Neumann explained. "And because of that we've had to develop some pretty good technology to allow us to basically go between the rotor blades and get that signal through."

Because every helicopter rotor system is different, software algorithms and antenna placements have to be fine-tuned for each model. With 10 different helicopter STCs now under development, Neumann said, "there's a lot of engineering going on right now to make that happen and to go through the certification process." But he reported that Honeywell is making good progress, and expects to have many of those STCs approved by the U.S. Federal Aviation Administration by the third quarter of 2017.

"We are seeing really good results so far," he said. "We are optimistic that once we get these STCs finalized in 2017, it will be a step change improvement for the market in this arena."

While the term "connectivity" is often associated with emails and Web surfing, the connected helicopter will allow its occupants to do more than update their Facebook statuses. According to Neumann, Honeywell is seeing interest in its connectivity solutions from diverse sectors of the helicopter market — not just corporate/VIP operators.

"We've had interest from everybody from some oil-and-gas folks looking to get large amounts of data off their helicopters for maintenance, to EMS [emergency medical services] operators that are really interested in trying to get medical information to a hospital," Neumann said.

He added that law enforcement operators have shown particular interest in the Aspire 200 as a supplement to microwave downlinking systems used for surveillance and incident management — which is one reason why Honeywell has prioritized development of an STC for the popular Airbus Helicopters H125/AS350. Neumann also suggested that real-time video streaming could be used by search-and-rescue operators to put more eyes on a search.

"Now we can actually take what the pilot and spotters in a helicopter are looking [at] and transmit that video in real time back to a base, where multiple people can monitor it," he said.

However, these applications may be just the tip of the iceberg. "We're really excited for once the [customer] starts to use it, because we know they're going to come back and ask us for applications," Neumann said, noting that with more than 30,000 engineers on staff, Honeywell is well positioned to develop those applications quickly. "We definitely have the ability to listen to them, develop an app, and get [it] to market."

Airbus presses ahead with Chinese factory plan

BY THIERRY DUBOIS

The long-hoped-for awakening of the Chinese civil rotorcraft market may finally be taking place — and Airbus Helicopters is gearing up to make the most of it.

CEO Guillaume Faury revealed in February that China was the company's largest single market in 2016, ranking first in both units and value. The country is estimated to need thousands of civil helicopters over the next 20 years for applications such as emergency medical services. However, the slow opening of the lower airspace had impeded sales until now. A recent acceleration in orders has taken the number of helicopters flying in China to 1,000, according to Faury. He is now counting on a 200-unit annual market in the country from 2020.

In the middle of this year, Faury will break ground for Airbus Helicopters' first final assembly line in China. The factory is planned to be up and running in 2019, producing H135 light twins. It will operate under a 2015 agreement between Airbus Helicopters and Sino-German Ecopark, a firm located in Qingdao, in the Shandong province of China.

Sino-German Ecopark has committed to build at least 100 H135s over a 10-year period. An "ecosystem" will be developed with Chinese partners, including maintenance, repair, and overhaul, and training facilities. The H135s produced in China will be distributed domestically.

Late last year, Airbus Helicopters engineers supported their counterparts from Avicopter for the first flight of the AC352 medium twin. The AC352 is the Chinese designation of the H175, a 50-50 joint program. Two dozen Airbus Helicopters employees are based in China to support AC352 engineering and production, with certification expected in 2018.

Thanks to China's "huge" potential in aerospace, Faury believes his company will have other joint projects in the country. Asked about Airbus Helicopters product lookalikes offered by Chinese companies, he said he sees Avicopter as a partner rather than a competitor.

Helicopter accident totals fall from 2013 peaks

BY ELAN HEAD

Helicopter accident totals have continued to drop from their 2013 peaks in most parts of the world, according to preliminary data released by the International Helicopter Safety Team (IHST).

At HAI Heli-Expo 2017, the IHST reported that total civil helicopter accidents in 2016 were down 17 percent compared to 2015, and fatal accidents also decreased by 17 percent year-over-year.

Compared to 2013, when the global civil helicopter industry saw total accidents spike to 359, last year's total of 254 accidents represented a 29 percent decline. Fatal accidents were down 31 percent, from a total of 75 in 2013, to 52 last year.

Some of this decline can likely be attributed to a decrease in flying activity, as 2016 was an economically difficult year for many sectors of the industry. However, even as he acknowledged the drop in flight hours, IHST spokesperson Tony Molinaro advanced a more optimistic interpretation of the data at a Heli-Expo press conference, telling reporters, "We think that there truly is an expanding culture of safety within the helicopter industry."

The improvement in total and fatal accident numbers was seen in most regions of the world. In the United States, for example, there were 106 accidents and 17 fatal accidents in 2016, compared to 146 accidents and 30 fatal accidents in 2013. Canada experienced the same total number of accidents in 2016 as in 2013 — 27 — but the number of fatal accidents decreased from six to two.

Europe cut its civil helicopter accident rate in half between 2013 and 2016, with 52 accidents and 12 fatal accidents last year, compared to 103 accidents and 25 fatal accidents in 2013. However, Russia and other countries in the Commonwealth of Independent States were a notable exception to the trend: total accidents in the region climbed from 19 in 2013 to 30 last year, while fatal accidents were also up, from seven to 12.

Because helicopter flight hour data is not available in most parts of the world, the only accident rate calculations available are for the United States. According to the U.S. Helicopter Safety Team (USHST), the U.S. civil helicopter accident rate for 2016 is estimated at 3.19 per 100,000 flight hours, compared to a recent peak of 4.95 in 2013.

That preliminary estimate is below previous lows of 3.94 accidents per 100,000 flight hours in 2010, and 3.87 in 2011. Last year's fatal accident rate is estimated at 0.51 per 100,000 flight hours, which is below the USHST's 2016 goal of 0.73.

However, these 2016 estimates — which are based on the Federal Aviation Administration's (FAA's) last aerospace forecast — are subject to change after September of this year, when the FAA's *2016 General Aviation and Part 135 Activity Survey* publishes data based on rotorcraft flight hours received from operators.

In recent years, survey data reflecting lower-than-forecast flight hours have pushed the USHST's preliminary estimates upwards. For example, the preliminary accident rate estimates for 2013 and 2014 — 4.20 and 3.64 accidents per 100,000 flight hours — were revised to 4.95 and 4.26, respectively, once more accurate flight hour data became available.

B.C. government launches SAR drone pilot project

BY HOWARD SLUTSKEN

Last fall, the British Columbia government launched a pilot project to evaluate the use of unmanned air vehicles (UAVs) in search-and-rescue (SAR) operations. The project is being overseen by Emergency Management BC (EMBC), the coordinating and supporting agency that provides the operational funding for specialized resources to regional SAR organizations.

The province's all-volunteer SAR teams provide an essential and critical service, finding errant hikers and out-of-bounds winter sports enthusiasts throughout B.C.'s rugged backcountry.

"It's a one-year pilot project which will evaluate the effectiveness and the functionality of UAVs in search-and-rescue," said Andrew Morrison, search-and-rescue specialist, EMBC. "We'll apply what we learn into policies that will guide the use of UAVs in SAR operations, following a similar model to the way we use aircraft in SAR."

Morrison said that one of the issues is deciding on the operational model. "The challenge we have with some of the commercial providers is that their people aren't trained to go into the environments where the SAR volunteers go. Or do you take a SAR volunteer and try to train them to be a pilot? There's arguments for both, and through the pilot project we hope to evaluate these options."

In B.C.'s interior, the Kamloops SAR team recently had a successful rescue as part of the pilot project. In late February, the team's contractor, Hummingbird Drones, deployed an infrared (IR) camera-equipped DJI drone, and found seven missing skiers and snowboarders who had ventured out-of-bounds near the Sun Peaks ski area.

"We've been impressed by how effective IR is, in being able to penetrate the forest canopy," said SAR manager Alan Hobler. Kamloops-based Hummingbird was a natural partner for the SAR team, given the drone company's experience with hot-spot locating during wildfires.

"There's not a big difference between seeing a heat signature from a hot spot after a wildfire and a human that's lost," said Robert Atwood, co-founder and CEO of Hummingbird Drones. He added that while infrared is "pretty binary, with black or white on the screen," there's still work to be done in utilizing visual feeds.

"You've got a million colors to sort through, and you have to do it really quickly, and often on a compact screen. It's about the resources available to analyze the video in real-time," said Atwood.

Mike Coyle is a SAR manager for the Coquitlam SAR team, in the Vancouver region. An 18-year SAR veteran, Coyle began researching UAVs over two years ago, and worked with EMBC to establish the pilot project.

"We look at all of the tools we have, not just for rescuing the subject, but also for keeping our team safe," said Coyle. "Sometimes in the bush I've been standing over a gorge and I can't see the bottom of it safely, and thought it would be nice to see over the edge before I go over the edge. A drone can help us do that."

While Coquitlam SAR will be utilizing a contractor, Vancouver's North Shore Rescue (NSR) is planning to purchase and operate its own UAVs, according to NSR team member Curtis Jones.

"The drone is a tool for very specific applications," said Jones. "At the end of the day, drones are not going to replace helicopters anytime soon. The helicopter plays a very different role in the search and rescue model. The pilots are searchers, too."

Hummingbird Drones is one of the partners in the pilot project. The company has previously used its drones to detect hot-spots during wildfires.
Hummingbird Drones Photo

Elbit & Leonardo partner on Heli-ClearVision

Elbit Systems announced at HAI Heli-Expo 2017 that it has signed a long-term agreement with Leonardo Helicopters to jointly market and equip Leonardo's line of commercial helicopters with the latest Heli-ClearVision enhanced flight vision systems (EFVS).

Heli-ClearVision is based on Elbit's ClearVision enhanced vision system (EVS) camera, which generates an infrared image to help pilots see through darkness, poor weather, and other low-visibility conditions. This image is projected onto a wearable display, either Skylens — a high-transparency visor that is compatible with headsets — or SkyVis, a monocular helmet-mounted display with line-of-sight technology. Both displays allow the pilot to fly with head up and eyes outside while viewing the EVS image.

The pilot's situational awareness is further enhanced by Elbit's combined vision system (CVS), which combines the real-world EVS image with a synthetic map based on a digital terrain model database. The system is also able to detect lights such as those of oil rigs, helipads, and runways.

In a press release, Elbit Systems Aerospace Division general manager Yoram Shmuely stated, "Elbit Systems is proud to be selected by Leonardo to integrate the commercial Heli-ClearVision EFVS across the line of Leonardo helicopters. Leveraging our world leading solutions of EFVS for [fixed]-wing platforms to the helicopter market will enable pilots to fly 'eyes out' and operate safely under degraded visibility and weather conditions that prevented such operation in the past."

Leonardo Helicopters managing director Daniele Romiti stated, "By offering these cutting-edge systems and technologies on our new generation platforms, we position Leonardo Helicopters more and more as the most capable helicopter to perform any mission with high safety in all weather conditions."

At Heli-Expo, Dror Yahav, Elbit Systems vice president of Commercial Aviation, told *Vertical* that the company is seeing particularly strong interest in Heli-ClearVision from the emergency medical services (EMS) sector. "Most of our first customers will be EMS operators," he said.

According to Yahav, Elbit is aiming for initial certification of the system by the European Aviation Safety Agency in 2018. The starting cost for the system is expected to be around US$100,000.

Embry Riddle student gets MDHI scholarship

Embry Riddle Aeronautical University student Cameron Collins will be adding MD 500E flight experience to his resume thanks to a scholarship sponsored by MD Helicopters, Inc.

MD presented an MD 500E transition scholarship to Collins on March 8 at HAI Heli-Expo 2017 in Dallas, Texas. This is the ninth year that MD has sponsored the scholarship, which is available exclusively to students enrolled in Embry Riddle's Helicopter Program.

Collins is a student at Embry Riddle's campus in Prescott, Arizona, where he is also enrolled in the Army Reserve Officers' Training Corps (ROTC). After graduation, Collins plans to join the Arizona Army National Guard and become an Apache helicopter pilot.

For Collins, who has done all of his helicopter flight training to date in Robinson R22 and R44 aircraft, the MD 500E course will be a welcome stepping stone on his way to the Apache.

"The MD is one of my dream helicopters," he told *Vertical*. "When I first started getting into helicopters, the 500 was definitely one of my favorites."

Collins is one of about 110 students enrolled in the Embry Riddle Helicopter Program in Prescott, which has partnered with Universal Helicopters for flight training. According to program chair Dawn Groh, "We are molding exceptional leaders and aviators who bring more than just great flying skills to the table. Our graduates bring an in-depth education, teamwork, and soft skills to any organization."

Groh praised MD for its support of Embry Riddle students. The helicopter manufacturer is located in Mesa, Arizona — about 100 miles south of Prescott — and provides students with various educational opportunities in addition to the annual scholarship.

"We have a very close relationship with MD," Groh said.

Cameron Collins (right) has been awarded a scholarship from MD Helicopters for MD 500E transition training. **Mike Reyno Photo**

JSSI expands helicopter programs

Jet Support Services, Inc. (JSSI) is planning to add at least another 10 hourly helicopter maintenance programs to its list of services, following the introduction of 18 new programs in 2016.

The company now has over 100 programs for rotary-wing aircraft, ranging from complete "Tip-to-Tail" coverage, to engine- and airframe-specific, and unscheduled maintenance coverage.

"We're the only provider that can provide engine and airframe coverage, and [with] avionics we're the sole source [hourly maintenance program]," said Ray Weiser, JSSI's senior director of helicopter services. "It's especially nice when you have a mixed fleet, and maybe you have a jet and you have a Sikorsky and an Airbus helicopter. If each one of those were to require three contracts to the OEM [original equipment manufacturer], you have nine contracts with three aircraft. JSSI can pull all that into one contract for one aircraft."

The company's helicopter business grew by 250 percent in 2016, the result of renewed focus on the industry over the last three years.

"Everybody associates us with a jet company in the past, but within in the helicopter space we're starting to gain recognition," said Weiser. "People know who we are, we're making noise, their competitors are using us; their neighbors are using us. If you're providing a service and you're doing it really well, the word gets out."

As well as adding new types to its portfolio as they become certified — this year should see new programs launched for the Leonardo AW169 and AW189, as well as the Bell 505 Jet Ranger X — JSSI has completed the expansion of its services from light to heavy helicopters.

"We looked at the lights first," said Weiser. "We wanted to make sure that we had a solution for every light, and we do now. We're very well versed in the mediums — we can almost say we've got them all. And the heavies are our latest focus."

With that in mind, the company recently released an airframe program for the S-92.

Weiser said JSSI's customers currently range from single-aircraft owner/operators to those with fleets of up to 10 aircraft, and they operate in all segments of the industry.

While there has been a huge growth of OEMs offering their own pay-by-the-hour programs in recent years, Weiser said the competition was actually enhancing JSSI's business.

"Competition is good, and then when [operators] compare the products, that's where we're winning the business," he said. "[The OEMs] build great helicopters, they build great engines, but this isn't what they do, and this is all that we do. So we've got be better. We've got to work harder for support; we've got to have better customer service, and that's kind of where we excel."

Rolls-Royce marks milestone, launches app

The Rolls-Royce M250 engine family is expected to surpass 250 million flight hours in 2017, a milestone that was commemorated by Helicopter Association International at HAI Heli-Expo 2017.

HAI president Matt Zuccaro and chairman Torbjorn "TC" Corell presented Rolls-Royce with a certificate of achievement on March 9 at the show in Dallas, Texas. In a press release, Jason Propes, Rolls-Royce senior vice president for Helicopters and Light Turboprops, described the M250 series as "an amazing story of understanding the customer's changing needs, and introducing innovation to enhance operations, reduce cost, and make flight easier for pilots."

Rolls-Royce received a certificate of achievement from HAI to commemorate more than 250 million flight hours on the M250 engine. From left: TC Corell, HAI chairman; Jason Propes, Rolls-Royce senior vice president for helicopters and light turboprops; and Matt Zuccaro, HAI president. **Skip Robinson Photo**

Originally developed by the Allison Engine Company in the early 1960s, the M250 has been adapted to multiple military and commercial helicopters over the years, beginning with the Bell 206A JetRanger and OH-58 Kiowa. According to Rolls-Royce, which acquired Allison in the mid-1990s, nearly 33,000 M250 engines have been delivered to customers, and about 16,000 of those are currently in service.

As Propes emphasized at Heli-Expo, today's M250 series "is not the same engine as it was decades ago." The M250-C47B/8 that powers the Bell 407GXP incorporates various design improvements that improve hot-and-high performance while increasing fuel efficiency. Meanwhile, the latest version of the M250, the M250-C47E with dual-channel full authority digital engine control (FADEC), is already flying on the Boeing AH-6i and the unmanned Northrop Grumman MQ-8C Fire Scout, and will power MD Helicopter's new MD 6XX, which was on display at Heli-Expo 2017 in concept form.

"We continue to work with customers interested in the M250 engine for adaptation in existing aircraft as the choice to power future platforms," Propes said.

Meanwhile, Rolls-Royce is expanding support for its new-generation RR300 engine, which powers the Robinson R66. Nearly 800 RR300 engines have been delivered for R66 operators, who have amassed more than 550,000 flight hours to date.

"That engine has been very successful in the market," Propes said of the RR300. "The reliability of that engine has just been stellar."

Rolls-Royce has established an RR300 FIRST (Fully Integrated Rolls-Royce Support Team) network of competitive authorized service centers that is modeled after the successful M250 FIRST network. The company has also added a support plan for RR300 operators, the TotalCare maintenance program; increased the number of deployed technical representatives; and introduced an RR300 customer training program through parts distributor Aviall. Additionally, Rolls-Royce has released an improved RR300 engine monitoring unit with enhanced reliability.

At Heli-Expo, Rolls-Royce was also highlighting a bigger engine: the 1,300- to 1,700-horsepower-class CTS800, jointly developed with Honeywell through the Light Helicopter Turbine Engine Company. Originally created for the RAH-66 Comanche program, the CTS800 was selected for the Turkish Light Utility Helicopter, and powers other models including the Leonardo Helicopters AW159 Wildcat. "We're excited about that engine as well," Propes said, noting that it offers an attractive performance boost over the 1,100-horsepower-class engines that power a number of medium helicopter models.

Rolls-Royce also used Heli-Expo 2017 to launch a new FIRST network app for smartphones and tablets. The free app incorporates a searchable directory of approved service centers and Aviall locations, allowing operators to quickly locate support providers around the world. The app is available for both Apple and Google Android devices, and can be located by searching for the Rolls-Royce FIRST network in either app store.

Interagency fire briefing causes frustration

BY JEN BOYER

Contractors at the Department of Interior (DOI) and U.S. Forest Service (USFS) Interagency Fire Briefing at Heli-Expo 2017 said they left the meeting frustrated at a lack of feedback on two controversial topics. Attendees were looking for explanations about a solicitation that appears to target one specific restricted category aircraft and decisions to not renew options on several Type 1 contracts that began last year.

The briefing is designed to update contractors and provide information on entering government contracting, but most arrived with serious questions and concerns.

The solicitation in question (No. D17PS00157) was posted on Feb. 24, 2017, and called for an exclusive use helicopter for use by the Bureau of Land Management (BLM), Boise, Idaho. Closing on March 17, 2017, and in effect from May 15 to Sept. 11, 2017, the solicitation calls for a Type 1, 12-passenger, twin-engine helicopter with 140-kt speed, wheeled landing gear with shock absorbers, and dual aft sliding doors.

Attendees voiced concern that the specific details in the solicitation, which seemed to clearly describe the Sikorsky UH-60 Black Hawk — a restricted category helicopter only flown by a handful of operators, would limit bidding opportunities for most contractors.

Walker Craig, chief of technical services for the Office of Aviation Services at DOI, suggested the solicitation was not limited to one type of aircraft, but when pressed by contractors, he cited Federal Acquisition Regulations that require discussion on a solicitation to be in writing.

"If you have a question on a specific solicitation, you need to submit that question through the solicitation," he said.

When asked when an answer would be forthcoming, Craig said the solicitation would be reissued with an amendment if the commanding officer in charge saw the need to do so based on the question.

Craig had a PowerPoint slide prepared showing the increased area that could be covered by a faster helicopter, highlighting how an initial attack helicopter is needed to bring in firefighters.

In response to another question, Craig said he didn't anticipate the DOI moving away from normal category aircraft and part 135 operators.

Further questions regarding the legality of posting a solicitation for a restricted category helicopter, the inability to move firefighters outside a temporary flight restriction (TFR) area in a restricted aircraft, and lack of options beyond the UH-60 were unanswered. Craig said responding to them would cause an unfair advantage to those in the room and he reiterated that questions needed to be sent in writing.

After a quick break, Frank Gomez, contracting officer for the USFS, took the podium and shared information on USFS helicopter asset needs. He highlighted that the Type 1 contracts started last year will not be exercising options this year, reducing Type 1 contracted helicopters from 34 to 28.

"This downgrade came from D.C.," said Jim Edge, helicopter program manager for the USFS, in response to questions regarding why historically optioned contracts were not being exercised. "The new administration has said every department will be cut by 10 percent and we're doing what we can to prepare for budget cuts."

Edge emphasized how airplane air tanker numbers decreased in 2012, calling for an increase in Type 1 helicopters. Now that new tankers are available, the USFS is looking at reducing Type 1 contracts, citing allowable payload.

"We want to be sure we're getting our money's worth," Edge said.

After the meeting, several contractors stayed to share their concerns.

"Both of these are frustrating," said Steve Wright, vice president of Rainier Heli International. "We just want it discussed openly so we can understand it," he added.

Brain Beattie, director of operations at Croman Corporation, one of the operators affected by the reduction, said: "This is a very serious issue to cut resources before policy decisions."

Jim Russell, vice president of CHI Aviation, agreed. "There are a lot of unanswered questions," he said. "They're going to do what they're going to do, but they could have explained it better; been more transparent."

Safety in Real Time

Real-time health and usage monitoring is now available for the Sikorsky S-92, thanks to a revolutionary partnership between PHI, Sikorsky, and Metro Aviation subsidiary Outerlink Global Solutions.

BY ELAN HEAD

Imagine being at the controls of a Sikorsky S-92 helicopter 200 nautical miles offshore when the main gearbox oil pressure caution message illuminates. The nearest helipad is 50 miles away, and you're not sure whether it's open or can support an S-92. Radio communication is intermittent. With no ability to make a safe precautionary landing, and no more information than you can read on your gauges, you're forced to watch and wait — weighing the known risk of a ditching against the unknown, but potentially catastrophic, risk of a major mechanical failure.

Now, imagine being in the same circumstances, but this time you have push-to-talk communication with your flight operations center, which is receiving real-time data from the helicopter's health and usage monitoring system (HUMS).

If the ops center reports that the aircraft systems appear normal, you may decide to continue toward your destination or a known platform for maintenance review. If, on the other hand, a component is exceeding its limits, you may decide that a deliberate ditching is justified — but you'll have time to prepare and brief your passengers. Meanwhile, ops specialists will be directing search-and-rescue assets to your exact location, which is transmitted to them every 10 seconds and backfilled to the second with actual GPS position data.

Since the beginning of offshore helicopter operations, flight crews have faced emergency situations as in the first scenario, with little or no help from operations personnel on the ground. Now, they can look forward to constant en-route monitoring and support, thanks to a new partnership between Sikorsky, PHI, and Metro Aviation. Announced at HAI Heli-Expo 2017, the companies have collaborated to transmit in-flight, real-time HUMS data from PHI's S-92s to its operations control center — a capability leap that could revolutionize how helicopters operate in remote and hostile environments.

"We're thrilled that we're able to partner with Metro and Sikorsky to get this launched," said PHI director of oil and gas

A Sikorsky S-92 operated by PHI banks during a flight over the Gulf of Mexico. The OEM and operator have entered into a partnership with Metro Aviation subsidiary Outerlink Global Solutions to provide real-time health and usage monitoring for the aircraft. **Ted Carlson Photo**

aviation services Pat Attaway. "Our hope at PHI is that when there's a technology launch, others will follow."

According to Attaway, PHI began exploring the potential for real-time HUMS several years ago as a way to further enhance the safety of its operations. The chief obstacle was finding a way to reliably transmit the large amounts of data associated with HUMS while also ensuring continuous two-way communication with the aircraft.

That's where Metro Aviation came in. Metro had established the flight data monitoring company North Flight Data Systems in 2008, and acquired the satellite tracking company Outerlink in 2014. Metro combined their expertise to develop IRIS, a system that combines voice, video, and flight data recording with broadband push-to-talk voice over internet protocol (VoIP) radio and high-frequency satellite tracking.

For connectivity, Metro entered into an exclusive agreement with the California-based communications company ViaSat, which developed a compact antenna for the IRIS system suitable for helicopters. ViaSat's network supports the transmission of data at broadband speed, at an economical price of just US$0.15 per kB. That makes it practical to transmit position and other data at 10-second intervals, backfilled to the second, rather than the one- to two-minute intervals that until now have been typical of satellite tracking.

PHI recognized that IRIS could provide the data transmission capability it was looking for, and supported Metro's supplemental type certification of the system for the S-92. Then, PHI approached Sikorsky about developing software that would allow the S-92's existing HUMS to transmit data via IRIS to the operator's ground station.

"That timing was quite coincidental," said Sikorsky senior program manager Linda Scott, explaining that Sikorsky had already been exploring ways to innovate with its HUMS technology. "When PHI brought us this opportunity, we were quite interested, and it didn't take us long to jump on it."

According to Scott, Sikorsky started by developing the relatively straightforward capability for operators to pull HUMS data at any time. "Anything they use HUMS data for now, they can do it in real time if needed," she said.

As the program progressed, however, Sikorsky and PHI recognized the potential to take real-time HUMS to the next level by developing "push" features that are activated by certain triggering events, each one associated with a caution or warning light in the cockpit. For the initial launch of the capability, they chose to focus on seven critical events primarily related to engine and gearbox malfunctions.

"When there's a system anomaly detected with one of the seven caution advisories in flight, it's actually going to push the data down to flight ops, without any action required by the pilot," Scott said. "There's going to be a screen in the operator's flight operations center, they're going to immediately see that caution advisory, and they're going to be able to see HUMS data associated with the system for which that caution advisory is coming up with the click of a button."

"As a pilot, you're looking for secondary information," Attaway noted. "There's only so much that the aircraft says. Now if you've had someone tell you about the HUMS data, you have a comfort factor."

Attaway emphasized that real-time HUMS "isn't about taking the authority or the decision-making out of the hands of the pilots. They're on site, they see the entire picture, the entire environment. But it is providing additional information so that they can make the best decision possible, and we on the ground are in a position to help them," he said.

Beyond the safety benefits, real-time HUMS also promises maintenance advantages. For example, if an aircraft becomes stranded away from base, maintainers will be able to query the HUMS remotely to determine what parts and tools they should bring with them to get the helicopter back in the air.

The first PHI S-92 to be equipped with real-time HUMS capability was deployed operationally in early March. Attaway said that the company intends to retrofit all of its S-92s with the capability, although it has not yet determined a schedule for the retrofits.

While the necessary satellite service is currently available only in North America, Metro Aviation president Mike Stanberry announced at Heli-Expo that the solution will eventually be available through the satellite constellation of Thuraya for the North Sea, Europe, Asia, the Middle East, Africa, and Australia. (The Thuraya connection will also give customers in North America redundant coverage.)

"We are also working to add another L-band satellite constellation to obtain connectivity capabilities in South America, eventually giving us worldwide coverage," he added. "We are currently offering the best connectivity solution available, but we are committed to constantly improving the connection." Because the IRIS system is satellite-agnostic and independent of any one satellite, a simple antenna change can open it up to more connections as they become available.

Of the future of real-time HUMS, Stanberry said, "I believe that there's going to be more people getting on board. . . . Once the oil companies realize that this capability is here, they're going to demand it."

If you would like to submit a press release or if you have a new product or service that you believe is newsworthy, please e-mail our news editor at news@verticalmag.com.

Veteran pilot Richard Alzetta, 72, has flown a variety of operations around the globe in a career spanning more than half a century. He recently recorded his 21,000th flight hour in helicopters — and more than half of those have been as an instructor.

RICHARD ALZETTA
VETERAN PILOT

INTERVIEWED BY OLIVER JOHNSON

***Vertical:* You're technically retired these days — but you're still flying quite a lot with Mountain View Helicopters, aren't you?**

Richard Alzetta: I used to own the school there with Paul Bergeron, and then I sold that to Paul in 2011 to kind of semi-retire. I'm still doing part-time instructing, and I do that with private individuals and with Mountain View Helicopters. I still do 300 to 400 hours a year.

***V:* How did you begin your career in aviation?**

R.A.: My first flight was when I was 11, but I had to wait until 1962 to get my private license on an airplane in a flying club in France. And then I joined a French military pilot program in 1963 when I was 18. I was flying fixed-wing and then later on flying helicopters. I stayed in the military for six years, and then I moved to the States. I got my commercial license there in 1969 and worked in Idaho and Alaska. Then in 1972 I got a contract to fly Bell 205s and 47s in Indonesia. I went there for a supposedly 18-month contract, and I ended up taking over the company as a manager and stayed there for 25 years.

***V:* How was life in Indonesia?**

R.A.: Very nice — it was beautiful! And then the last five years in Indonesia I was flying in the really high mountains of the Indonesian part of New Guinea. There's a big copper mine there, and they have one of the "Seven Summits" — the highest peaks on each of the seven continents — and that's where I was flying. I landed on top of the high peak there — called Puncak Jaya, or Carstensz Pyramid — which was 16,300 feet. I flew there for five years, and it was all really high mountain stuff; we were moving drilling rigs at 15,000 feet. When I was there, I found a Second World War B-25 American bomber that had disappeared 50 years earlier. Two years later, the American military sent a team to recover the remains of the crew, the pilots, and the passengers.

***V:* What brought you to Canada?**

R.A.: There were guerillas in Papua, and they eventually put a bounty on the foreign pilots and helicopters so that they could put pressure on the government if they could catch one. We were getting shot at, so I decided it was time to go. When I was flying in the Northwest U.S., I loved being in the mountains. Calgary is close to the mountains, I like the different seasons, so that was a good choice for me.

I've been here now for pretty much 20 years. I had to redo all the Canadian licenses — fixed-wing, helicopter, all the instructor licenses. When I was in Indonesia, I was an instructor, also an examiner for the government. Obviously in Canada that doesn't count, so I had to redo everything, and eventually I became a Class I instructor, which I'm still doing. I was also a Transport Canada examiner for private and commercial helicopter licenses.

***V:* What did you learn in?**

R.A.: In late 1965 I was learning in a Bell 47, and then I transferred to an Aérospatiale Alouette II. In the squadron, I flew Alouette IIs, Alouette IIIs, Sikorsky S-55s, and then a little bit of Vertol H-21s.

In Indonesia, I mostly flew Bell 205s, and also some Bell 47 and 206, and a Sikorsky S-58T. In 1979/1980, I was doing an IFR [instrument flight rules] contract with the S-58T in the middle of the China Sea for the United Nations, helping Vietnamese refugees. We were supporting the United Nations, but also looking all over the China Sea for the pirates that were attacking the refugees.

***V:* You've flown a pretty varied mission set over the years, haven't you?**

R.A.: I have done military missions, seismic, offshore, mountain work with geologists, support for oil companies — moving a lot of sling loads to move the big drilling rigs in Indonesia — and I have done a lot of instruction work. I was a flight instructor in Indonesia, and most of the stuff I've done in Canada is really instructing. I have about 11,000 hours as an instructor. I flew a lot of mountain work in the Alps, when I was in Alaska around Mount McKinley, and in Indonesia around Puncak Jaya, so I do a lot of mountain training at the school here.

***V:* What's the most challenging work you've done?**

R.A.: The most challenging work to me has always been flying in the mountains because of the weather, the wind, and the altitude. And that's what I enjoyed the most actually, because of the challenge. Rescue work in the mountains can be particularly challenging, because of the pressure to recover the people. Hopefully the weather cooperates, because if the weather is not good, then there is nothing you can do.

***V:* How has instructing changed over the years?**

R.A.: I started flying helicopters in 1965

in the military, and the training that the people receive now at Mountain View Helicopters is a lot better than I got! We have a lot more information about aerodynamics and things like that now. The courses definitely have improved because of the overall increase in knowledge about helicopters and flying in general.

But you never stop learning. I'm still learning. If you're a pilot and you think at one stage you know everything, you better stop flying — because that's when you're going to crash.

V: Have you had any accidents?

R.A.: No, I've never had an accident, I've had engine problems once in a while, stuff like that, but I've never crashed. I've had several incidents of losing fuel pumps and oil pumps. I had one when I was supporting the United Nations, flying the Sikorsky S-58T. One of the turbines exploded, so I had to land with the passengers. I found a little island in the China Sea and I landed on the little beach that was barely bigger than the helicopter. Me, my copilot, and the United Nations guys with us, were actually rescued by a Vietnamese refugee boat, which took us to a United Nations camp on an island that was not that far away. We had to get on a ship, and then took the ship — a German freighter — back to Singapore. There, I bought a new engine, leased a Bell 212 from a different company, and put the engine in the 212 with two engineers and another pilot. Me and the two engineers replaced the engine on the beach. It took us about three days. Then we put the old engine inside the cabin, I did a test flight — everything was ok — and we flew back to Singapore, which was about 200 nautical miles away.

V: Was that your most memorable mission?

R.A.: That one sticks out the most. When I was in Alaska on the North Slope, sometimes you got into a whiteout condition. That's pretty hairy. But that's nothing mechanical — that's just weather.

V: What makes a good pilot?

R.A.: Somebody who can absorb the course, is fairly quick to learn, and has got good hand-eye coordination. Somebody who can study, who likes to read — because you have to read books and technical information. You have to, in a way, enjoy taking exams, because as a pilot you're going to be taking exams all your life. If you don't like to do written tests, it's not so good. Read magazines like *Vertical* to get information about accidents to know what could go wrong, and how you can avoid the problem. That's very important. And I would say the love of flying is very important. To me, personally, unless you love what you are doing, you're probably not going to be super good at it. So, you really have to love what you are doing.

V: Given the choice, would you choose this career path again?

RA.: Definitely! I would not change anything. I've loved it since the first flight I did when I was 11 years old. I still love it and I'm still amazed that I'm doing this. I would do it all over again, and I hope to do it for many more years.

This interview has been edited and condensed.

redefining the future

Bell Helicopter's FCX-001 concept aircraft stole the show at Heli-Expo 2017. According to the manufacturer, its creation is the result of the company returning to its roots as an industry pioneer.

Story by Oliver Johnson | Photos by Sheldon Cohen

The Bell FCX-001 concept aircraft is unveiled in front of a large crowd at Heli-Expo 2017 in Dallas, Texas. Bell CEO Mitch Snyder said the aircraft showed "a different Bell."
Skip Robinson Photo

e

Download as wallpaper at verticalmag.com/wallpaper

Bell Helicopter unveiled its vision of the future of vertical lift transport at Heli-Expo 2017 in Dallas, Texas, in the highly-stylized shape of the FCX-001 concept aircraft. Bell brought the aircraft to the show as a display of a renewed company-wide focus on innovation, and to show off some of the exciting cutting-edge technologies in various stages of development at its research facilities.

The technologies incorporated in the medium twin-engine FCX-001 include those likely to mature in the near future, as well as those that are a bit more ambitious in their reach — as evidenced in a cockpit that is entirely free of physical controls. Visitors to the Bell booth at Heli-Expo were able to explore the aircraft in the form of a full-scale mockup, with immersive virtual reality headsets allowing them to experience the FCX-001's unique control and operating system.

Notable elements in the FCX-001's design include a fan-driven anti-torque system, hybridized propulsion, morphing main rotor blade tips, an extensive use of glass in the fuselage, gull-wing doors, and the use of augmented reality in the cockpit to control the aircraft.

On the ceiling of the widened cabin, which was configured for eight passengers at Heli-Expo, but is capable of accommodating up to 12, Bell designed a honeycomb of drop-down control modules to allow for maximum customization and comfort for passengers. The concept envisions the modules providing the ability for passengers to adjust things such as their lighting, temperature, or infotainment experience.

Bell CEO Mitch Snyder said the FCX-001 was inspired by the concept cars produced by automobile manufacturers for major auto shows.

"I said, 'Let's take the same thing to HAI [Heli-Expo] this year. Let's come up with our concept aircraft, take those technologies we've been working on — not all of them, but some of them — and apply them to a concept aircraft, and let people come see the things [we're doing] and the ideas we're having,' " he said.

"This is a different Bell, this is a different place we're going, and this gives you a peek at what we're working on, without showing you everything. So, some of those technologies are there, and some of them are not quite, yet. Some are going to mature quicker than others. But the main thing to is you're seeing different lines, a different look and a different feel of what Bell Helicopter can be."

To reach such a goal required a novel approach to the aircraft's design. The company threw together a group of engineers and designers, led by director of innovation Scott Drennan, and senior brand strategist Levi Bilbrey, respectively, and gave them free reign to push the boundaries of rotary-wing design, with just a handful of set requirements to meet. Among these were the hybridization of at least part of the drive system, advanced anti-torque, more autonomous operation, noise reduction, and a more pleasing passenger experience.

Drennan said there was some initial hesitancy between the engineering and design teams, but they quickly developed a symbiotic and mutually beneficial relationship. "It turns out engineers need a push towards the sci-fi; and it turns out the creative folks, if you're going to embark on a mission like building aircraft that are actually field-able, safe, and good for the operational standpoint of all our customers, they need a little bit of a pull."

The pilot of the FCX-001 would control the aircraft through augmented reality. The pilot's headset would enable him or her to create their own workspace, pulling up controls as they are needed, or setting automated directives.

At Heli-Expo, the mock-up of the FCX-001 was presented with a passenger configuration of two rows of four seats, but the aircraft would be capable of carrying 12 passengers.

The morphing blade tips would be swept back during forward flight, resulting in a reduced noise profile. **Bell Helicopter Illustration**

The process began with the design team creating rough sketches detailing 12 unique looks, and these were gradually evolved with the input of the engineering team and then whittled down to the final design. And in another groundbreaking move, the team used virtual reality as a design tool as they developed the FCX-001.

"We can put a pilot or engineer in the seat of the aircraft and have them make real-time design decisions about, 'I don't have enough head clearance here,' or, 'My sight line is blocked there,' [or,] 'These seats feel a little too large [or] too small," said Bilbrey. "The virtual reality tools helped us a lot with that, because we can visualize something that doesn't exist yet."

STEPPING INTO TOMORROW'S WORLD

Beginning with the rear of the aircraft, let's take a more detailed look at the FCX-001's design.

In a notable departure for Bell, the aircraft does not feature a tail rotor; instead, the anti-torque is provided by multiple fans embedded within the tailboom. The vented system gives the capability to thrust in either direction, and will also have thrust vector control, allowing it to forgo a horizontal stabilizer.

Powering that anti-torque system is an electric motor as part of a hybridized propulsion system.

"Normally you'd have a drive system that exits the main propulsion unit and travels down the tailboom into a gearbox — usually in a lot of ours, a 45-degree gearbox," said Drennan. "[In the FCX-001] that system changes altogether. Electricity is the distribution method, so you have wires and a generator up close to the thermal engine up top, and then it would culminate in electric motors."

On top of the aircraft, the morphing main rotor blades were an

attention-grabbing aspect of the aircraft's design at Heli-Expo. Essentially, the technology aims to allow the tip of each blade to move between different flight regimes, much like a "swing wing" on an airplane, to maximize efficiency and performance, and reduce noise.

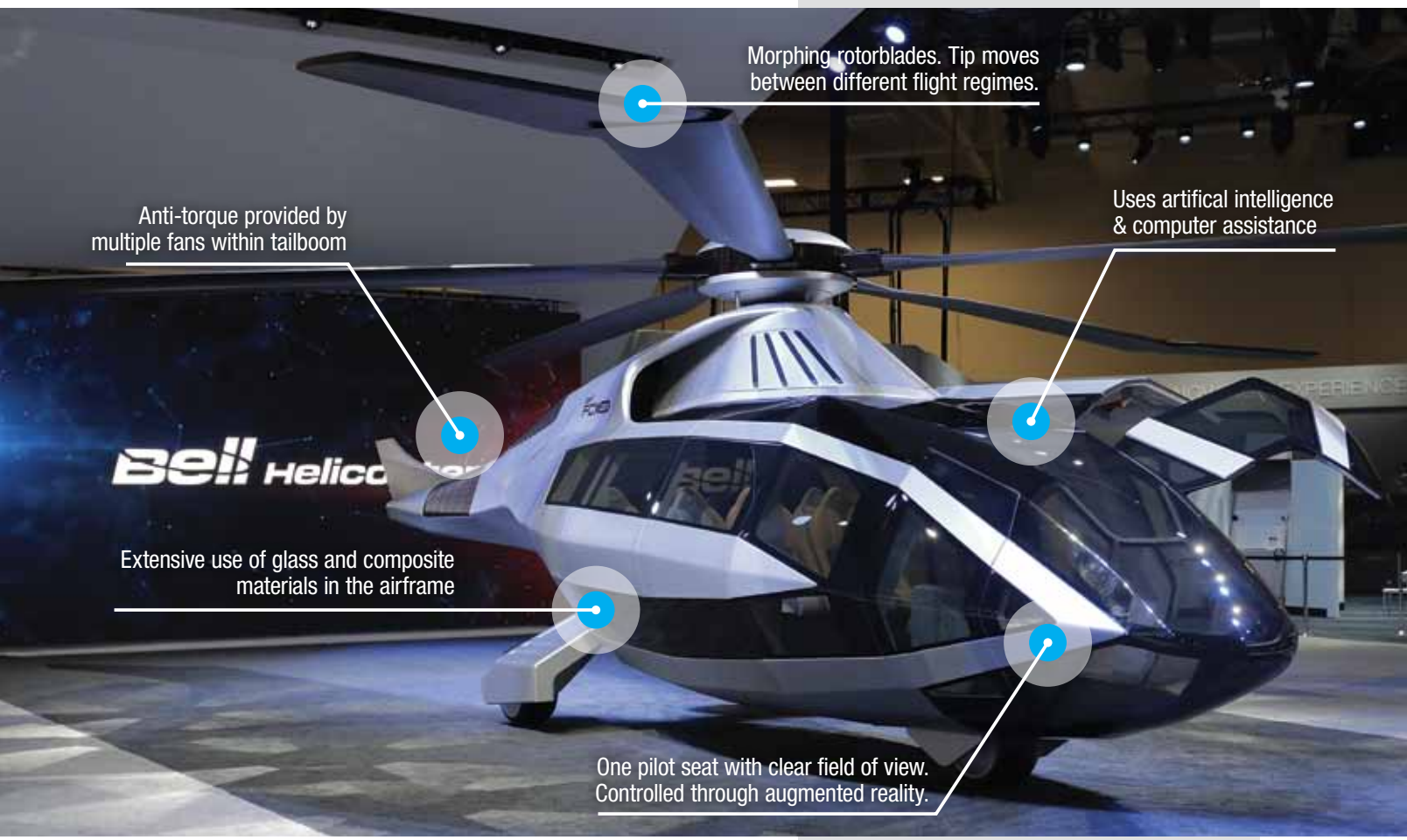
"Straight out, you're getting an efficiency in hover, and creating the noise that comes with that mission performance piece," said Drennan. "Then you change by sweeping them back a little bit, where you don't need the full diameter in forward flight, and also changing the noise profile that's out there at the tip."

The airframe itself is also quite different to anything Bell has previously created. In terms of scale, the FCX-001 is a little bit bigger than a Bell 412 in terms of both length and width, but its lines and extensive use of glass would present a few challenges in production, with a heavy reliance on composite materials.

Inside, the FCX-001 has just one pilot seat. "In a [medium twin], that's quite unusual, but we'd like to cue up a future vision here that through computer assistance [and] artificial intelligence, you want to place the pilot in the situation where their higher brain function is doing your mission control and your important safety functions, and let the computers [and] sensors you have on board do the dumb, dirty, dangerous and dull," said Drennan.

In front of that pilot seat is a clear field of view, unobstructed by any displays — or controls. These will all be provided in the form of augmented reality, in which a pilot wearing a headset will be able to create their own workspace. The idea is that the headset will be able to recognize the pilot's hands in space, allowing them to create and

The aircraft has a novel anti-torque system consisting of multiple fans embedded within the tailboom. This technology is already running on a test bench at Bell's facilities.



CERTAIN TECHNOLOGIES ON THIS MIGHT BE SOONER THAN LATER, AND SOME THINGS ARE A LITTLE BIT FURTHER REACHING JUST TO INFLUENCE NOT ONLY OURSELVES, BUT THE INDUSTRY.

- LEVI BILBREY, SENIOR BRAND STRATEGIST, BELL HELICOPTER

move different screens around the cockpit, and even anchor them to certain points in space so that they don't move when the pilot moves his or her head.

"It's an interesting concept because you can customize your flight deck, pull up the controls you need when you need them, or set automated directives and just get the feedback instead of always cluttering up your screen," said Bilbrey. "Microsoft HoloLens is a good example that exists today, [but] obviously conceptually we're hoping that technology advances as well and can work with our flight systems."

But how far down the line are such technologies? "Much a like a concept car . . . you'll start to see next gens of that car company start to take influence from their concept," said Bilbrey. "I think that's what we'd hope for this. Certain technologies on this might be sooner than later, and some things are a little bit further reaching just to influence not only ourselves, but the industry."

In the nearer term, Drennan said that Bell is already running a test bench of the anti-torque fan technology, and is also setting up a hybrid system.

The concept design is the most visible result of a renewed emphasis on innovation at the Bell, instigated by Snyder.

"If you look across all of us [manufacturers], we're kind of standard in what we do," he said. "I want to push the envelope to say this is what we can be as an industry. We can be different. We can be that future. I push really hard for Bell to say, we've been pioneers in the past, we've pushed the envelope in the things we've done and what we've invented. Let's push the envelope here and take it to a new level."

The FCX-001 would use enhanced computer assistance and artificial intelligence to enable the pilot to focus on mission control and safety functions.
Bell Helicopter Illustration

Watch your operation come to life with an entire package of flight management tools from Cirro. If you're looking to increase efficiency and reduce costs, Cirro is the app you need. Don't take our word for it, see it for yourself. **Get a personalized demo at www.getcirro.com**

Cirro

Works on Apple, Windows, and Android devices

Google play App Store

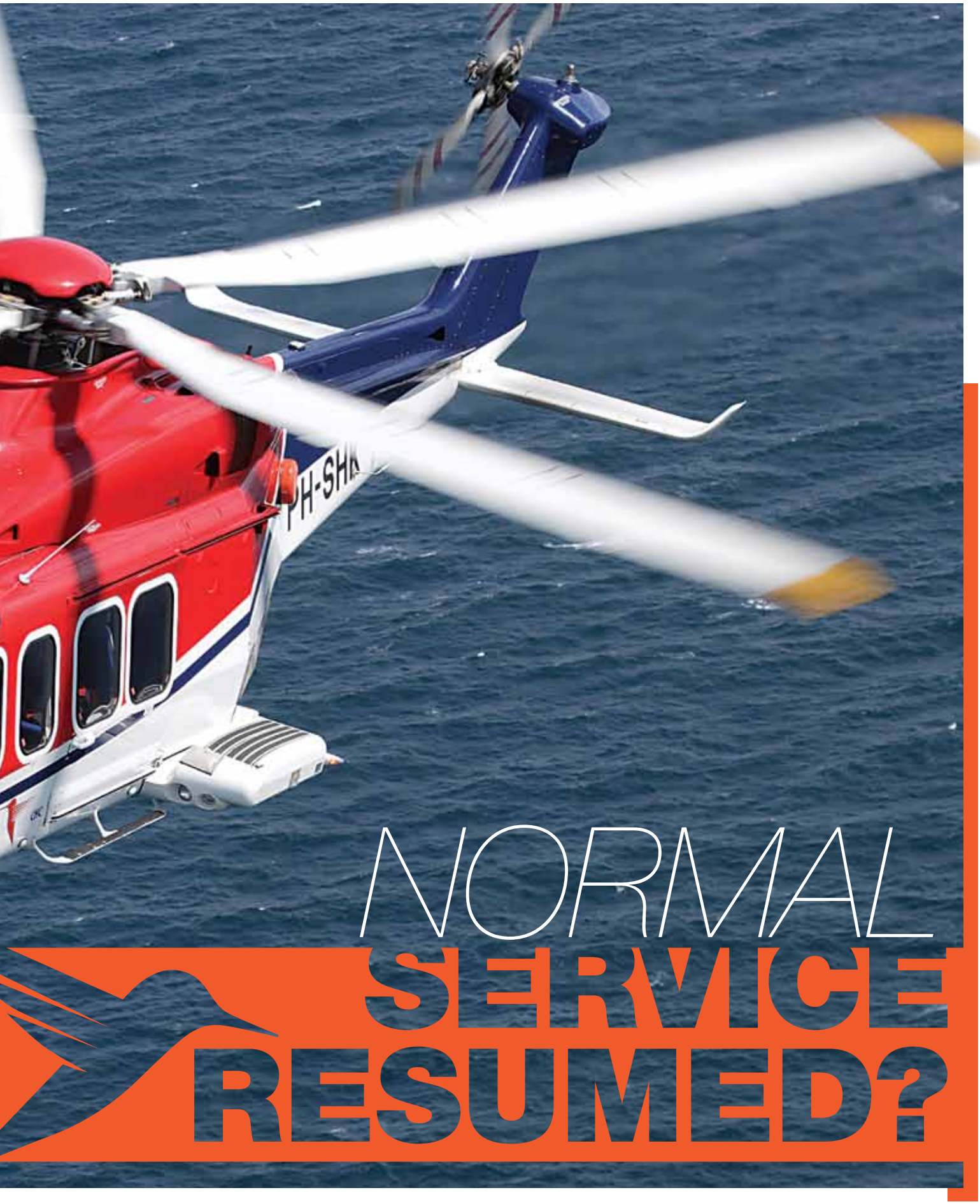
AirSuite info@air-suite.com • www.air-suite.com • 807.577.7511 • Cirro is an AirSuite product

Download as wallpaper at verticalmag.com/wallpaper

A Dutch-registered CHC Helicopter Leonardo AW139 flies over the North Sea. The operator plans to make the AW139 one of the core types in its future fleet.
Simon Pryor Photo

CHC Helicopter operated one of the largest fleets of civilian helicopters in the world when it filed for Chapter 11 bankruptcy protection on May 5, 2016. It has emerged, just 10 months later, a very different company. What's changed and how will the industry react to the new-look CHC?

By Oliver Johnson & Kenneth I. Swartz



NORMAL SERVICE RESUMED?

The Sikorsky S-92 will fulfill CHC Helicopter's heavy-lift fleet requirements in the future.
Stefano Massini Photo

On March 24, as CHC Group emerged from a 10-month Chapter 11 reorganization process overseen by the U.S. Bankruptcy Court, it turned the page on what has been the most traumatic chapter in the storied history of what was once the world's largest medium and heavy helicopter fleet operator.

Just over three years ago, under the stewardship of then-CEO and president Bill Amelio, CHC was a very different company that seemed to be riding high in a very different market. As a beaming Amelio rang the opening bell for Wall Street traders on Jan. 21, 2014, celebrating CHC's listing on the New York Stock Exchange (under the ticker "HELI"), oil prices were comfortably above $100 a barrel, and the company was servicing the booming industry with a fleet of 238 aircraft operating around the world.

That summer, oil prices nosedived, and the high debt burden the company was carrying began to cause the financial stress that ultimately led to it filing for Chapter 11 bankruptcy protection in May 2016.

CHC has exited that process in a very different shape — both on the surface and behind the scenes. Financially, it has secured US$450 million in investment, including US$150 million from Milestone Aviation Group, which will become CHC's lead lessor for its future fleet. The current fleet has been reduced to 137 aircraft through the rejection of over 80 leased aircraft, and the company is marking its return to "normal" operations with a new brand that draws upon the 70-year legacy of one of its founding companies, Okanagan Helicopters.

CHC's president and CEO, Karl Fessenden, who was brought in to replace Amelio in February 2015, told *Vertical* the exit from the Chapter 11 process gives the company a clean balance sheet and a fresh start.

"We have been able to reduce our debt by about US$1 billion, which obviously significantly improves our balance sheet and stability financially," he said. "We have a right-sized fleet that is highly utilized and adapted to our customer needs. We've streamlined

> **"WE DID NOT LOSE A SINGLE CUSTOMER THROUGH THIS PROCESS, WHICH, WHEN THE PROCESS STARTED, I THINK A LOT OF THE INDUSTRY THOUGHT WE WOULD HAVE A MASS EXODUS AND THE FUTURE WAS NOT BRIGHT.**
>
> ***- KARL FESSENDEN, PRESIDENT AND CEO OF CHC HELICOPTER***

our operations and reduced our fixed costs so that we can really thrive in a very difficult oil-and-gas environment that we don't think is going to change too quickly, and we're really excited to have a fresh start."

But to fully understand what happened to CHC, and the path forward for the company, it's worth taking a look at how it became one of the largest civil helicopter fleet operators in the world.

MERGERS AND ACQUISITIONS

The Canadian Holding Company (which later became CHC) was created in 1987 through the merger of Canada's three largest instrument flight rules (IFR) and offshore oil-and-gas operators: Craig Dobbin's Sealand Helicopters, Okanagan Helicopters, and Toronto Helicopters.

The combined company was highly diversified with extensive visual flight rules (VFR) utility operations, a growing emergency medical services (EMS) and heli-logging fleet, and extensive onshore and offshore oil-and-gas experience in Canada, Latin America, Africa, the Middle East, Asia Pacific and Oceania.

Operating large expensive IFR helicopters in one jurisdiction had its risks, so many operators sought to become more like companies in the offshore industry, where drilling platforms and supply boats routinely moved between different regions of the world.

CHC Helicopter was the most ambitious of the offshore players, buying a stake in British International Helicopters (formerly BEA Helicopters and British Airways Helicopters) in 1993, then purchasing Norwegian company Helikopter Services Group in 1999, and competitor Schreiner Aviation Group of the Netherlands — which had operations in the North Sea, Africa and Asia — in 2004. By then, CHC had revenues of about C$800 million,

CHC had 40 H225s in its fleet before it began the Chapter 11 process. Now, it just has two, and neither of them are currently flying.
CHC Photo

Okanagan Helicopters was one of three founding companies that created CHC. The operator is celebrating the 70th anniversary of Okanagan's founding in 2017.

two-thirds of which came from offshore operations.

The merger and acquisition activity was costly, so CHC reduced its debt by spinning off its domestic Canadian helicopter bases (as Canadian Helicopters) and MRO facilities (as Vector Aerospace) in separate initial public offerings in 2000 and 1998, respectively.

Following the death of Craig Dobbin, CHC's founding chairman and CEO, in 2006, the company was offered for sale. On Feb. 22, 2008, First Reserve Corporation of Greenwich, Connecticut, announced at HAI Heli-Expo that it was buying "the world's largest provider of helicopter services to the global offshore oil-and-gas industry" for C$3.7 billion cash, which it claimed was the largest-ever buyout in the oilfield services industry. CHC Helicopter's global headquarters remained in Vancouver, B.C., and experienced helicopter industry professionals continued to run the unconsolidated regional business units.

In 2010, a new senior management team entered the CHC cockpit with very little hands-on experience in the aviation, helicopter, or oil industries, and they were given the mandate to increase profits. CHC started releasing quarterly financial statements a short time later, revealing that it had substantial revenues and was profitable before interest, tax, depreciation and amortization expenses were subtracted — but that it was consistently losing money once interest expenses on its debt were factored in.

In January 2014, CHC went to equity markets to raise US$310 million in new capital by issuing 31,000,000 shares priced at $10 each. The proceeds would be used to retire some higher interest secured notes and reduce other debt. At the time (fiscal 2013), CHC had revenue of $1.7 billion, 4,300 employees, and 238 heavy and medium helicopters, making it the world's largest commercial operator of these aircraft.

But out beyond the horizon, where the majority of CHC's helicopters earned a living touching down on drilling platforms, a big storm was brewing. World oil prices started to plunge in the summer of 2014, leading the major oil companies to cancel offshore exploration plans and slash major capital expenditures. The value of CHC shares went into a nosedive as quarterly results showed that the company was hemorrhaging cash.

In early 2015, the CHC board recruited a new management team, located in Dallas, to turn the business around. They were supported by a team of aviation financial consultants who had helped fly the U.S. airline industry through a major restructuring following the Sept. 11, 2001, terrorist attacks and the world financial crisis. Eventually, CHC management ran out of options, and had no recourse but to file for Chapter 11 financial restructuring in the spring of 2016.

"I would say the real issue was the high debt burden that had built up over the years, through a series of acquisitions as well as just different financing," said Fessenden, reflecting on the path that led the company to the bankruptcy court. "The previous leadership had really bet heavily on aircraft and leasing and commitments with the OEMs, and when the oil-and-gas market dropped to $27

As CHC emerged from its Chapter 11 restructuring, it had 46 S-92s in its fleet. **CHC Photo**

a barrel and our customers drove [down] serious productivity in this downturn, it was just too big a burden for the company to be able to succeed without the Chapter 11 option."

RESTRUCTURING THE COMPANY

The primary goal of the Chapter 11 process was to make CHC a profitable company again, by cutting its debt obligations, slashing its helicopter fleet and expenses, and securing new financing.

Tragically, CHC's journey through Chapter 11 was bracketed by two fatal accidents involving CHC-operated aircraft: The first, on April 29, 2016 — just days before the operator filed for Chapter 11 bankruptcy protection — saw an Airbus H225 crash near Turøy in Norway, killing all 13 people on board. The second, on March 14, 2017, involved the crash of an Irish Coast Guard S-92 off the west coast of Ireland. As *Vertical* went to press, the bodies of the two Irish Coast Guard pilots had been recovered, while the search continued for two other crewmembers. The investigations into both crashes are ongoing.

The immediate fallout from the Turøy crash saw the European Aviation Safety Agency (EASA) ground the Airbus AS332 L2 and H225 Super Pumas. The grounding was then adopted in other regions of the world, affecting about 57 aircraft (17 AS332 L2s and 40 H225s) operated by CHC in the North Sea, Brazil, Africa, Asia and Australia.

While the impact of the Chapter 11 process was broad, with unsecured investors losing their money, employees laid off, and under-utilized facilities closed, perhaps the most visible impact for the wider industry was in the number of aircraft being returned to the leasing companies. The helicopter leasing industry had grown significantly during the preceding years as deepwater drilling expanded and oil prices climbed, and now CHC helicopter lessors were facing large-scale aircraft returns — including H225s that were unlikely to return to offshore service in the near term.

"Certainly, when we started this process and started returning aircraft, we weren't very popular, to be brutally honest," said Fessenden. "I would say we had over a dozen lessors that we had to deal with, [and] part of what we ended up doing was to significantly reduce the number of lessors so that we could have closer relationships with a smaller number of suppliers."

Fessenden said the discussions the company had with some of the lessors took on more of a partnership tone than that of a supplier/customer relationship, singling out Milestone and Waypoint as particularly supportive — with the former ultimately supplying $150 million in financing to the operator.

As for its interactions with its own customers, Fessenden said a constant transparent communication appeared to have paid dividends.

"We did not lose a single customer through this process, which, when the process started, I think a lot of the industry thought we would have a mass exodus and the future was not bright," he said. "From the beginning — and it continues today — our customers had the assurance that we would be successful, and they also understood that this is a very uniquely American process, and it's very different to bankruptcy in the U.K., or a liquidation in Australia. So, we had to do some education about what Chapter 11 means, which was very helpful also to keep everything in perspective."

Industry analyst Brian Foley, president of Brian Foley Associates, said the protection of the bankruptcy courts likely allowed CHC to avoid huge early termination penalties and maintenance requirements

A Bell 412 utilized for emergency medical services (EMS) in Australia. According to CHC's Karl Fessenden, 15 percent of CHC's revenue is provided by its EMS and search-and-rescue work. **CHC Photo**

CHC now has 32 AW139s in its fleet — down from 43 of the type pre-Chapter 11. **CHC Photo**

CHC's worldwide fleet has been drastically cut from 230 to 137 aircraft, largely through the rejection of leased aircraft. **Øyvind Hagen Photo**

A CHC-operated Sikorsky S-76 in South America. Fessenden said the region was one of those that presented opportunities to expand its search-and-rescue and EMS work. **Todg Williams Photo**

mandated when returning the unneeded aircraft. "It's presumed that CHC has now 'right sized' the fleet to match reduced demand in the oil-and-gas sector," he said. "Filing Chapter 11 literally saved the company."

FORGING A NEW PATH

As a new CHC emerges from the Chapter 11 process, it does so with a new look, launched shortly before HAI Heli-Expo in Dallas, Texas. The new branding includes a refreshed logo (though the iconic hummingbird remains), a new "Reach Beyond" positioning statement, and a change in company colors to the orange of Okanagan Helicopters.

"What we wanted to do was show our brand as a physical presence changing as we change and emerge as a fresh, strong, smart, business partner," said Fessenden.

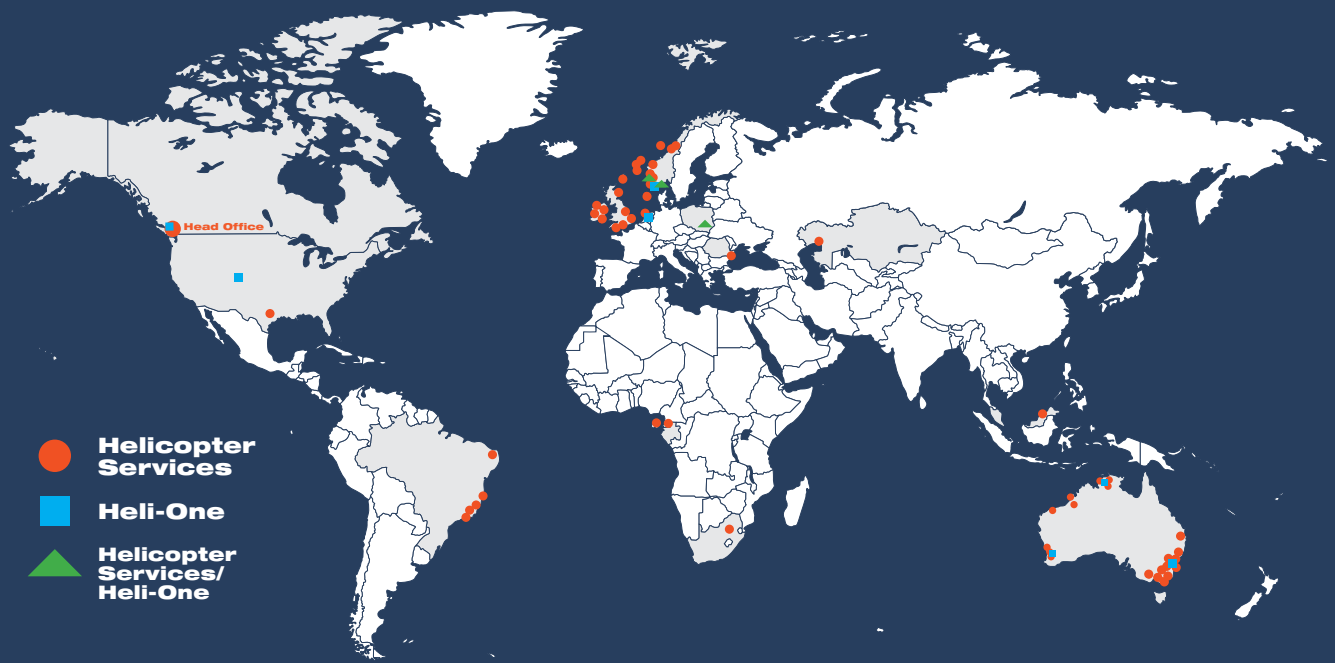
Heading into the Chapter 11 process, CHC had a fleet of 230 aircraft, owning 67 and leasing the rest. These included 50 S-76 A++/C+/C++ aircraft, 46 S-92s, 43 AW139s, 40 H225s, 34 AS332L/L1/L2s, seven Bell 412s, seven AS365/H155s, and three H135/H145s.

Safran is the world's leading manufacturer of helicopter engines. It offers the widest range and supports 2,500 operators in 155 countries with one constant aim : to stay focused on their missions and to keep their helicopters flying every day, everywhere.

safran-helicopter-engines.com
: @SafranHCEngines

SAFRAN

CHC HELICOPTER BY THE NUMBERS



VALIDATED BASES WORLDWIDE (64 LOCATIONS)

EMPLOYEES

2015 4,500 EMPLOYEES

vs.

2017 3,000 EMPLOYEES

% OF REVENUE

OIL&GAS	68%
HELI-ONE	17%
SAR/EMS	15%

Global Fleet CURRENT

S-92	S-76	AW139
46	29	32
AS332L/L1	**Bell 412**	**OTHER**
12	7	11

Global Fleet (Oct. 31, 2015)

46	40	34	43	23	20	7	7	7	3
Sikorsky S-92A	Airbus H225	Airbus AS332L/L1/L2	Leonardo AW139	Sikorsky S-76C++	Sikorsky S-76C+	Sikorsky S-76A++	Bell 412	Airbus AS365 Series/H155	Airbus H135/145

YOU HAVE TO ENSURE THAT YOU STAY COMPETITIVE IN THIS INCREDIBLY COMPETITIVE MARKET.

- KARL FESSENDEN, PRESIDENT AND CEO OF CHC HELICOPTER

Emerging from Chapter 11, the new-look CHC has 137 aircraft in its fleet. These include 46 S-92s, 32 AW139s, 29 S-76s, 12 AS332L/L1s, seven Bell 412s, and 11 other aircraft of various types. Some of those aircraft are now on flexible conditions with CHC's lessors, said Fessenden, which means that CHC only pays when they use the aircraft. Going forward, he said there might be "some slight reductions" in the fleet over the next couple of years as the offshore market continues to stabilize. "We're probably [going to be] in the ballpark of 125 to 130 aircraft," he said.

Just two H225s remain in the CHC fleet, and neither of them are currently being flown.

"Given what happened with the grounding and with the questions surrounding that aircraft type, we rejected the majority of our 225s," said Fessenden. "We're still considering, once we and the other Helioffshore operators are fully satisfied with the investigation, which is still ongoing, that we may fly that aircraft again, but at this point we only have a couple of those aircraft in our fleet."

Future acquisitions are likely to be in the super medium spectrum, said Fessenden, adding that the company hoped to make announcements over the next few months regarding deals for the Airbus H175 and Leonardo AW189.

The overall reduction in CHC's fleet has also served to reduce the proportion that is leased to 55 percent, which Fessenden described as a "better balance." Ultimately, he said the company would like to get as close to a 50/50 split of owned versus leased as possible.

The vast majority of CHC's revenue (68 percent) comes from its oil-and-gas business segment, with 15 percent provided by its emergency medical services (EMS) and search-and-rescue work, and 17 percent coming from Heli-One (its maintenance, repair, and overhaul business unit). Despite the offshore industry downturn, Fessenden said he doesn't anticipate the company's oil-and-gas focus to change. "It's a key, core, part of what we do," he

Heli-One — CHC's maintenance, repair, and overhaul business — provides 17 percent of its parent company's revenue. **Heli-One Photo**

Heli-One's capabilities are vast, including repair and overhaul, heavy maintenance, design and supplemental type certificates, completions, paint, and machining. **Heli-One Photo**

Inside the cockpit of an S-92 as it performs a flight out to an offshore oil rig. **Todg Williams Photo**

said, “but we would like to grow our search-and-rescue and EMS business, and we’re actively engaged in doing that as we speak, and we’ll continue to support and develop Heli-One’s market and growth potential also as we emerge.”

That said, the company’s success going forward will not be dependent on a rebound in the oil and gas market, said Fessenden. “Part of our emergence strategy was all about focusing on thriving and prospering in a low [-priced] oil environment,” he added.

In terms of regional growth, oil-and-gas markets in Latin America, Southeast Asia and Africa offer opportunity, said Fessenden, and there were opportunities to expand CHC’s search-and-rescue and EMS services around the globe. “They’re very large and lumpy opportunities, because they typically tend to be 10-year contracts, so we’re looking at a few of those around the world that we think are really good opportunities based on our experience and capabilities,” he said.

Heading into Chapter 11, CHC had about 4,500 staff around the world. Today, that number is closer to 3,000, and Fessenden said further cuts will likely be necessary to keep the company competitive.

“While the price has improved over last year of a barrel of oil, offshore projects and capital expenditures are at all-time lows, so I would say we definitely will continue to focus on cost and efficiency improvements,” he said. “To that end, I would say that we’re not done with our internal realignment and restructuring. You have to ensure that you stay competitive in this incredibly competitive market.”

A RETURN TO REGULAR OPERATIONS?

How is the industry going to receive the “new” CHC? Only time will tell. According to Foley, vendors who decide to service the company again may have tighter payment terms, such as cash on delivery, until the operator establishes a track record of good performance.

“The new company will need to prove itself again to its customers, investors, employees, vendors and equipment financiers,” said Foley. “[But] regardless of the past, lessors and manufacturers will still compete for CHC business due to a lack of activity in the sector. However, it’s conceivable that the rates and terms will not be as attractive for CHC as they were in the past as lessors seek to reduce their risk.”

That said, he added that some customers may opt to go with a provider that has been more financially stable if there’s a reasonable alternative.

Fessenden, however, believes CHC’s emergence from the

A CHC-operated Irish Coast Guard S-92. Tragically, just days before the company emerged from the Chapter 11 process, one of the Coast Guard’s S-92s crashed off the west coast of Ireland. **Niall Duffy Photo**

Chapter 11 process is concrete proof of a turnaround in financial security.

"When I first came to CHC, a lot of discussions with our customers were focused on our finances," he said. "The debt burden of CHC has been known for many years to be high. Now we've eliminated that conversation given our fresh balance sheet, so now we can talk about customer solutions and growth and different requirements — and have a much healthier dialogue that's not focused or distracted by this debt burden, but rather is focused on the future."


With a fresh balance sheet in hand, CHC hopes brighter days are ahead.
CHC Photo

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

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

He can be reached at at oliver@mhmpub.com
Follow him on Twitter @orjohnson_

Back in THE GAME

The 505 Jet Ranger X marks Bell's return to the short light single-engine market following the end of production of the phenomenally successful 206 series. In early March, we had the opportunity to find out how well the aircraft stands up to its proud legacy.

by Guy R. Maher

Boy, how time flies. It seems like just yesterday that Bell Helicopter announced it was discontinuing production of the ubiquitous 206B JetRanger — but that was eight years ago. By late 2010, the last 206B-3 rolled off of the line, ending a run of more than 50 years that saw over 8,000 aircraft delivered in numerous variations.

At the time, Robinson was engaged in certification flight testing of its new R66 Turbine, and during press conferences and personal conversations, Bell representatives seemed resigned to the fact that Robinson would cover that segment of the light single-engine market. But less than three years after that last 206B left the factory, Bell announced it would be returning to the short light single engine helicopter market with a reimagined version of the 206B — the 505 Jet Ranger X. With Canadian certification now in hand, and Federal Aviation Administration certification expected by the time you are reading this, Bell offered *Vertical* the opportunity to evaluate its latest product offering.

By calling it the 505 Jet Ranger X, the manufacturer appears to be both embracing the aircraft's legacy while giving a sense of its evolution. The influence of the 206L-4 is keenly felt, from the top of the rotor system, down through the transmission, to the drive train and the tail rotor. Not only was this a smart move to keep design costs low, but it also means the 505 retains the legendary Bell two-bladed autorotational characteristics.

Approaching the 505, the rotor system may look familiar, but that's pretty much where the visible similarities to the 206 stop. This is especially true when examining the new cabin. The cabin frame (built

After being out of the short light single engine helicopter market for seven years, Bell returns with the 505 Jet Ranger X. The aircraft has a proven 206L drive train, a drastically improved cabin over the 206, and cruise speeds in excess of 120 knots.
Sheldon Cohen Photo

by Aernnova, along with the tail boom) is mostly aluminum, with two large keel beams in the floor supporting the structure. The roof and sides of the cabin are composite and honeycomb, while the forward canted bulkhead where the nose attaches is carbon fiber. Behind the passenger section is mostly aluminum, along with a composite belly section to support the fuel bladder. And speaking of fuel and baggage, the fuel capacity is 84.85 US gallons (336 liters), while the baggage compartment, accessed form the pilot side, provides 22 cubic feet (0.6 cubic meters) of storage space.

The fuselage reveals some significant differences from the 206 series, with the nose reaching out a full foot further from the front of the skids. Contrary to the 206 (B or L), where the pilot sits right in line with the front of the skids, the 505's pilot seat is positioned ahead of the front of the skids. Not only that, but the total skid length is about six inches shorter than the 206B's, and over two feet shorter than the 206L-4's. Yet, from the tip of the nose to the back of the tail, the 505 is two feet longer than the 206L-4. Keep in mind that since the 505 employs the L-4 drive train, its tail boom is longer than the 206B. This added length means more tail rotor leverage and the authority of the L-4, rather than the sometimes marginal tail rotor power of the 206B.

A slotted horizontal stabilizer is mounted on the underside of the boom roughly midway down. It's simple, appears stout, and as I would find out later, does a nice job of keeping the cabin level in cruise. The vertical fin at the aft end of the tail boom is typical Bell 206 in appearance, though it's much thinner.

Opening the access door to the aft end of the fuselage reveals a framework of structural tubes reminiscent of the old Bell 47 crane cage days. And sitting on top of all that support is the 530-horsepower Safran HE Arrius 2R engine, derated to 492 hp. In the 505, the engine is rated for a maximum of 475 hp for takeoff and 428 hp for maximum continuous operation. A dry inlet barrier filter is standard.

The aircraft has dual channel full authority digital engine control (FADEC), but only one channel is operating at a time. The two channels alternate on each engine start as to which one is "in charge." The system also includes a hydro mechanical unit (HMU) which is essentially slaved to the FADEC computers for metering fuel. Should the HMU fail — as in a stepper motor failure — then

The 505 received certification from Transport Canada in December 2016, and the company celebrated the first customer delivery at HAI Heli-Expo 2017 in March. **Sheldon Cohen Photo**

The author (right seat) trying out the 505, with the standard G1000H integrated avionics system. **Guy R. Maher Photo**

The author (left) with Bell pilot Will Williamson and the 505 test ship. **Guy R. Maher Photo**

there is an auxiliary control unit (ACU) as a back-up for the HMU.

Whereas the aft fuselage section resembles the 206, the forward cabin is another story. Open the cabin doors — especially on the left side with the 55-inch total opening clamshell door — and you see the completely flat floor of the wide-open cabin. Yes, the legacy 206 "broom closet" is gone. Also gone is that cramped feeling you'd get from being in the back of the legacy JetRanger — especially if you were a center-seat passenger. The 505's cabin is 10 inches wider than the 206, and your forward view is clear — straight out the windshield.

But if it's cargo you want to place in the back, you can flip up the three standard rear seat pans (the optional premium leather seats do not fold) to provide for extra space. Or — better yet — the three rear seats can be quickly disconnected from the aft cabin bulkhead. This makes 61 cubic feet (1.7 cubic meters) of flat floor cargo space available with tie-down anchors to hold the load in place.

The standard equipped useful load for the 505 is 1,500 pounds (680 kilograms). Adding some popular options such as dual controls, second comm radio, emergency locating transmitter

"ANYBODY WHO FLIES A 206 WILL HAVE NO PROBLEM GOING STRAIGHT INTO THE 505. TRUTHFULLY, EVEN IF YOU DON'T HAVE ANY 206 EXPERIENCE, IT WILL STILL BE AN EASY TRANSITION.

(ELT), helicopter terrain awareness and warning system (HTAWS), synthetic vision imaging system, traffic advisory system, premium leather seats, and a rotor brake will knock that useful load down by around 75 lbs. (34 kg). And if you want air conditioning, that's almost another 75 lbs. The external load gross weight is 4,475 lbs. (2,030 kg) with a cargo hook limit of 1,500 lbs.

Rear seat passenger loading is possible from either side, but easier from the left side with the aft clamshell door opened. The pilot seats can slide to any position for ease of boarding passengers or pilots, but must be locked into the full forward position for flight. As typical with most helicopters, the right front seat is the standard pilot station. However, the 505 is approved for solo pilot operations from either front seat.

TAKING TO THE AIR

My guide for the flight was Bell pilot Will Williamson, and we were joined by a Bell communications representative. Sitting in the pilot's seat, I had plenty of leg room. The pedals are taller than the 206's, and have ample fore and aft settings to suit most pilot heights.

The main panel is very clean — essentially just the Garmin G1000H and the glass standby attitude module (SAM) positioned above it. The G1000H is equipped with one Garmin Integrated Avionics (GIA) 63H unit that includes GPS/WAAS receiver, VHF COM transceiver, VHF NAV and Glideslope receivers, and a remote GTX 33H Mode S transponder with extended squitter for ADS-B out. A Garmin 350H audio panel is also standard. You can add a second GIA 63H for complete dual NAV/COM capabilities if desired.

The center pedestal just below the main panel is also incredibly clean and simple. It begins with a few environmental controls, then the audio panel, some lighting controls, and then one switch each for the battery, generator, engine, and hydraulics. And in the test ship, it finished with a second optional VHF COM only radio. That's it.

One thing that was a bit odd for me was the collective, which had a cork-wrapped area that looked like a throttle — but wasn't. In fact, there is no mechanical "twist grip" throttle. On the right side of the module at the top of the collective is a two-position toggle switch that selects either "Idle" or "Fly." That's all you get.

"With two computers, two sets of sensors, and the ACU backing up the HMU, the engineers felt there was enough redundancy to deem the manual throttle as unnecessary," Ralph Gannarelli, Bell senior flight instructor specialist and lead instructor for the 505 training program, later told me.

Back to the flight at hand, Williamson flipped on the battery switch, bringing the G1000H to life. He quickly entered the occupant weights, which, combined with the fuel on board, showed we were about 200 lbs. below the maximum internal gross weight of 3,680 lbs. (1,670 kg).

Williamson kept the systems page up on the multifunction display (MFD) screen to make it easy for me to see the various operational parameters, but the primary power situation indicator (PSI) is always present on the lower left quadrant of the primary flight display (PFD) screen for power indications and limitations.

So with our respective collective throttle switches set to "Idle," Williamson turned the engine switch on the pedestal to the "Start/Run" position. Then we just watched the FADEC do it all. It doesn't get any easier.

Picking up to a stabilized hover was pure 206. Anybody who flies a 206 will have no problem going straight into the 505. Truthfully,

The baggage compartment, accessed from the pilot side, provides 22 cubic feet (0.6 cubic meters) of storage space. **Guy R. Maher Photos**

The pilot sit ahead of skids on the 505, which are about six inches shorter than the 206B's, and over two feet shorter than the 206L-4's. Bell is planning an eight-inch extension to the tail of the skids.

The three rear seats can be quickly disconnected from the aft cabin bulkhead. This makes 61 cubic feet (1.7 cubic meters) of flat floor cargo space available with tie-down anchors to hold a load in place.

A slotted horizontal stabilizer is mounted on the underside of the tail boom. The author discovered it does a nice job of keeping the cabin level in cruise.


The 505 is powered by a Safran Arrius 2R engine, rated for 475 hp for takeoff and 428 hp for maximum continuous operation, and it incorporates a dual channel full authority digital engine control (FADEC). A dry inlet barrier filter is also standard.


The tail rotor system is all Bell 206. Note the weight on the tail for C.G. purposes. It is mounted on steel "ropes" to dampen vibration.


The 505 utilizes the 206L-4 LongRanger's rotor system.

even if you don't have any 206 experience, it will still be an easy transition. The hover was smooth, stable, and level. But with that longer nose and the glass that reaches down to the pilot's feet, the sight picture is certainly different from the 206. Not bad, mind you — just different — and the visibility was excellent. The pedals seemed stiffer than the 206, with more feedback, and the cyclic seemed a little heavier, too. But considering that the last Bell I had flown was a 407 — which you control through telepathy — anything would seem heavier.

With an outside temperature of 60 F (16 C), the 505 needed about 58 percent torque to hold a five-foot hover. There was no mistaking the 206 rotor system passing through effective translational lift heading for climb and cruise.

At 2,000 feet (610 meters) mean sea level and 65 percent torque, the indicated airspeed (IAS) was 110 knots. I kept pulling in some torque until I reached 75 percent, where the IAS stabilized at 120 knots. I had another 15 percent torque available for maximum continuous cruise if I wanted. I suspect most 505 operators will settle in on the 110- to 115-knot range, consuming 30 to 32 gallons per hour of Jet-A in the process.

The 505 maintains a very level and comfortable cruise attitude, no doubt thanks to that horizontal stabilizer. What I also noticed was as the speed increased from 110 to 120 knots, so did a two-per-revolution vibration. Knowing how smooth the 206L-4 rotor system could be, I was somewhat surprised. Williamson did say that Bell will be incorporating a FRAM dampener in between the seats to smooth out the ride. In my subsequent discussion with Gannarelli, he reminded me that the smooth ride qualities of the L-4 were the result of the nodal beam suspension system that, although effective, was also quite heavy. The 505 on the other hand, incorporates the LIVE (liquid inertia vibration eliminator) system which is lighter, and optimized to give its best ride at around 115 knots.

IMPRESSIVE POWER MANAGEMENT

Shooting normal and steep approaches, the biggest differences I noticed versus the 206B or L were the excellent sight picture and the superb FADEC handling of the power management. I even performed an exaggerated quick stop from 55 knots, and

When shooting normal and steep approached, the biggest differences the author noted between the 505 and the 206B or L were the sight picture and the FADEC handling of the power management.

CLEARLY, BELL HAS STUCK WITH WHAT IT KNOWS IN BRINGING THE 505 TO MARKET. THE AIRCRAFT HAS A PROVEN LEGACY ROTOR SYSTEM FROM THE 206, BUT IT ALSO HAS A MUCH MORE USER-FRIENDLY CABIN, A FULLY INTEGRATED AVIONICS SYSTEM, AND A MORE POWERFUL ENGINE.

The cabin of the 505 is 10 inches wider than the Bell 206B, seating five people comfortably. Visibility is excellent from all seating positions.
Sheldon Cohen Photo

Bell 505 - At what cost?

When Bell announced the development of the 505, the target in its sights was clear. "[Bell] was watching Robinson ramp up with the R66 and realized that there were a lot of former Bell customers we were missing out on," Chuck Evans, director of marketing for commercial and support services, told *Vertical*. "We knew we'd have to enter the market with a product that was new and different, price competitive, and we had to do it fast."

Bell did bring the 505 to market pretty quickly — compared to the normal OEM clock for such a project. But what about the cost? How does it really compare to the R66?

The standard ship today is priced at about $1.1 million, not including any extra equipment. When I asked for some follow-up kit pricing on items that would likely be requested on the 505, I couldn't get any firm figures. "The price of the Bell 505 can vary depending on the configuration and customization desired by the customer," the company stated in an emailed response.

Thankfully, Robinson's pricing is easily available — so here's what a really tricked out R66 will cost. The list: avionics include Garmin GTN 750, G500 PFD/MFD, synthetic vision, second Garmin comm, GTX 345 transponder with ADS-B in/out, fully coupled HeliSAS autopilot, air conditioning, leather seats, upgraded paint, 406 ELT, and a few other smaller items. Price all in? $1,032,620.

Bell publishes an all-in hourly cost of operation projection of $443 per hour; Robinson's is $341. But not so fast — there are some apples to oranges on these figures. For one, Robinson uses 500 hours per year against fixed costs; Bell uses 200 hours. Robinson uses almost $1 per gallon more than Bell on fuel costs. So, in an attempt to level the field, my Robinson versus Bell cost-per-hour was $383 to $443, respectively. That said, I'm sure there are 20 different ways to run these numbers to get the desired result.

Bell has done an impressive job at bringing the 505 to market for considerably less than the $1.6-million 2010 price of the 206B. But, when it comes to the R66, it's equally safe to project that it will take a minimum of 25 percent more to buy, and at least 20 percent more per hour to run a comparably-equipped 505. Bell seems to be banking on that being close enough to snatch some turbine business away from the brand that Frank built.

in spite of abruptly honking the tail back, the FADEC kept the rotor RPM and torque beautifully in check through the entire flare and recovery. In the 206s, you'd be watching the needles moving all over the dial.

Hover work was also quite satisfying. The wind was pretty steady at seven knots. The limit for sideward and rear flight is 25 knots. I performed both left and right sideward flights into the wind until the groundspeed reached 18 knots to give me 25 knots through the air. The 505 was solid and smooth.

The same goes for 360-degree pedal turns — even when passing through that direct tail wind position when things can get twitchy. Just like the 206, touching down from the hover is a non-event — level and soft.

I tried a couple of maximum performance takeoffs, but rather than transitioning forward after achieving a normal obstacle height, I just kept the 505 going straight up. At 97 percent torque, I saw 1,650 (500 meters) feet per minute on the VSI. I'm sure there was a little of the "spring board" effect from the launch, but I was reading that value passing through 300 feet (90 meters) above ground level.

This was a good time for an out of ground effect hover test. We had burned off a little fuel by then, so the power

required was from a low of 55 percent torque to a high spike of 65 percent when coming out of the catch of the tail wind. Clearly, these weren't the most adverse of conditions — but there was certainly a lot of margin left before reaching the 90 percent maximum continuous torque allowance.

The 505 is much easier to fly in hydraulics-off mode than any 206, even though it employs the same hydraulic servos as the L-4. Of note, there is a "helper spring" on the collective, which made that control feel "softer."

I'm sure it will come as no surprise that autorotations were pure high-inertia, Bell 206L rotor system-style events. The only difference is, of course, one repositions the collective throttle toggle switch from the "Fly" to the "Idle" position to initiate the maneuver, instead of rolling off a mechanical throttle. We did a hovering auto first just to try it out. The power dropped off smoothly and the resultant soft touch-down with leftover rotor RPM was just like the 206.

But this throttle switch did make me curious about something: how does it respond if one were doing autos with power recoveries? So we did a couple to find out. Even with the different sight picture from the 206, finding the attitude for our targeted 65 knots was no trouble. I also played with different speeds during the glide. Minimum rate of descent comes at 50 knots whereas maximum glide distance comes at 70 knots. Sixty knots is optimum for increasing flare efficiency.

Williamson said I should bring in the power higher than one would normally expect for the power recoveries. This was to show me the spool-up time for the engine, with plenty of time to watch and still flare to level and hover. On my second attempt, Williamson told me to take it low, initiate the flare and switch to "Fly" as I leveled and pulled in collective. After the flare, I pulled in pitch, waited for the power to come up, and the low rotor light and horn activated just as if it was a full-down auto.

I momentarily hesitated on the collective pull, and Williamson instructed me to "keep pulling just like for a touch-down auto." So I did. And what I experienced was a very smooth increase in power that nicely brought up the rotor RPM without any spikes in power or danger of going over torque. The FADEC nicely managed everything within normal limits. Plus, the exact amount of left pedal needed on power up was much easier to anticipate.

What still remains to be seen is exactly how Bell will train for certain tail rotor emergencies — especially the stuck left pedal under high power situations and no twist grip throttle. "We're not sure yet how we are going to train for a really bad stuck left pedal in a high-power situation — I'm still working that out," said Gannarelli. "For a stuck right pedal, we'll do a steep approach to a hover, then just turn the switch off."

The autorotations wrapped up the session and it was time to head back.

Bell hasn't really reinvented the wheel here. What it has done is reenter a market it dominated for many decades. However, that market now has many more players, who all recognize that controlling cost is king.

Clearly, Bell has stuck with what it knows in bringing the 505 to market. The aircraft has a proven legacy rotor system from the 206, but it also has a much more user-friendly cabin, a fully integrated avionics system, and a more powerful engine. Die-hard Bell fans should be very happy, along with those "newbies" who now have another OEM to turn to when choosing a new light single engine helicopter.

Guy R. Maher | Guy has recorded than 16,000 flight hours as a dual-rated pilot and flight instructor with helicopter, airplane and instrument ratings. He runs Lanier Media Aviation Services, a company he founded in 1978. He can be contacted at guy@verticalmag.com.

S-92© ENGINE INLET BARRIER FILTER

Aerometals

916.939.6888 • www.aerometals.aero

Norðurflug allows visitors to Iceland to get up close and personal with some of the most spectacular geological phenomena in the world — such as this small volcanic eruption in 2010.

Download as wallpaper at verticalmag.com/wallpaper

FLYING IN THE LAND OF fire&ice

How Icelandic operator Norðurflug Helicopters overcame the country's economic and operating challenges to provide visitors with an experience like no other — and put the small island nation firmly on the tourist map.

Story by Owen Peterson | Photos by Norðurflug Helicopters

There are few places in the world where I, as a pilot, would pay to have someone else fly so I could focus solely on enjoying the scenery. Iceland has always been at the top of this very short list.

Located at the western-most edge of Europe, just below the Arctic Circle, Iceland straddles the North American and Eurasian tectonic plates, making it home to volcanoes, geysers, and hot springs — as well as Europe's largest ice cap. Because of this, the country's approximately 330,000 residents are aptly described as inhabiting "the land of Fire and Ice."

Even if you haven't had the chance to visit Iceland yet, there's a good chance you've already heard of Norðurflug Helicopters — or have at least seen one of its photos. The largest of just three commercial helicopter operators on the remote island, the company may be best known among helicopter enthusiasts for its social media presence, which features beautiful photographs of its aircraft and happy clients against a backdrop of red-hot lava or thermal springs, or soaring over majestic fjords, waterfalls, and glaciers. While these images capture the natural beauty of Iceland, they also highlight many of the challenges and opportunities of flying in such a rugged landscape.

The story of Norðurflug's founding is also the story of Iceland's recent history. Two years after Norðurflug was established in

2006, Iceland was pushed to the brink of economic and political collapse by the global banking crisis. Leading into the crisis, Icelandic banks had borrowed nearly US$250,000 per Icelander, and the average citizen's household debt reached 217 percent of their disposable income. When the global financial services firm, Lehman Brothers, collapsed in September 2008, the banks were stressed to the point that they had insufficient funds to cover the deposits of their clients. Sensing the impending collapse of one of the largest Icelandic banks, the U.K. government froze that bank's assets — along with those of the Icelandic Central Bank. This led to the collapse of the national currency (the Icelandic Króna), the price of imported goods spiked, and many loans and mortgage payments skyrocketed. Some lost their homes, unemployment grew, and protests began in the streets, ultimately leading to the overthrow of the government.

Iceland's economic and political reality posed significant challenges for everyone in the country, including Norðurflug. Led by CEO Birgir Haraldsson, Norðurflug creatively re-focused its business plan to make best use of its Bell 206, and Airbus AS350 and AS365 N Dauphin. Haraldsson leveraged his leadership abilities, his attention to detail, and the skills he learned in previous careers (as a naval architect, an executive at a shipping company, in corporate banking, and in venture capitalism) to provide a comprehensive and exhilarating opportunity for tourists to experience the country. The team developed brochures, videos and an active social media presence to highlight the experiences on offer. They

The Airbus AS365 N Dauphin is one of three types in the Norðurflug fleet. The aircraft can hold up to eight passengers, seated in two rows.

Iceland's otherwordly landscape has made it a popular filming destination. Recent movies shot there include *Oblivion, Star Wars: The Force Awakens, Interstellar,* and *Prometheus.*

The Blue Lagoon — a geothermal spa near Keflevik International Airport — is one of the most visited attractions in Iceland.

Norðurflug operates two Airbus AS350 B2s and one AS350 B3.

also made it easy to for people to get further information and book a flight. Previously, those interested in enjoying Iceland's beauty by helicopter had to contact an operator, inquire about charter rates, and come prepared with a plan as to where they wanted to go or what they wanted to see.

Norðurflug Helicopters also continued to focus on aerial photography for movie, television, and advertisement clients. In Haraldsson's words, the team's goal was "to build a lively company that [could readily] adapt to customer needs at any time." Using the AS365 N (which had been acquired from the Japanese federal police), chief pilot Jón Björnsson built on his previous work as a film pilot to collaborate further with Icelandic companies such as TrueNorth Productions, offering international filmmakers a near turnkey platform for their aerial photography needs. After completing his initial training in the mid 1980s at Ranger Helicopters in Sault Ste. Marie, Ontario, Björnsson returned to Iceland for a varied career that has included aerial photography, utility operations, instructing, and tourism. He has personally trained and/or acted as an examiner pilot for several of the approximately 25 commercial helicopter pilots in Iceland today.

MAKING THE NEWS

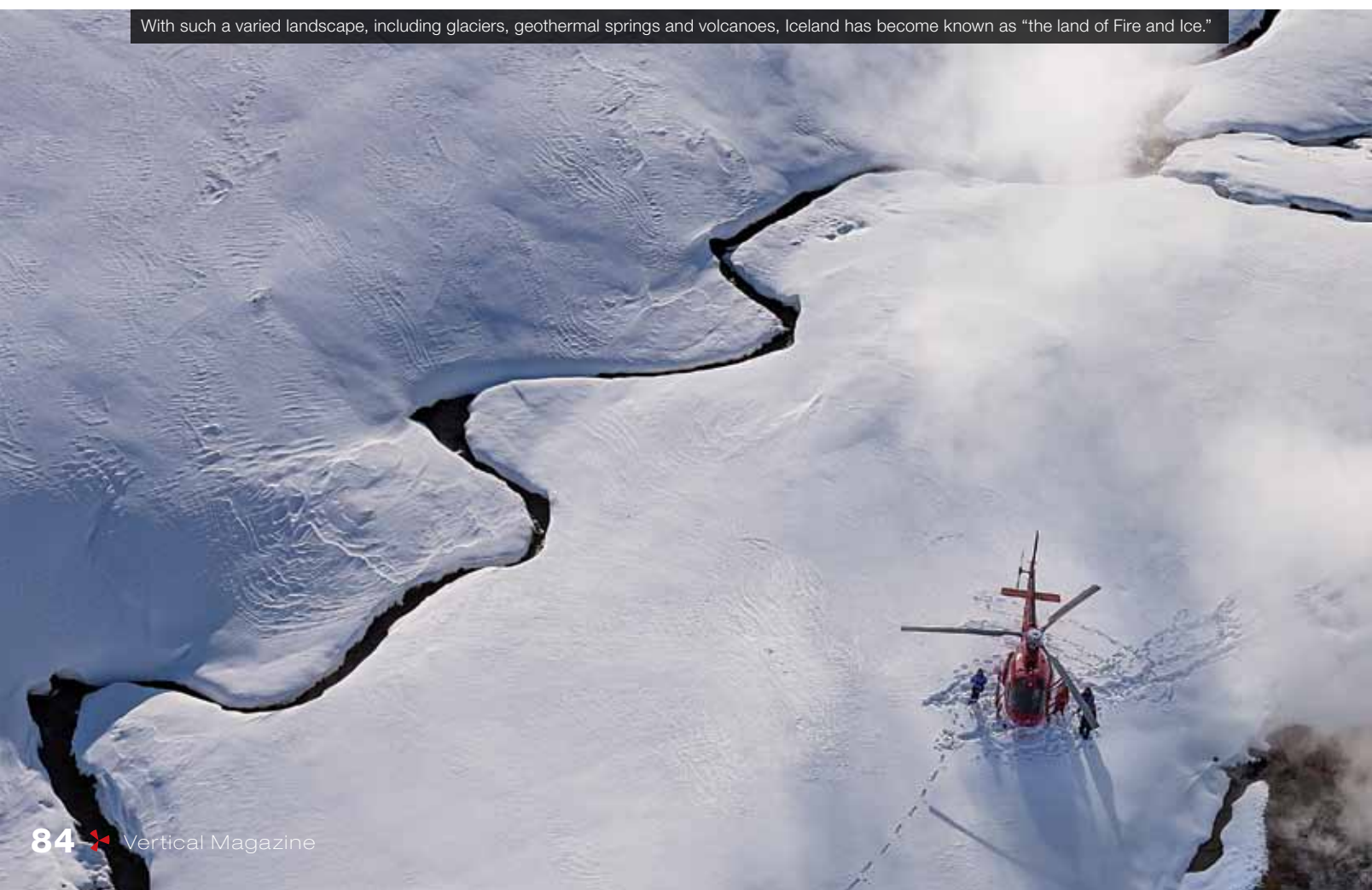
Norðurflug persevered and evolved as the nation struggled to rebuild. But in April 2010, just as the country started to rebound, the Eyjafjallajökull volcano in south central Iceland erupted. The enormous volcanic ash cloud it created closed much of Europe's airspace for six days, and continued to cause disruptions for the next month. In a timely coincidence, members of the Icelandic Travel Industry Association, including Norðurflug and Iceland Air, had been preparing a media campaign called "Inspired by Iceland." It was widely seen internationally in the aftermath of the Eyjafjallajökull eruption. Instead of feeling the wrath of a continent, the campaign introduced Iceland to the world through a series of fun and, at times, quirky videos, as well as an engaging social media campaign that highlighted the beauty and intriguing contrasts of the country's many landscapes and friendly people. The initiatives helped convey the variety of exciting possibilities that could be found under the summer's midnight sun and winter's northern lights.

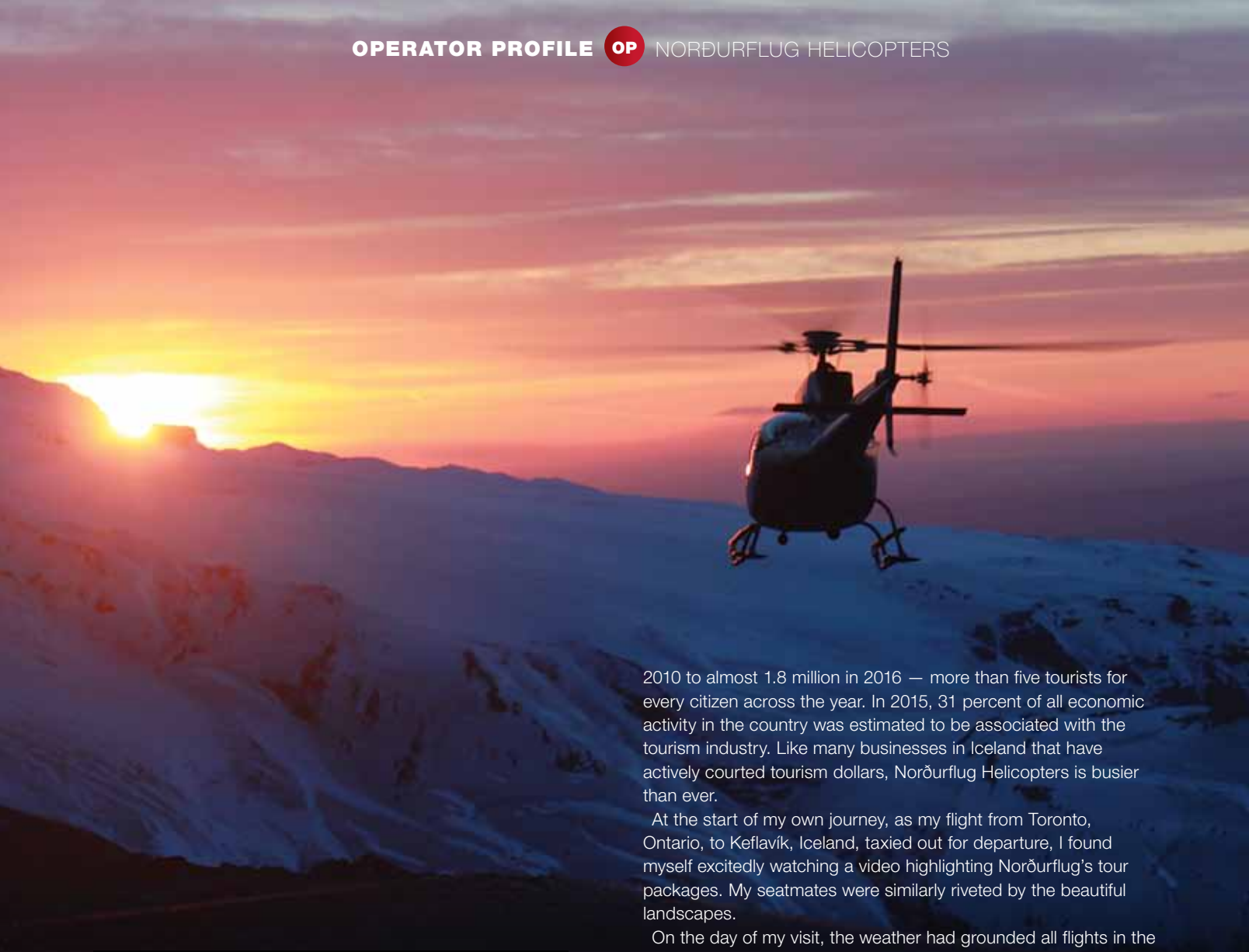
In 2011, Norðurflug moved into its current location at Reykjavik Airport. The new location offered a client reception center, a waiting lounge, and direct walk-out access to awaiting aircraft. In the lounge, clients can relax, enjoy free beverages, and check out a billboard of posters from the various movies and television shows for which Norðurflug has provided aerial photography services.

A strategic investment in Norðurflug from Air Greenland has furthered the Icelandic company's growth. Air Greenland, based in Nuuk, Greenland, provides domestic and international service with its fleet of 19 helicopters and nine airplanes (a number of its domestic routes are flown exclusively by helicopter). In addition to bringing a pair of AS350 B2s to Norðurflug, the partnership also offers the benefit of indirect support from Air Greenland's extensive operational and engineering/maintenance teams, as well as the flexibility of sharing, on a contract basis, experienced pilots when needed.

Iceland has seen an incredible rise in tourists from 488,600 in

With such a varied landscape, including glaciers, geothermal springs and volcanoes, Iceland has become known as “the land of Fire and Ice.”





Tourism is booming in Iceland. Almost 1.8 million people visited the country in 2016 — representing more than five tourists for every resident over the year.

WE COULD PLAINLY SEE THE DIVIDE BETWEEN THE NORTH AMERICAN AND EURASIAN TECTONIC PLATES IN THE LANDSCAPE BELOW, WHICH MOVE ABOUT TWO CENTIMETERS FURTHER APART EACH YEAR.

2010 to almost 1.8 million in 2016 — more than five tourists for every citizen across the year. In 2015, 31 percent of all economic activity in the country was estimated to be associated with the tourism industry. Like many businesses in Iceland that have actively courted tourism dollars, Norðurflug Helicopters is busier than ever.

At the start of my own journey, as my flight from Toronto, Ontario, to Keflavík, Iceland, taxied out for departure, I found myself excitedly watching a video highlighting Norðurflug's tour packages. My seatmates were similarly riveted by the beautiful landscapes.

On the day of my visit, the weather had grounded all flights in the morning. As a result, the customer service team had to contact and reschedule many clients. After a quick lunch with Haraldsson and several of the staff, the weather gods smiled upon us and we embarked on the "Countless Craters" tour. Our pilot, Guðjón Sigurjónsson, briefed us on the safety features of the AS350 B2 and, within minutes, we were cruising over the city. We departed south from Reykjavik toward the coast and its majestic cliffs. Along the way we orbited volcanic craters and hovered next to a large pool of near-boiling water before turning west over the rugged beauty of a moonscape-like area.

While flying, Sigurjónsson explained the geology and history of the island. He described how different parts of the landscape evolved, how the volcanic craters and fissures were formed, and how geothermal heating plants provide electricity, domestic heating, and hot water to the 200,000 residents of the capital region.

Midway through the tour, we landed next to a small crater and got out for a short hike. There were several small volcanic craters around the landing site and the ground was devoid of vegetation except for some mosses. Steam rose from cracks and crevices in the distance. Sigurjónsson explained that we were in the youngest part of Europe, geologically speaking, and later, from the air, we could plainly see the divide between the North American and Eurasian tectonic plates in the landscape below, which move, which move about two centimeters further apart each year.

A strategic investment from Air Greenland has furthered Norðurflug's growth, bringing a pair of AS350 B2s to the Icelandic operator.

PLANNING FOR TOMORROW

Today, Iceland's economy is much stronger, and tourism continues to grow rapidly. So, too, has Norðurflug. The flying season has expanded to encompass more of the shoulder seasons, and an increasing amount of heli-skiing takes place in the spring months. The number of year-round staff is increasing and seasonal employees, often from other E.U. countries, augment the already large mix of languages spoken among the staff.

Haraldsson carefully selects employees to bring additional skills to complement the company's primary roles — such as Sólveig Pétursdóttir, Norðurflug's marketing manager. Pétursdóttir worked for a number of years as a river guide in Iceland before undertaking additional studies in tourism. She travelled to New Zealand to collect data regarding her thesis topic, which explored how operators there have been so successful in developing a market for helicopter tourism. Pétursdóttir has also recently joined the pilot group and is flying tours with the Bell 206. As Haraldsson put it, he looks for staff who can contribute to the "beautiful milkshake of skills" at Norðurflug.

As the company's senior management looks to the future, they foresee opportunities to grow the business and renew their fleet of helicopters. These are exciting and challenging times for everyone in Iceland. For those lucky enough to work at Norðurflug Helicopters, "getting out of the office" involves flying over some of the most beautiful and diverse scenery I've ever seen. For tourists like myself, Norðurflug offers a unique chance to replace earthly concerns with exciting adventures.

Owen Peterson | When not out seeking life and travel adventures, Owen works as a HEMS pilot and software engineer in Toronto, Ontario.

The Bell 206 JetRanger rounds out the Norðurflug fleet. It's the smallest aircraft the operator flies, with a capacity of four passengers.

Norðurflug is expanding its flying season to encompass more of the shoulder seasons. An increasing amount of heli-skiing takes place in the spring.

Iceland straddles the Euroasian and North American tectonic plates, giving rise to specatular geological features.


NORÐURFLUG


START PAC
START PAC

Some of Start Pac's key players. From left: Jim Wurth, chief engineer design and development/pilot; Judith Wurth, chief executive officer; and Eve Storm, company president.

off & RUNNING

The story behind Start Pac — the company and products that have become a saving grace for pilots caught in remote locations with drained aircraft batteries.

Story by Ben Forrest | Photos by Dan Megna

Jim Wurth took his MD 500 helicopter deep into the Arizona desert one day in 1997 and set down for the night on a stretch of land 60 miles from the nearest habitation. He and a friend were exploring a set of ruins that would take all day to reach by car, he said. But by helicopter they were easy to reach.

"We got up in the morning, and there was frost all over everything," said Wurth, a retired commercial pilot who flew 24 years for Eastern Airlines. "The battery was so cold-soaked, it wouldn't start the engine."

They waited into the afternoon while the sun heated the battery and finally got the aircraft to start. But Wurth decided this would never happen again.

"A cell phone didn't work, so you're pretty much in trouble if you can't get going in a situation like that," he said. "You going to walk out 60 miles? I don't think so."

He spent two months developing what would eventually become known as the first Start Pac, a lightweight portable starting unit he could carry with him for emergencies.

"It was just to have a reliable unit that I could carry aboard the helicopter when we flew out into areas like I did before," he said.

But where Wurth saw the Start Pac as a homemade fix intended mainly for personal use, his wife Judith saw a business opportunity.

"I knew that he had something, and I knew it was the best-engineered product you could

IT'S KIND OF LIKE THE AMERICAN DREAM, WHERE YOU HAVE TWO PEOPLE THAT LITERALLY START WITH NOTHING AND CREATE SOMETHING THAT NOW SELLS GLOBALLY. WE'RE SHIPPING PRODUCTS ALL OVER THE WORLD EVERY SINGLE DAY.

- EVE STORM, PRESIDENT OF START PAC

get," said Judith, who was also retired at the time after a successful career as an entrepreneur, real estate developer and property manager. "When I saw the Start Pac, I told him. I said, 'You know, we're going to be selling these all over the world someday,' and he said, 'I think you're crazy.' But I've always been a dreamer. Always. And I've always taken risks, good and bad. So I didn't even think twice. I felt like we had a first-class product."

They sold 11 Start Pacs before the end of 1997, and business improved dramatically afterward. Today, the Start Pac product line includes 61 models and sells several thousand units a year, said company president Eve Storm.

"The combination of both of their strengths really had a palpable synergy that was able to make Start Pac what it is today," said Storm, who is also Judith's daughter and Jim's stepdaughter. "They used to say this is a hobby gone wrong, because they were retired. They didn't need to work, and they just kind of did it and it just kind of went nuts and went crazy. And then at the same time it's also kind of like the American dream, where you have two people that literally start with nothing and create something that now sells globally. We're shipping products all over the world every single day."

Start Pac now has nine dedicated employees operating out of its head office in Las Vegas, Nevada.

A Start Pac GPU power supply starting unit, designed for ground use to perform repeated engine starting functions.

Start Pac's aircraft power supplies vary from 25 amps to 400 amps.


The Start Pac manufacturing facility in Las Vegas spans 15,000 square feet.

A Powerful Range

There is a Start Pac product for virtually every kind of aircraft, with the exception of commercial airliners.

"We're not going to target Virgin Atlantic," said Eve Storm, the company's president. "That's not going to be one of our customers. We just target everybody underneath."

The company makes portable starting units, power supplies and ground power units for helicopters of all sizes, as well as smaller fixed-wing aircraft and business jets.

"Anybody that's an operator, anybody that has an aircraft or a helicopter or a plane, anything like that, those are all going to be our customers," said Storm.

The company's portable starting units come in various sizes and power levels, with lead acid models clocking in at 24 volts, 26 volts and 28 volts. There are also smaller, lighter lithium portable starting units that clock in at 26 volts and 28 volts.

"With a lithium unit . . . it can sit in a discharged state for six months," said Storm. "You plug it in, charge it up, you're good to go."

Start Pac also offers Twin Pac portable starting units that have double the battery capacity for operations that need access to multiple, repeated engine starts.

The company's power supplies are designed for powering up avionics and accommodating maintenance work while bypassing the aircraft battery.

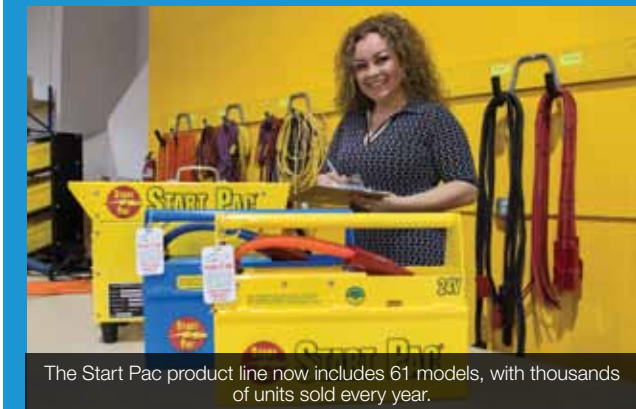
Start Pac's aircraft power supplies vary from 25 amps to 400 amps, with the most powerful systems capable of powering the cockpit, avionics and onboard air conditioning of a business jet.

The company's ground power units have both engine starting capabilities and a power supply, and are generally intended for use at a home base. They range from 24 volts to 28 volts, with both electric and diesel-electric hybrid options.

Start Pac also offers quick-change ground power units whose batteries can be removed and replaced in a matter of seconds, rather than having to send the unit to a manufacturer and rebuild it.

"They're able to get back into action without having any downtime," said Storm.

The company also makes starting units for train locomotives and has an Earth Gear starting unit for heavy equipment like buses, tanks and trucks.



The Start Pac product line now includes 61 models, with thousands of units sold every year.

The Start Pac line includes several portable starting units and non-portable ground power units (GPUs) that can be used in place of an engine battery to start both rotary- and fixed-wing aircraft.

It also features aircraft battery chargers and power supplies for avionic functions, as well as starting units for railroad locomotive engines. Start Pac's railroad products stem from a request in 2007 from the BNSF Railway to design a starting unit for its diesel locomotive engines. Within 30 days, Jim had designed a Start Pac for BNSF, and today nearly all Class One railroads in the United States have Start Pac units, he said. Canadian railroads and short line railroads in the United States are also said to use Start Pacs.

"Our goal is to reach or exceed what we've done in the aviation industry in the railroad industry, and it is possible," said Judith.

Start Pac has nine employees operating out of a 15,000-square-foot manufacturing facility in Las Vegas; a small but dedicated crew that has built a reputation for exceptional products and outstanding customer service.

"We're all emotionally invested in the company," said Storm. "We're all invested in the product line, we're all invested in the customer base. So every sale, whether it's a $600 sale or a $200,000 contract, we treat every customer, every sale, with the same amount of commitment, passion, [and] customer service. We want everybody to feel like they matter, like their business is important to us, that we value them."

The company's goal is to have customers for life, not for a single transaction. So its employees go to great lengths to cultivate relationships based on trust and respect, even going as far as to give out their cell numbers so they can be reached on weekends.

"We're here for the customer every day, seven days a week, regardless," said Storm. "And I think that's been a big factor, is that they know that we care as much about them as they care about their own operation."

Jim and Judith built Start Pac with two very different skill sets that complement each other like peanut butter and jam. His curious, innovative, mechanically-inclined personality fused with her entrepreneurial nature, which was fueled in part with the belief that hard work and tenacity would produce success.

"If you think you're going to get rich quick or you think you're going to be successful quick in anything, then you're fooling yourself," said Judith. "It does not happen that way. Maybe a Hollywood person can be discovered at a photo stand or something, but in reality it takes a lot. When you start at zero, which we did, it takes a lot of work and time. But if you do that and you have the right product and the right attitude, you're going to be successful no matter what you do."

As the 20th anniversary of Jim's frigid night in the Arizona desert passes, the company is aiming for more growth. The goal is to expand its reach in the railroad industry while also exploring the unmanned aerial vehicle market, and others.

But the focus is on serving people, not on selling products.

"We're here to support them and help them have what they need to be safe, what they need to maintain their aircraft, to help them take care of their investments," said Storm. "We're not about selling, we're about serving, and I think that customers really appreciate that, at the end of the day."

Ben Forrest | Ben is assistant editor of *Vertical* & *Skies* magazines. 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.

LIGHTSPEED®

ADD ANR { ACTIVE NOISE REDUCTION } TO YOUR HELMET

"Flying long days in a high-task environment and sometimes chaotic airspace requires reliability, comfort, and clarity. My Lightspeed delivers every day."

— Alex Kriewall, ENG Pilot, Los Angeles

From Lightspeed Aviation, a leader in providing active noise reduction to pilots for over 20 years.

- ✓ Outstanding noise cancellation
- ✓ Specifically engineered for helmets
- ✓ Full three year warranty
- ✓ Integrated Bluetooth
- ✓ Quick disconnect
- ✓ Certified installers
- ✓ Add to existing or new helmets

For more information and a listing of certified installers visit lightspeedaviation.com/helmets

Click here to watch the video

A Flight For Life AS350 B3. The design of the AS350 series hydraulic system was at the center of the NTSB's investigation into the crash of a Flight For Life AS350 B3e on July 3, 2015. **Mike Reyno Photo**

FLIGHT FOR LIFE: ANATOMY OF AN ACCIDENT

The safety issue identified in a 2015 Flight For Life helicopter crash was well understood nearly a full year before the accident. Why did it lead to tragedy anyway?

By Elan Head

On March 28, 2017, the U.S. National Transportation Safety Board (NTSB) convened to determine the cause of a fatal helicopter accident in Frisco, Colorado, in 2015.

The crash of the Flight For Life helicopter — an Airbus Helicopters H125 (AS350 B3e) — killed Air Methods pilot Patrick Mahany and seriously injured two flight nurses, David Repsher and Matthew Bowe. In a horrific post-crash fire that was captured on video, Repsher sustained burns to over 90 percent of his body and was hospitalized for over a year.

The dramatic footage of the accident prompted a national conversation about civil helicopter crashworthiness that has already led to a commitment by major U.S. helicopter air ambulance (HAA) operators, including Air Methods, to retrofit their fleets with crash-resistant fuel systems. It also lent urgency to the creation, by the Federal Aviation Administration (FAA), of a Rotorcraft Occupant Protection Working Group — a first step toward mandating wider adoption of crash-resistant technology.

But the NTSB's investigation into the Flight For Life crash highlights additional far-reaching issues. It reveals the serious challenges of managing the world's largest air medical operator, Air Methods, as well as persistent shortcomings with the FAA's oversight of HAA operators. It calls into doubt official FAA guidance on conducting maximum-performance takeoffs.

And it returns attention to the design of the AS350 "AStar" hydraulic system, which has been implicated in previous incidents and accidents. In its March 28 ruling of probable cause, the NTSB placed the blame for the Flight For Life crash squarely on Airbus. However, in failing to aggressively address a known safety issue, the FAA and Air Methods missed opportunities to prevent the tragedy as well.

In an industry in which design compromises abound, the Flight For Life accident highlights a complex question. To what extent should a regulator, manufacturer, operator, or individual pilot be responsible for compensating for the potential for pilot error in an aircraft's design?

A LESS-THAN-IDEAL SOLUTION

The aircraft system at the center of the Flight For Life crash is the yaw load compensator, which is installed in parallel with the tail rotor servo on AS350 B1 and higher models.

As the manufacturer made each successive AS350 variant more powerful, the necessary tail rotor authority was provided by increasing the aft tail rotor blade surface area with progressively larger trim tabs — rather than redesigning the tail rotor entirely. This solution was effective, but it came at the cost of a stronger tendency for the blades to return to zero pitch during flight.

In normal, hydraulically-boosted flight, the tail rotor servo actuator pressure cancels out this tendency, and loads on the pilot's anti-torque pedals are light. But if the aircraft were to lose hydraulic pressure, the pedal loads would increase to unacceptable levels without another form of assistance.

That alternate form of assistance is what the yaw load compensator provides. By trapping some hydraulic fluid in an accumulator using a check valve, the yaw load compensator allows the average pilot to control the helicopter in the event of a hydraulic system failure, as required for aircraft certification. When relying on the yaw load compensator, pedal loads increase significantly, but remain manageable.

The yaw load compensator has always been a design compromise; an expedient solution, not an ideal one. And with its latest AS350 variant — the AS350 B3e, now known as the H125 — Airbus did attempt to move away from it.

The H125 was originally designed with additional tail rotor balancing weights in lieu of the yaw load compensator, but the weights ended up putting excessive stress on the tail rotor's laminated half-shell bearings. Following an accident in September 2012 that led to an emergency airworthiness directive, the H125 was redesigned to remove the extra balancing weights and revert to the yaw load compensator.

In dual-hydraulic AS350 models, including the H125, the tail rotor servo and yaw load compensator are powered only by the lower, or No. 2, hydraulic circuit. In the event of a tail rotor servo malfunction, the pilot can cut off pressure to the tail circuit by turning a collective-mounted yaw servo isolation switch to "off." If the check valve is functioning properly, then the pilot will receive assistance from the yaw load compensator following the loss of hydraulic pressure.

Until procedural changes were implemented in the wake of the Flight For Life crash, testing this functionality in a dual-hydraulic AStar was part of a pilot's pre-takeoff checks. The pilot would turn the collective-mounted isolation switch to "off" and feel for increased but manageable loads in the pedals.

Then, the pilot would test for the ability to depressurize the yaw load compensator's accumulator by pressing the ACCU TEST button on the control console and verifying that the pedals became very stiff. (The ability to depressurize the accumulator is necessary in order to return the tail rotor blades to zero pitch in the event of certain tail rotor control failures.)

The pilot would conclude the pre-takeoff test by resetting the ACCU TEST button, restoring the collective-mounted isolation switch to "on," and feeling for normal hydraulic assistance to the pedals.

The test sequence was straightforward for any pilot with a thorough understanding of the system. But it also contained a potential pitfall. If a distracted pilot depressurized the yaw load compensator accumulator without resetting the collective switch to "on," there was no warning light to alert him or her to the oversight — and the pilot could take off without any hydraulic assistance to the pedals.

An accident in Albuquerque, New Mexico, in April 2014 called attention to this possibility in the dual-hydraulic H125. In that event, which

was captured by a nearby security camera, a PHI Air Medical H125 began spinning to the left as it lifted from the University of New Mexico Hospital's rooftop helipad. The aircraft impacted the rooftop and came to rest next to the helipad, luckily causing only minor injuries to the pilot and two medical crewmembers on board.

According to the NTSB's report on the accident, the pilot recalled that the anti-torque pedals "felt jammed or locked in the neutral position." The pilot added that during the spin, he looked for a warning light but did not see one.

The pilot's collective-mounted yaw servo isolation switch was found in the "on" position, the correct position for flight. But examination of the aircraft did not find any abnormalities that could have explained the loss of yaw control, and without a cockpit video recorder, investigators were unable to establish the position of the switch prior to takeoff.

The NTSB declared the probable cause of the accident to be "the pilot's loss of yaw control during takeoff due to the absence of hydraulic boost to the tail rotor pedals for reasons that could not be determined based on the available information." A finding in the accident was the lack of a caution indicator to alert the pilot of the lower hydraulic system configuration.

While the PHI accident was inconclusive, an incident in Temple, Texas, two months later provided stronger evidence that the "switchology" in dual-hydraulic AStars could be problematic. In that event, an AS350 B3 operated by Air Methods began to spin to the left upon lift-off following refueling at a local airport. The pilot executed a hovering autorotation and was uninjured, as were the two crewmembers on board.

This time, the yaw servo isolation switch was found in the "off" position. In subsequent testing using a hydraulic mule, the hydraulic system was found to be fully functional, and normal assistance was restored to the pedals when the switch was returned to "on."

In its report on the incident, the NTSB found the probable cause of the accident to be "the pilot's failure to reposition the yaw servo hydraulic switch to the 'on' position during the pre-takeoff hydraulic system check, which resulted in a complete lack of hydraulic boost to the tail rotor system and increased the load required to move the control pedals."

In August 2014, motivated by the Texas incident and one other event, Airbus Helicopters issued a safety information notice for operators of dual-hydraulic AS350 B3, AS550 C3, and AS355/AS555 aircraft, calling attention to the possibility of taking off without hydraulic assistance to the tail rotor, and carefully explaining each step of the pre-takeoff hydraulic checks.

The notice also announced a modification to new-production H125s to incorporate a flashing warning light when the yaw servo isolation switch is in the "off" position. A service bulletin to retrofit existing dual-hydraulic AS350 models with the warning light followed in February 2015, but it was not mandatory, and the FAA did not adopt it as an airworthiness directive — leaving it up to operators to decide whether or not to comply with the bulletin.

ORGANIZATIONAL BLIND SPOTS

This is where accounts of who at Air Methods knew what, and when, become confused and contradictory.

In late August 2014, *Vertical* contacted Air Methods to ask how the company was responding to the incident in Texas and the associated safety information notice, "perhaps through changes to training or operational procedures?" An Air Methods spokesperson responded, "This is an open NTSB investigation, so it wouldn't be appropriate to discuss the details at this time."

However, it is not clear that key operations personnel were even aware of the incident and safety notice, let alone responding to them actively. In interview transcripts included in the NTSB's public docket, Air Methods' interim chief pilot at the time of the Frisco crash said he was aware of the 2014 safety notice and also aware of the company's "hard landing" in Texas, but said he "did not study" the Texas incident.

The director of operations said he was aware of the safety notice prior to the Frisco crash. However, as to whether safety information was communicated to Air Methods pilots following the Texas incident, he said, "I'm not aware if there was or there wasn't . . . other than what I was told, that the training cadre had a document that they were sharing with the pilots."

The yaw load compensator is installed on B1 and higher models of the AS350. Airbus attempted to eliminate it in the AS350 B3e, but was unsuccessful in doing so.
Airbus Helicopters Photo

One Air Methods pilot told the NTSB that he was aware of the safety notice when it came out, and that it was highlighted during differences training by the check airman who also conducted Patrick Mahany's initial differences training for the H125. However, when that check airman was interviewed by the NTSB, he said that he was not familiar with the safety notice prior to the Frisco crash, and he did not include it in his differences training before the accident.

The assistant chief pilot who conducted a checkride for Mahany in March 2015 said he would have received the safety notice when it came out in 2014. However, he added that he was a new check airman at the time and "I was not training in a dual-hydraulics aircraft, so I would have been aware of that and not really immersed myself."

The assistant chief pilot said he spent some extra time discussing the dual hydraulic system with Mahany prior to his checkride. But the checkride itself was conducted in a single- rather than a dual-hydraulic AS350, and by the time of his NTSB interview in October 2015, the assistant chief pilot had still logged only around 80 flight hours in AStar helicopters.

Meanwhile, the director of safety at the time of the Frisco crash, who is no longer with the company, said he wasn't aware of the safety notice until after the accident. Regarding the incident in Texas, he said, "I recall hearing about it, but that's about it."

Air Methods has long touted the fact that it was the first air medical operator to enter the FAA's Safety Management System (SMS) voluntary implementation program — an initiative that is intended to help operators proactively identify and address risks before they result in accidents. Yet, despite Air Methods having attained the highest level of that program in 2013, NTSB transcripts suggest that its high-level operations managers were only vaguely aware of an incident within their company that prompted a manufacturer's safety notice.

That's not to say that no one within the company was aware of the incident or safety notice. Individual pilots who subscribed to Airbus Helicopters' Technical Information Publication on Internet (TIPI) service would have been alerted to the safety notice by email. Beyond that, some of the company's safety communications are issued by regional managers.

For example, a couple of weeks after the Texas incident, one regional manager emailed pilots with an account of the incident and the note, "Good read and reminder . . . We've had an issue or two in our own region. Please follow the checklist and understand that in a [dual-hydraulic aircraft] the switch on the collective can make the main rotor system seem perfectly normal while the load on the pedals can become significant."

Based on interviews with Patrick Mahany's friends and family, NTSB investigators concluded that Mahany was "aware of the issue with not having the switch in the 'on' position." Nevertheless, it became apparent after the accident that Air Methods lacked a reliable system for receiving and disseminating manufacturers' safety notices and service bulletins (SBs).

"I think one of the holes we found out after the accident was that [the] SBs would come into a single location, and whether they were operationally-oriented or maintenance-oriented, they were still handled through one central location and didn't necessarily get distributed, because there was no process to distribute them out at that time," the former director of safety said.

In his own interview with the NTSB in October 2015, the director of safety's acting replacement confirmed, "There has been a review, certainly, of how information flows since this accident, and that process broadened. . . . Safety notices now go to the training department as well as maintenance. How they made it to the field before was through the maintenance department."

This change was formalized in May 2016, when Air Methods revised its Technical Publications Procedures to ensure that all safety information notices and special airworthiness information bulletins are forwarded to the chief pilot, director of operations, and aviation compliance evaluator.

Air Methods' systemic difficulties in distributing safety notices are suggestive of the challenges associated with managing an organization of 1,300 pilots spread across 300 bases, each base with its own local operational challenges and practices. Air Methods' former safety director described the company's culture as "fragmented and distributive . . . There was a disconnect, I think, between the corporate expectation and what was talked about at [headquarters in Englewood, Colorado] and how it translated to the individual base employee."

Perhaps the only thing more daunting than managing an aviation organization like Air Methods is providing it with regulatory oversight. And transcripts of interviews with the FAA inspectors responsible for Air Methods suggest that they were not well positioned to understand the technical reasons for the company's incident in Texas, or its implications for the wider organization.

In his interview with the NTSB in October 2015, Air Methods' principal operations inspector (POI) said that he was largely absorbed with managing the company's transition to a new SMS under 14 Code of Federal Regulations part 5. "There's a lot of work there," he said. "One of our main focuses right now is trying to keep that process on track."

Regarding manufacturers' safety notices and service bulletins, he said that seeking them out was not part of his "regular daily routine." He said he was not familiar with the 2014 safety notice prior to the Frisco accident, and although he was aware of the incident in Texas, he was not part of the investigation into it, or aware of any concerns that were brought out during the investigation.

Of the other inspectors assigned to Air Methods, he said, "not all of them are even capable right now of going out and conducting checks for Air Methods due to the lack of currency or qualification." Due to FAA resourcing decisions, his inspectors were no longer able to attend airframe qualification courses, and some of them were conducting surveillance on aircraft with which they have "no experience whatsoever," he told NTSB investigators.

These concerns weren't new. An April 2015 audit report by the Department of Transportation's Office of Inspector General had called attention to deficiencies in the FAA's training program for HAA inspectors, pointing out that "without the proper training, inspectors

DUE TO FAA RESOURCING DECISIONS, SOME INSPECTORS WERE CONDUCTING SURVEILLANCE ON AIRCRAFT WITH WHICH THEY HAD "NO EXPERIENCE WHATSOEVER."

cannot conduct flight proficiency evaluations on the type or model of aircraft they oversee."

This was true for members of the Air Methods certificate management team. As the POI observed, "I personally would not be comfortable for an inspector who's never sat in an AS350, let alone an AS350 B3e with a dual hydraulic system, to actually go out and have to administer an initial checkride to an Air Methods pilot."

When asked by *Vertical* what steps the FAA has taken to improve the training and qualifications of its inspectors overseeing the Air Methods certificate, an FAA spokesperson initially declined to comment, and then did not respond to follow-up questions before deadline.

'A SYSTEM WITH TRAPS'

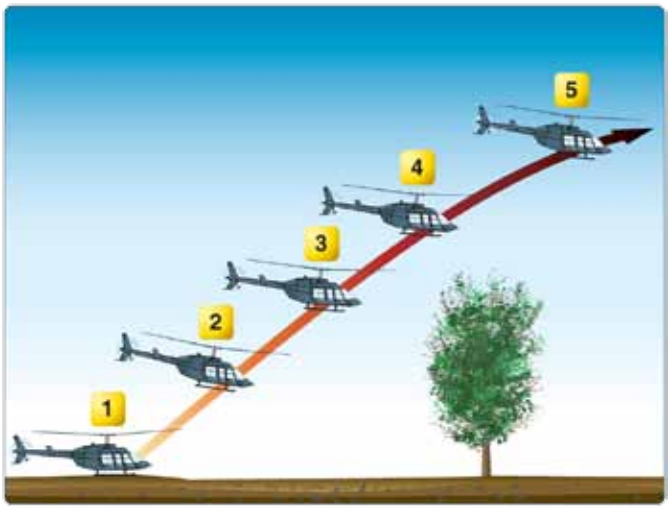
On March 28, 2017, the NTSB ruled the probable cause of the Flight For Life accident to be "Airbus Helicopters' dual hydraulic AS350 B3e helicopter's (1) preflight hydraulic check, which depleted hydraulic pressure in the tail rotor hydraulic circuit, and (2) lack of salient alerting to the pilot that hydraulic pressure was not restored before takeoff."

Board member Robert Sumwalt pushed for this probable cause declaration, rather than the version originally proposed by NTSB staff — that the accident was due to "the pilot's failure to reset the yaw servo hydraulic switch to its correct position during the pre-flight hydraulic check."

"This has to be more than pilot error," Sumwalt said at the NTSB's hearing. "There has to be something deeper, and I think if you design a system with traps, sooner or later, you're going to snare somebody, and unfortunately, this pilot and the two flight nurses were caught in that trap on July 3, 2015."

The NTSB recommended that Airbus Helicopters, for both newly manufactured and existing dual-hydraulic AS350 helicopters, "assess and implement changes to the dual hydraulic system that would both ensure pedal control hydraulic assistance and mitigate the possibility of pilot error during any check of the hydraulic system." It also recommended that the FAA require existing dual-hydraulic AS350s to be equipped with a visual and an aural alert for the loss of hydraulic boost to the pedal controls.

In fact, it is impossible to definitively say that Mahany took off with his yaw load compensator depressurized. The collective stick control block and the ACCU TEST push button were submitted to the NTSB Materials Laboratory for X-ray scans, but they were so badly damaged in the post-crash fire that their positions could not be conclusively determined. Although there was a cockpit video recorder on board the aircraft, that, too, was so badly damaged that no files could be extracted from it (which led the NTSB to reiterate a previously issued recommendation that crash-resistant flight recorders be required on all newly manufactured turbine-powered aircraft).



An illustration from the FAA's Helicopter Flying Handbook, showing a maximum performance takeoff from the surface. Many pilots prefer to perform the maneuver from a low hover to reduce risk, but the handbook does not mention that possibility. **FAA Image**

In email correspondence with *Vertical* prior to the NTSB hearing, Air Methods rejected any insinuation that Mahany contributed to the cause of the accident. However, the company has certainly proceeded as though he did.

Since the Frisco crash, Air Methods has increased emphasis in differences training for pilots flying both single- and dual-hydraulic AS350 helicopters. This has been part of a generally strengthened commitment to training that has included partnering with FlightSafety on a new Learning Center in Denver, Colorado, which recently added an AS350 B3 Level D simulator (the second of four Level D full-motion simulators planned for the facility).

By the end of 2015, the company had also modified all 19 eligible AStars in its fleet with the flashing hydraulic warning light — a process that was initially held up by a shortage of kits and then by the lack of an approved rotorcraft flight manual supplement from Airbus. Air Methods' acting director of safety told the NTSB that the company's engineering department had planned on doing this even before the accident, but it "was not in the priority pile because it was not a mandatory bulletin."

Air Methods has additionally committed to retrofitting 100 percent of its Airbus AS350 and EC130 fleet with crash-resistant fuel systems (CRFS) as certified systems become available for all models. This, too, had previously been on the company's radar screen. In 2010, an Air Methods-operated AS350 B2 crashed shortly after takeoff in La Monte, Missouri; the fuel tank ruptured during impact, but there was no post-crash fire.

"It was kind of like, OK, we dodged the bullet on that one," the former director of safety recalled in his interview with the NTSB. But he said that subsequent discussion with Airbus about developing a CRFS "got pushed back somehow," and no CRFS retrofit solution was available for the H125/AS350 B3e at the time of the Frisco crash.

Airbus began offering a CRFS on new-production H125s in March 2015 and introduced a retrofit option for the H125 last year. Meanwhile, Vector Aerospace has been developing a retrofit CRFS solution for older AS350 and EC130 models in partnership with Robertson Fuel Systems. Although that project is a year behind its original schedule, Vector recently reported that the companies have been conducting "diligent testing and modification work" on the system, which is now expected to be available in late 2017.

THE LAST LINK IN THE ERROR CHAIN

If the accident in Frisco really was due to an incorrect switch position, then better training or a flashing warning light might have averted it, and the presence of a CRFS almost certainly would have lessened the consequences.

But any helicopter pilot who has seen video of the crash knows there's one other thing that might have prevented it: a slow, careful lift-off to the hover, rather than Mahany's significant application of power from the ground. Whether the loss of yaw control was due to an incorrect switch position or a mechanical failure, had Mahany increased power more gradually, he likely would have noticed the discrepancy in time to set the aircraft back down. The NTSB found that Mahany's "failure to perform a hover check after lift-off" was a contributing factor to the accident.

Most of the Air Methods pilots interviewed by the NTSB endorsed slow lift-offs and hover checks as best practice. That makes Mahany's takeoff perplexing, because this 13,000-hour pilot was by all accounts a consummate professional, dedicated to his job and committed to

Air Methods operates around 400 helicopters in its air medical services division alone — an enterprise that presents significant organizational challenges. **Mike Reyno Photo**

safety. Moreover, the accident flight was for a public relations event with Boy Scouts of America, so there was none of the time pressure associated with a medical scene call.

A hint as to why Mahany might have taken off as he did can be found in the interview with Air Methods' former director of safety, who said that during the company's investigation of the accident, it was discovered that some pilots at the Flight For Life base were in the habit of performing maximum-performance takeoffs from the ground. The base had only recently upgraded from an older AS350 model to the more powerful H125, and "so their takeoff profile — because the pad was around 9,000 feet, 9,100 feet, I think it was — with the older aircraft, a little less power, they would just take off: bring max power in, do a max performance takeoff," he said.

This was not a technique that was endorsed by Air Methods, and the company's training materials explicitly call for pilots to perform a hover power check prior to departure. But the surface takeoff is common enough in the industry that it is enshrined in the FAA's own *Helicopter Flying Handbook*, which describes a maximum performance takeoff as being *normally* initiated from the surface (emphasis added), with no mention of taking off from a low hover. The handbook notes that the "large collective movement" in a max performance takeoff "requires a substantial increase in pedal pressure to maintain heading."

Granted, the handbook instructs pilots to perform a controllability and power check in a hover before returning to the surface to initiate takeoff. However, is there any good reason to endorse surface takeoffs for normal civilian operations in which the possibility of whiteout or brownout is no factor?

Dave Schwartzenberger, a pilot instructor at HNZ Topflight (previously known as the Canadian Helicopters School of Advanced Flight Training) in Penticton, British Columbia, doesn't believe that there is. The school specializes in training students for high-altitude and mountain operations in power-limited aircraft, so Schwartzenberger has plenty of experience taking off at altitudes above 9,000 feet.

"The style of takeoff where you pull max power while in contact with the ground is very dangerous and can lead to loss of control/dynamic rollover with no power benefit compared to the low hover," he wrote in an email to *Vertical*. "Even if you lifted into the hover, checked power/controllability and landed, and then did this style of takeoff, the risks are still present and this is not a technique we ever use.

"Slow and smooth in all of our operations is always a focus so that any undesired trends can be identified and corrected right away," he continued. "If you do not have the power and controllability in a stabilized low hover to conduct a published departure or depart vertically over obstacles, then the aircraft is out of proper configuration or is too heavy for conditions."

Kevin Bredenbeck, a former Sikorsky experimental test pilot who is now director of operations for the helicopter training academy FX LLC, agreed. "Aerodynamically and from a performance standpoint, I cannot see a reason for the max performance takeoff to normally be conducted directly from the ground," he said.

In an extended email exchange with *Vertical*, the FAA acknowledged that a maximum performance takeoff can be conducted from a hover. Moreover, the agency was unable to provide an example of a situation in which a hover check would be possible (e.g. not precluded by brownout or whiteout conditions) and the aircraft would be operating within its performance limitations, yet a takeoff from the surface would still be required.

Nevertheless, an FAA spokesperson said that the agency is not considering revisions to the guidance in its *Helicopter Flying Handbook* at this time.

In a civilian context, it seems likely that the maximum performance surface takeoff is a practice that dates from an earlier age of rotorcraft operations, when under-powered helicopters were more routinely operated beyond their limits, and manual throttle controls made it possible to use excess main rotor rpm to assist a helicopter into the air.

Otherwise, the primary relevance of the technique is to rapidly depart an area in which people are shooting at you — and as a decorated Vietnam veteran with a reported 1,200 combat hours, Mahany had likely had plenty of opportunities to do exactly that. He also had the skill to conduct surface takeoffs, until the clear summer day when, lifting off from a smooth, level pad, he was confronted with an unexpected loss of yaw control.

The Flight For Life crash was undeniably tragic. But it also presents valuable lessons for the entire helicopter industry. No aircraft is perfect; no regulator, company, or pilot is, either; and occasionally their weaknesses and blind spots combine in a way that leads to needless suffering and loss of life. The hope is that if we learn from these tragedies, they won't happen again.

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

degrees of FLIGHT

Student pilots at the University of North Dakota get the benefit of earning a degree alongside their pilot ratings — and with financial aid and scholarships also available, the school's flourishing program sticks out in a competitive flight training market.

Story by Jen Boyer

Photos by Wes Van Dell

A Sikorsky S-300 gets ready for takeoff at the University of North Dakota (UND) in Grand Forks.

Download as wallpaper at verticalmag.com/wallpaper

On the wind-swept plains of Grand Forks, North Dakota, about 80 miles (130 kilometers) south of Canada on the Minnesota border, the University of North Dakota (UND) has successfully trained professional pilots for decades. The university is primarily known in aviation circles for its professional and industry-connected fixed-wing program, but for the last 15 years, its aerospace division has quietly established a firm presence in the civilian helicopter-training arena.

Operating six Sikorsky (formerly Schweizer) S-300s and a new R44 Cadet, UND offers helicopter students a college degree as well as private and commercial licenses and instrument, certified flight instructor (CFI), and certified flight instructor-instrument (CFII) ratings. For those seeking a Bachelor's degree and a full set of ratings through CFII, the cost can easily exceed US$100,000. However, because UND is a fully accredited state university, full financial aid and a number of scholarships are available to students, unlike at many other flight training facilities.

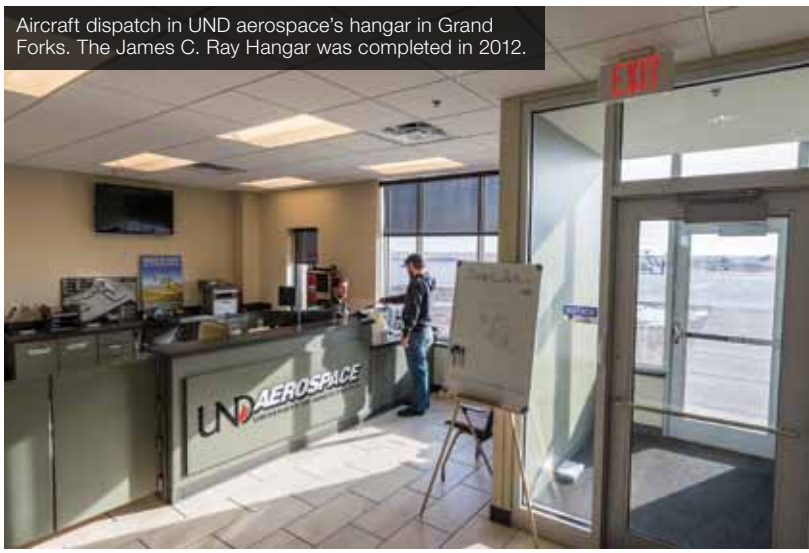
Ron DePue, chief flight instructor – helicopter, has 30 years of experience teaching at UND and currently oversees the department, which includes eight flight instructors, and an average of 55 students a year.

"Our program started out supporting Army ROTC [Reserve Officers' Training Corps] students and expanded as other companies and agencies sent pilots for training," DePue said. "Today, however, at least 60 percent of our students are civilian and self-funded through financial aid, their own cash, and/or scholarships."

UND first stepped into helicopter training in the mid-1970s to capture Veterans Administration (VA) program participants returning from Vietnam. While that first attempt lasted less than a year, the university rebooted the program in 1981 to take advantage of the Army ROTC nationwide scholarship program. This federally-funded program paid for a student's tuition, a book stipend, and lab fees required toward a degree.

UND already offered a fixed-wing degree program, where flight training was the lab. All courses and flight training were covered under the ROTC scholarship.

The UND now has six S-300s in its fleet, and they were recently joined by a Robinson R44 Cadet.



Aircraft dispatch in UND aerospace's hangar in Grand Forks. The James C. Ray Hangar was completed in 2012.

THE BIG THING ON STUDENTS' MINDS THESE DAYS IS FUNDING, AND IT'S BECOMING MORE DIFFICULT TO SECURE. BECAUSE WE'RE A FOUR-YEAR UNIVERSITY, OUR STUDENTS SECURE STUDENT LOANS TO COVER FLIGHT TRAINING.

- RON DEPUE, CHIEF FLIGHT INSTRUCTOR – HELICOPTER, UND

"The Army suggested UND add a helicopter program due to their need for helicopter pilots," said DePue. "UND purchased two R22 helicopters and started the program in '81 to serve those ROTC students."

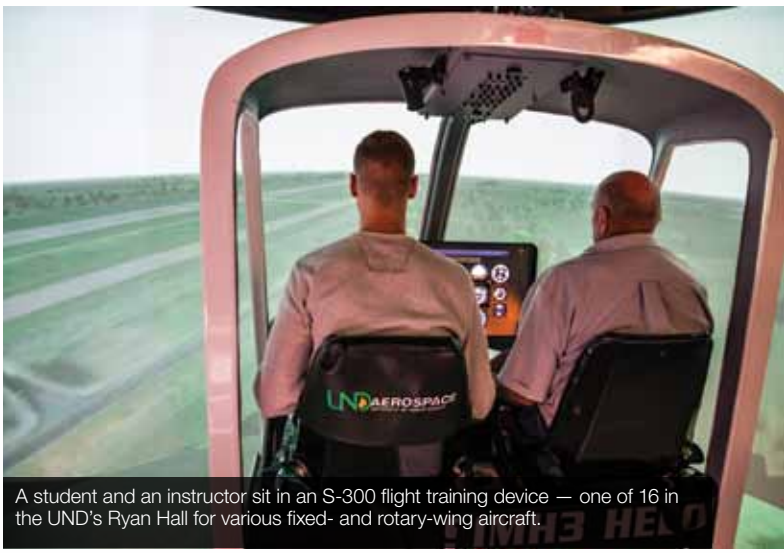
Two years in, the Army training team in Ft. Rucker visited to review the program. Their main suggestion was to use a helicopter model more closely compatible with aircraft that the Army was using, which at that time was the Hughes TH-55A.

Subsequently, in 1983, UND switched to the now S-300 to meet the Army's need. Fifteen ROTC students a year enrolled in the three-year degree program, from which they graduated with a Bachelor's degree and commercial instrument helicopter certificate before heading to Ft. Rucker to begin their Army officer career.

The UND helicopter program served the ROTC program almost exclusively until the late 1980s, when Saudi Aramco, a Saudi Arabian oil company, signed a contract to send two to three students a year for commercial instrument ratings, which continues to this day.

The UND previously operated Bell 206s in addition to S-300s, but has now transitioned to an entirely piston-powered fleet.

Dr. Warren Jensen delivers a lecture. Jensen is a Chester Fritz distinguished professor and flight surgeon for the John D. Odegard School of Aerospace Science.



A student and an instructor sit in an S-300 flight training device — one of 16 in the UND's Ryan Hall for various fixed- and rotary-wing aircraft.

The 1990s brought several paramilitary pilots from the Drug Enforcement Agency, United States Border Patrol, Immigration and Customs Enforcement and other law enforcement entities. These agencies worked with UND for about five years. The program grew to add aircraft to meet demand, including the MD 500, Airbus AS350, and Bell 206.

Around 2003, the school began to experience an uptick in civilian students as the helicopter industry increased awareness of the need for pilots. Civilian student numbers increased again after the financial slump in 2008/2009 had closed a number of funding options for pilots.

Then, due to budget cuts, the Army canceled its ROTC helicopter training at UND, with the last ROTC students completing training during the 2013-14 school year. With the ROTC gone, UND is ramping up visibility of its program, one of the few in the U.S. left where qualified individuals can receive full financial aid to learn to be a professional helicopter pilot.

UND TODAY

While a student pilot can pursue any undergraduate degree offered at the university, UND's aerospace division offers a Bachelor of Arts in Business Administration with one of two majors, airport management or aviation management, and a Bachelor of Science in Aeronautics degree with emphasis on the following disciplines: air traffic control, aviation technology management, commercial aviation fixed-wing, commercial aviation helicopter, flight education, or UAS operations.

The Bachelor's degree and Federal Aviation Administration (FAA)-approved part 141 flight training program, when taken together, often take a student about four and a half years, or as DePue put it, four academic years and two summer quarters — if a student wants to be done in exactly four years.

"However, it isn't uncommon for our flight instructor [students] to complete the flight training and work for us as instructors while they complete their degree," he added.

While a prospective professional helicopter pilot with financing


Chief helicopter pilot Ron Depue gives a group briefing on a preflight.


A student practices instrument flying by wearing a hood in the S-300.


The UND developed a supplemental type certificate to outfit its S-300 fleet with the latest Garmin G500H avionics.


The flight planning room in UND Aerospace's helicopter hangar in Grand Forks.


UND's helicopter department has eight pilot instructors.

already in place can attend any flight school and, if attending full time, complete all training in 18 months to two years, DePue suggested UND has far more to offer that pays off down the road.

"The big thing on students' minds these days is funding, and it's becoming more difficult to secure," he said. "Because we're a four-year university, our students secure student loans to cover flight training. That's only a piece of it though."

UND's aerospace department and the expertise of the courses and professors, as well as world class facilities, are additional factors, he said.

"At any flight school, your flight instructor will tell you about physiology or about reading weather reports, for instance, in one or two ground school sessions," said DePue. "Here you take full courses on these topics by people who are experts in their field. Physiology is taught by aero-medical professionals and students experience high altitude situations in the high altitude chamber, seeing for themselves not only the basic signs of hypoxia, but also identifying their very own signs, as everyone experiences them differently. Weather is taught by meteorologists. It's a depth of understanding you don't get at a typical flight school."

MEETING NEEDS

UND is also shifting to meet the needs of the civilian student for the civilian helicopter market.

"Around the early to mid 2000s, we began to see a paradigm shift," DePue said. "Years ago, a pilot needed turbine experience to get a job. The job market today is such that this just isn't a factor any longer. However, it's almost impossible to get a job without Robinson

This beautiful 24" x 36" poster has **43** stunning renderings of current and next generation helicopters from around the world. Available in our shop for **$24.99** + shipping and handling. This poster is a great addition to any helicopter lover's collection.

A limited number of these stunning posters are available – so order yours today!

Only $24.99!

MAKES A **GREAT GIFT!**

shopcanada.mhmpub.com
shopinternational.mhmpub.com

Vertical
www.verticalmag.com
THE PULSE OF THE HELICOPTER INDUSTRY


N8363C
NO SMOKING
GARMIN
MANIFOLD PRESSURE
INCHES OF MERCURY
RPM
ROTOR
ENGINE
QUARTZ CHRONOMETER
TRIM
LEFT
RIGHT
FUEL
CYL HEAD TEMP
LIMIT MP
THIS HELICOPTER MUST BE OPERATED IN COMPLIANCE WITH THE OPERATING LIMITATIONS SPECIFIED IN THE FAA APPROVED ROTORCRAFT FLIGHT MANUAL.
ROTORCRAFT MANUAL FOR WEIGHT & BALANCE PROCEDURES

Looking out the cockpit of an S-300 as it flies over lush green fields near the UND hangar in Grand Forks.

UND aerospace's campus is spread across five buildings at UND, including Robin Hall, completed in 2016.

All maintenance is conducted by UND's staff of mechanics. UND aerospace operates as one of the largest Part 145 repair stations in the region.

UND operates the S-300 and Robinson R44 in its fleet. Here, the two types fly with the UND aerospace airport campus in the background.


The UND aerospace division's helicopter department teaches about 55 students a year.

experience and that's why we sold all of our turbines and purchased the R44 last year."

Mark Kennedy graduated from UND in 2013, with a degree in commercial aviation, a minor in meteorology, and his helicopter commercial instrument license with a CFI rating. He landed a flight instructor job at the school, where he remained for an additional three years to build instruction experience and flight time.

"I really like the S-300 and had all my time in that helicopter when I graduated except for a few hours in the turbine," Kennedy said. "It would have been hard to get the first instructor job with no Robinson time had I not been hired at UND, so I think the R44 is a good thing for UND students. It's certainly going to open opportunities."

Kennedy was hired with around 1,300 hours total time at Maverick Helicopters in Las Vegas in 2016. There he flies tours and charters in the Airbus H130 to the Grand Canyon and surrounding areas. He said his experience at UND prepared him well for the job.

"UND is a real university and the schooling and flying is very structured," he said. "At the time, you wonder if all that structure is really necessary — schedule pre- and post-flights, rules, policies, and procedures and all. It felt like a bit much to me. But I have to say after I got my job at Maverick, I realized how valuable that all was. The real world of commercial flying is all about rules, policies, procedures and structure. It was very easy to step into the job and structure. I don't think you get much of that organization and structure at small flight schools."

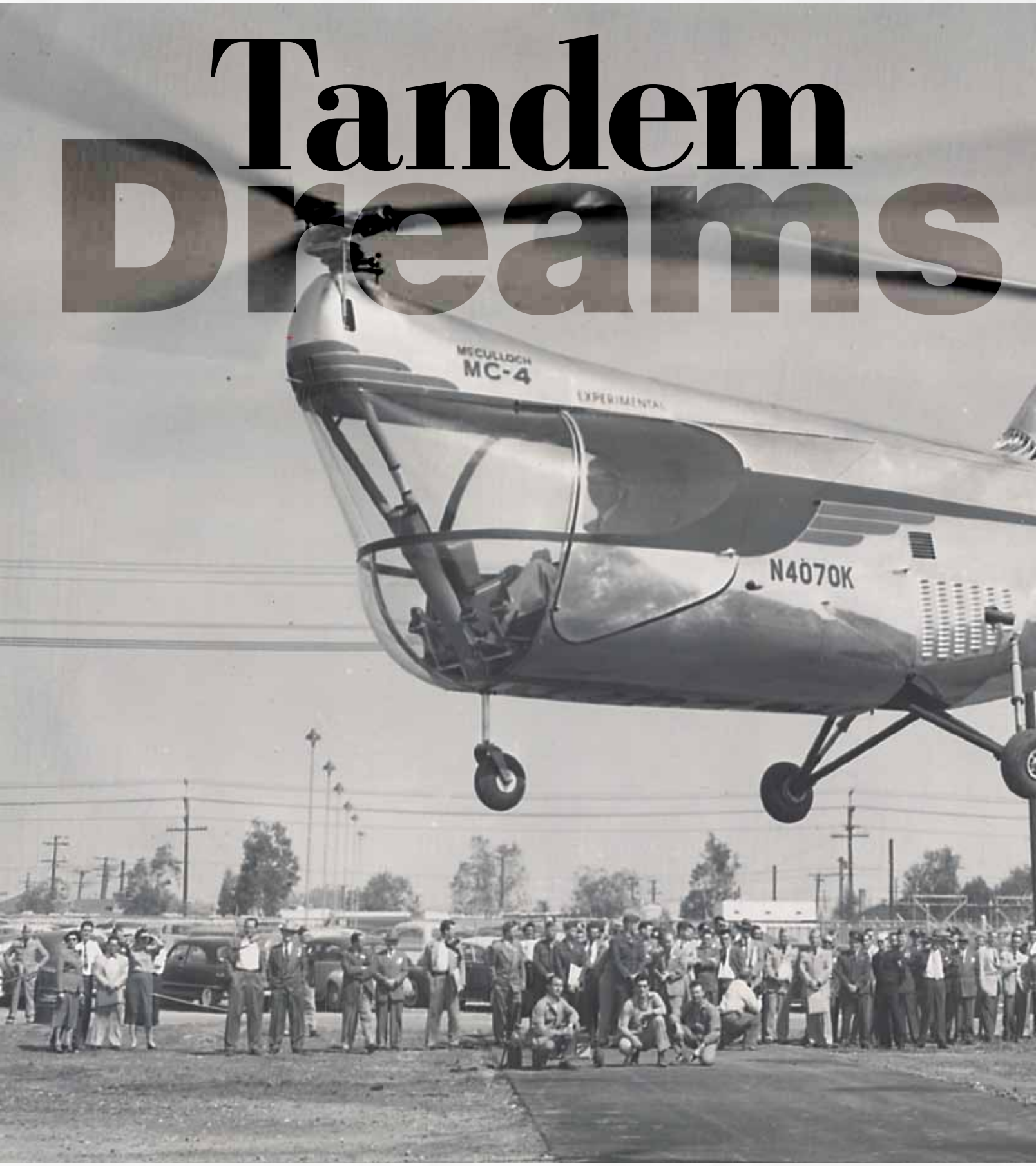
UND recently took delivery of its first R44 Cadet.

Paul Kolle, who graduated from UND in 2010, wouldn't be a pilot without the university. Today he flies as a line pilot for Aviation Services Unlimited in Rome, New York, performing utility work such as long-line, power line and gas line patrols, marijuana eradication, and other similar jobs.

"The only way I could have gotten here is with the UND program," he said. "I was able to get financial aid and then, once I had my ratings, work there as a flight instructor to build time. Yet, almost as important was the networking with other pilots coming through. I've had two job interviews since I left UND, and both of them were the result of networking with fellow UND people. UND has a strong alumni network and a good reputation in the industry. One piece of advice I share to anyone looking into being a helicopter pilot is to stay in touch with your fellow students and instructors. Be proactive and network. "

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.

Tandem Dreams



The McCulloch MC-4 two-place tandem rotor helicopter is demonstrated to a crowd during an early test flight. **Jeff Evans Collection Photo**

Drago Jovanovich was behind the first commercially-certified tandem-rotor helicopter in the U.S., but his dream of turning his designs into a successful private-use aircraft were left unfulfilled.

By Bob Petite

The McCulloch tandem-rotor MC-4 helicopter was the first light rotorcraft manufactured by the McCulloch Aircraft Corporation's helicopter division, and was the first tandem-rotor helicopter certified for commercial use in the United States.

It was designed by D.K. (Drago) Jovanovich. Jovanovich was born in what was then Yugoslavia in 1916, and immigrated to the U.S. during the 1940s, moving to Philadelphia, Pennsylvania — the heart of early helicopter development in the country. Not only was Jovanovich a rotary-wing designer, he was an inventor with knowledge of autogyro technology.

Jovanovich joined Frank Piasecki's P-V Engineering Company in 1944, after Piasecki received a U.S. Navy contract to build the world's first tandem-rotor transport helicopter. It was there that Jovanovich worked on the design of the rotor system for the PV-3/XHRP-X "Dogship." The XHRP-X first flew on March 7, 1945. Apparently Piasecki looked at developing a smaller version of the tandem-rotor helicopter, but the idea was not followed up on.

The following year, Jovanovich left Piasecki and started up his own company, called the Helicopter Engineering Research Corporation (HERC), with partner Frank Kozloski in Philadelphia. There he and Kozloski designed and developed the HERC Jovair JOV-3 — a light two-place tandem-rotor helicopter planned for commercial private use.

The JOV-3 two-seat tandem rotary-wing aircraft was only 26 feet and 4 inches in length. The helicopter team had looked at counter-rotating coaxial rotors at first, but settled on a tandem layout. The two three-bladed rotors were made of metal, while the steel tube fuselage was covered with an aluminum skin and fabric, and it had tricycle landing gear.

The original helicopter had a gross weight of 1,200 pounds (544 kilograms), an empty weight of 777 lbs. (353 kg), and a useful load of 423 lbs. (192 kg). Its cruising speed was 73 m.p.h. (117 km/h) with a maximum speed at sea level of 100 m.p.h. (161 km/h). The aircraft's endurance was 2 hours 20 minutes, with a range of about 138 miles (222 kilometers). A Franklin 100-hp engine was originally used to power the JOV-3, but this was later replaced with a 125-horsepower Lycoming engine. The aircraft's cost was estimated to be only $8,500 per unit.

Experienced veteran test pilot George Townson, who had over 15 years' experience flying early autogyros and rotary-wing aircraft, first flew the JOV-3 in 1948 out of the Boulevard Airport in Philadelphia.

MOVING TO MCCULLOCH

Money for the aircraft's development was hard to come by in the early days, resulting in Jovanovich's decision to join the McCulloch Aircraft Corporation — a division of the McCulloch Motors Corporation — in their newly established helicopter division as chief helicopter engineer in 1949.

The original MC-4 during an engine run-up. **Jeff Evans Collection Photo**

The MC-4 helicopter cockpit provided an excellent view for the pilot. **Jeff Evans Collection Photo**

The MC-4 was designed by Drago Jovanovich, and was slightly larger than his original JOV-3 helicopter. The MC-4 first flew in March 1951. **Jeff Evans Collection Photo**

It was here that Jovanovich designed a slightly larger tandem-rotor helicopter, based on his original JOV-3, called the MC-4. The side-by-side two-seat helicopter was now powered by a 165-h.p. Franklin engine, and it had its first flight in March 1951 out of the same airport as the JOV-3 in Pennsylvania.

The MC-4 measured 32 feet and 5 inches in length, and had a gross weight of 2,000 lbs. (905 kg), an empty weight of 1,453 lbs. (660 kg), with a useful load of 547 lbs. (248 kg). Cruising speed was 90 m.p.h. (145 km/h) with a maximum speed of 120 m.p.h. (193 km/h). The range was around 240 miles (386 kilometers).

Later in 1951, McCulloch manufactured a larger MC-4C tandem-rotor helicopter, powered by a 200-hp Franklin engine with fins on the back below the rear rotors. These provided much better lateral stability. The U.S. Army became interested in the MC-4C, designated the YH-30, and ordered three for evaluation and testing in 1952. The helicopters were disposed of in 1953.

McCulloch employed Al Bayer as a director of sales, service, and as a flight test pilot on the MC-4. He later moved to Hughes Tool Company as a test pilot. Norm Smith was another pilot.

The U.S. Navy purchased two MC-4C helicopters (designated as the XHUM-1) for tests in 1953. Both the Army and Navy found the helicopters underpowered and not that reliable. In addition, they said the drive system was too complex, and the aircraft were disposed of in 1955. No further McCulloch helicopters were purchased. This was quite a blow for McCulloch, which had great hopes for its light tandem helicopter in military use.

The MC-4 was the first tandem-rotor helicopter to be certified for commercial use on Feb. 17, 1953. McCulloch looked favorably on entering the civil market with their light tandem-rotor helicopter, but sadly, there were no orders.

THE JOVAIR SEDAN

Jovanovich left McCulloch and started up the Jovair Corporation in 1960, moving to Culver City, California, with plans to enhance and refine the MC-4 design. Over time, he manufactured a prototype four-seat, four-door commercial tandem-rotor helicopter called the Jovair Sedan — billed as "The first practical personal and business helicopter." The Jovair Sedan was issued a U.S. type certificate in 1963.

The Jovair Sedan measured 33 feet and 2 inches in length, and had a gross weight of 2,300 lbs. (1,045 kg), an empty weight of 1,463 lbs. (665 kg), and a useful load was 837 lbs. (380 kg). The Jovair Sedan cruised at about 90 m.p.h. (145 km/h) with a range of two hours. Its service ceiling was 12,500 feet (3,810 meters).

The Jovair Sedan 4E four-place helicopter was powered by a 210-hp Franklin engine, but a more powerful turbo-charged 225-hp Franklin engine was in a version called the Sedan 4ES as an option. An agricultural use stripped-down Jovair Sedan called the 4A could also be ordered. Jovanovich also planned a crop-spraying Jovair Sedan, but it was never manufactured.

There were only a few Jovair Sedan versions manufactured by the mid-1960s, and unfortunately Jovanovich could not find anyone to help build his Jovair Sedan.

Jovanovich was able to export one Jovair 4E Sedan to Switzerland. The helicopter was completely underpowered, and with four passengers and full fuel could barely hover in ground effect in the Swiss mountains. The agreement with a company to manufacture the Jovair Sedan fell through, so no new helicopters were manufactured. Recently, the abandoned Jovair Sedan helicopter was discovered in an old farm building, still intact. Plans are in place to fully restore the helicopter to flying condition sometime in the future.

The Hughes Tool Company in Houston, Texas, eventually acquired

HELICOPTERS SAVE **LIVES,** HELICOPTERS SAVE **RHINOS**

Rhino Air is a charity dedicated to using helicopters with advanced thermal and night vision technologies to prevent the needless slaughter and poaching of Africa's Rhinos and Elephants.



*Contact us at **1-800-553-9176** and help put an end to poaching.*

CORPORATE SUPPORTERS:

Vertical · Churchill Navigation · Nightflight Concepts · Rotor Zen Helicopters · Gyronimo for Aviators

RHINO AIR

rhinoair.org

Rhino Air is a U.S 501 (c) (3) public charity

Jovanovich's refined four-place Jovair 4E Sedan tandem helicopter was certified by the FAA in the early 1960s. **Jeff Evans Collection Photo**

the rights to the Jovanovich designs and patents, with the Hughes Model 269 benefiting from Jovanovich's early helicopter experience. The McCulloch Aircraft Corporation later reacquired the rights to the Jovair helicopter designs in the 1970s, but never built any more helicopters.

Jovanovich, working with McCulloch, went on to design a small two-seat autogyro called the McCulloch J-2 gyroplane in the early 1970s. He had much more success with the J-2 gyroplane, which was certified in May 1970. McCulloch Aircraft purchased the rights to Jovanovich's design and sold 98 J-2 gyroplanes between 1971 and 1973 out of their factory in Arizona. The factory shut down in 1974.

Surprisingly, several of the original McCulloch MC-4 helicopters have survived in the U.S. The U.S. Army Museum in Fort Rucker, Alabama, has a YH-30 in storage. The Pima Air and Space Museum in Tucson, Arizona, has a U.S. Navy HUM-1 on display, as does the Yanks Air Museum in Chino, California, while Classic Rotors in Ramona, California, has one in storage. The strange thing is, the Navy only purchased two McCulloch MC-4s.

Although the Jovanovich Jovair Sedan 4E did not become a successful commercial venture, his J-2 gyroplane kept him in business for several more years. The development of the personal private helicopter market envisioned by many was a real struggle between the 1940s to the 1960s. Sadly, Jovanovich died on Nov. 12, 1983, without achieving his dream of introducing a personal-use tandem-rotor aircraft into the market.

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.*

Vertical The pulse of the helicopter industry

NOW ONLINE

The world's best helicopter website has gotten even better.
More amazing content. Brilliant design. An immersive reader experience.
The results will blow you away.

THE NEW **verticalmag.com**

loads **2X FASTER** globally

exceptional **MOBILE** experience

enhanced **SEARCH** capability

totally **SECURE** browsing

MarketPlace

YOUR #1 ROTORCRAFT RESOURCE FOR...

MRO \ PRODUCTS \ SERVICES \ SALES & LEASING \ EMPLOYMENT

INTER MOUNTAIN
TURBINE SERVICES, INC.

24/7
SUPPORT

SALES
PARTS
ENGINES
EXCHANGES

NEW WE ARE NOW AN APPROVED TRAINING ORGANIZATION FOR THE LT101 & HTS900 ENGINE SERIES OFFERING FLIGHT LINE MAINTENANCE COURSES




LT101 – HTS900

TRIUMPH ENGINE CONTROL SYSTEMS REPAIR CENTER

+1 (801) 785-9898
INTERMOUNTAINTURBINE.COM

HONEYWELL AUTHORIZED SERVICE CENTER

CANWEST AEROSPACE

CANWEST GLOBAL AIRPARTS

ENSURING SAFETY & **RELIABILITY**

Aircraft Services (AMO/MRO)

Used Aircraft Refurbishment
New Aircraft Completion
Component Overhaul
Structure & Paint
Avionics & Instruments
Parts & Exchange

1-604-532-0322
Hanger #10, 5225-216th Street | Langley, BC, Canada V2Y 2N3

www.canwestaerospace.com

24/7
International AOG & Field Support

ALPINE AEROTECH LP

WE SUPPORT LEADING HELICOPTER MAKES & MODELS WORLDWIDE

MULTI-MISSION

SOLUTION PRODUCTS ON SALE NOW!

- Cargo Mirror & LED Pulse Light Kits
- Cabin Floor, Pylon, and Bulkhead Protection
- Tailboom Baggage Protection
- Aero-Lite Door Handles
- Fuselage FWD Step
- Access Panels & Doors
- Bear Paws
- Drain Reservoirs
- Shoulder Harness Kits
- Fuel Filler Guards

855.500.2376
(toll free for North America)

250.769.6344

Kelowna & Abbotsford, B.C., Canada

info@alpineaerotech.com

SHOP NOW TO SAVE

alpineaerotech.com

REMOTE HELICOPTERS

EMPLOYMENT OPPORTUNITIES

Remote Helicopters Ltd. has immediate openings for the following positions:

QUALITY ASSURANCE MANAGER:

- Permanent full time position
- Reporting to the Director of Maintenance
- Responsible for the quality and regulatory compliance for all work performed by Remote Helicopters' AMO

Applicants must meet the following:

- Be willing to relocate to Slave Lake, AB
- Fulfill the requirements of CAR 573.04
- Hold a valid AME licence (violation free)
- Six (6) years experience in aviation
- Six (6) months aviation experience in the last two years
- Industry recognized training in QA/Auditing or past experience in Aviation Quality Assurance

PRODUCTION MANAGER:

- Permanent full time position
- Reporting to the Director of Maintenance
- Responsible for the supervision of maintenance activities as directed by the Director of Maintenance

Applicants must meet the following:

- Be willing to relocate to Slave Lake, AB
- Hold a valid AME licence (violation free)
- Have at least six (6) months supervisory experience
- Have knowledge and experience on BH 05, 06, 212, and AStar 350 series
- Meet the requirements of Appendix D of Remote Helicopters MPM Procedures Manual

To apply, contact **Keith Mercer,** Director of Maintenace, keith.mercer@remotehelicopters.com

Box 1340 Slave Lake, Alberta, Canada T0G 2A0 / P: 780.849.2222 / F: 780.849.5235 / **remotehelicopters.com**

Vertical HAS AN ONLINE CAREERS PAGE

DID YOU KNOW

Vertical online has **82,500+** unique visitors each month?

Check out our current employment ads at **WWW.VERTICALMAG.COM/CAREERS**

BAILEY HELICOPTERS · DELTA Helicopters Ltd. · GSH · HELIQWEST · HORIZON HELICOPTERS · NATIONAL HELICOPTERS INC. · REMOTE · TRANSNORTH HELICOPTERS · UNIVERSAL HELICOPTERS · wiskair

COLUMN

THERE I WAS... | **MIKE MUENCH**

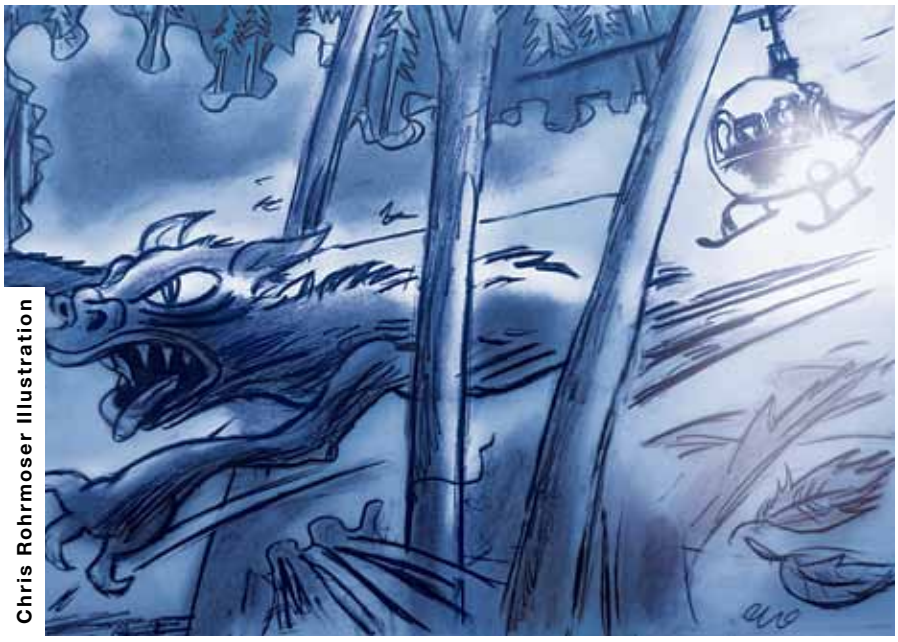
THE JERSEY DEVIL

"The Garden State" of New Jersey is the most densely-populated state in the U.S. Residents of northern New Jersey are packed in like sardines. With lower rents there than across the river in Manhattan, commuters can travel two hours or more in traffic getting to their jobs in New York City. South Jersey, on the other hand, is comparatively deserted, with little more than a few small cities and towns and most of the 1,800 square miles of the heavily forested Pine Barrens — home to the legendary Jersey Devil.

I have flown thousands of hours over the Pine Barrens as the only pilot for the Burlington County Government in South Jersey. That county encompasses the largest part of the more than one million acres of pine trees, bogs, pygmy pines and carnivorous plants that make up the Pine Barrens. In my 18 years with the county, the most frequently asked question posed to me was: "Have you ever seen the Jersey Devil?" The locals or "Pineys" as they call themselves, weren't really interested in whether I thought it was real. They knew that much already. They just wanted to know if I'd ever seen it from the air. There have been many reported sightings and several books written on the subject.

Once, while flying our county's Hiller UH-12E across the Pine Barrens just before dusk, I noticed a flurry of activity below as I passed over the tiny town of Chatsworth. Seeing flashing lights on the ground as a police cruiser was waved over, I noted that several people were all pointing in one particular direction. Always up for a good diversion, I started a descent and banked in the direction of the pointing index fingers. Nothing.

Now, as I leveled out just above the treetops... "Wait! What the ... ?" I saw that something was running, but I couldn't make out if it was a biped or quadruped. It was running on two legs with a sort of limp or uneven gate. And there was something about its right leg — it appeared to be laden with scar tissue. The scarred skin gave off a slight sheen against the flat black hair covering the rest of the beast. Then, all of a sudden, it dropped down on all fours and picked up speed. It almost resembled a bear, but it was much too lean, and its long tail trailed behind; a tail too long for a bear. At this point I had a clear view of it, and could see either two spikes atop its head, or two short pointy ears. I realized that from this profile angle, it had a very short muzzle, unlike a bear. It looked much like the tree climber I'd seen the year before, in a forest fire that I was assisting with. At the time, I dismissed it as probably being a black bear, but remember thinking it was the strangest looking black bear I'd ever seen.



Chris Rohrmoser Illustration

To my amazement, the creature then leaped what I would consider a very wide stream or brook. With its limbs outstretched, I saw what appeared to be a sort of webbing between its front and rear legs, similar to a flying squirrel. Suddenly, it disappeared into the woods. Below and beside the helicopter, I saw something flickering through the branches as I quickly overtook it. Pulling the nose of the ship up into the air and flipping on the landing light, I reduced power, and kicked in full pedal until the helicopter pointed in the opposite direction. All of a sudden, I found myself looking straight into two ember-like, orange glowing eyes staring directly back at me. For that split second, it seemed there was a familiar connection between us that sent a shiver down my spine. I can't explain it. Then I heard... no, felt, a non-verbal warning of impending danger — and saw trees coming up at me! I yanked in full power and pulled up into level flight. Ol' Betsy moaned and groaned, blades slapped the air, trying to get a bigger bite, and tree top branches smacked against the skids and chin bubble as I passed through translational lift. I pulled the nose up a little more and started into a left bank. Looking over my shoulder in the direction of the turn, I caught a glimpse of its scarred right rear leg as it darted into the woods.

Thinking back to the forest fire of the previous year, some 20 miles away, it all came back to me. I remember the smoldering fur on its right shank as it jumped down out of a tree from quite a height, trying to escape the flames, all the while fixating on the helicopter. It seemed to be following us toward a clear path through the smoke and flames, leading away from the seemingly all-encompassing fire. That must be the same creature. Did it also remember that earlier encounter? And if so, was that warning I sensed a show of concern, appreciation or repayment for leading it out of the fire?

As dusk drew to a close, I started a climb, continuing on my way. Over the ensuing years, I believe I spotted it a few more times, once at dawn feeding on ripe berries in a cranberry bog, and possibly one or two other fleeting glimpses. Were these rare sighting of the Jersey Devil? I wonder…

NEW COMPOSITE MAIN ROTOR BLADE NOW AVAILABLE FOR BELL 206B SERIES

This new Van Horn Aviation composite main rotor blade available exclusively from Aeronautical Accessories is carbon fiber constructed and has a laminar flow airfoil shape with tapered tips, reducing cabin noise. It offers weight and dimensions comparable to the standard Bell 206 main rotor blade and is FAA Authorized. To further increase operational performance, Van Horn composite Bell 206 B/L series tail rotor blades are also available from Aeronautical Accessories.

AERO-ACCESS.COM | SALES@AERO-ACCESS.COM | 1-800-251-7094

Innovation. Reliability. Performance.

Aeronautical ACCESSORIES™
A Bell Helicopter Brand

A LEGEND REIMAGINED

The Bell 505 Jet Ranger X is a new five-seat aircraft designed to deliver safety, efficiency and reliability through the use of advanced technology. Featuring the Garmin G1000H™ flight deck and large cabin doors for easy loading of passengers and cargo, the new Bell 505 Jet Ranger X offers multi-mission capabilities with exceptional performance characteristics.

CAP

Ask about how Customer Advantage Plans can safeguard your direct maintenance costs and provide the ultimate in cost predictability.

BELLHELICOPTER.COM

On a Mission.

Bell Helicopter®
A Textron Company