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wrap-up:
the future is NOW

Room for 12
the Cessna Citation Longitude

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Female entrepreneur takes on the world

Credit Rachel Payne for gumption. The 25-year-old from Orlando, Florida, survived major heart surgery at 19 and a childhood spent hanging with her dad and his parts swapping buddies to become the founder of hangarswap.com, an online business that intends to reshape the aviation marketplace. “I spent my entire childhood at the airport,” says Ms. Payne, who is a certified private pilot and also the owner of aircraft salvage company, Fast Aviation. “I remember my father going over to a buddy’s hangar and they would have a swap meet where Dad would offer him money or trade for something sitting on a shelf. It was easier and cheaper to do that than call all around, pay for it, and then wait for the part to arrive. I based hangarswap.com off an old school notion of swapping parts at the hangar, with a modern platform.”

Influenced by her environment, Ms. Payne started selling airplane parts at 15 to help pay for her own truck and extracurricular activities such as flying and riding dirt-bikes. Today Hangarswap.com is reportedly getting three million hits with traffic doubling on a monthly basis. The e-business is a central location where anyone from private individuals to major salvage companies can sell their airplane parts.

Ms. Payne hopes that by providing an aviation specific marketplace with no buyer’s premiums and low selling fees of five percent, her team can do their part to keep general aviation more obtainable and affordable. And she’d like to keep the online commercial entity user friendly. To that end, potential customers can see what they’re buying on the screen and immediately know if it’s in stock. There is also a chat feature where you can talk to someone who is a mechanic, knowledgeable aviator, or even Ms. Payne herself. “It is so important that you can communicate about the item you’re about to purchase,” she says. “The only way Hangar Swap will grow is through your support, and so we are here to listen and more importantly take action on your suggestions.”

— John Campbell
Editor

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Upcoming Events

Bombardier hopes for more federal support for CSeries program



Reuters reported in November that Bombardier is in talks with the new Canadian Liberal government about a further cash infusion into its struggling CSeries jet program, which the planemaker expects to turn a profit by around 2020, according to Chief Executive Alain Bellemare.

The long-delayed single-aisle passenger jet program is already billions of dollars over budget and has left Quebec-based Bombardier saddled with over \$9 billion in debt. The 2020 profitability date is broadly in line with analyst expectations.

“We’ve been in discussion with (the Liberal government) regarding some sort of participation on some form of financing investment,” Bellemare told Reuters at the NBAA Business Aviation Convention & Exhibition in Las Vegas on Novem-

ber 16th. “It is still in the early stage so I wouldn’t want to speculate.”

The financing talks come after the Quebec government said in October it would invest \$1 billion in the CSeries program in return for a near 50 percent stake in the project. Bombardier has received 243 firm orders for the CSeries, but it is still short of its target of 300 firm orders by the time the jet enters service in 2016. In October, Bombardier said it was in “advanced discussions” to sell the CSeries jet to airlines in North America, but it did not identify potential buyers.

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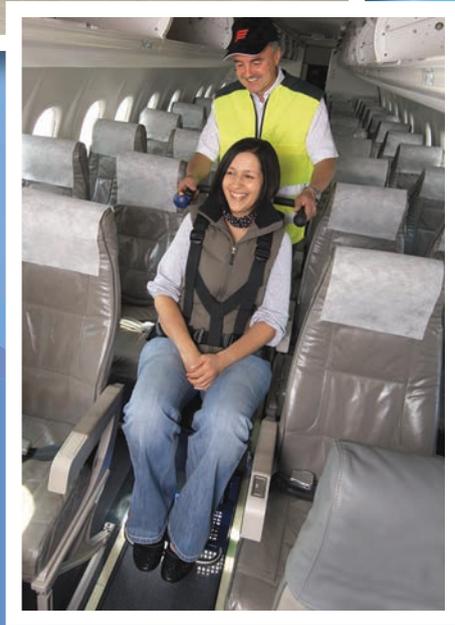
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STCs & new products

Fresh windshield for Hawker 800 aircraft

PPG Industries' aerospace transparencies group has received Parts Manufacturer Approval for its new-design glass-faced acrylic windshields for Hawker 800 series business jets, including the Hawker 750, 800, 800XP, 800 (U-125A), 850XP, 900XP and 1000 aircraft. These windshields are said to offer superior scratch, abrasion and chemical resistance over the previous all-acrylic design. The new-design windshields are claimed to have a better, more reliable anti-ice heating system, higher visible light transmittance and improved precipitation-static drain.



For more information visit www.ppgaerospace.com

Swiss Army knife gets new redesign

The Swiss Army Knife has been given a redesign for the first time in decades, a new look that includes a new curved shape and new blade-locking system with easier access to the tools for both right- and left-handers.



There are now up to 11 functions in total including a five-turn corkscrew, flathead and Phillips screwdriver, punch and an awl with a cutting edge. It is available in four versions and four colours.

For information visit www.swiza.com



Impact-rated hex drivers from Snap-On Industrial

Snap-on Industrial's new two-piece impact rated hex drivers are manufactured from a special alloy steel and heat-treated for optimum strength and durability. It's said they are engineered with precise fit and tight tolerances to prevent slippage and disengagement.

The drivers are designed for use with pneumatic or cordless impact guns. Snap-On claims the two-piece design surpasses one-piece models, making replacement economical and convenient. Additionally, the bits can be easily replaced by hand with no need to put them in a vice and punch them out with a hammer.

For information visit www.snapon.com



Work better out of the weather with shelter kit

Liftsafe Fall Protection's cold weather shelter has been designed for remote engine service. The shelter kit fits in one storage crate for easy shipping while the flame retardant material provides a safe protective barrier for working within.

The interior can be heated upon assembly, providing comfort to maintenance staff during remote engine service work. The cold weather shelter contains reinforced air bags on the top of the wing, separating the shelter from the work area.

For more information visit www.fallsafetysolutions.com



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AERO Specialties' complete oxygen and nitrogen service carts include boosters, regulators, hoses, and aircraft adapters.

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MECACHROME CANADA WINS MAJOR CONTRACT



Mecachrome Canada, a provider of assemblies and machined components to the aerospace industry, has announced its official first major contract with Airbus SAS on the A320neo program for the manufacturing and delivery of major complex titanium components. Mecachrome anticipates this contract of several million dollars is the beginning of a long-term relationship. "Although our French facilities have been doing business for Airbus SAS directly, it is the first time that Mecachrome Canada gets the chance to work with Airbus SAS directly," said Jean-Charles Raillat, CEO at Mecachrome Canada. "This award is a clear demonstration of our hard metal machining strength and competitiveness on the global scene."

LYCOMING PROJECT CITED AS AVIATION CLIMATE SOLUTION



Lycoming Engines has been included as part of the Aviation Climate Solutions collection of 100 examples of how the aviation industry is collaborating to cut carbon dioxide emissions and help reduce its impact on climate change. Lycoming received this recognition for its

ion nitriding project, which enabled the company to significantly reduce its environmental impact.

Michael Gill, Executive Director of the Air Transport Action Group, a cross-industry association that published the report, said, "Our industry has also taken a lead in climate action, putting in place a comprehensive framework and goals to reduce emissions from air transport. The Aviation Climate Solutions are a set of case studies showing how different parts of the industry all over the world, including Lycoming Engines, are working together to reduce our climate impact."

Some of the measurable environmental impacts of Lycoming's ion nitriding project include reduction of annual CO₂ emissions by 1.2 million pounds; reduction of annual electricity usage by 110,000 kWh and reduction of annual water consumption by 400,000 gallons. In 2008, the aviation sector became the first to set global goals to proactively manage its climate change impact. The long-term goal is to reduce net CO₂ emissions from aviation to half of what they were in 2005, by 2050.

H160 GOING ACCORDING TO PLAN SAYS AIRBUS



Airbus says its prototype H160 is progressing according to plan and the aircraft has already reached a maximum speed of 175 knots and an altitude of 10,000 feet. As one of the key priorities of the H160's development program is maturity at entry into service, its Arrano engines will be installed and tested on the dedicated integration installation called the Dynamic Helicopter Zero before the prototype performs its first flight by the

end of this year. To date, the DHC0 has performed more than 70 hours of testing. A new generation 5.5 to six-tonne twin-engine helicopter, the H160 will be tailored for a wide range of applications, including oil and gas operations, emergency medical services, public service, and private and business aviation.

NEW AERONAUTICAL LIBRARY UP AND RUNNING



Vaughn College of Aeronautics and Technology in Flushing, New York has completed the new Aeronautical and Academic Library and Learning Center, the last phase of the \$40 million campus-wide expansion, renovation, and sound mitigation program.

The architectural and engineering design ensures a quiet and comfortable learning environment at a college located only 200 feet from one of the runways of the LaGuardia Airport in Flushing. The college offers master, bachelor, and associate degree programs in engineering, technology, aviation, and airport management.

INSPECTION INTERVALS INCREASE FOR BELL 412EPI



Pratt & Whitney Canada has increased the clutch inspection interval for its PT6T-9 engine, which powers the Bell

412EPi helicopter. The increase will see the interval move from 1,250 hours to 2,000 hours, meaning that a clutch inspection is required only once during the engine's gearbox TBO of 4,000 hours. Previously, three inspections were required during the TBO period.

"The extension of the clutch inspection interval means significant savings for PT6T-9 operators," says Irene Makris, Vice President, Marketing, P&WC. "We made the call to extend the interval after inspecting a representative sample of clutches in the field during the month of September. Based on an analysis of these clutches at 1,250 hours and 1,900 hours, we're pleased to validate this new interval for our customers. The sampling, detailed inspections and analysis conducted by our team create a significant operational benefit to operators."

AT LONG LAST ... AN ACTUAL WORKING JETPACK



Science fiction became science fact in New York when for the first time in history an aviator flew by jetpack in a controlled and sustained flight around the Statue of Liberty.

Soaring high across the Hudson River, Australian entrepreneur David Mayman became the first person to prove the viability of personal flying devices. Mayman's flight in early November was the culmination of a 10-year challenge to design and build a lightweight, wearable flying device that will allow people to take to the skies. The JB-19 is small enough to sit in the back seat of a car but powerful enough to fly thousands of feet high.

Approved for the flight by the FAA and US Coast Guard, the JB-9 jetpack, was developed by legendary Hollywood inventor (and winner of three Academy Awards), Nelson Tyler and May-

man who spent millions of dollars and thousands of hours secretly developing the device which has never before been seen in public. Their struggle has been documented over the last eight years by an Emmy-award winning film team.

DEAL IN THE WORKS BETWEEN LOCKHEED AND SIKORSKY



Lockheed Martin was expected to close its \$9 billion acquisition of Sikorsky Aircraft from United Technologies Corp in early November, now that it has received final regulatory approval from China. "With this final regulatory approval, we are one step closer to completing this historic acquisition," said Lockheed Chief Executive Marillyn Hewson. Lockheed announced its planned acquisition of Black Hawk helicopter maker Sikorsky in July.

NEW FIVE-BLADE CARBON FIBRE PROPS FOR PC-12 FLEET



Hartzell Propeller has introduced a new five-blade composite swept tip propeller specially designed to maximize performance for the Pilatus PC-12 fleet. The 2016 model PC-12 NG will feature the new 105-inch diameter, composite propeller as standard equipment. With the five-blade Hartzell propeller, the 2016 PC-12 NG cruises five knots faster, climbs to a cruise altitude of

28,000 feet 10 percent quicker, and has a 50-foot reduction in total takeoff distance. Its highly swept airfoil reduces flyover and cabin noise and its blades are certified for unlimited life. It's also said to be seven pounds lighter than the standard four-blade aluminum propeller, lighter than alternative wood core five-blade propellers and five to 10 times stronger than beech wood and spruce wood core props.



Designed for increased takeoff, climb and cruise performance, the new five-blade swept tip prop from Hartzell Propeller has received a Supplemental Type Certificate from the FAA for installation on PC-12s. Hartzell's Structural composite utilizes aerospace grade carbon fibre.

NATIONAL AIRLINES COUNCIL OF CANADA ANNOUNCES 2016 SCHOLARSHIP PROGRAM



The National Airlines Council of Canada (NACC), the trade association representing Canada's largest passenger air carriers, announced its 2016 Scholarship Program to help college and university students in Canada pursuing studies relating to airline operations or management, avionics and aircraft maintenance. Two \$1,500-scholarships will be awarded to students whose studies relate to aviation in Canada. Eligible students are invited to submit their applications by 5 p.m. (EST) January 22. Award recipients will be announced at the NACC's annual summit in the spring of 2016. ■



With restrictions to Cuba easing, more business aircraft are traveling to the island than ever.

NBAA 2015:

Security issues, the status of unmanned aircraft systems, and supersonic travel were all hot-button topics at this year's Business Aviation Convention & Exhibition.

The NBAA's Business Aviation Convention & Exhibition is the most significant media event for North America's business aviation industry, hosted this year in Las Vegas during the middle of November. Bringing together business leaders, government officials, manufacturers, and corporate aviation department personnel, it's an event that shapes the industry for the short- and long-term future. Staples of the big show include static displays of new products, prototypes and emerging trends. There's also a series of lectures and workshops that touch on topics affecting the working lives of professionals such as you. Here's a look at some of them.

Top 10 Issues for International Operators in 2016

The NBAA International Operators Committee put out its first Top Ten list of hot topics for flying safely, securely, efficiently and legally around the world. With a focus on challenging airspace and airports, the committee ran through its focus areas at NBAA2015.

1. Access: Top of the list were threats to access and the committee's work to relieve them in China, Brazil, Australia, Indonesia, Turkey and elsewhere.

"We're still dealing with military controlled airspace in China. Understanding that system is critical," said



By 2050, a suborbital business aircraft might be feasible, possibly modeled on Virgin Galactic's SpaceShipTwo.

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Doug Carr, NBAA vice president of regulatory and international affairs. “In Beijing, no matter how much planning you take, you may be denied access with little-to-no notice, as happened during APEC.”

Pat Dunn, a Singapore-based G450 pilot added, “I found a third party provider who was able to get me parking at Beijing, but it cost me a thousand dollars a night to stay on the ground beyond one night.”

In Indonesia, where domestic flights by foreign-registered aircraft are prohibited, NBAA is advocating for freedom to operate. In Australia, Carr noted that – thanks to efforts by the Australian Business Aviation Association – the law will be changing to a first-come, first-served system, replacing the current priority given to commercial aircraft over all others.

“Today, your flight from Sidney to Brisbane could be delayed up to three hours because of priority,” said Carr. “That’s changing.”

2. Avionics Mandates: Operators in various airspaces need to be equipped for FANS, LINK 2000+ and ADS-B Out by the deadlines. “There are very few shops that do ADS-B Out modifications, and they’re going to be hammered,” said Carey Miller, manager of business development at Universal Avionics Systems Corporation. “There’s a tidal wave of upgrade coming and the difference with ADS-B Out is, if you’re not compliant by the mandate, you’re grounded.”

3. 2016 Olympics in Brazil: With the Summer Olympics



The NASA Pathfinder and NASA Pathfinder Plus, were the first two aircraft developed as part of an evolutionary series of solar- and fuel-cell-system-powered unmanned aerial vehicles.

coming to Rio de Janeiro in 2016, parking and slots are going to be in very high demand, and the rules for applying are not yet defined. Stay tuned.

4. Contingency Planning: With so many security hotspots (there are currently 35 NOTAMs for countries such as Iran, Iraq, Libya, North Korea and Somalia) and unpredictable global weather (in 2010 a volcano eruption shut down travel to Europe for a week), operators need to talk to their handlers as early as possible when planning a trip.

5. Cuba: With restrictions to Cuba easing, more business aircraft are traveling to the island than ever. But receiving travel authorization is still complex; aircrews cannot stay as long as their passengers (requiring drop-offs); financial transactions may be problematic for U.S. citizens once on the ground; and an aircraft's insurance policy or OpSpecs may exclude travel to Cuba.

6, 7, 8, 9 and 10: The committee also focused on customs and APIS submissions; gross navigational errors by business airplanes in the North Atlantic airspace; reduced lateral separation minima in the tracks; EU-ETS; and differing regulations for approaches with enhanced visions systems across countries.

Futurist Predicts Big Changes on the Horizon for Aviation

Exponential changes in technology will lead to a transformation in the aviation industry that may seem unimaginable

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The integration of s-UAS is already happening, and aviation is about to experience a transformation and expansion of capabilities not seen in decades.



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from where we sit in 2015, but they are coming sooner than we think. After all, noted John Peterson, founder and president of the Arlington Institute, “Fifteen years ago a phone was just a phone, and now they are computers you are carrying around.”

Peterson, who describes himself as a “professional futurist,” spoke about the future of airplanes and flying on the opening day of NBAA’s Business Aviation Convention & Exhibition (NBAA2015). Peterson said that the 21st century will see 1,000 times more technological advancements than the previous century and things that once seemed impossible may soon be possible and even commonplace.

He also presented this idea from computer scientist, inventor and futurist Ray Kurzweil, “Non-biological intelligence created in 2045 will be a billion times more powerful than all human intelligence today.”

Peterson also predicted that in the not-so-distant future people would control computers with their minds, not with a mouse and that robots will be commonplace. Already, he said, car

manufacturers are working on cars that drive through mind control, which could lead to the same technology in airplanes one day.

Peterson also said that 3D manufacturing is changing the way everything is produced.

“You are limited only by your imagination. It is coming. It is going to fundamentally change the way everything is manufactured.”

Unmanned aircraft systems (UAS) are also “big gamechangers,” said Peterson, adding they are “unlike anything that anyone has ever seen in aviation.” In 2010, the FAA predicted 10,000 UAS would be in use by 2020; now the agency expects one million to be sold this holiday season. Facebook has created a solar-powered plane to deliver Internet. The unmanned aircraft, which has the wingspan of a Boeing 737 and weighs roughly 880 pounds, can fly for six months at a time, Peterson said. “It changes connectivity for the whole planet. The future of aviation is going to be very much different than the past has been.”

Aviation Panel Tackles Questions about UAS Industry

The varied uses throughout business aviation for small unmanned aircraft systems (s-UAS) were explored during the “Small UAS in Business Aviation” session at NBAA’s Business Aviation Convention & Exhibition as industry leaders addressed questions from companies exploring their own uses for UAS. Panel moderator Brad Hayden, president and CEO of UAS service provider Robotic Skies, began the discussion

by noting the significant number of s-UAS operations already taking place.

“The integration of s-UAS is already happening, and as a result, aviation is about to experience a transformation and expansion of capabilities that we have not seen in our industry, literally, in decades,” Hayden said. “The Section 333 exemption process to allow small UAS commercial operations had just been implemented when we met last year in Orlando. Just a year later, over 2,000 companies have been granted exemptions to fly small UAS under line-of-sight restrictions.”

Missions already performed by s-UAS include commercial photography, power grid and pipeline inspection and mining safety inspections. Paul McDuffe, vice-president of commercial business development for UAS manufacturer Insitu, noted that over the past year his company has flown ice monitoring operations for oil and gas companies, and surveyed more than 130 square miles of railroad track in central New Mexico for BNSF under the FAA’s UAS Pathfinder program.

“I haven’t found a business [sector] yet that doesn’t stand to benefit from UAS,” said Bryan Wynne, president and CEO of the Association for Unmanned Vehicle Systems International (AUVSI), who noted that UAS will represent an \$80 billion industry over 10 years once regulations are in place to guide operations.

Chris Broyhill, transportation director for municipal utilities provider Exelon Business Services, spoke from experience when answering questions about the integration of UAS operations into existing business aviation flight departments.

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“When people in the company have a question about operating in the airspace, they should come to us for answers,” he said of his flight department. “Anything long-distance or that requires flying in the airspace should be a flight department function. That said, once commercial UAS are allowed to be legally operated by non-pilots, some line-of-sight operations could probably be performed from outside the flight department.”

The potential for s-UAS operations performed by non-pilot employees may also help ease concerns from those workers about having their current roles supplanted by UAS.

“Many [Section 333] exemptions have been granted to Fortune 100 and 500 companies,” added John Downey, founder and CEO of UAS platform developer Airware. “There is tremendous opportunity for UAS, as a core IT function of the company, to serve in a complementary role to existing divisions.”

How Far Off Is the Supersonic Business Airplane?

Aerion announced its first firm order for its AS2 at NBAA’s Business Aviation Convention & Exhibition on November 17, bringing the supersonic business jet closer to reality. Now, some experts think the supersonic age is set to take off.

“This time, what we have is real. I believe we will see a supersonic business jet by 2023,” said Oscar Garcia, chairman of InterFlight Global Corporation at NBAA2015, estimating 40 to 100 letters of intent for the AS2 have been received, including the 20-unit order by Flexjet announced earlier at the show.

Off and on for 20 years, manufacturers such as Gulfstream, Sukhoi and Dassault have attempted to move supersonic aircraft past the design stage, but none have taken over for the Concorde since 2003. Today, Garcia and the engineers at Aerion, with their partners at Airbus, are bullish because of developments in laminar flow wings and ramjet engines.

With today’s fastest, ultra-long-range business aircraft, such as the Gulfstream G650 and Global 6000, a flight from Los Angeles to Tokyo takes 12 hours. Those airplanes could

cover the world in four days. “So, the size of the world is four days,” said Garcia.

As the Honeywell Global Business Aviation Outlook released at NBAA2015 revealed, demand for ultra-high-speed, ultra-long-range aircraft continues to outpace other categories. “What buyers want is minimal time on the aircraft,” said Garcia, “and more time at their destination.”

At supersonic speeds, approaching Mach 2, an aircraft could cover the world in 17 hours with one or two stops, “so the size of the world is two days,” said Garcia. For supersonic business aircraft to find a market, though, they’d have to meet several challenges including be capable of long range and ultra-long-range missions, taking off and landing with conventional engines below 60,000 feet, produce no noticeable sonic boom over land, and receiving certification from the FAA and other civil aviation authorities. Moreover they would need to produce an environmental footprint not too different from the latest business aircraft. The environmental footprint is key, explained Garcia, especially in terms of noise and emissions. “We cannot have a breakthrough with speed at the expense of all the other breakthroughs we, as an industry, have worked so hard to achieve,” he said, emphasizing that supersonic aircraft will have to be compliant with Stage 4 noise standards.

While supersonic business airplanes may be a reality soon, “There’s nothing today that achieves hypersonic speeds, of Mach 2 to 5,” said Garcia, although he predicted that in 10 to 15 years, there might be.

The challenges for hypersonic travel are greater, with no engine yet invented, except those used by the military, to power those speeds. Such an aircraft would fly at the edge of space, in “airspace that no civil aviation authority yet understands,” and have serious cabin pressure issues. Garcia also predicted that by 2050, a suborbital business aircraft might be feasible, possibly modeled on Virgin Galactic’s SpaceShipTwo or the EADS Space Plane, that could travel anywhere on earth in two hours.

“Supersonic, hypersonic and suborbital commercial air travel begin with business aircraft,” said Garcia. ■



If you'd like to contribute your professional association's newsletter to AMU magazine contact our editor, John Campbell via email :

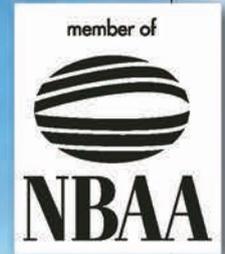
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This flight tonight

(I should not have got on . . .)



Above: Air Canada Flight 797 engulfed in smoke

Sadly, sometimes it takes a high-profile tragedy to bring attention to a problem.



BY GORDON WALKER, AME 'E'
Professor of Avionics, Centennial College

Those of us who devote our lives to the maintenance of aircraft are cognizant of the dangers inherent when travelling 600 mph, seven miles above the surface of the earth. We are also aware of the fact that commercial air travel is an extremely safe form of transportation, second only to escalators in terms of motorized mass transit devices.

That notwithstanding, when commercial airliners do crash, the death toll is jarringly high, with

only about a one in four chance of anyone surviving an accident where any fatalities occur. The reality is, airplanes do crash, and people are killed as a result. It stands to reason that those who fly more frequently are more likely to be involved in an aviation incident or accident. It's simple math. I recently wrote an article citing the example of golfer Payne Stewart's fatal Lear Jet crash into a field in South Dakota. This article generated considerably more feedback than I normally receive, prompting me to consider the prevalence of celebrity aviation fatalities.

Most aviation related celebrity deaths have occurred on smaller, privately owned or chartered aircraft. A notable exception to this rule is Canada's own folk music legend Stan Rogers. Being a solo



Installation of track lighting on the floors of aircraft passenger cabins were among the recommendations following the fire aboard Air Canada FLT 797 in 1983.

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the landing. Firefighters were able to revive the captain by dousing him with cold fire retardant, enabling his exiting the cockpit through the sliding window.

Although it was established that the cause of the fire was not a malfunctioning toilet flush motor, a definitive cause was never determined. Examination of the lav's trash bin suggested it was not the source of the fire either. However, the possibility exists that a cigarette discarded in the area of the lav's trash bin could have started the fire.

There is also the possibility that the fire was electrical in nature, caused by a shorting of wires, and the heat generated in the wiring as a result. This becomes something of a "which came first, the chicken or the egg" scenario.

It is possible that an electrical short circuit caused the wiring to overheat. A DC-9 has its two JT8D engines located on either side of the aft fuselage. This means the wiring from each of the two engine-driven generators, and a third APU-driven generator passes through the aft section of the airframe, in the vicinity of the aft lav. Each of those

generators is capable of producing 40 KVA of power...that's a combined total of about 120,000 Watts with the associated electrical current, passing through wiring in the area surrounding the aft lav. Certainly this kind of current, if unrestricted by circuit breakers and overcurrent protection devices, is more than capable of starting a fire as a result of the heat generated within the wiring. Paradoxically, the possibility exists that a fire burning the insulation off the wiring caused the short circuits. So the question becomes, "Did the fire start because the wiring shorted out, or did the wires short out, because a fire burned off the insulation?"

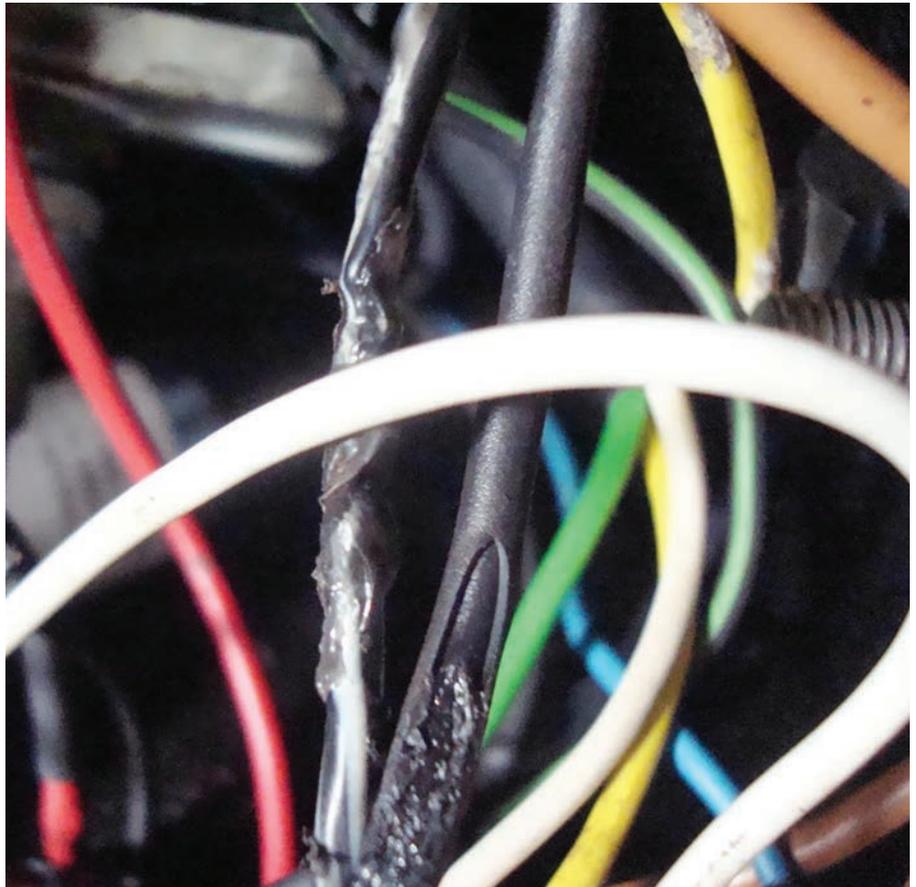
Despite the actual cause of the fire remaining undetermined, what has been established, is that a fire started aboard the aircraft in the area of the aft lav. Fire damage to the wiring in this area resulted in extensive loss of electrical power, and an almost complete loss of all avionics navigation systems.

As the flight crew began their emergency descent into Cincinnati, the fire continued to burn unseen behind the cabin walls and ceiling panels. Thick, toxic smoke filled the cabin and eventually the cockpit as the captain struggled to land the aircraft without the aid of electrical stabilizer trim. Once on the ground, evacuation of the crew and passengers commenced, until there was a sudden, flash fire within the cabin. It is believed that the opening of the emergency exit doors on the ground, and the resulting rush of oxygen intensified the fire, contributing to burns and smoke inhalation amongst those trapped inside the cabin. Stan Rogers was one of those fatalities.

The purpose of the intensive investigation process associated with aircraft accidents is not to point fingers or lay blame. The purpose is to find out why the accident occurred, and determine steps that may be taken in order to prevent a similar situation from ever reoccurring.

As a result of the DC-9 fire in Cincinnati, many recommendations were made, and followed. Recommendations such as:

- Installation of smoke detectors in aircraft lavatories



Did the fire start because the wiring shorted out, or did the wires short out, because a fire burned off the insulation?

- Installation of automatic fire extinguishers in aircraft lavatory trash bins
- Installation of track lighting on the floors of aircraft passenger cabins
- Development and use of materials in aircraft cabins which are less toxic and flammable
- Better firefighting equipment in aircraft cabins
- Better training for flight attendants in fire fighting techniques
- Procedural changes to operations manuals regarding in-flight fire situations

Stan Rogers' death that day in Cincinnati probably garnered more media attention than his music ever did during his lifetime — a fate common to those who die tragically young.

Q: What is the purpose of a circuit breaker?

Answer to previous question:

Q: How does a hypoxia recognition system determine pilot incapacitation?

A: If no activity has occurred (such as pressing soft keys or rotating selector knobs) after a given period of time, the hypoxia recognition system will start to issue visual and eventually, aural alerts.

GORDON WALKER entered the avionics industry after graduating from Centennial College in 1980. His career with Nordair, Air Canada, CP Air, PWA, and ultimately Canadian Airlines took him to many remote corners of Canada. Since leaving the flight line to pursue a career as a college professor, Walker has continued to involve himself in the aviation/avionics industry by serving on several CARAC committees concerned with the training and licensing of AMEs. As well, he has been nominated to the CAMC Board of Directors, and has been elected President of the National Training Association (NTA). ■

Western AME Association



Robinson R66 Airframe Field Maintenance Course

Date: January 4-8, 2016

Location: Art Smith Aero Centre - 1916 McCall Landing NE, Calgary, Alberta

Time: 8:00 am - 4:30 pm every day

The Robinson R66 Airframe Field Maintenance course is designed for aircraft maintenance engineers and other aircraft maintenance

personnel who will be working on and certifying maintenance on Robinson R77 helicopters. You will study airframe systems and components, drivetrain, rotor, flight controls, hydraulics, fuel and electrical systems specific to the Robinson R66, along with appropriate maintenance and servicing tasks, guided by the procedures laid out in the manufacturer's instructions for continued airworthiness. This course has been developed to satisfy the type-training requirements for CARs 566.18.

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Annual Symposium and Tradeshow

Our annual Ontario AME Symposium and Tradeshow was held on October 1st and 2nd at the Hilton Meadowvale Resort and Conference Centre. There were over 50 exhibitors comprised of many sectors of the aviation community, repair and overhaul facilities, manufacturers and parts suppliers. Course sessions were scheduled for purchasing; management systems; human factors; SMS Training; dangerous goods; effective communication; corrective action plans; mental health and the workplace; helicopter technical updates; parts installation and documentation; composite repairs; and several additional topics. Transport Canada ran a pre-symposium session on Wednesday for MDMs.

We had a very well attended banquet and awards night on the Thursday evening. This year's entertainment was "The Dueling Pianos". Each year we present awards at our annual dinner. This year the 2015 awards were:

- Clare Leavens Award [contribution to the association] – Louis Anderson;
- Gordon B. Rayner Award [teacher/public servant] – Guy Doherty
- Robert McCombie Award [outstanding work] – Vernon F. Stutt; and

- Aviall High Achievement Award [for professional skill and leadership] – Warren Couch

Association Annual General Meeting

Our Association's Annual General Meeting was held during the tradeshow on Thursday, October 1st, 2015 at 8:30 am. We confirmed to our members that we had met all the deadlines for compliance with the new Canada Not-for-Profit Corporations Act and we had received the appropriate confirmation from Corporations Canada.

We advised our members that our Board of Directors meets monthly; an external auditor on a yearly basis audits our finances; and a financial report was made to our members at the AGM. The AME Association of Ontario has representatives on the Program Advisory Committees of the six colleges running aircraft maintenance and avionics programs. Representatives were also in attendance at the aircraft skills competitions and the aviation career day sessions. As part of our attempts to be community involved, we made financial contributions to three "aviation" charity golf tournaments.

— Submitted by Stephen Farnworth
For the Board of Directors

Pacific AME Association



About us

PAMEA is a non-profit association comprised of aircraft maintenance engineers, aircraft maintenance personnel and aviation industry corporate members.

PAMEA is an active member of the Canadian Federation of AME Associations (CFAMEA).

www.pamea.ca

email: pamea@telus.net



About Us

The Atlantic AME Association is one of five similar associations across Canada which represent regional interests as well as concerns of national importance. The Canadian Federation of Aircraft Maintenance Engineers Associations (CFAMEA) is a national body, which is supported and financed by all the regional associations and which represents the associations at the national level.

The purpose of the association is to maintain and enhance the standards of professionalism of the AME and the aircraft maintenance industry as a whole and to protect the rights and privileges of the AME. The association works with and is consulted by Transport Canada in the formulation of new rules and regulations to promote the viewpoint of the AME. We are represented on various committees and working groups involved with aircraft maintenance and licensing.

A separate committee under the auspices of the association runs an annual conference. This workshop is a two-day event that features speakers as well as a tradeshow with over 50 booths from various companies, suppliers, manufacturers and other organizations. Attendance at the sessions held during the conference may be counted toward the recurrent training requirements required by Transport Canada.

The Purpose and Objectives Of This Association Are

- To promote and protect the profession of the Aircraft Maintenance Engineer
- To develop, maintain and improve representation and consultation with regulatory bodies that affect or may affect the profession of the Aircraft Maintenance Engineer
- To represent the views and objectives of the membership of the Association
- To promote and develop the knowledge, skills and proficiency of the profession of the Aircraft Maintenance Engineer through education, publication and research
- To cooperate and associate with groups, associations and organizations on matters of mutual interest
- To promote honourable practices among the membership and between persons in the aviation industry

The Association is non-union, non-sectarian and non-partisan.

ARAMC Calendar: save these dates

- ARAMC 2016 will be held in Moncton, New Brunswick from April 6-8 at the Delta Beausejour Hotel, 750 Main Street
- ARAMC 2017 will be held in St. John's, Newfoundland from April 26-28 at the Delta Hotel St. John's, 120 New Gower Street

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SFAR41 Maintenance Category Change



The following was received in response to a query our board sent to TCCA regarding the changes of policy to SFAR 41c aircraft.

“TCCA is in the process of developing an Internal Process Bulletin (IPB) to officially inform our Regional Offices and TCCs of the new assessment policy. The new policy will state that experience and skill obtained on SFAR 41C aircraft will only be applicable towards obtaining an M1 rating. The rationale for this change is that the AWM 523 now contains airworthiness standards pertaining to Commuter Category aircraft.

“This new policy will come into effect following an implementation period, which I think will be 12 months. During the implementa-

tion period AME licence applicants will be able to apply for either an M1 or M2 rating but not both using SFAR 41C experience and skill. The IPB will be followed with an Advisory Circular (AC) that will replace ANC004 and will contain the new policy regarding SFAR41C aircraft. Nothing has changed with regards to privileges, as M1 and M2 licence holders will continue to have privileges on SFAR41C aircraft including their derivative models.”

— Jeffrey Phipps Chief, Operational Airworthiness (AARTM)
Standards Branch Transport Canada, Civil Aviation



Central AME Association



About Us

The Central Aircraft Maintenance Engineer Association is an organization dedicated to maintaining and enhancing the standards, rights and privileges of all AME members in the central region of Canada. Our chapter is one of five similar associations across Canada that collectively supports the national body CFAMEA. Our organization works with Transport Canada in the formulation of new rules and regulations and provides a collective viewpoint for all AMEs. CAMEA

is a not-for-profit organization run by a volunteer group of AMEs. We elect members of our organization to be part of our Board of Directors. Members of CAMEA are comprised of AMEs, AME apprentices, students, non-licensed persons working in the industry and corporate members.

email: camea@mymts.net

PAMA SoCal Chapter



September 2015 Meeting Wrap

The SoCal Chapter thanks Mr. Jim Taylor, Crewmember Emergency Training, Paul Zapata, Regional Account Executive and all at HRD Aero Systems, Inc. for their time and generosity in hosting the September 2015 Chapter dinner meeting and excellent technical presentation including life-saving demonstrations on "What YOU Need To Know About Safety and Survival Equipment" at the 94th Aero Squadron Restaurant in Van Nuys, California. Jim can be reached by email at training@hrd-aerosystems.com or phone (661) 295-0670 ext. 2541. Or click on their logo on the SoCal PAMA website for a direct link to www.hrd-aerosystems.com.

A&P Student Scholarship

The A&P/IA Continuing Education Scholarship deadline is May 2, 2016. The Awards Presentation will take place June 14, 2016. This scholarship is open to all southern California residents currently enrolled in good standing in an accredited A&P or IA Training School/Program.

www.socalpama.org

Central Ohio PAMA



Columbus Historical Society "Reaching for the Sky" at COSI Website

The exhibit "Reaching for the Sky: The History of Columbus Aviation" will be on display at the Center of Science and Industry (COSI) thru April 2016. Mr. Jeffrey LeFever and Mr. George O'Donnel from CHS will be part of the presentation to help show the Terminal and Hangar One's part in our great Columbus aviation history.

Nov. 10: "Accidents and Incidents of CMH District"

Our November meeting featured Inspector Mark Harden, FAA Safety Team with a presentation on "Fiscal Year 2014-15 Accidents and Incidents in the CMH District." It was held in the Lane Aviation Media Room and had a good turnout of around 58 people in attendance.

Before Mark's presentation, we conducted a short business meeting to elect next year's board members.

Mark's presentation featured facts and statistics of the accidents and incidents from Columbus District, many still under investigation by the NTSB. Loss of Control was a major factor in many of the accidents after power failure or various other component failures. His message to CFIs and Maintenance instructors in attendance was to re-emphasize to students those flight control skills during training or bi-annual flight reviews.

The meeting was a SPANS event listed at the FAASite website to receive WINGS and AMT Award credit. The meeting concluded with a prize raffle and we wish to thank Jim Kulp of General Electric and Jeff Hannie of Flying Colours Corp for contributing the prizes.

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Dec-Jan 2013

AMU Chronicles
 Aviation Terms – Part 2
 HRF Explained
 Human Factors
 The Regs

Upcoming Events

5	Wed
11	Tue
Middle East Business Aviation Summit @ Al Maktoum International Airport	
16	Jan
Pacific AME 30th Year Celebration and Maintenance	



Features



AMU Chronicles

Not So Boring – Borescopes A large part of our job maintaining aircraft is the never-ending task [...]
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Vector Aerospace Hosts PTGA
 Vector Aerospace Hosted the PTGA Customer Day Event at Facility in Johannesburg, South Africa For Immediate Release – [...]

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Room for Twelve



The super-midsize segment is about to undergo a “revolution” with the pending arrival of the new Citation Longitude. At least that’s what Cessna says about the business jet that recently made its public debut in Vegas.

When Cessna Aircraft Company debuted its new Cessna Citation Longitude business jet at NBAA’s Business Aviation Convention and Exhibition in Las Vegas in November the company also announced plans to enter the large business jet category with the clean sheet, 4,500-nautical mile Citation Hemisphere. The Longitude and Hemisphere will join the Citation Latitude to complete a new, large-cabin, three-aircraft Citation family.

It’s the Longitude though that Cessna hopes will “revolutionize” the super-midsize segment. “We’re thrilled to unveil the future of this larger Citation family,” said Scott Ernest, Textron Aviation president and CEO. “The debut of the Longitude has been

highly anticipated among prospective customers, industry observers and our Textron Aviation team members.”

So, what is it about the aircraft that potentially makes it a critical arrival to the industry? “Class-leading comfort,” for one thing, says Cessna, which is a subsidiary of Textron Aviation Inc. With seating for up to 12 passengers, including an optional crew jump-seat, the Citation Longitude features a stand-up, flat-floor cabin with a standard double-club configuration, allowing the most legroom in the super-midsize class. With fully berthable seats and a class-leading, in-flight accessible walk-in baggage compartment, the Longitude is designed specifically for maximum



Above: Citation Longitude cockpit

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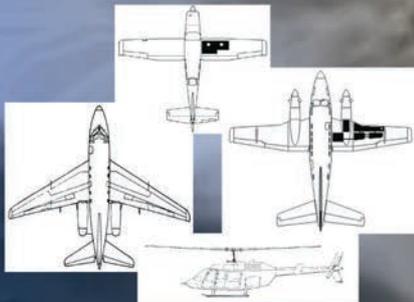
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Above: Citation Longitude cabin

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Powering the aircraft are Honeywell's newly designed HTF7700L turbofan engines capable of a factory-spec maximum cruise speed of 476 knots and a four-passenger high-speed range of 3,400 nautical miles. "We believe that this range and performance is what the market wants for typical missions in this class," Ernest said. "No other business jet in this space matches the Longitude's combination of range, payload, cruise speed, standard features and lower total ownership costs."

The engine is the latest in Honeywell's HTF7000 series, which has become the engine of choice for virtually all super mid-size business jets. Having now surpassed 2.4 million flight hours, the 7000 family is said to provide class-leading reliability and low maintenance costs.

Cessna says the HTF7700L's periodic inspections and standard maintenance can be easily performed on-wing with new and easy-to-use standard hand tools, reducing costly aircraft downtime. The engine is also designed to be environmentally friendly, exceeding all standards of the International Civil Aviation Organization's Committee on Aviation Environmental Protection.

"Honeywell engines and auxiliary power units have been powering business aviation for more than four decades.



Above left: Galley; above right: baggage storage on the Citation Longitude

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REMEMBER!
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“Our new engine is perfect for Cessna’s new super mid-size business jet, providing the perfect blend of power and efficiency for this burgeoning class of aircraft,” said Brian Sill, president, Business and General Aviation, Honeywell Aerospace.

In addition to the engine, Honeywell will supply Cessna with its 36-150 Auxiliary Power Unit (APU) for ground operations such as air conditioning, main engine ignition, compressed air and other functions. The 36-150 APU can provide backup power in flight, and is reportedly more compact and significantly lighter than other APUs in its class. It eliminates dependence on ground power and also provides substantial fuel savings by reducing the load on main engines.

Also announced at the NBAA Show in Las Vegas was that the Montreal-based Thales Group would provide its Rudder Flight Control electronics system for the Longitude. This “rudder-by-wire” is based around a pair of Thales Smart Electronic Control Units (SECUs) that use electrical signals to augment pilot inputs from rudder pedals, and enhance the stability of the aircraft, making the flight trim smoother and allowing the pilot to better control the plane. The use of electrical impulses allows for the complete elimination of the heavy cables and pulleys of a conventional rudder control system, thus reducing weight.

Inside the aircraft, Honeywell’s Cabin Pressure Control and Monitoring System (CPCMS) offers more precise cabin pressure control than previous systems. The CPCMS controller is an all-electric unit that interfaces with the integrated avionics computer to automate cabin pressure control with no need for flight crew action during normal operation. Its state-of-the-art digital design and proven technology provide fast response times to maximize passenger comfort.

The Citation Longitude also features Honeywell’s most advanced mid-size environment control system, which is specially designed to meet the cabin air-conditioning and pressurization needs of the business aircraft marketplace and provide superior cabin comfort in even the most demanding environments.

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support services to help operators fly more efficiently, with access to Federal Aviation Administration-certified aircraft dispatchers, weather planners and commercial pilots to assist crews in all phases of flight. Access to flight planning is available via telephone, the Internet, datalink communications and the convenient MyGDC mobile app. The Citation Longitude aircraft will come with a one-year subscription to Honeywell GDC.

The brake control system and the landing gear position sensing system for the Longitude will be provided by Crane Aerospace & Electronics. “Being selected is a testament to our proven track record of providing brake control and landing gear position sensing systems for various Cessna Citation models,” said Crane president Brendan Curran. This will be the first Brake-By-Wire system for a Cessna business jet, and will also include brake temperature monitoring functionality.

The Longitude is on track for its first flight in 2016 with anticipated entry into service in 2017. ■

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The loss of tail rotor effectiveness



A crosswind during a caribou tracking mission in the Canadian north puts a Bell 206B into a bad situation.

On May 29, 2013, Wood Buffalo Helicopters, Bell 206B helicopter C-FZWB was conducting wildlife survey work approximately 75 nautical miles north of Fort McMurray, Alberta. In the course of identifying a landing site, the helicopter entered an un-commanded rotation to the right, and descended into a stand of trees at 1058 Mountain Daylight Time. The pilot and right rear seat passenger sustained fatal injuries. The remaining passenger, who occupied the left front seat, was seriously injured. The 406 MHz emergency locator transmitter activated on impact. There was no post-impact fire.

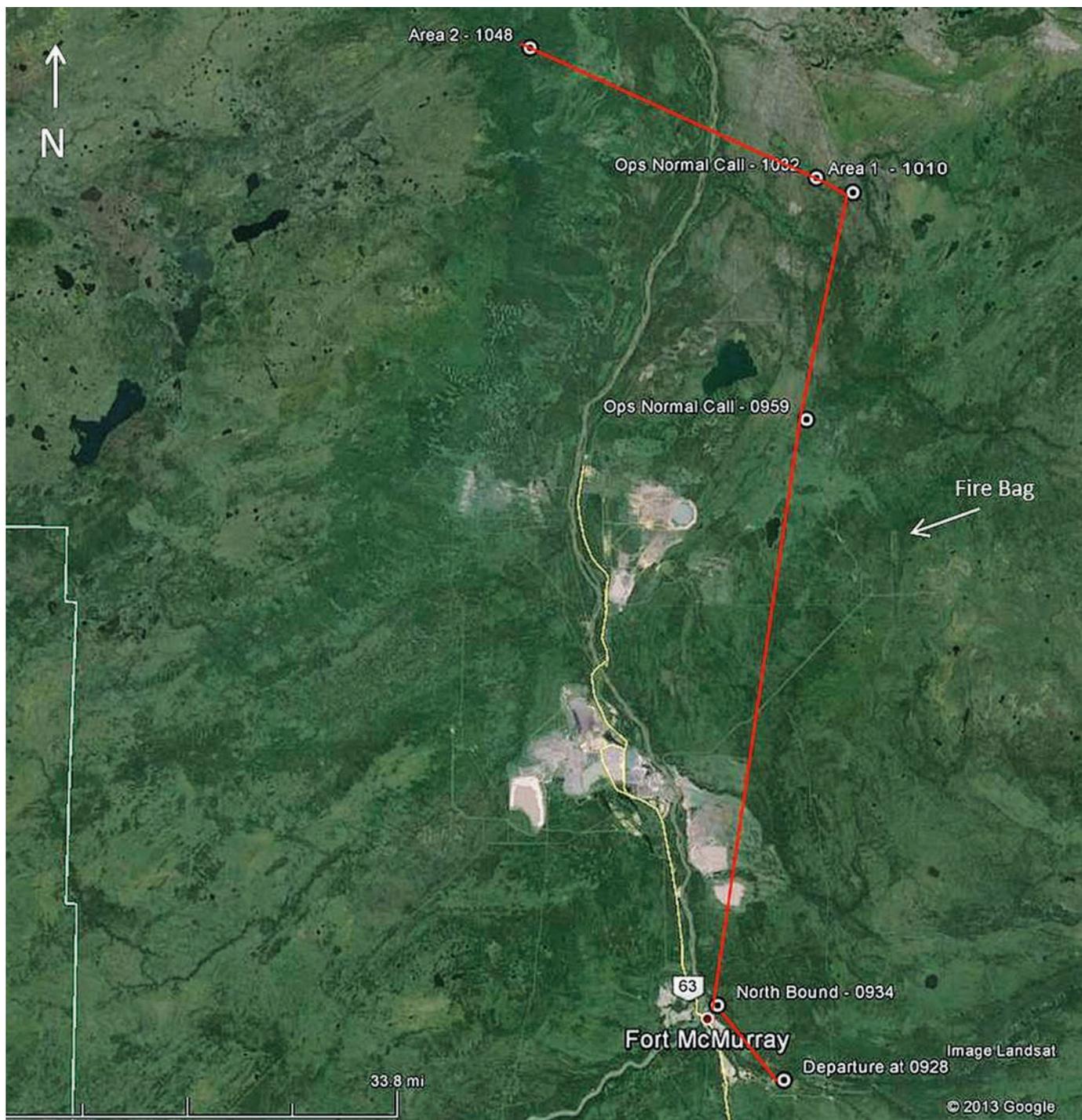
Factual Information History of the Flight

The flight was chartered by Alberta Sustainable Resource Development (ASRD) to track discarded caribou radio collars. Two wildlife biologists would

use an externally mounted antenna coupled to a portable receiver to track these collars. Once found, the helicopter would land in the vicinity of the collar, and the biologists would disembark, locate, and retrieve the collar on foot.

Aircraft operating under contract to ASRD are required to maintain a radio watch with the local command and control centre located in Fort McMurray. The pilot made an initial radio check call with the ASRD command centre at 0915.

At 0924, the pilot called in to report that they were departing northbound. The flight departed the Wood Buffalo Helicopters' facility, located at the Fort McMurray Airport, at 0928. As required by ASRD policy, the pilot transmitted a 30-minute position/status call to the ASRD command centre at 0959, reporting that they were north of Fort MacKay/Firebag Aerodrome.



Appendix A: Flight path

The helicopter was at 1340 feet above ground level (agl) with a ground speed of 99 knots. At 1010, the helicopter entered Area 1 where a number of orbits were conducted in order to fix the location of a radio collar. The helicopter flew as low as 100 feet agl, but did not land in the area. The ASRD command centre attempted radio contact at 1029 with no response. The pilot did check in at 1032 indicating that operations were normal and that they were proceeding to the second site to the northwest. At that time, the helicopter was at an altitude of 550 feet agl and at a groundspeed of 58 knots.

At 1048, the helicopter arrived in the vicinity of Area 2. The next eight minutes were spent orbiting the area to fix the radio collar's location and assessing a suitable landing zone. At 1055, the helicopter orbited the area and executed a wide left-hand turn at 140 feet agl.

At 1056:14, the helicopter turned eastbound at 120 feet agl at a ground speed of 36 knots. At 1056:24, the helicopter was at 105 feet agl at a ground speed of 27 knots. The wind component at this time would have been predominantly a left crosswind from the north at approximately five knots.

At 1056:34, the helicopter was at 115 feet agl with a ground speed of 16 knots. At this point, a right turn to the south was initiated. The ground speed had reduced to five knots. A final global positioning system (GPS) waypoint was recorded at 1056:54 with the aircraft at 18 feet agl with a ground speed of three knots. Upon completion of the turn to the south, the helicopter would have been exposed to a tail-wind condition. The helicopter entered an un-commanded rotation to the right. There were no

indications of mechanical malfunction prior to or during the rotation. The helicopter descended into a stand of poplar trees 60 to 70 feet tall, coming to rest on its right side.

After ASRD attempted radio contact at 1108, with no response, it received a telephone call from Wood Buffalo Helicopters at 1109 regarding a reported emergency locator transmitter (ELT) signal for C-FZWB. At 1114, a company helicopter was dispatched to the last known co-ordinates to search for

the helicopter, arriving over the site at 1143. It located C-FZWB at 1154. Additional rescue resources arrived on scene to help recover the helicopter's pilot and passengers.

Wreckage Examination

Three trees adjacent to the site exhibited damage related to the helicopter's descent through the trees. All three showed rotor-blade damage near the tops; one tree had been topped and the majority of its branches stripped off.

All of the helicopter's components were identified within a 100-foot radius of the aircraft. The helicopter's cabin and fuselage were in a single piece, but it had sustained substantial impact damage, particularly on the right side of the fuselage. The main rotor head shaft had separated below the rotor head, and was located 26 feet from the wreckage. One main rotor blade had sustained two fractures. The other main rotor blade, while still attached to the rotor head, was substantially damaged.

The tail boom was adjacent to the fuselage but it was severed approximately three feet aft of the horizontal stabilizers. It had indications that it had struck a tree at that point, on the left side of the tail boom. The remainder of the tail boom, including the vertical fin and tail rotor, was located about seven feet aft and slightly east of the forward section. The aft section was oriented with the tail cone towards the main wreckage.

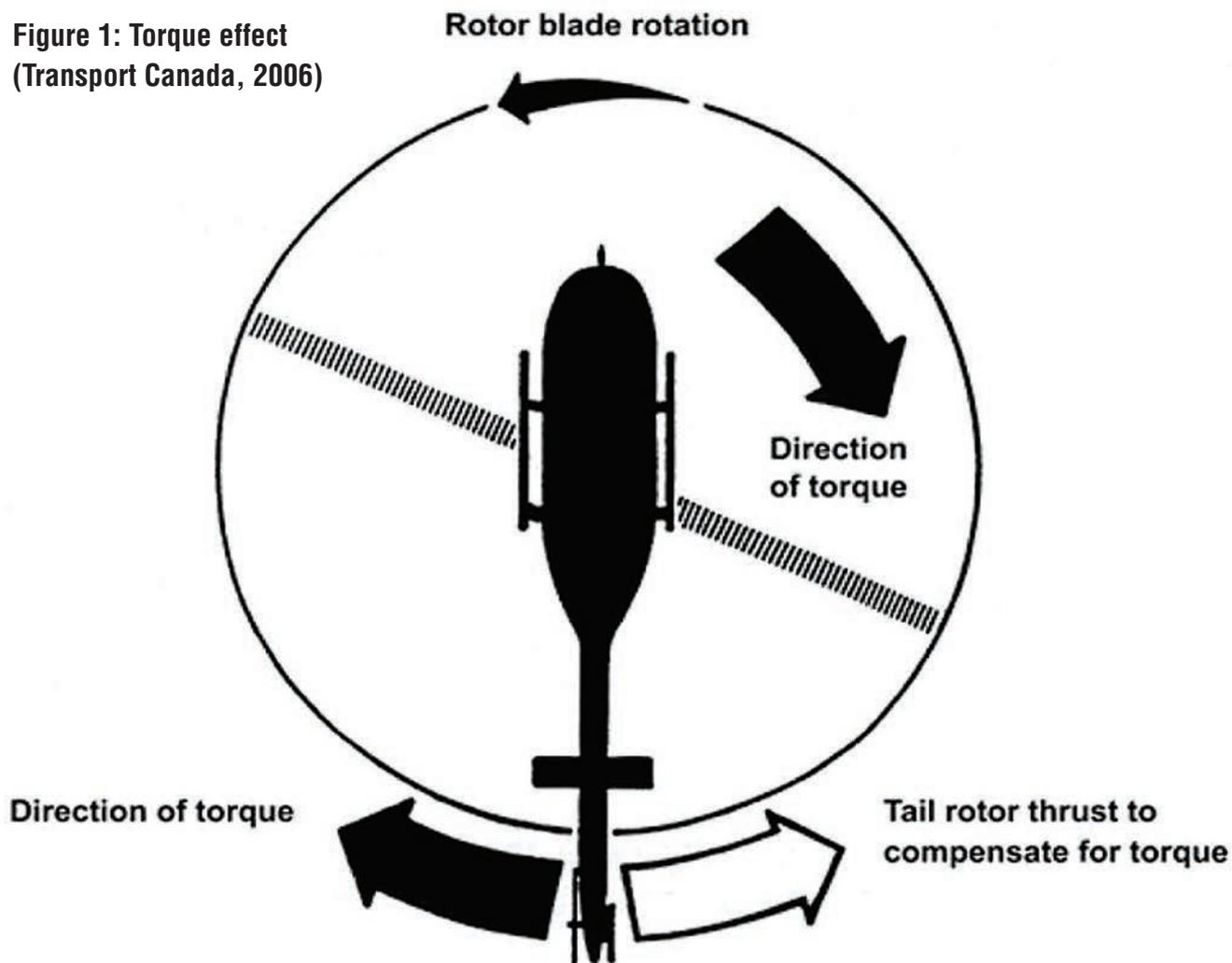
The tail rotor was mostly intact with one blade still attached to the yoke. This blade was straight with minor impact damage to the skin. The other blade had fractured just outboard of the yoke, and was lying on the ground approximately five feet east of the aft section of tail boom.

The investigation determined that there had been flight control continuity before the accident. Continuity with the engine, transmission, and tail rotor assembly was verified. Damage to the aircraft was consistent with power being produced. Tree impact damage to the main rotor blades was to the under-surface of the blades.

At the time of the occurrence, the pilot was occupying the right front seat,

The advertisement features a collection of power tools including air drills, angle attachments, and drill bits, each with a part number label. The tools are arranged on a blue background with a faint pattern of tools. At the bottom, there is a globe logo with 'NY' and 'CA' on either side, and the text 'USATCO U.S. Air Tool Co.'. Below the logo, it says 'Serving the aerospace & metal working industries since 1951!'. There are four small inset images showing hands using tools on metal parts. At the bottom, contact information is provided: 'Toll Free US & Canada: 800-645-8180 www.USATCO.com' and 'USATCO\U.S. Air Tool Company, Inc. Ronkonkoma, NY tel: 631-471-3300 fax: 631-471-3308 Rancho Dominguez, CA tel: 310-632-5400 fax: 310-632-3900'.

Figure 1: Torque effect
(Transport Canada, 2006)



which is the traditional pilot position in helicopters. One passenger was in the right rear seat. Both pilot and the right seat passenger were wearing aviation helmets at the time of the occurrence, and had been secured with the available four-point harnesses. The surviving passenger, in the left front position, was not wearing a helmet and was using the four-point harness. This passenger was able to evacuate from the helicopter through the broken front windscreen. At the time of the occurrence, the helicopter was within the prescribed weight and balance limits.

Flight Crew

Records indicate that the pilot was certified and qualified for the flight in accordance with existing regulations. The pilot held a valid commercial pilot licence – helicopters, endorsed for the Bell 206 helicopter. At the time of the occurrence, the pilot held a valid Category 1 civil aviation medical certificate with no restrictions. The pilot had begun employment with Wood Buffalo Helicopters on April 1, 2013, and had received

ground training—which included awareness of vortex ring state and loss of tail rotor effectiveness—and flight training on the Bell 206B helicopter. The pilot successfully completed a company-administered pilot proficiency check for the Bell 206B on April 14, 2013.

At the time of the occurrence, the pilot had accumulated approximately 504 hours of flight time on helicopters, 400 hours of which on the Bell 206 helicopter. The pilot was on his 11th consecutive duty day, after having had eight days off. The pilot's last three days of work consisted of no flying on May 26, 3.1 hours of flying on May 27, and three hours of flying on May 28. There was no indication that any physiological factors, including fatigue, played a role in the accident.

Aircraft

The helicopter was owned by Wood Buffalo Helicopters and operated under Subpart 702 of the Canadian Aviation Regulations at the time of the occurrence. A review of the helicopter's maintenance records indicated that the helicopter was

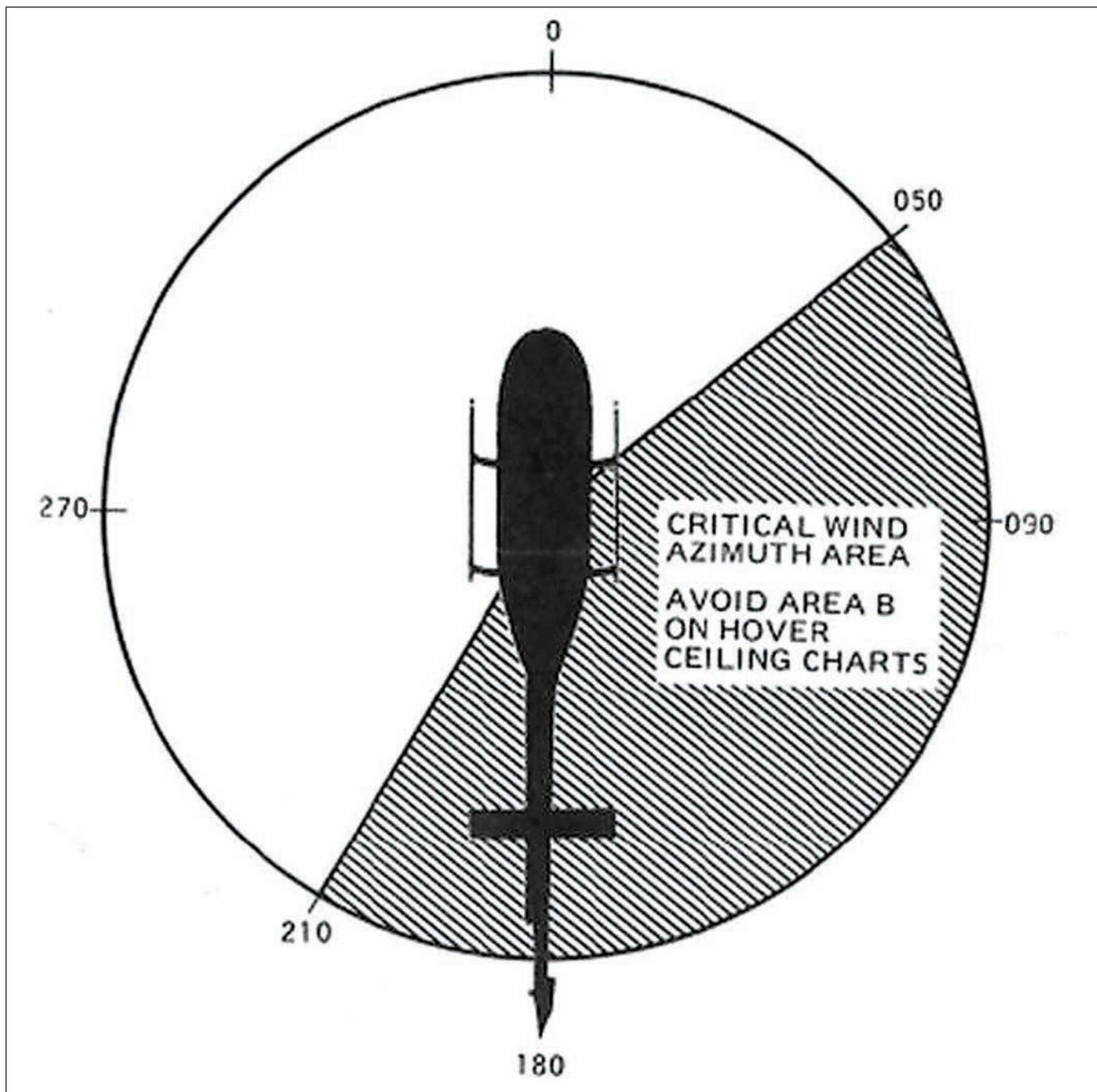


Figure 2: T Critical wind azimuth area. Bell Helicopters, Bell Jet RangerII Model 206B Flight Manual

maintained in accordance with the existing regulations at the time of the occurrence. There were no reported or outstanding defects. The helicopter was not equipped with flight data recorders or cockpit voice recorders nor was it required to be by regulation. It was equipped with a Garmin GPS, which retained track data of the occurrence flight.

Weather

The ASRD produced a weather observation from Birch Mountain, which is located approximately 11 nautical miles south

of the accident site. At 1200, the visibility was 19 nautical miles. The temperature was 18C and the relative humidity was 51 percent.

The density altitude was calculated to be 2,198 feet above sea level. The winds were reported to have been from the north at five knots; the cloud height was not reported.

A pilot report from the company helicopter, the first on site after the accident, indicated that the sky was clear, winds were light, and the temperature was about 23 to 24C. No cumulonimbus clouds or adverse weather conditions were observed.

Unanticipated yaw or loss of tail rotor effectiveness

The main rotor blades of the Bell 206B helicopter rotate counter-clockwise when observed from above. As a result of this rotation, the helicopter experiences a torque effect in the opposite direction, which results in the helicopter yawing to the right. To counter this movement, the helicopter is equipped with a tail rotor system. As torque is transmitted through the main rotor system, the pilot is able to counter the resulting yaw with the use of the tail rotor control pedals, which increases or decreases the amount of anti-torque thrust as required.

Loss of tail rotor effectiveness (LTE) is the occurrence of an un-commanded yaw rate that does not subside of its own accord and, which, if not corrected, can result in the loss of the helicopter. LTE is not related to an equipment or maintenance malfunction, and may occur in all single-rotor helicopters at airspeeds less than 30 knots. It is the result of the tail rotor not providing adequate thrust to maintain directional control, and is usually caused by either certain wind azimuths (directions) while hovering or by an insufficient tail rotor thrust for a given setting at higher density altitudes. The Bell 206 aircraft flight manual advises caution when operating when the relative wind is within the critical wind azimuth area.

Bell Helicopters issued Information Letter 206-84-41 in 1984 identifying low speed flight characteristics that can result in unanticipated right yaw. The Federal Aviation Administration's Advisory Circular 90-95 discusses the phenomenon




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Wreckage of helicopter C-FZWB in the stand of poplar trees

of unanticipated right yaw and recommends recovery techniques. This article identifies conditions in which LTE may occur, notably “during any maneuver which requires the pilot to operate in a high-power, low-air-speed environment with a left crosswind or tail wind,” especially in right turns. The recommended recovery procedure would require the application of full left pedal, movement of the cyclic forward and, potentially, a reduction in power, if altitude permits.

Transport Canada’s Helicopter Flight Training Manual makes the following reference to LTE: “In strong gusty wind conditions, a turn away from the into-wind position should be opposite to the torque reaction [...]. In this way you will ensure that there is sufficient tail rotor control available. Should control limits be reached at this stage, a safe turn back into wind can be accomplished.”

Analysis

The examination of the helicopter as well as the data collected during the investigation indicates there were no mechanical issues that would have resulted in the loss of control and subsequent crash. There was no indication that any physiological factors, including fatigue, played a role in the accident. The analysis will focus, therefore, on the aerodynamic phenomenon known as loss of tail rotor effectiveness.

The helicopter was operating in a flight regime where it was exposed to the left crosswind and tail wind, which would have placed the relative wind into the critical azimuth zone. While conducting a reconnaissance for landing, the helicopter was flown at a low speed and high power setting. As the pilot progressively reduced speed, the helicopter became increasingly vulnerable to LTE. The damage to the under-surface of

the main rotor blades indicated that the pilot attempted to increase his collective control input in an effort to power out of the area. The application of power in this particular flight regime would have exacerbated the right yaw tendency and aggravated the loss of control. The helicopter experienced LTE, causing a loss of directional control at a height above the trees that precluded an effective recovery.

The manufacturer and regulator have produced information to alert pilots to the phenomenon of LTE. The pilot would have been exposed to this information during his initial training and subsequent training on the Bell 206 helicopter. The investigation could not determine the pilot’s level of awareness of LTE in the flight regime in which the helicopter was operating.

Findings as to Causes and Contributing Factors

The helicopter entered a flight regime that resulted in a loss of tail rotor effectiveness, causing a loss of directional control at a height that precluded recovery, resulting in a collision with terrain.

Safety Action Taken

Wood Buffalo Helicopters has instituted a change to its training forms to document that loss of tail rotor effectiveness instruction was completed during its technical ground training and flight training programs. The company also conducted an LTE awareness campaign after this accident through a company safety meeting as well as through the creation and distribution of an operations bulletin on LTE and the hazards related to slow and low flight. ■

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Restoration Obsession Disorder

The song is right. There ain't no cure for love.

I got a call the other day from a buddy who runs a local motorcycle salvage yard, with a lead on a free Honda CB750. "It's pretty rough. It has been sitting outside for the last 15 years," Scott said, "but it's got a lot of good parts on it." The next day, I was hauling the bike home, when most sane people would have left it in the guy's backyard for another 15 years. As I wheeled the seized and corroded hulk into my shop and parked it beside my gleaming, restored 1972 CB750 Honda, I shook my head and asked why?

Part of the reason I named my little workshop "Honda Heaven" is the simple fact that I have a tendency to rescue old decrepit Hondas in need of a home. Some get rebuilt and others get recycled to bring life to other restorations. If you have that particular mindset, it's a disorder, which is difficult to shake. This so-called disease has many symptoms. First, you must have a love of all things mechanical, be it cars, motorcycles, aircraft or farm tractors. Second, you must have the patience of Job, to see a project through to completion. You must be a complex individual made up of part mechanic, part fabricator, part historian, part scrounger, and part packrat. If you are missing any one of these inherent qualities your restoration project will surely grind to a halt.

This topic of restoration brings to mind another recent phone call, concerning a vintage aircraft. My buddy Brian asked if I would be interested in seeing an old DeHavilland Gipsy Moth that was being refurbished by some friends of his. I accepted without hesitation. On the prescribed day we hopped into Brian's pickup and drove to a farm somewhere north of the Greater Toronto Area.

The urban sprawl of the suburbs was edging ever closer to the farmland that encompassed beautifully landscaped gardens, and a still visible grass airstrip. I could tell right away that this was a special place. Our hosts were Walter and Barry Huron, and soon the tour began.

The shop was filled with all manner of vintage mechanical treasures. Old cars from the 1920s and '30s shared space with motorcycles from the '60s and '70s. Some were restored to their former glory while others silently waited their turn. Hanging in the rafters was a long row of vintage '70s Vetter motorcycle fairings sharing space with wings and floats from a '20s era DeHavilland Gipsy Moth. A Piper Super Cub sat wingless close to the main door, itching to see sunlight and roll its wheels along the grass strip again, as it had so many times before. My instincts were correct...this was in fact a very special place.

The tour concluded in the main workshop area and again my senses were bombarded with technical wonderment. Sitting on two sawhorses, was the beautifully restored, delicate fuselage of a Gipsy Moth. The workmanship was flawless, and it was immediately obvious that Walter Huron is no stranger to restoring early DeHavilland aircraft. He has restored and had a hand in rebuilding many others. Strewn around the fuselage were a few different models of Gipsy Major engines in various states of repair, one of which will no doubt be refurbished to one day pull this beautiful airframe skyward. Everywhere I looked there were more technical treasures.

Walter's son Barry also clearly shares the disease. It is often hereditary, passed from generation to generation, like a good set of Starrett micrometers. Sitting high on a bench was one of Barry's projects: a 1974 Norton 850 undergoing major surgery. A modern inverted front fork with huge disc brakes had been grafted on to replace the spindly original, while frame modifications were being added to de-stress and enhance rigidity. When completed, this Norton hybrid will be fast, handle well and stop even faster. The rest of the shop area was filled with numerous machine tools, engines, parts and Barry's own unique and whimsical mechanical sculptures. This one shop holds within its walls over 80 years of technology, all intertwined in an eclectic mix of mechanical nirvana. It was my kind of place and these were my kind of people.

Which brings me back to the question of why? Why bother to drag home a crusty old Honda that no one else wants? Why search and scrounge in the bush to find battered remnants of old aircraft? Why spend two days manufacturing a bracket that is no longer available anywhere else on the planet? I am sure if you asked the Huron family, the question would be a moot point. I suppose, like me, they just can't help themselves. It is inherent in their very nature.

For some it is a need to make time stand still, to relive simpler times. For others it is an opportunity to save a mechanical device from certain destruction and return it to its former glory. In fact, restoring something old may well be the absolute pinnacle of responsible recycling. Ultimately, it's wonderful to know that all the time, energy, cursing and skinned knuckles are helping to save the planet while simultaneously preserving a beautiful vintage aircraft for future generations to enjoy. In my humble opinion, that is a wonderful legacy, and definitely a pastime worthy of pursuit. Here's hoping they never find a cure! *For more published writing by Sam Longo, please visit www.samlongo.com* ■

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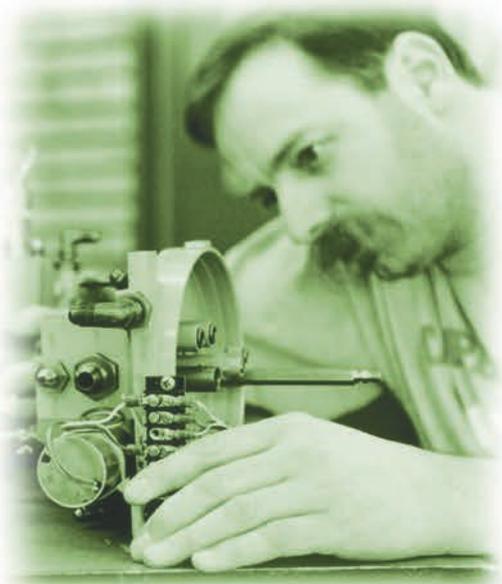
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