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36 FIRST NATIONS TRAINING INSTITUTE

Many First Nations communities are reliant on aviation for supplies, transportation and emergency services but Indigenous pilots have been few and far between. The First Nations Training Institute aims to change that with programs geared specifically to that demographic.

BY ANNA PANGRAZZI

42 FLIGHT ATTENDANT TO PILOT

Allison Couch knew her future was in aviation and at a young age she's already experienced it from a variety of perspectives. She's been a maintenance planner and flight attendant but her goal has always been to be in the cockpit. She takes us on that journey so far.

BY ALLISON COUCH

47 GARMIN D2 AIR

The past decade has seen a proliferation of wearable technology and the new watch from Garmin has a host of features specifically for pilots. It might also remind you to stop and smell the flowers.

BY STEVE DRINKWATER



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ON THE COVER

On the Cover
Quebec's back-
country offers myriad
adventures.
Photo by Samuel
Daigle





Blackhawk Aerospace Dealer



2016 MOONEY M20TN



1981 PIPER SARATOGA



1960 CESSNA 210



1978 CESSNA 172

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Looking to the Future

AMID LAYOFFS, A LABOUR SHORTAGE LOOMS

By now it's clear that broad sectoral support for the aviation industry to combat the devastating effects of the COVID-19 pandemic isn't forthcoming from the federal government. Indeed, slashing travel options is a fundamental tool for controlling the spread of the disease.

As companies struggle just to keep the lights on and thousands of people lose their jobs, it's hard to look to the future but that's exactly what the industry needs to be doing if it wants to avoid a staffing crisis that could be more devastating than the virus.

Although much of the industry seems to be at a standstill, time marches on and the mere passage of time represents an existential threat to any hope of future

prosperity. Aviation was already on the cusp of an acute labour shortage as the flood of employment that characterized the 1970s through the 1990s matures into a giant retirement bubble. All those well paid, well represented pilots, technicians and specialists are looking forward to comfortable retirements with little incentive to stay on in a work environment that has changed a lot in the past 30 years.

Meanwhile the work/life balance priorities that increasingly guide the career paths of younger workers don't favour the odd hours that, ironically, workers in service industries like aviation endure to make that convenient 9-5 lifestyle possible for so many.

Of course, there will always be those who are laser-focused on an aviation

career, but that lure of challenge, adventure and faraway places that has kept the pipeline filled is less productive than ever.

The pandemic and the economic hardship it has caused has compounded that with an exodus of skilled workers looking for alternative employment.

Add it all up and there's the possibility that there will not be enough people left to manage the recovery we all hope for. As counterintuitive as it seems, now is the time to expand training and recruitment to ensure the recovery from the pandemic doesn't come with a painful and lingering hangover. It will be up to businesses large and small to manage their own futures by ensuring they have the workforce they need. ✈

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WAYPOINTS

A,N,48,11.041,16,18.132,08/23/2000, CANADIAN AVIATION NEWS 20:5 A,N,48,11.041,16,18.132,08/23/2000, WAYPOINTS 20:53:03,Z0

Major GA Building Initiative in the Okanagan

KELOWNA FLYING CLUB TO BUILD MUCH NEEDED HANGARS



> | The Kelowna Flying Club (KFC) proposes to develop a 5.5-acre plot of land on the west side of the central Okanagan airport (CYLW) into a much-improved site that would include 42 steel T-hangars and around 50 paved outdoor tie-down spots. Paved taxiways will interconnect the site with north/south-aligned Taxiway D. Of the 50 tie-downs, 10 would be made available for itinerant parking.

The not-for-profit KFC formed a subsidiary, Kelowna General Aviation Services Ltd. (KGAS), which began discussions late last year with the airport's management team. Gaining their support, KGAS is now ready to present their proposal for a 30-year head lease to Kelowna's city council. Assuming a positive outcome, KGAS would then develop the site, build and sell the hangars together with a 30-year sub-lease for a target price of \$90,000. The paved tie-down spots would be sublet out at approximately \$800 per year, a rate organizers say will be competitive with nearby airports (e.g., CYPK-Vernon and CYYF-Penticton).

Leading KGAS is KFC's president Dave McElroy, a former Canadian Owners and Pilots Association chairman the founder of Give Hope Wings, an organization that raises funds for national charity Hope Air.

"Together with our airport partners, we will transform YLW into the premier General Aviation destination airport in Canada by 2025," McElroy told *Canadian Aviator*. "We've received positive expressions of interest for most of the paved tie-down spots and for the hangars too."

KGAS is taking a novel approach to the project by making it a 'cost-plus' endeavour, meaning there is no profit built into the pricing model. "No directors of KGAS, or the KFC, will reap any personal benefits from the prodigious amount of work that has gone into the formation and will continue to go into the operation of KGAS," added McElroy.

The steel T-hangars are planned to be 41 feet wide, 33 feet deep and 12 feet high, and will be erected on a concrete pad. Sliding doors will be included. Vehicle access and parking will be available, and taxiways will be asphalt. KGAS estimates annual operating fees of \$3,000

(L) Image of a similar layout plan. (R) An aerial view of the current General Aviation aircraft parking area.

per hangar. KGAS also plans to include a self-serve Avgas sales and dispensing facility on the site.

"This development project will increase and diversify airport revenues, while lowering the airport's administrative and maintenance costs to deliver the service of managing general aviation parking," senior airport operations manager Philip Elchitz told *Canadian Aviator*. "There is significance demand for enhanced aircraft parking and low-cost hangars at Kelowna International Airport and this project will meet that demand without any capital expenditures from the airport budget." Elchitz adds that the project will also fulfill a strategic objective to facilitate a low-cost alternative for the supply of self-service Avgas, which will further attract GA pilots and enhance tourism in the area.

Should the project proceed as envisioned, build-out could be completed before the winter of 2021 or soon after.

Interested parties can contact KGAS at president@kgas.ca. ■

All-Canadian Air Tankers

CONAIR COMMITS TO Q400 CONVERSIONS

> Canadian aerial firefighting pioneer Conair has gone with a Canadian solution for its long-term business plan. The Abbotsford, B.C. company has announced its future large platform firefighting aircraft will be based on the De Havilland Q400, which is currently built in Toronto. The new aircraft will be designated the Q400AT.

"We evaluated 29 aircraft before selecting the Q400 for modification into an aerial firefighting tool. The unanimous opinion of our flight operations experts was that the Q400 exceeds all the Next Generation performance criteria within a manoeuvrable and stable platform," said Jeff Berry, Director of Business Development at Conair. "The Q400AT is fast, fuel-efficient, and tactically flexible, operating both initial attack as well as sustained support actions."

Conair, which has modified a huge array of aircraft types for firefighting in more than 50 years in business, has actually been converting Q400s for other companies since 2005. It has delivered eight Q400MR (multi-role) versions and the first Q400AT went into service in Australia this past fire season.

In the past, firefighting aircraft have mostly been decades-old designs that had already had long service lives in other roles. Parts were hard to find and the technology was dated on many of those airframes, so switching to a design that is still in production has distinct advantages. "The Q400 is still in production and has strong Original Equipment Manufacturer (OEM) support from De Havilland Aircraft of Canada Limited (De Havilland Canada), guaranteeing availability of parts and servicing for years," said Berry.

Conair recently bought 11 former Flybe Q400s for conversion to air tankers and, as they come into service, the company



will be replacing its fleets of Lockheed Electra and Convair 580 air tankers. The company also uses Air Tractor single-engine air tankers (SEAT).

"We look forward to manufacturing the Q400 aircraft into airtankers out of our hangars in Abbotsford, British Columbia, employing a group of specialists during a particularly tough time for the

aviation industry," said Conair CEO Barry Marsden. "It makes us proud that this Canadian-made, De Havilland Canada airframe, powered with Canadian-made Pratt & Whitney engines, will be modified by our team in Canada, and then put into operation around the world to help our partners suppress wildfires for what could be decades." ■

206 Door Fixes Unveiled

CARGO DOOR/FLAP CONFLICT ADDRESSED

> | At least two companies have come up with fixes for a dangerous design quirk on Cessna 206s, especially those operated on floats. British Columbia's Coast Dog Aviation of Pitt Meadows is offering an STC'd cargo door modification and Wipaire is working on a modified latch system that addresses the issue.

The aircraft was certified with centre-latching rear doors and, if the flaps are down, it interferes with the forward door. That, in turn, makes it difficult to open the rear door and in an emergency that can cost lives. In fact, it's estimated that at least eight people have drowned in submerged 206s because they couldn't get the doors open.

The latest tragedy was in 2019 in the Northwest Territories where three passengers who survived the crash drowned before they could get out. That prompted an airworthiness directive from Transport Canada that requires removal of a centre row seat so back-row passengers have a clear path to a front door in an emergency.

Coast Dog's fix, developed with Airworthiness Resources Corp., involves installing a spring-loaded hinged corner of the forward door that folds out of the way of the deployed flap. Wipaire's fix moves the doorframe-mounted latch for the rear door to the inside panel of the door where it's easily accessible.

Transport Canada has approved the



Coast Dog/Airworthiness modification as an alternative method of compliance and Wipaire says it's expecting approval early this year. ■

tailBeaconX TSO'd

ADS-B OUT DEVICE COMPATIBLE WITH CANADA'S FUTURE REQUIREMENTS

> | Montana-based uAvionix has announced that their tailBeaconX, an ultrasmall device that can be installed in place of a standard tail beacon or position light on certified aircraft, has now received TSO approval from the American regulator FAA, allowing it to be installed on certified aircraft after initially being available only for amateur-built or otherwise non-certified aircraft.

The device incorporates a Mode S transponder, a GPS position source, an ADS-B OUT Extended Squitter (broadcasting on 1090 MHz) and a dipole antenna. It also comes with a red LED position light.

"Combining [all these elements] into a single package was a major feat for our team — resulting in major cost reduction to our customers," said Ryan Braun, uAvionix's chief operating officer. "Weighing only 140 grams, taking no critical panel space, while incorporating its own

antennas, the path to ADS-B compliance is significantly simplified for a large group of aircraft," he added.

This development has major implications for the Canadian market, as current low-cost ADS-B OUT devices, which broadcast exclusively to ground stations on 978 MHz, do not comply with the pending Canadian mandate, which will require the space-based 1090ES technology.

To complete the system, a method of remotely programming the transponder with an assigned four-digit code from the cockpit is required. uAvionix offers either their AV-20-E or AV-30 to accomplish this. The AV-20 is a relatively basic instrument that includes an angle-of-attack indicator, whereas the AV-30 is



essentially a complete EFIS (electronic flight instrument system).

The tailBeaconX is available for U\$2499. It can be paired with an existing control head or EFIS, with the AV-20 for an additional U\$895, or with the AV-30-C for an additional U\$1995. ■

AIRMAIL

A HERO REMEMBERED

I was very interested in your article concerning Group Captain 'Buck' McNair in the Lest We Forget article in your last issue (Down East, Nov-Dec 2020). I was fortunate to spend an evening with him and his wife Barbara in 1961, when he was commanding officer of RCAF 4 [F] Wing Baden Soellingen in West Germany when it was part of RCAF — 1 Air Division Europe. It was the tradition back then for the base CO and wife to attend the Canadian High School, Rhine Valley Park, senior prom. As the senior male student in Grade 13 at the time, I shared a table with GC McNair, his wife and the senior female student, Sandra Pelton. The four of us also opened the dancing. Mrs. McNair was very patient in showing me how to dance properly.

During the evening, he was reluctant to talk about his activities during the war years, only to just mention that he had done a fair bit of flying and had some success tangling with the German air force. He talked more about his involvement in the Dieppe raid and also what it was like to be in Malta during the war years. He also talked about the difficulties of flying an aircraft off an aircraft carrier during that time.

My father served in RAF Bomber Command during the war and was also very reluctant to talk a lot about his wartime experiences. It wasn't until 2006, just before he died, that I managed to wrangle a lot more wartime info from him. His normal comment when asked about what he did was to say that he was just doing his job.

Even though it was over 50 years ago, I still easily remember that evening with GC McNair and his wife. He was very modest, charming and friendly but not very forthcoming about some topics. Whenever we bumped into him on the station during the four years we were in Baden, he always had time to stop for a chat. He also came to our school regularly whenever something was going on. We found out after the dance that he had shot down some 16 enemy aircraft during the war and had been shot down himself a number of times. He had also re-

ceived a number of decorations for his bravery. I won't forget my time with him.

Michael Cawood

HERE'S WHAT FOR

I have been a subscriber since *Canadian Aviator* and have enjoyed your magazine and attempts to keep up with aviation in Canada.

I have an issue with Robert S. Grant's article (Tales from the Lakeview, Nov-Dec 2020). The photo on page 34 is of CF-BTC which was taken by me at Cree Lake, Saskatchewan in 1992. The caption says Credit: Art by Cher. Bob interviewed me on the rescue of BTC from Cree Lake Saskatchewan. I sent Bob a series of photos which he used in an article on the rescue of BTC by engineer John Blaszczyk and myself in an issue of *Aviation Quarterly* (Volume 2, Number 2, Summer 1996). That photo on page 34 was one that I sent him. I guess the old fella's memory is not so clear anymore. I spent two years flying with Bob as a contract Bird Dog pilot with Hicks and Lawrence in 1997 and 1998 when he was on CL-215s and CL-415s with the Ontario Ministry of Natural Resources. We spent a lot of blue alerts together. He still calls me occasionally and I think he should now so I can give him what for! Have him call me so we can discuss this.

Keep up the good work. I will keep subscribing for as long as you are publishing.

Joe Sinkowski

Ed Note: We contacted the author, and he has called the writer personally and apologized profusely. We regret the error.

PANIC BUTTON

Regarding Mireille Goyer's column When to Overshoot (Right Seat, Nov-Dec 2020), the telling point in her article is the last sentence in her 3rd paragraph: "... mismanagement of the thrust reversers and FADEC programming prevented a power increase." Again, did we see here disaster ensuing from the absence of a simple, intuitive, quick and easy-to-select, manual control override switch to

instantaneously defeat the computer-controlled automated flight control systems and instantly give flight control to the pilot?

A large, brightly coloured toggle switch, with "Manual/Auto" positions clearly marked, and robust enough to be urgently slammed into "Manual" by the captain's hand or that of the co-pilot, would do very nicely.

The second point is Goyer's discussion on the need for stable approaches. Her observations are on the mark and quite right. However, I question the wisdom of the premise that every approach must comprise a non-negotiable, never to be deviated from, perfectly set up stable approach, and that this must be instilled into pilots in their training.

This is a recipe for accidents. When one of those irritatingly inconvenient, potentially dangerous, things happen on final, the pilot who has had the never-to-be-deviated-from, de rigueur perfectly set up, stable approach drilled into him/her, may be unable/unwilling/overly hesitant to rapidly/urgently act right out of the box with the non-de rigueur control inputs that could save the day.

Approaches today are always flown under power. Times certainly change; the days when approaches were always dead stick are long gone. Back then the pilot learned to judge how wide a circuit and at what point on the downwind the throttle could be idled, and the aircraft safely glided through the base leg on to final and touchdown on, or close to, the numbers. Having to open up the engine to make the runway was called "rumbling in" and a signal that some more practice was in order.

Another technique is to fly a tight circuit which obligates the pilot having to slip off excess altitude on base and final in order to make the numbers, but at least to not land excessively long.

Both of these techniques effectively provide frequent opportunities to practice for the day when perhaps an off-airport landing must be done due to some problem.

David Green

GEAR & GADGETS



Portable Panel

Dynon is now offering their D3 Pocket Panel, a portable EFIS (electronic flight instrument system) that features an attitude indicator with synthetic vision, displaying GPS ground speed and track (heading), GPS altitude and vertical speed, the turn rate and a slip/skid ball. A G-meter is available on a second page. The screen is dimmable for night flight. The 3.5" x 3.25" x 1" product comes complete with DC and AC chargers and RAM suction cup mounting hardware. As a portable device, it can be legally installed in certified and non-certified aircraft. The internal lithium-ion battery lasts for over five hours if ship's power is unavailable. About \$1250. More at www.dynonavionics.com



Ultimate Home Sim

A lot of us are spending more time at home and have discovered the limits of the PC-based flight simulators available. For a bigger simulator experience, Redbird offers highly capable home devices that incorporate many of the features of the professional sims the company sells. The top of the line is the Jay system with rudder pedals. It sells for about \$4,500. More at simulators.redbirdflight.com



Vest Solution

Survival experts are unanimous that pilots should wear an emergency vest packed with survival and communications gear in case they are separated from their survival kits that are packed in the airplane. Most of what's available, however, is either for war correspondents or fly-fishers. As a more comfortable (and less noticeable) alternative, there is the SCOTTeVEST line of vests and jackets. Marketed as travelling garments, they have as many as 50 pockets that could accommodate many of the items useful in a survival vest without the unfortunate fashion statement. From \$100 to \$300. More at scottevest.com



Seaplane Duffel

There are almost as many pilot bag styles as there are pilots, but sometimes only a duffel will do. When a multitude of pockets aren't needed —just secure, water-resistant space for bulky items and a change of clothes — Flight Outfitters' Seaplane Duffel fills the bill. It comes in 40- and 60-litre sizes and can be collapsed into a tight roll when it's not carrying its weight. About \$60 to \$80. More at flightoutfitters.com



There's a Scribe Within

CANADIAN AVIATION LITERATURE IS ALIVE



Something different has been happening on my computer—an amazing spin-off from the pandemic lockdowns—professional aviators are putting pen to paper and recording their flying adventures.

It started quietly a couple of years ago when retired Air Canada captain Rick Found, the son of the co-founder of the Found Aircraft Company, recorded the history of the Found Brothers' tough little freighter dubbed the Bush Hawk. The development of this Canadian airplane suffered badly from the politics of the day and the devious manipulations of 'angel money' along with some sleight of hand by bankers. The first press run of Rick's book, published by the owner of this very magazine, was soon out of print so Rick updated it with new information as the amazing little aircraft took its final blow and was sold, along with its entire factory, to manufacturers outside of Canada. The Found book's second press run continues to be a popular choice for aviation readers.

Then came Jim Griffith, also a retired Air Canada captain, who published his memoir titled *Best Seat in the House* in

which Jim's humour prevails throughout as his career and that of TCA, our formerly named national airline, progressed from Lockheed 10s and those noisy North Stars to prop-jets to Dreamliners. A planeload of Velveeta Cheese heading for Fort Worth, Texas turns out to be gold bullion for the U.S. Treasury, with one bar missing, in one of Jim's funniest chapters, and the cover of his book, donated by artist George Pendlebury of the Canadian Aerospace Artists Association (CAAA), is an amazing watercolour of TCA's early Lockheed 10A. I mention the cover art on this book because many of you may not realise that the love of this flying business includes many Canadian artists who specialize in depicting airplanes at work. The industry has an equal number of photographers who also keep us in the picture.

Dennis Currie's book, *Half a Mile in Rain*, was that aviator's recap of his entire flying career in narrative and in lyrics that resulted in a beautiful and poignant book. Dennis was one of the founding authors writing for this magazine when I was involved with its publishing back in 1992. We gave Dennis a page dubbed Currie's Corner where he put flying a 185

on floats or a Boeing 777 across the pond to Heathrow into a perspective we could all applaud. Dennis's book is a classic.

I'm not going to cite the other thirteen titles that came along and are now in print or in process (or even printed and now sold out) for fear you might think I'm beating my own drum, being the provider of editing, design and publishing services, but you might be asking, "Where are we going with this?"

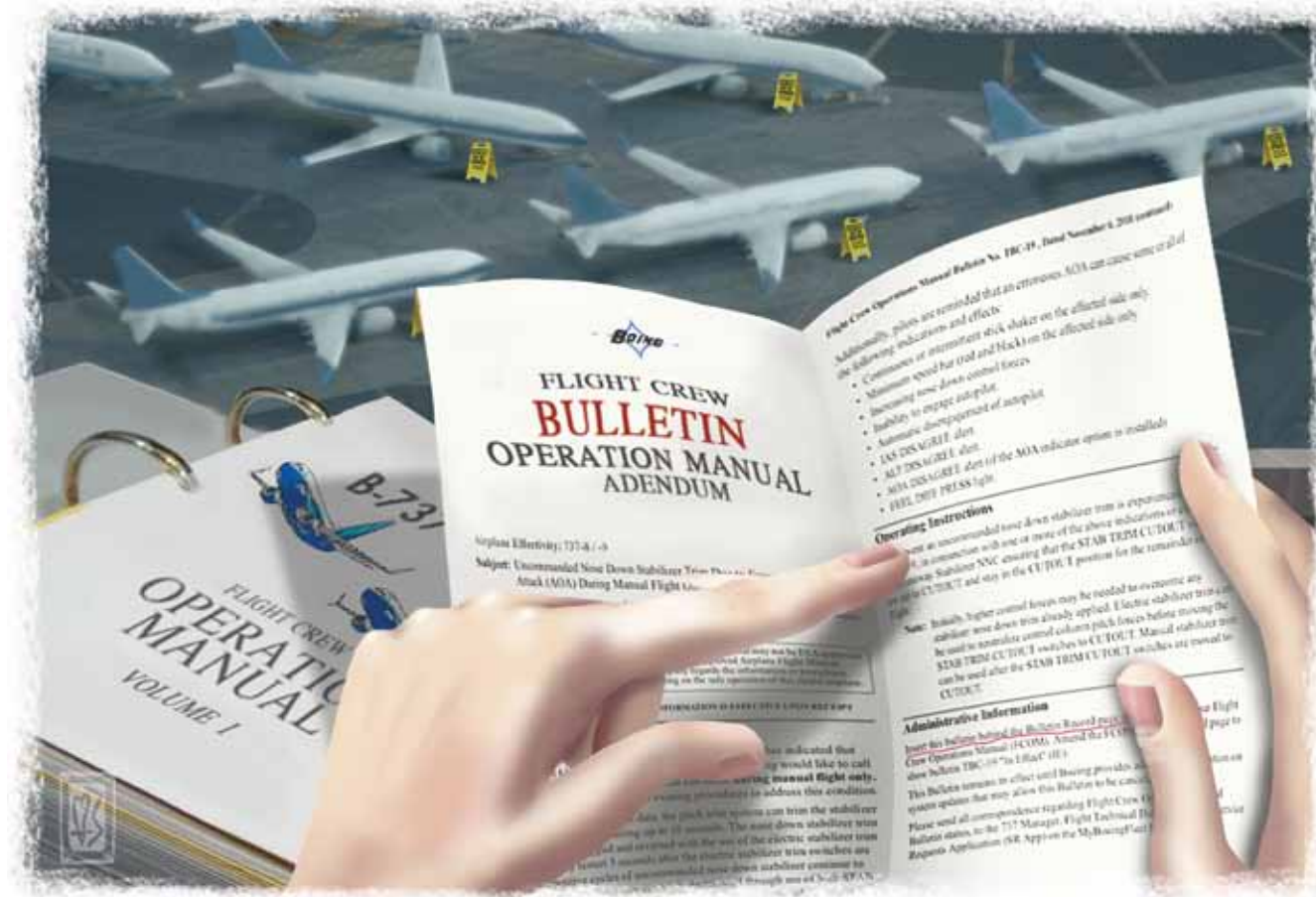
Well, two places—first, it was *Canadian Aviator* magazine that initially recognized the need to provide publishing services for professional aviators to get their work in print and we should remove our helmet momentarily in recognition of their good deed. Aviation books are a niche market and traditional publishers don't have access to the readership as does a popular trade publication like *Aviator*. Second, there has been a lot of Canadian history written in our skies and some of it never got to see the light of day. I can name three books written recently by professional aviators that have brought to light some vital Canadian history that wouldn't be out there if it hadn't been for a retired scud-runner or a four-bar left-seater putting words to paper. Hurray for them!

Like Amazon, Random House and Penguin have ganged-up creating a huge organization that has bought out almost all the publishing companies in the world. When you open their books, you will see a little blurb stating, "The publisher appreciates the support of the Canada Council for the Arts" or "the Canada Book Fund" or some other fund... well that support is financial and guess what?—your average aviator penning his book is called a self-publisher and as such he carries the can for the entire cost of editing, design and printing, so you won't find that little caption on his copyright page, but you will find his title listed here in these magazine pages, and YES, this is a plug to support your aviation press because they are writing some of the best bestsellers. 🐾



Complexities of Modern Aircraft

THE IMPLICATIONS FOR SAFE FLIGHT USING MODERN TECHNOLOGY



The Boeing 737 Max is back in the air. The saga began on October 29, 2018. Within minutes of taking off, a Lion Air B737 Max plunged into the Java Sea at high speed. It left behind a trail of small aircraft parts floating alongside mementos of people's lives. The accident plane was less than three months old.

The unusual pre-crash flight path caught the attention of the industry. Soon, discussions focused on the role played by the aircraft's Manoeuvring Characteristics Augmentation System (MCAS).

Boeing added the system to improve the Max's stability characteristics during manual flight at high angles of attack. No other B737 model needed or had such a system installed. Yet,

Boeing did not document the new system in manuals or training material. There were no system-specific malfunction checklists either.

Within days of the Lion Air crash, the FAA issued an emergency Airworthiness Directive with amended operating limitations and new procedures. The crew of the Ethiopian Airlines B737 Max used the updated information before it bore a 30-foot hole in a hill a few months later.

Manufacturer-provided information is a contributing factor in many accidents. Omission, confusion and misuse of the information are recurring issues. However, it had been a long time since the content and quality of operating instructions played such a critical role in a string of accidents.

Aircraft manufacturers must provide critical and relevant aircraft information to pilots. They may use a combination of markings, placards and documents to do so. Certifying authorities provide few content guidelines. What goes in, and how, is mostly up to manufacturers. Boeing stated that it "...decided against disclosing more [MCAS] details to cockpit crews due to concerns about inundating average pilots with too much information."

It is true that too much information can create more confusion than enlightenment in some instances and may lead to unwarranted action delays. It is also true that too little information can force crews to act as test pilots.

What does a pilot really need to know to operate an aircraft? More often than

not, the answer is an educated judgment call. Legal considerations and assumptions about the technical/academic background and flying experience of the typical operator guide the decision process.

For example, instructions to lower the landing gear might include each step of the activation and verification process in aircraft often flown by casual pilots. A succinct 'Landing gear — down & verify' might suffice in aircraft flown by professional pilots. The first approach is dummy proof, but also cumbersome. The second approach may result in faulty operation if the operator has little retractable landing gear systems knowledge and experience.

Once manufacturers figure out the 'what', they switch their focus to the 'when'. Flying is a contextual process; outside the training environment, pilots only consult markings, placards and manuals to achieve context-driven goals such as operating within limitations, conducting a specific phase of flight and responding to an abnormal situation. Effective information delivery anticipates and mirrors the user's mental model.

Technology pre-sets task sequences for most operations. For example, activating electrical power supply precedes powering an electrical unit. Other tasks sequences are not as self-evident. Take the pre-flight check. Pilots must check all listed items before flight. The manufacturer-recommended sequence is more flow-driven than technology-driven. Such arbitrary arrangements can present operational challenges. Visually checking fuel quantity and quality on the ramp before taxiing to the fuel farm makes no sense. Interrupted or incomplete task sequences often lead to omissions, a fact that manufacturers address differently. Some put their faith in pilots; others add redundant steps.

Markings and placards serve a different timeline philosophy. They are timely and isolated prompts. A static tire pressure placard to ensure proper inflation

without diving into the manual is nice. A flashing low-fuel indicator can save lives, but someone has to decide when to activate the marking. The proper timing can vary significantly depending on types of operation and users. An ill-timed indicator is more hindrance than help.

As aircraft became more complex, manufacturers realized that pilots could no longer commit everything to memory. In the mid-1970s, the industry began to develop standards for manual structure, phraseology and typography to facilitate information access and improve comprehension on the fly.

The General Aviation Manufacturers Association (GAMA) defined nine manual sections. The General Limitations, Emergency Procedures, Normal Procedures, Performance, Weight and Balance/Equipment List, Systems Description, Handling, Service and

recommendations.

Going digital ends some printed word restrictions but bring new challenges. Some electronic aircraft documents mimic traditional publications. Using them is similar to using old-fashioned printed manuals, minus the weight but plus the screen reading and power supply worries.

More innovative solutions offer a powerful scenario-based consultation. Information is stored according to type, conditions, user-level and more. The system presents context-specific task sequences upon crew request or automatically when conditions such as a sudden drop in hydraulic pressure warrant it. Adaptive markings display context-relevant values such as performance-specific V-speeds. The enhanced flexibility requires more end-user behavioural research and more implementation work hours.

As aircraft become increasingly complex and more automated, developing pilot material is becoming increasingly challenging. Avionics manuals alone count more pages than most general aircraft manuals did 20 years ago.

An untold pact bounds pilots and manufacturers. Manufacturers disclose all relevant aircraft information in an airborne man-

ageable manner for the type of pilots operating the aircraft. Pilots acquire minimum levels of competencies, memorize any critical aircraft data and become proficient at retrieving and using manufacturer-issued information.

The outcry around the B737 Max was more emotional than past controversies around accidents linked to design shortcomings because pilots felt that Boeing broke the longstanding manufacturer/pilot pact.

It takes two to tango. The B737 Max saga was a stark reminder to all aircraft manufacturers to be transparent. It is also a reminder to pilots to be diligent. Sometimes the information is available, but the pilot is unaware. What you don't know can hurt you. 🐉

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THE LONGSTANDING MANUFACTURER/
PILOT PACT."**

Maintenance, and Supplements sections are sequenced in order of operational importance.

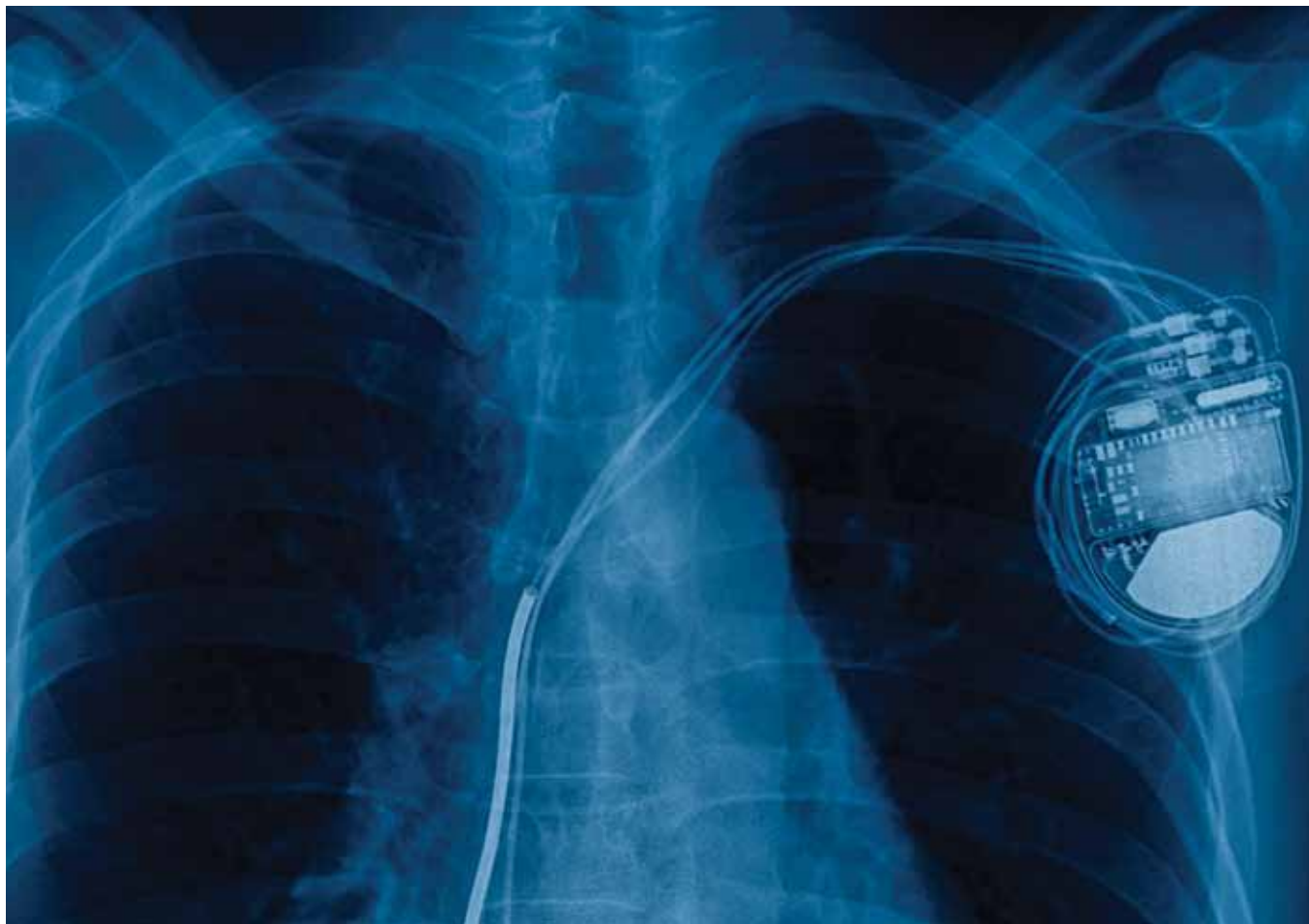
Meanwhile, the European Association of Aerospace Industries (EACMA) developed a simplified version of the English language to improve reading comprehension of technical and procedural material regardless of English level. About 60 writing rules govern composition and a dictionary defines and restricts vocabulary. Some certifying authorities require ASD-STE100 compliance for documents (Aerospace and Defense Specification [for writing in] Simplified Technical English).

NASA compiled research findings to help minimize mechanical reading errors. Their guide includes typeface, line spacing, line width and other layout



Pilots and Pacemakers

THE TWO CAN EASILY CO-EXIST



The 70-year-old General Aviation pilot knew that he needed to inform his Civil Aviation Medical Examiner (CAME) after his cardiologist arranged for a pacemaker insertion. The CAME told the pilot that the easiest way to sort out his aviation fitness was to schedule an appointment, bringing all his cardiology documents with him. He had no chance of returning to flying until at least three months following the pacemaker insertion, so four months later the pilot paid a visit to the examiner.

The pilot explained that several months before he had gone to see his family physician with symptoms of dizziness and fatigue. The doctor performed extensive blood testing and an

electrocardiogram (ECG). There was no abnormality in the blood tests, but the ECG showed quite a slow heart rate, 40 beats per minute or bradycardia, which was diagnosed as 'sick sinus syndrome'.

His physician then explained that the heart has a natural pacemaker which is called the sino-atrial node, or sinus for short. The normal electrical signals spread from this node through a special conducting system (like wires) to allow first the atria then the ventricles to contract in a regular and coordinated way to pump blood through the circulatory system. When the sinus ages and can no longer generate 60 to 100 beats per minute it is called a 'sick sinus' and needs to be replaced by an artificial electrical pacemaker.

The doctor made a referral to a cardiologist in order to ascertain that there were no underlying structural abnormalities with the heart. When this was verified through further testing, the cardiologist referred the pilot to a vascular surgeon to have the pacemaker surgically implanted in the pilot's left upper chest. The vascular surgeon told the pilot that the incidence of pacemakers was 2.6 per 1,000 population, generally rising to 26 per 1,000 for those over 75 years of age. Pacemaker reliability and safety are well-established, and this continues to improve.

The surgery was said to be minimally invasive (implanted just under skin and over the ribs) with a relatively short recovery time, with pain at the insertion site for about two days. Only light

activity would be allowed for the first few weeks, then full activities of any sort could be resumed.

Pacemakers come as single chamber, dual chamber and biventricular. The pilot would need a single chamber type with an electrical lead threaded through a vein into the heart where it would restore a normal heart rate set at 70 beats per minute, which was adjustable. The vascular surgeon reassured the pilot that the cockpit environment should not affect the pacemaker, nor vice versa. However, nearby cellphones (~six inches), strong magnets, hand-held scanners at airports, MRI scanning, radiation therapy and other machinery (e.g., arc welders) could affect the pacemaker adversely. Microwave

ovens were erroneously reported to affect pacemakers.

The pilot had no problems with the procedure, which was quite brief (20 minutes), and he had no problem with

make, model and serial number of the pacemaker. The pilot reported that the replacement pacemaker had cleared his fatigue and dizziness completely.

The examiner performed another ECG, which showed that all the heartbeats were generated by the artificial pacemaker. The cardiologist indicated that there was no sign of any underlying cardiac pathology other than the 'sick sinus'. The CAME was happy to restore this pilot's fitness to fly, but he was cautioned to follow up with the pacemaker clinic every six months, as he had been asked to do, and to bring his pacemaker clinic reports to his next civil aviation examination.

The normal lifespan of a pacemaker battery is from 5 to 15 years and replacement is quite simple. ✈️

"PACEMAKER RELIABILITY AND SAFETY ARE WELL-ESTABLISHED, AND THIS CONTINUES TO IMPROVE."

wound infection. When the pilot returned to the CAME he had his cardiology documents with him, which included a 24-hour Holter monitor, an echocardiogram, an exercise stress test and the

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Building a House

NOT FAR DIFFERENT FROM RUNNING A SUCCESSFUL FLOAT PLANE OPERATION



Nicole and I are building a house. We wanted to challenge ourselves in a new environment. We decided that, after running our small bush operation for so long, managing a building site should be right up our alley. We took courses, made plans, invested in solid tools and set to work. We were both right and wrong in so many ways.

I love the trades and the people who make their living from them. There are so many parallels between how a bush pilot comes up through the ranks and how a plumber, electrician, HVAC or framer apprentice eventually makes good on their commitment to their craft through hard work, long hours, determination and skill.

I started out as a dock hand which is easily the lowest member of the bush flying team. This is not to say that they are not an integral piece of the puzzle; rather, a dock hand is usually low on experience and high on enthusiasm. Dock hands push forward every day learning from all the pilots on the roster. They are impressionable and love hearing the tall tales from the senior pilots in the group. A dock hand's job is to catch the airplanes as they taxi to the dock, fuel them, load them, wash them and basically do all the small things that the senior pilots either don't have time to do or don't want to do anymore. Being the inexperienced carpenter's apprentice has brought me back full circle to my roots. Many days I found myself lugging lumber and tools from one side of the yard to the other. I work the tools and pitch in with thoughts and ideas when the time and situation allow, but I am smart enough to let the experienced leaders on our crew do their job and be responsible for the bigger picture.

When a dock hand graduates to junior pilot it is a big deal. Your days of hard work and dreams of being at the controls have finally come true. More often than not you go through a training protocol or

Teamwork and dedication to the task get the job done.

PHOTO COURTESY KEITH SAULNIER

probationary period on a smaller airplane such as a Cessna 172 or 180. The bulk of your flying is during better weather days consisting of hauling luggage solo or passengers with a more experienced co-pilot making all the judgment calls. I feel that the second- and third-year carpenters and tradesmen on our building site fall into this category. They know what they are doing and can be left alone to do a job. Site leaders will give clear instructions on what they need done and how to accomplish it. They may even give a demonstration of what they would do in a given situation or how a particular tool may behave. The work is inspected when completed and advice or a coffee chat often happens on how it went and what could have been done differently.

You can always tell when a seasoned bush pilot is in the room. They have the quiet competence that speaks volumes, where some junior pilots seem to just speak volumes. I love their enthusiasm and encourage it. Veteran bush pilots can fly any airplane in the fleet. They have years of customer service under their belt and know how to effectively communicate to both their passengers and the good people running the company. They have been through adverse situations, learned from them and dealt with the consequences. The love of flying is still there, and they have achieved the work/life balance that allows them to ex-

cel at their work. I love it when a senior trades person shows up on our building site. The juniors and apprentices get a little quieter, the radio gets turned down and many hushed conversations happen away from us homeowners. The seasoned tradesperson will then stroll over and walk us through some of the mistakes they have found, or changes that must be made due to the fact that the conceptual drawing that looks great on paper may need a little rejigging to make it happen in the real world. They com-

**"YOU CAN ALWAYS TELL
WHEN A SEASONED BUSH PILOT IS
IN THE ROOM. THEY HAVE THE
QUIET COMPETENCE THAT
SPEAKS VOLUMES..."**

mand the respect of their peers with their competence and knowledge.

I had the good fortune of cutting my aviation teeth under the wonderful tutelage of Brad and Karen Greaves at Ignace Airways. They taught me so many valuable work and life lessons that it would take multiple articles to fully get into, but core principles such as respect, patience, rewarding hard work and pushing yourself to be accountable and the best that you can be are always at the forefront in my mind. Nicole and I worked hard to

make all our staff feel like their contribution to the team effort was as important as it truly was. We were in charge of setting the pace, scheduling, finance, maintenance, company morale and so much more. Sometimes we were even allowed to fly! Basically, we were in command and had to bring our best effort every day because so many people depended on it. My brother-in-law Corey is the lead hand on our building project. He has been in construction for a long time and it shows. Corey understands his business and is able

to stay ahead of all the trades and make sure that the big picture is always at the forefront. He also has that quiet and subtle way of explaining what needs to be done. I can't help but think that he would have made an amazing bush pilot.

We have learned so much since we have taken on this project. When it is done, we will have helped to build this

house from the ground up. Our hands will have been in on every phase as we build both a home for our family and lifetime memories. I feel that once again we have learned as much about ourselves as we have new skill sets.

Nicole and I are thankful for all that Corey and the other experienced trades bring to the job site every day. Similar to how we operated our little airline we feel that, if you surround yourself with high-quality people you genuinely enjoy spending time with, high-quality work will get done. ✈️



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Exploring Quebec's Backcountry

LAURENTIANS OFFER A TASTE OF MOUNTAIN FLYING



When we think mountains, we think of the many extraordinary mountain ranges that fill Alberta's and British Columbia's landscapes. Snow-capped peaks and rugged terrain make it one of the most picturesque regions in Canada. But what if I told you that Eastern Canada had something similar to offer on a smaller scale?

The Laurentian Mountains are a range in southern Quebec, north of the Saint Lawrence and Ottawa Rivers with peaks as high as 3,825 feet above sea level. Home to many ski resorts such as Mont Saint-Sauveur and Mont Tremblant, the Laurentians offer endless activities to

fill your boots for an outdoorsy person like me. Small towns nestled into the valleys, winding roads between, I could definitely see myself living out there someday.

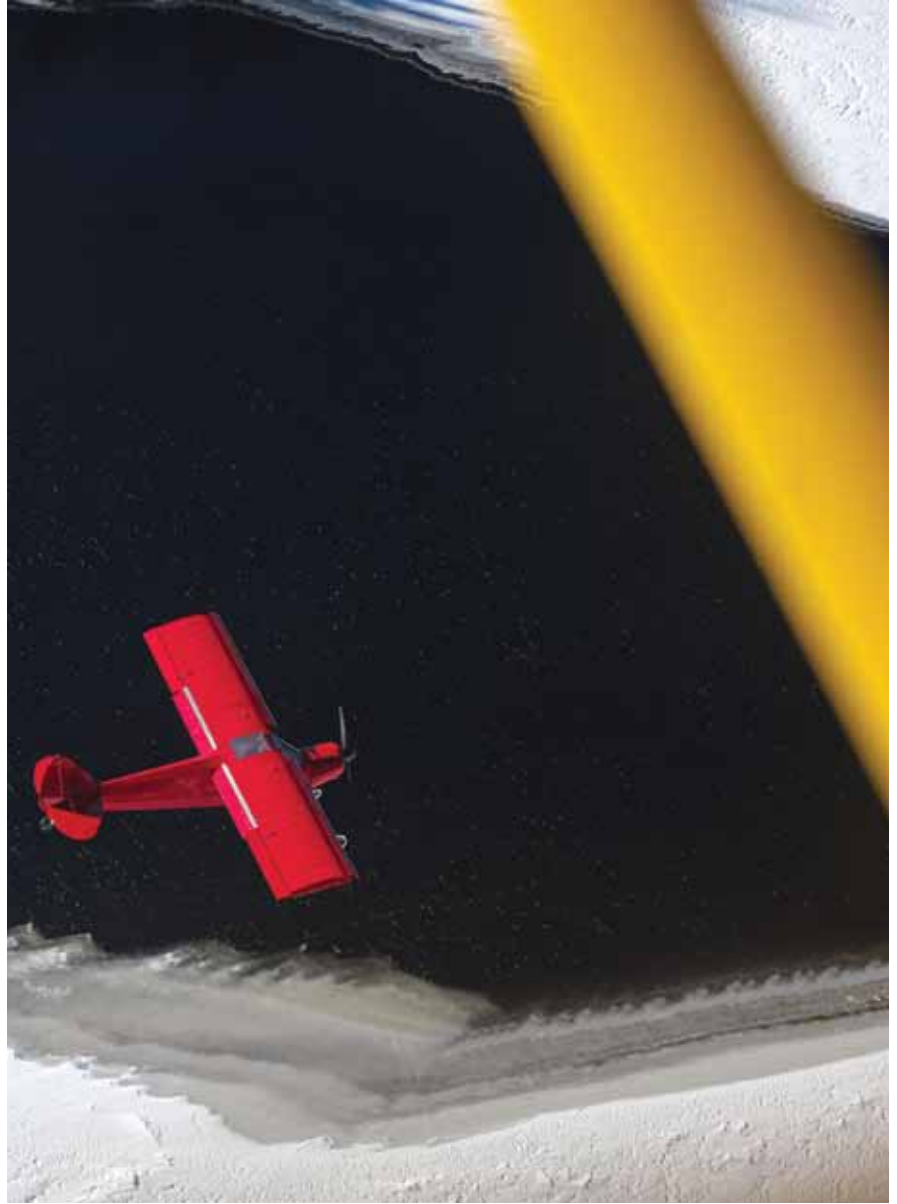
December and January were slow months for ferry flights and tailwheel training, so I spent a lot of time in Quebec. This gave me a chance to reconnect with old friends such as Olivier Marois and Jeff Perron. I met Oli twelve years ago through flight school, and Jeff five years ago when I trained him on skis. Oli is now the owner of an amazing STOL (Short Take Off and Landing) machine that he built in his garage. It's a Piper Super Cub fuselage with extended

Winter opens thousands of runways in Canada.

wings, massive backcountry Super Cub slats, custom-built landing gear, lots of carbon fibre and titanium bits and pieces powered by a 180-horsepower Lycoming O-360, making its performance unmatched. Jeff on the other hand owns an immaculate 1946 Piper J3 Cub with an 85-horsepower Continental engine, but this doesn't stop them from flying together every weekend and challenging each other in Quebec's backcountry.

On a sunny winter morning, Jeff invited me to come along for a flight. I grabbed my newly upgraded camera gear and headed out to a private farm

PHOTOS: SAMUEL DAIGLE



strip near Saint-Benoît on the North Shore. This would also be a fantastic opportunity to take some shots for my photography portfolio. When I arrived, Oli was just landing, and Jeff was warming up his bright yellow Cub. We then took off and started our trek northward into the Laurentians, which brought back many memories of when I was building up time for my commercial licence in a '68 Citabria on skis.

I wanted to capture Quebec's backcountry flying at its finest, so we arranged to stay in formation the whole way while communicating to get those air-to-air shots I had in mind. Rolling hills in the distance, covered in birch

trees, sharp cliffs, old heritage homes with smoky chimneys and endless rivers. These snowy winter landscapes are a big part of Quebec's charm. We landed on a few snow-covered sandbars along the Rivière-Rouge and eventually landed in a field where we had some lunch while enjoying the sunny winter day.

Upon departure, the snow blowing off Oli's skis left a sparkling trail beneath his flight path in the afternoon light. We turned south along the Rivière-Rouge to eventually join the Ottawa River, the scenic route to get back home. Approaching the Ottawa River, the sun cast a golden glow on Oli's Super Cub, which quickly became a silhouette

Rugged landscapes make the Quebec backcountry a great destination.

in front of the bright orange sun as it neared the horizon. Kiteboarders were heading back to shore, kids were playing on the ice and fishermen waved as we flew over their cabins. We eventually broke the formation and parted ways as we were running out of daylight.

First flight of 2021 was a lot of fun and let's hope everything that follows will be just as good. While sending out résumés for this year's float season, I'll keep working on my photography portfolio and keep looking for airplanes to ferry. 🛩️



40 Years of Flying de Havillands

THE BEST STOL AIRPLANES EVER TO TAKE TO THE SKIES



On February 5, 2008 I landed late in the evening at Ottawa. It was a bitterly cold winter night, with high winds and it was snowing. I had just ferried C-FCSU, a de Havilland DHC-6 Series 300S Twin Otter, from Vancouver to Transport Canada's main base for disposal. It was fitting in that it was thirty-four years earlier on February 13, 1974 that I had flown this same airplane from Montreal to Ottawa. The aircraft was retiring from federal service and so was I, as this was my last flight as captain of a government airplane. This once highly modified airplane, and its five sister ships, were my comfortable old rocking chairs, that I had started flying with the Canadian government's STOL Demonstration Service,

Airtransit, and that I had been flying ever since for Transport Canada. It was also fitting that my love affair with de Havilland airplanes was terminating at Ottawa, as it was forty years earlier, on April 10, 1968, that I was first checked out on CF-GCW, a de Havilland Beaver at this same airport. From that first flight in 1968 until this last flight in 2008, there was not a year that I hadn't flown a de Havilland airplane.

Is this a unique situation to have flown these famous STOL (Short Takeoff and Landing) airplanes for forty years? Not at all, you only have to search out the Canadian (and Northwest U.S. and Alaska) pilot communities to find other dedicated de Havilland pilots with many, many years of experience. However, it is a privi-

The author's last flight with a de Havilland aircraft was in a DHC-6 Series 300S Twin Otter, C-FCSU, in February 2008. The aircraft is shown here above BC Ferries' Spirit of British Columbia in Georgia Strait.

lege to count myself as a member of this de Havilland bush pilot fraternity.

I have flown many different aircraft types during my career, including Beechcraft, Boeing, Cessna, Douglas, Grumman and Piper aircraft, plus a few Bell and Hughes helicopters. My favourite types were always the de Havilland Beavers (including the Turbo Beaver), Otters and Twin Otters, all built at the Downsview factory in Toronto.

John Bogie, Canadian Aviation Hall of Fame member and former owner of Laurentian Air Services and its subsid-

iaires, claimed to have owned over one hundred de Havilland Beavers. This was more than any organization other than de Havilland of Canada and the U.S. military. In addition, he also operated both single and Twin Otters. John searched the world over for Beavers and Otters and repatriated them to Canada from such diverse places as Africa, Australia, Norway, Germany and the U.S. Usually these acquisitions were at a rate of one, two or three aircraft at a time. However, in the early 1970s, he was able to purchase 64 L20/U6A aircraft (the military version of the Beaver) from the U.S. Army in Germany in one lot. These aircraft were shipped to Lachute, Quebec where they were converted to civilian standards.

While Laurentian Air Services operated many different types of aircraft, their main bread-and-butter operations were carried out with Beavers and Otters. In the 1960s and early 70s, I was a pilot and later the chief pilot for Laurentian Air Services. As I carried out my duties, I flew many, many different airframes of these two types. Our operations were primarily carried out on floats and wheel-ski equipped aircraft. We operated all over eastern Canada and the northeastern U.S. However, our primary areas of operations were in Quebec and the interior of Labrador. Utilizing these superb aircraft in remote areas in some of the harshest terrain and weather conditions in the world with little or no support attested to de Havilland's superior design and the craftsmanship while building these airplanes.

The Canadian STOL Demonstration Service, Airtransit, is a tale all in itself and will be the subject of a story in this column in a later issue. I joined the company as a pilot, in late 1973, and flew with them until its termination in April of 1976. This program utilized six highly modified Twin Otters that were equipped with spoilers, an anti-skid braking system, an emergency brake system, a modified electrical system and advanced avionics. The demonstration service operated between Ottawa's Rockcliffe airport and a specifically built STOLport located on an old Expo 67 parking lot on downtown Montreal's waterfront. The company flew up to thirty-



three round trips a day between Ottawa and Montreal. This was my introduction to these Twin Otters, several which I later flew for over thirty years with Transport Canada in British Columbia. After the STOL service was terminated, I moved to Vancouver and flew float-equipped 100/200 series Twin Otters on commuter and charter services on the West Coast for AirWest Airlines.

Each of Transport Canada's six regions across Canada subsequently inherited one of the Airtransit Twin Otters and this was my segue to join the federal government as a Civil Aviation Inspector. While carrying out my duties I not only flew the Twin Otters but, for many years, also flew the Department's amphibious Beaver. Because of my previous background in remote, mountainous and coastal operations, I frequently operated in every nook and cranny in B.C. and even a few forays into the Yukon and Alaska. In later years I flew one of these Twin Otters as a pollution patrol aircraft that ranged from Washington to Alaska and out to 200 miles offshore in the shipping lanes.

For forty years I had the opportunity to fly these wonderful airplanes in wilderness areas on wheels, floats and skis. I have operated de Havilland seaplanes in the Atlantic, the Arctic and Pacific Oceans. In 1968 I flew Beaver N° 1, CF-FHB, which now resides in the National Aviation and Space Museum. For several years in the early 1970s I flew CF-VQD, the last Otter off the production line. Six

The author first flew a de Havilland aircraft 40 years earlier: a DHC-2-Mk1 Beaver, CF-GCW, in April 1968.

brand new specially modified Twin Otters, some of which I flew for the next 34 years, commenced in 1974. There were so many other de Havilland airframes over those forty years. Which one was my favourite? I think my answer would be the one that I was flying at the time. The one that was the most fun to fly, and had the most performance, was the Turbo Beaver. It was like an Olympic athlete on steroids!

Next year we will celebrate the 75th anniversary of the Beaver. This year the Otter will celebrate the 70th anniversary of its first flight. The Twin Otter's first flight was in 1965 and it is now once again being built as the DHC-6 Series 400 by Viking Air Ltd. in Victoria, B.C. The Beaver and Otter airframes are continually being overhauled, refurbished and re-engined. Last year I even witnessed the first flight of an electric powered Beaver. These legacy airplanes and the new Twin Otters will be operating for many, many years to come. What do you replace a de Havilland airplane with? A de Havilland airplane!

Some of you young folks who are now a new or budding pilot will sometime in the future be able to say, "Yes, I flew these wonderful STOL airplanes for the last forty years". I think that this is a good possibility, and my only regret is that I can't do it with you. In doing so I wish you the old bush pilot's blessing: "May you have Tight Floats and Tailwinds." 🛩️



Threat and Error Management

AIRLINER SAFETY TECHNIQUES APPLICABLE TO GA AIRCRAFT TOO



The original crew had diverted the airplane into Gander, the result of a medical emergency. Parachuted into the situation, the First Officer and I were fresh horses. Our mission now entailed flying the Boeing 787, with its 325 passengers and 14 crewmembers, the remainder of the way to London.

Getting a Dreamliner up and running is about a one-hour process, with strict Standard Operating Procedures (SOP) detailing every step. An example is loading the planned route into the Flight Management Computers (FMC). Checking over the FMC's calculations, we noticed the computer was predicting our arrival at the oceanic entry point approximately 300 feet low. In North Atlantic (NAT) pro-

cedures, this is a big no-no. Flights are required to enter 'The Ocean' on speed and at altitude. By upping our climb thrust and climbing at BAoC — Best Angle of Climb airspeed, we'd be able to meet the requirements of our clearance. In doing so we'd identified a threat and mitigated its effect.

Departing Runway 21, we turned eastward and contacted Gander Centre. In the relative calm of the climb out, the Oceanic and Remote Area Checklist was brought out, confirming we'd met all requirements to enter NAT airspace. Approaching the Oceanic entry fix, we ran through another SOP, one that insured we were going the right way and at the right speed and altitude. All were steps to help prevent errors.

An Air Canada Boeing 787 Dreamliner of the type that the author flies.

We were about 40 miles into the Oceanic sector when it happened. The First Officer calmly announced, "Engine failure". In response, I called for the engine failure drill. As I was dealing with the immediate effects of thrust loss, the FO loaded the single-engine cruise altitude into the FMS, effectively giving control of vertical navigation to the auto-flight system. With that, we commenced a descent to our single-engine cruise altitude of 29,000 feet. As the drill flowed into the checklist, I made a blind call to all stations monitoring 121.5 MHz. While all this was happening, I initiated a 30-degree right turn, calling for an offset track

five miles right of course to be loaded into the navigation computer.

Eventually Gander was able to provide us with a clearance to their airport. With a GPS approach loaded into the computers and landing clearance in hand, we touched down at the calculated point on the runway and brought the widebody aircraft to a stop. A bevy of fire trucks inspected our aircraft for damage.

Then a new voice came over our headsets, this one not in character. "OK guys, that was great. Before I reposition you to the terminal building, give me your considerations." It was our Check Pilot, deftly squeezing the last drops of value from our simulator scenario. After a 10-minute break, we climbed back into the Great Beast and departed on another 'cyber-flight', this time to Toronto. It was now the First Officer's turn to fly. A scripted cargo hold fire resulted in another expeditious return to Gander, with us evacuating on the runway.

It had been quite a night, reminding me that the use of simulators in training and checking has changed greatly in recent years. Initial type ratings still require various handling exercises be conducted during training. These are the skating and shooting drills of learning a new airplane. Nothing much has changed here. Unlike a simple proficiency check that used to mark the end of initial training, candidates are now scheduled for two sessions, known as LOFTs, or Line Oriented Flight Training. Similar to the Line Oriented Evaluation (LOE) that follows a day or two later, LOFTs are designed to mimic a real flight, only one fraught with peril. It's important to know that, unlike earlier times, good 'hands and feet' alone may not be enough to carry the day.

Similarly, a new language has also evolved. Instructors and Check Pilots now speak in terms of 'Threat and Error Management'. Crews are now required to identify potential threats and then prescribe countermeasures to either avoid the risks altogether or, at a very minimum, mitigate their effects. Threats to the safety of flight are everywhere: non-forecast weather, the classic engine fire or failure, even simple crew complacency. Errors, in contrast, occur mainly within

the cockpit and are further delineated as ones having consequences and those posing little danger. Missing an altimeter setting during VFR flight is not the same error as doing so during an instrument approach in weather.

A modern simulator's technical sophistication is staggering, making them something akin to the devil's toolbox where scripting complex problems is considered. Threats can be conjured up with the literal push of a button. Even with these resources at his disposal, a Check Pilot must still be assured of two things. The first is that the crew clearly demonstrates an ability to safely fly the airplane, even in a degraded technical state and high-stress environment. The second is that they are proficient in employing methods such as Threat and Error Management to deal with the Human Factors dimension in their unfolding problem.

Our simulated engine failure over the North Atlantic and the uncontrolled cargo hold fire on the second leg are examples of this modern approach to training and checking. Those scenarios were laden with threats designed to induce errors. The safe recovery of the airplane will always be the final goal but doing so with full awareness of the dangers implicit rates a close second. At the very least, dismissing threats and succeeding despite errors will merit a strong debriefing or, in the extreme, having the ride assessed unsatisfactory. Nearly as important as the outcome then is the method, as raw genius tends to be woefully unreliable when one is draining the swamp.

The flight safety takeaway for General Aviation pilots is simple. You might not find yourself in a \$25 million full-motion simulator dealing with an engine failure over the Atlantic at night, but you will be forced to deal with threats unique to the airplane you fly. Do your best to identify these before they come stalking you. While avoiding threats is the ideal, in reality this isn't always possible. Best then to have a good plan at the ready to mitigate their effects. Where errors are involved, strive to avoid them, but ultimately know that your ability to recognize and trap them before they have negative consequences can be the next best thing. ✈

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Ground Effect is Your Friend

LEARN HOW TO USE IT TO YOUR BENEFIT



In the late 1970s, the world of single-seat car racing was consumed by the technological phenomenon of ground effect. Effectively, what this term referred to was how the astute use of inverted wings very close to the ground produced vast amounts of downforce that sucked the cars to the road like mega-powerful vacuum cleaners. The exploitation of ground effect has been around ever since.

In aviation parlance, ground effect is also a well-known aerodynamic phenomenon. However, opposite to the objective of a racing car, ground effect doesn't help suck the aircraft to the ground, it helps suck it into the air.

Ground effect can have a key role to play in the effort it takes a wing to lift itself skyward. The level of this effort is a function of the wing's induced drag. The

more lifting a wing tries to do — that is, the higher its angle of attack — the more induced drag it creates in trying to do that lifting. However, when an aircraft is flying in ground effect, its induced drag is sharply lower.

The acceleration of air downward by a wing, known as its downwash, has the resultant effect of pushing the wing upward thus creating the aircraft's lift. It just so happens that a wing's downwash is much lower nearer to the ground owing to its airflow being forced to parallel the surface below. (Its drag-inducing wing tip vortices are lower too.) Thus, with the downwash lessened, so too is the aircraft's induced drag. There's less work for the wing to do to lift the aircraft for a given speed. Effectively, less inhibited acceleration is available when drag isn't working against the aircraft's effort to get itself aloft.

A Piper J-3L-65 Cub in ground effect.

Ground effect, as its name implies, is only available near the ground. Also, there's only a small range within which it is present. That presence is within a vertical distance from the ground equal to the aircraft's wingspan. For example, if an aircraft's wingspan is 35 feet, it'll experience ground effect within 35 feet of the ground. Once beyond 35 feet, two things happen: ground effect disappears and induced drag shoots up.

Ground effect can be used to one's advantage to accelerate an aircraft to an appropriate climb speed immediately after lifting off. The problem that ground effect can create occurs when the aircraft gets off the ground before it has reached its flying speed. This could typically occur, for instance, when departing a soft field. A nose-high attitude with full throttle

PHOTO: RYAN FLETCHER/STOCK

may get the aircraft staggering into the air thanks to ground effect's reduction of induced drag. However, once beyond ground effect's cradle, and if still at the speed that barely got the aircraft airborne, the sudden onset of induced drag may retard the aircraft's speed. This could stall the wing and bring the aircraft settling (if not crashing) back to the ground.

To avoid this scenario, it's important for pilots to know their aircraft's takeoff speed for the prevailing conditions. They also need to know the distance they'll need to take off. Most importantly, they need to take advantage of what ground effect has to offer: a means to accelerate to an appropriate climb speed when induced drag won't hinder the aircraft's progress to get there. An aircraft accelerates more quickly in ground effect than above it. Spending a few seconds in level flight just a few feet off the ground gets the aircraft to its safe climb speed more quickly.

It should be noted that ground effect also has an influence upon landing. The reduction in induced drag as the aircraft enters ground effect above the runway may cause the aircraft to float past its intended touchdown point. The more speed the aircraft is carrying as it enters ground effect, the greater the likelihood that it will float over so much of the runway that a landing will no longer be practical. Thus, managing approach speed is vitally important so as not to get locked into ground effect, especially if the runway is short.

Be wary that, in ground effect, the downwash from the wings can pass over the tail section at a decreased angle of attack. Thus, the download on the tail in ground effect can be less, giving it greater lift, which will cause the nose to drop. Near the ground, it may be necessary to pull up slightly on the elevator to stay level in ground effect. Once out of ground effect, the downwash over the tail will increase, pitching the nose up.

Ultimately, just like the race car guys discovered, when managed properly, ground effect has a huge benefit on aerodynamics. Make good use of it in an aircraft and you'll find extra speed that will suck your aircraft efficiently skyward. ✈️



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ATC Layoffs

ONCE UNIMAGINABLE, NOW A REALITY



I said it would never happen. My wife asked more than once during the downturn in air traffic in Canada since COVID-19 became a thing about a year ago. I repeated my answer with all the logic as I saw it.

“Layoffs in air traffic control haven’t happened yet, and I just can’t see it happening — even now.”

I then reiterated that if layoffs did occur, I wouldn’t be directly affected. I was officially employed as an air traffic controller starting in early 1992, meaning by the end of 2020, I would have nearly 29 years on the job. In a union-driven workplace, layoffs would normally be done based on reverse order of seniority — those in the longest had the most protection and I was high on that list. But I didn’t believe for a second it would occur, anyway.

Air traffic controllers can’t be replaced quickly, easily or cheaply. And these three factors, in my mind, would make ATC layoffs a non-starter.

First, there are hurdles to jump when training controllers. Transport Canada requires a licence, which requires training to meet certain standards. They also require that documented processes be followed — you can’t just apply for a licence, pay a fee and be given a piece of paper. Generally speaking, from selection of an ATC candidate for training to the point where they have received a licence (ATC uses the same term pilots use on aircraft types: When they have ‘checked out’ in a unit), it takes upwards of two years.

Selection of candidates has always been slow and problematic. Simply put, not everyone can do the job. Among other

aspects there are maturity, spatial awareness and emotional suitability issues to judge. None of these can be determined with complete accuracy during a single interview or even multiple interviews. This means that the selection process has never seen a success rate anywhere near 100 percent. Historically, the success rate from interview to qualification has always been around 35 percent.

Even without a pandemic in progress, the logistics around training are also an issue. There must be staff available to conduct training. On this front, there are two points: Nav Canada decided to cut many trainees out of the system in September 2020 in order to save money. All stages of training involve operational controllers in addition to the essential support staff — from classroom and simulator work to on-the-job instruction. With layoffs, it’s

possible that enough staff could not be released from operations for training new people if air traffic jumped quickly.

And, obviously, all of this comes at a cost. In training a pilot, there are operating costs that simply cannot be ignored, from fuel and aircraft maintenance to instructor wages and beyond. ATC is only different in the specifics, but the context remains quite similar in that there are costs associated with training a controller.

I maintain a firm belief that, following the events sparked by the pandemic, traffic will rebound. It always has. 9/11, SARS, MERS, the financial crisis in 2008 and the list goes on. Beyond people wanting to fly, there are many reasons why flight is necessary. Cargo isn't very susceptible to viruses, as we've seen with the increase in flights in this sector. At the time of writing, several vaccine candidates were reaching approval and distribution plans were in effect, meaning people will begin to fly again.

The unknown in this case, as with every case, is the recovery time frame. And while I accept that this was the biggest drop in the traffic flow during my career, it won't last forever.

Also, if the traffic surges during recovery, cutting staff means that the system may not be able to handle the resurgence, let alone have enough lead time to begin training new controllers to fill the gaps. A suddenly overtaxed system is not a healthy one.

Layoffs seemed entirely unlikely to me. But Nav Canada was facing a real

problem. If airplanes don't fly, operators don't pay fees to them. This means drastically reduced revenues. And since much of Nav Canada's costs of doing business are related to employee wages, it seemed logical, in and of itself, that staff should be reduced to slow the bleeding.

And so, it was announced in late November that Nav Canada would make cuts to control staff across the country in addition to the deep cuts already felt in other important sectors of its operations. In addition to closing two Flight Information Centres and reviewing some RAAS operations by several Flight Service Stations, Nav Canada would set its sights on closing seven control towers and reducing the number of controllers in the ACCs, mostly those on the eastern half of the country, by a significant percentage.

To say I was surprised was an understatement. For all the reasons I walked through earlier, I just didn't think it would happen. Was I ignorant or naive?

When this was announced, I thought of the junior staff who had recently checked out. Last month or last year, they had just started a rewarding career. The job has its downsides, sure, but it's a job I enjoyed for 29 years up to this point. Now they're on the chopping block, right at the start of it.

While there were discussions on lists that would be kept and who might be on callback if traffic started to pick up again, these people have lives, houses, families and such. They simply can't wait an

unknown time frame to see if they'll get called backed. They'll have to look for other employment, and maybe won't be available to return to ATC duty — or simply won't want to risk it a second time.

I believe in looking out for others when I can. Perhaps it's a teamwork aspect of ATC that crept into my thinking, or maybe it's just how I'm wired. The announcement caused me to look at my pension numbers. If the numbers could work and my departure could make room for a junior controller to carry on, I had to at least consider it.

With no real assurances of how life would be, I decided to try to make that room for someone else, and my last day as an air traffic controller was November 30, 2020.

While this was not the sole deciding factor, it played a large part in my ultimate decision to leave a career I enjoyed. Because of that position, I had a host of experiences that wouldn't have been available to others, and the projects I and my co-workers got involved in changed the way we move traffic in the Maritimes.

While shift work takes its toll on one's body and social life, I don't regret getting into the job in the first place. Someone else should have those same opportunities, even if the career path might never be quite the same as what I experienced.

What remains to be seen, in my view, is this: How quickly does the traffic rebound, and how quickly can the Air Navigation System respond to the need when it does? 🛫

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Preparation is Everything

BOTH MENTAL AND PHYSICAL FITNESS ARE VITAL



The day had been a mixed cocktail of anxiety, sunburns and fatigue. It was late Tuesday evening during the week-long U.S. National Aerobatic Championship in Salina, Kansas, and I was sitting in the briefing room on the upper floor of Hangar 606. Nineteen of my fellow advanced-category competitors surrounded me. The purpose of this meeting was for the top ten scoring pilots from the first flight of the competition to submit a figure of their design which would then be used to compose a fourteen-figure 'free-unknown' sequence to be flown last.

I had earned a bronze medal after the first flight which entitled me to submit my own figure in third order. The idea in this process is to submit something which can be flown well but might possibly trip up your opponents. Enter my 1-½ Snap Roll from upright flight into an opposite direction 2 x 4 (two points of a four-point roll) that finishes in a half outside loop down (pushing on the stick instead of pulling). Less than a month earlier I had flown this

figure at another competition, and I was waiting for a chance to use it. Watching closely as the seven remaining pilots submitted their figures one by one, no figure surprised me — until I saw it. To me, it was diabolical; an outside/inside loop with a 4 x 8 (four points of an eight-point roll) centred at the top of the loop.

As the last flight of the championship loomed ahead, I was sitting confidently in second place overall. I stayed up late at the hotel restaurant with my coach, Aaron McCartan, as well as a good number of my equally stressed-out contemporaries. An assembled sequence of our design containing fourteen figures had been finalized.

With the completed sequence card in hand, I rapidly retreated to my hotel room which contained colourful strips of masking tape on the floor that represented this Salina aerobatic box. (What did the hotel janitorial staff think of this display of cryptic symbology? I can only imagine their concern about my plotting.) Next, I loaded up my go-to weather modeling app and studied the forecasted up-

Preparation is key to a good routine.

per and surface winds expected during our final flight scheduled for a little over a day from now. Inherently knowing the wind direction is of utmost importance in the planning and execution of any flight, it takes on a whole new meaning when planning a three-dimensional flight in a 1-kilometre cube of airspace starting at 200 metres (in the advanced category) above the ground. In this space, everything is restricted: The orientations of the X and Y axes of the box and the actual directionality of how you choose to fly the figures on that flight. A successful competitor must leverage the strength and direction of the wind to display accurate figures to the people with the only opinions that matters — the judges.

As a seasoned flight instructor and pilot examiner, one of the tenets I strongly promote in training is that one of the greatest strengths of a pilot lies in their ability to adapt. Knowledge is acquired through a hunger to learn by way of study, experiences and the guidance of a

PHOTO COURTESY LUKE PENNER



Dreaming big is fine but you have to back it up.



simply, I burn a lot of gas in the airplane, practising even after long workdays that sometimes leave me not feeling like spending another 90 minutes of prep for a 25-minute practise flight.

Positive G tolerance fades and negative G tolerance fades even more quickly. There is only one way to maintain this, and that is to fly hard acro often. All this effort throughout the year can give a bit of a 'tip-of-the-iceberg' effect to an outside observer who only sees you fly (hopefully at the top of your game) for approximately four to five minutes. However, it is all the hours of unseen effort which allows for a flight to appear effortless.

I am fortunate to be a Transport Canada pilot examiner and in this line of work I sometimes get to observe an above-average performance from a candidate who ends up not only passing their flight test, but scoring extremely well. During these

Preparation truly is everything. This can't be overstated. Whether you are a student pilot or a many-thousand-hour pilot, the need to be at our best when we strap into an airplane and 'commit aviation' never ceases. The only bad flights are the ones where you learn nothing, and you only learn nothing if you aren't looking closely enough.

I've come across countless admirable and successful pilots in my lifetime, and I believe it is no coincidence that the vast majority of them have an air of humility in the way they conduct themselves and approach flying. It is important to reflect on the lessons learned between flights as the solution is often to look within and not without. Pilots tend to dream big, so make sure you show up on game day, hungry and prepared to achieve whatever it is that makes you excited to get out of bed in the morning. 🐦



The Flying Priest

AND HIS DISAPPROVING BISHOP

Ray Hawco was never one of those young boys who filled his bedroom with model airplanes and his mind with dreams of soaring in the blue. Sports, scuba diving and fishing held pride of place. As he grew older a calling led him to the priesthood. But when a friend said he was going to take flying lessons in Gander, Newfoundland, he urged Hawco to join him. Deeming it a challenge and something he found interesting, he agreed. By this time Hawco had been ordained, with all the responsibilities that entailed.

There was no policy saying priests couldn't also be pilots, Hawco explained, but he knew his bishop was against the idea, likely seeing it as a life-threatening danger that would interfere with his priestly duties. Working on the theory that it is better to ask for forgiveness than permission, Hawco went ahead with flying lessons, fitting them in with his work in thirteen communities and the seven churches under his care. Realizing he just didn't have the time to commit to regularly scheduled ground school classes, he sought and received permission to study on his own time. Flying lessons also were scheduled around his availability on days with suitable weather. In this way, the young priest earned his wings over a period of a couple of years. By 1970 he had his licence plus a float endorsement.

"The bishop didn't know anything about it."

Realizing even as he was still learning to fly that Newfoundland featured only a few airports but thousands of lakes and ponds, Hawco saw the logic of being able to operate on floats. But gaining that skill would come at a high emotional cost.

A close friend was taking lessons at the same time and both he and Hawco wanted their float endorsements. So, they each took the necessary training which consisted of five hours of flying time and innumerable takeoffs and landings.



"Once we had our endorsement...we both wanted to rent a plane to go for a solo cross-country flight," Hawco recalled. "So we rented a Cessna 180." His friend took off at about 3 p.m. one fine afternoon with a promise to return by 6 p.m. so Hawco could have his turn.

"Unfortunately, on his first landing, his friend crashed and was killed, possibly due to either rough water, a crosswind or lack of experience." That, said Hawco, cast a dark pall over his young flying career for quite a while.

But, once in possession of his licence, Hawco was determined to buy his own plane. His bishop was upset enough when he found out that Hawco had gone ahead with his flying plans without talking to him first. He also had no idea Hawco planned to buy his own plane.

Young priests didn't make much money in those days but Hawco was also an experienced scuba diver, providing an-

Ray Hawco combined service to the ministry with service to aviation.

other source of income. Commercial diving with a St. John's company plus occasional odd jobs such as freeing fouled boat propellers helped raise the funds to acquire a plane. Up to this time Hawco had been stationed in the coastal community of Bonavista, serving surrounding smaller communities. But an impending move to the inland mining community of Buchans, which he had never visited before, loomed. So, he called the parish priest there and arranged to fly to the town, landing at a seaplane base on a nearby pond, for a get-acquainted visit.

Unfortunately, when he landed, he was told the dock to which he moored was company property, owned by ASARCO, the mining company that operated the town, and his plane could not remain moored there. There followed a



Floatplanes were Hawco's favourite mount.

series of spirited discussions with various company and town officials but, with the help of the incumbent priest, he was eventually permitted to leave his plane tied up to the company's dock for two hours, which allowed him the time to familiarize himself a little with the town and the parish. A couple of weeks later he arrived back in Buchans by car to take up his new posting. Having settled in, he sought some well-earned vacation time. Presumably, the bishop had no idea he planned to use the time off to go to Orillia, Ontario to buy an Aeronca Champ he'd seen advertised, complete with wheels, skis and floats. Price tag in 1970 - \$5,900.

Hawco had seen photos of the plane and everything seemed in order until he actually arrived in Orillia and discovered the aircraft had big holes under each wing where the fabric had been removed to inspect the wing struts and control cables.

The plane met other criteria for safe flight but, on a tight schedule to return to his church duties in Newfoundland, there was no time to replace the fabric covering that would seal the holes. A phone call to a friend who was a qualified aviation maintenance engineer offered an interim solution. Get some good, strong duct tape, the friend advised, and wrap it from leading to trailing edge completely around the wing and it should get him back to Newfoundland where a permanent fix could be made. Hawco and the Champ arrived safely in Buchans on May 9, 1970. The repairs, Hawco said, lasted for six months before he eventually replaced the tape with the proper fabric.

"Then, all hell broke loose," Hawco recalled. "The bishop said, you got a plane?"

His bishop never really accepted his flying but eventually got used to it and

even agreed to go up for a trout fishing trip when weather allowed. A fine day and the bishop's schedule, however, never lined up.

Hawco continued to fly whenever possible but always with a purpose in mind. "I loved to fly but not around in circles. I had to be going somewhere, fishing or trouting or to a meeting."

Hawco crashed the Champ in 1975, fortunately escaping any life-threatening injuries. Insurance helped pay for its replacement, a Piper PA-12 on floats, which he rebuilt over a period of four or five years. It served him well until 1987 when he traded it in on a Cessna 172, a plane he would own until he sold it in 2018.

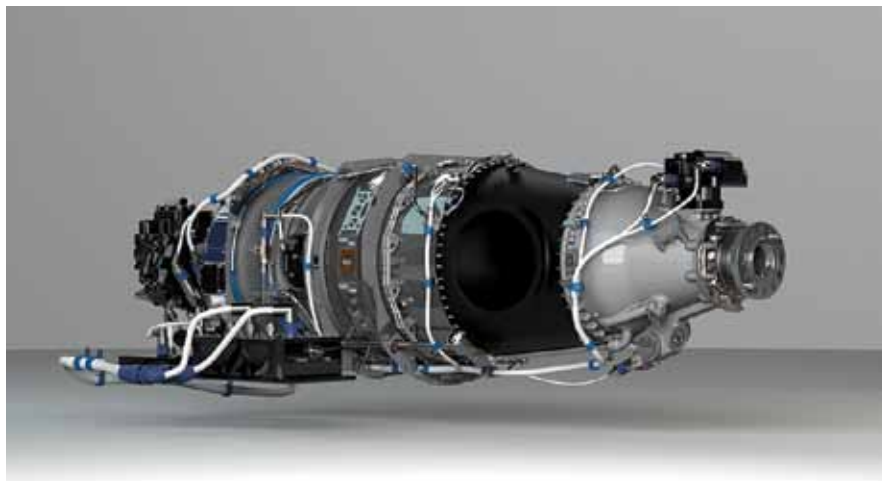
By 1980 Hawco had resigned his work as a priest but remained heavily involved with the church. Along the way he had received a master's degree in rural sociology and filled several positions with the provincial government and in private enterprise, using the plane for both pleasure and sometimes in his work to get to various locations around the province. He even took a swing at politics but, after being defeated by the incumbent in an election, decided politics wasn't for him.

Outside working hours, Hawco volunteered with COPA, the Canadian Owners and Pilots Association, and represented Newfoundland on the association's national board for 12 years. He is still a member of the St. John's COPA chapter, Flight 97, and the central Newfoundland chapter, Flight 195. In the early 1980s he established the Avalon Floatplane Association as a legal corporation responsible for the operation and maintenance of the float plane base at Paddy's Pond near St. John's.

And so, the flight hours continued to build until several medical issues forced a stop in 2018. In 48 years of flying, his logbook totalled about 6,000 hours on floats with another 1,000 on wheels and skis. Today Hawco and his wife live in quiet retirement near St. John's, but his love of flying persists and nearly half a century spent flying provides a host of memories and experience, some of which he is now putting down on paper as a memoir entitled *Against the Wind*. He hopes to see the book published later this year. 🐾

PT6 E-Series

CANADIAN ENGINEERING EXCELLENCE CONTINUES



Pratt & Whitney Canada has remained a leader in turboprop engine technology for 60 years.

duced their first running version, which flew on an airframe in 1961. By 1964 it was in service and is now the famous PT6A, a turboprop engine of some 750 horsepower. P&WC now has a workforce of some 10,000 employees worldwide, with 6,000 in their plants across Canada. The head office and a plant are located in Longueuil, Quebec.

On December 2, 2020, P&WC formally announced their latest addition to the PT6 family, the PT6E-67XP. The PT6 E-Series builds on the reliability of the PT6 family and Pratt & Whitney's more than 1.5 billion hours of operational expertise. P&WC also informed the media that the 50,000th PT6A had been built. It was what the company describes as, "An exceptional milestone in General Aviation".

The recent evolution of the PT6 engine is found in the 2019 launch of the PT6 E-Series, described by Pratt & Whitney as the first turbine engine in the General Aviation market to offer a dual-channel integrated electronic propeller and engine control, an integral section of the PT6-E's electronic engine control (EEC). Spokesperson Irene Makris, the vice-president for sales and marketing at P&WC, stated, "With the PT6 E-Series engine now at the forefront, we remain committed to pushing innovation as we've been doing since the very beginning." The new PT6 E-Series engine is

in full production, powering the Pilatus PC-12 NGX. P&WC expects the number of PT6Es in the field to continue growing far beyond just this one model.

Having built EEC into this new incarnation of the PT6, the E-Series enables pilots to have two independent control systems with full digital engine protection. What does this mean? The EEC can make small engine adjustments by tweaking the engine's performance, providing maximum power

The Canadian aircraft engine company Pratt & Whitney Canada (P&WC) has been around since the late 1920s.

The American parent company, Pratt & Whitney (P&W), now a division of Raytheon Technologies Corporation, holds the reins of power. It became the mission of its Canadian subsidiary, P&WC, to make its mark in aviation by producing its own engine model. During the Second World War, P&W, famous for its wartime motto 'Trust in God and Pratt & Whitney', was one of the major radial engine producers. After the war P&W (the American unit) decided to

get involved in jet engines. Rather than pure jet or reciprocating engines, the Canadian unit chose to concentrate on the turboprop market. P&WC does its own

**"WITH THE PT6 E-SERIES ENGINE
NOW AT THE FOREFRONT, WE
REMAIN COMMITTED TO PUSHING
INNOVATION..."**

research, development and marketing as well as the manufacturing of its engines. In 1958 they began designing and building prototypes. By 1960 they had pro-



during flight, enabling a faster rate of climb, speed increases and 10 percent more power from the engine. The engine monitors itself via 100 parameters, which enable maintenance technicians to maximize engine performance during the engine's lifespan while reducing operating costs.

The pilots will now be able to push a button and let the EEC go through the start-up procedure on its own or, by pushing another button, command the EEC to shut the engine down. Pilots can set their desired airspeed with the digital auto throttle and the EEC will achieve it while monitoring and adjusting the engine's performance, ensuring that the airplane stays at the set airspeed until commanded to do otherwise. "The single lever and integrated electronic propeller and engine control system allows precise engine control by constantly monitoring temperature and torque to provide the right engine power and performance throughout all phases of flight," the company said in a statement.

As mentioned above, the Swiss company Pilatus Aircraft recently introduced the PC-12 NGX aircraft at a ceremony during the National Business Aircraft Association's annual convention at Henderson Executive Airport near Las Vegas, where they made mention of the single lever simplicity of

The Pilatus PC-12NG is launch customer for the PT6 E series engines.

the PT6E-67XP during the unveiling of its third model of the venerable PC-12 single-engine turboprop. Pilatus also offers a complete redesign of the cabin and new avionics in addition to the single engine power lever.

A P&WC spokesperson announced that, "Customers enrolling in the new Platinum ESP for the PT6 E-Series engine will benefit from at least a 15-percent reduction in hourly engine operating costs." Maintenance intervals have been doubled from 300 hours to 600 hours, TBO intervals will be 43 percent longer (3,500 hours to 5,000 hours) and operators will see a 40-percent reduction of scheduled maintenance with the new engine.

As already mentioned, the PT6E-67XP engine has no mechanical connection between the throttles and the engine; it is done electronically. The PT6E-67XP engine has a thermodynamic 1,845 shp on takeoff, a maximum climb at 1825 shp and 1825 shp cruise while the pilots will have 1200, 1200 and 1100 shp respectively.

Since inception, of the over 50,000 PT6 engines produced, some 24,000 are still flying. And there are more engines to come. ✈️



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Oiled Eyeballs

FAIREY BATTLE PLAYED AN IMPORTANT WARTIME ROLE



While waiting for my grandfather in a tool shed owned by the Chapleau Electric Light and Power Company, 105 miles southwest of Timmins, I eased aside a dust-covered wooden cabinet. A spider the size of a Pratt & Whitney R-985 cylinder instantly hit the floor with an audible thud and skittered away. Before my 10-year-old hands ceased trembling, I noticed an airplane photograph tacked to the wall. The yellowed print somehow survived decades of northern Ontario cold and summer dust.

No one in the railway town knew much about airplanes, but the image stayed with me all the way to adulthood. Years later, I gazed upon a real-life example of the same type in Ottawa's Canada Aviation and Space Museum. The arachnid-free low-wing flying machine with an

oblique white stripe on the fuselage represented a British-designed Fairey Battle first flown on March 10, 1936. Powered by a 1,030-hp Rolls-Royce Merlin, the Royal Air Force planned to replace its flocks of slow-flying biplane fighters. At least 2,201 rolled through factory doors. Unfortunately, the Brits found themselves in conflict with the Luftwaffe in 1939.

The average Battle weighed 6,647 pounds empty and looked impressive with a 54-foot wingspan as well as a tail towering 15 feet, 6 inches above the English cricket fields. The sleek 12-cylinder engine matched with a three-blade propeller seemed formidable as a three-place light bomber. The RAF and the Canadians who flew them did their best, but circumstances soon showed the aircraft could not last long in wartime. Tragically, Luftwaffe pilots and anti-aircraft guns

Some Fairey Battles were flown to Iceland under escort for training and anti-submarine patrols.

blew them out of the European skies. One writer called the Battle "hopeless", another used the epithet "depressing". Author Kenneth M. Molson compared their disastrous results to an aerial Charge of the Light Brigade.

On a low altitude mission, outstanding for the aircrews' heroism, seven of eight Battles went down and during another occasion, none of five dispatched survived a bridge attack. Although outperformed by 100 mph, one persistent gunner managed to shoot down a state-of-the-art Messerschmitt Bf 109. Switched to night operations, Battles did marginally better. The real winners were French scrap dealers, who salvaged wagonloads of whatever mangled metal they could recover.

PHOTO COURTESY RCAF VIA NORMAN MCGEE

In a rare moment of reason, RAF high level planners took time away from their tea breaks to remove Fairey Battles from frontline roles and out of range of Axis fighters. Nearly 754 were shipped to Canada where they became crucial components of the British Commonwealth Air Training Plan (BCATP). As cockpit classrooms with bombing and gunnery schools, they excelled. Twin-spar wings and metal semi-monocoque construction absorbed punishments inflicted by low-time pilots and cross-eyed student gunners as long as no one shot at them.

For towing nylon sleeve targets, maintenance engineers installed a wind-driven winch on the aircraft's left side and a target drogue container under the rear fuselage. The lumbering Battles never endeared themselves to student airmen. To access the 'old bucket of bolts', they climbed into their learning stations through a large ventral hole which had originally been fitted with a protective cover. In Canada, the doors froze solidly shut and mechanics had little choice except to remove them.

"Two of us would go up together, each with a drum of ammunition for the Vickers machine gun. There wasn't much danger, I suppose, if we were careful but a gunnery station on the Battle was an open cockpit behind the pilot," wrote Flt Lt Alfred E. Church. "When firing, the gunner stood up with a strong leash snapped to his parachute harness and the other snapped to a metal ring on the aircraft frame."

"Both cadets squeezed together with one at the guns and the other braced against the wall. The position was very dangerous as the hole was large enough to fall out of. The fun started when we had to change positions," added author Don Daikins. "The upper gunner kicked the guy down below who more or less stood up and started to shuffle around the hole."

A crew member on another flight described an ordeal 400 feet after takeoff in 1941 when an ethylene glycol antifreeze line burst. Hot fluid inundated the cockpit and covered the windshield as the pilot attempted an emergency return. With goggles on, he slid the canopy open but immediately yanked them off for better vision. Not surprisingly, more fluid



slammed his face. He made the airport, collided with a snowbank and slid to a dramatic metal-tearing stop in a cloud of slush and ice. The Battle survived and the pilot became known for well-lubricated eyeballs.

Besides practice ammunition, the 'air chauffeurs' regularly hauled 11-pound bombs and had to map-read a triangular course. Unknown wind factors, varying ground speeds and inaccurate altimeters made the task difficult. Aromas from hot leather helmets in summer and frozen throats in cold seasons demanded the boarding of airsickness bags every trip. Hours droning above prairie fields or boreal bush country blended with gasoline, glycol and exhaust odours resulted in many fully filled wax-lined paper sacks. Disposal meant extra bombing practice on livestock or occasional pedestrians.

The Canadian Aviation and Space Museum's example left the British factory to board a Halifax-bound ship and continued by rail to Trenton, Ontario. Arrival took place on September 9, 1941 as No. R7384, while sister Battles spread across Canada's numerous BCATP airports. Before World War Two ended, the aircraft went into storage and by December 1, 1944 received the dreaded 'Pending Disposal' tag at Winnipeg's No. 2 Air Command.

Postwar civilians had no place for surplus Battles, although many of the original shipping cases became storage sheds and chicken coops. De Havilland DH-82C Tiger Moths, Fairchild PT-26 Cornells, Douglas DC-3s and even a few

Although 739 Fairey Battles went to Canada, seven served as instructional airframes. Canada Aviation and Space Museum's example rests serenely in a storage hangar for public tours.

Curtiss P-40s carried civil registrations. A Winnipeg automotive parts dealer jumped at the opportunity to acquire all the Battles he could tow away in order to resell their tires and wheels. In 1970, an American bought the remains of one survivor, dismantled the carcass and trucked the crates to Michigan for rebuild. Regrettably, an automobile accident terminated the purchaser and his restoration plans.

As for quiet-plodding No. 7384, historian Donald R. MacNeil explained the aircraft left storage in 1963 for restoration in Calgary by RCAF volunteers. A year later, the National Aviation Museum accepted stewardship and, under the renamed Canada Aviation and Space Museum, the import from England stands out as one of five Battles in existence. Considered obsolete shortly before the disasters in Europe, Fairey Battles still played major roles toward the climax of the Second World War. No glory came their way, unlike Avro Lancasters, Supermarine Spitfires or Hawker Hurricanes.

After recovering from the spider fright in Chapleau, I listened to my grandfather explain that his friend and co-worker, Clyde Fife, had placed that photograph in the tool shed. A modest man, he never spoke of his RCAF service. Few in the tiny railway town ever knew of Fife's contributions. He remains in my memory bank. 🐸



DIVERSITY IN AVIATION HAS FEW LIMITS

INDIGENOUS TRAINING INSTITUTE LEADING THE WAY
STORY BY ANNA PANGRAZZI
PHOTOS COURTESY FIRST NATIONS TRAINING INSTITUTE



The airport used by the First Nations Training Institute was originally a First World War military training base.

One of the most rewarding aspects of being involved in the Northern Lights Aero Foundation, NLAF, an organization that recognizes women in Aviation and Aerospace, is the amazing people we get to meet and highlight at our Annual Gala. This year one of our recipients is Jo-Anne Tabobandung, the Dean of Aviation at FNTI, the First Nations Technical Institute. FNTI is celebrating their 35th anniversary of providing culturally appropriate post-secondary programs rooted in Indigenous ways of knowing. Their stories are very interesting and intertwined. One of the most inspiring and awesome things about Jo-Anne and FNTI is that they have created a welcoming and inclusive community where close to 40 percent of their aviation students are female.

FNTI is an Indigenous-owned and governed post-secondary school which was incorporated in 1985 to provide computer and administration training to First Nations people. FNTI was created through strategic and innovative partnerships between the Tyendinaga Mohawk Council, the FNTI Board of Directors, Indian and Northern Affairs Canada and the Ontario Ministry of Colleges and Universities. In 1990 they also started offering flight training at the Tyendinaga Airport on the Tyendinaga Mohawk Territory on the Bay of Quinte in Ontario. The airport was built in 1917 as part of the British War

Office's effort to establish new pilot training grounds in Canada to aid them in the First World War. Between 2,000 and 5,000 pilots were trained at Camp Mohawk, as it was then called. The Camp ceased operations in 1918 following the Armistice and then was reactivated in 1943 during the Second World War when it became the home of the British Commonwealth Air Training Plan's No. 1 Instrument Flying School. It was at this time that three asphalt runways were constructed along with permanent hangar facilities, a control tower and living quarters. When the facility was returned to the community in ►



1990, FNTI recognized that there was a lack of Indigenous pilots and so they opened an aviation school on the old Camp Mohawk site to train First Nations, Inuit and Metis pilots.

Jo-Anne was a student in the first aviation course offered at the Tyendinaga airport in 1990 and the only Indigenous female student in her class. She had to overcome the stigma of being both Indigenous and female in a technical, male-oriented field. She graduated with her commercial licence with a multi-engine

IFR rating and then earned her instructor rating. FNTI hired Jo-Anne as a flight instructor and she used her knowledge and spirit of overcoming those stigmas to encourage and mentor Indigenous female student pilots. In 2006 she became the first female Chief Flight Instructor, a position she held for 13 years. During that time, she was appointed by Transport Canada to act as a Pilot Examiner (Private, Commercial licences and Multi and IFR ratings). Two years ago, she was promoted to the Dean of Aviation at FNTI.

Dozens of Indigenous pilots have graduated from the program, many of them going home to serve their communities.

Along the way, Jo-Anne also earned an Honours Degree and BA in Public Administration and Governance from FNTI in partnership with Ryerson University. In addition, both Jo-Anne and her husband Victor Tabobandung graduated from the FNTI Aviation program in the same year. Victor is also a pilot, and together they have three beautiful daughters.

The mission of FNTI is 'To share unique educational experiences, rooted in Indigenous knowledge, thereby enhancing the strength of learners and communities.' This mission makes the aviation program unique. Jo-Anne calls it her community within a community. Her nominator for the NLAf award wrote that it is her unyielding passion and commitment to empower people and specifically female students. Her success as an educator is not only in giving her students the technical skills, but also instilling in them an understanding of the empowerment that comes from



being grounded in their culture and gender. She has been called a champion of students and always seeks to ensure a cooperative, inclusive and culturally relevant learning environment. It seems to me that this is the sort of thing that attracts young women to the program. Jo-Anne tells me that she does not specifically go out and recruit young women but that there has been this 'word-of-mouth' promotion about the program, which seems to contribute to the increasing female population in the school. Beyond the technical training, the aviation program also offers courses in Indigenous Culture and Community. They have feasts and gatherings because food is also an important aspect of culture. Since they attract many different First Nations, Inuit and Metis cultures, there is a sharing of their food and ideas. FNTI infuses programming with Indigenous world views, knowledge and methodologies by including Elders in learning sessions and ceremonies. There is a course on communications, not just in the language of aviation but on speaking in public and communicating ideas. Empowering students in

these values of community and inclusiveness has an impact on them as mentors and role models back in their home communities. A high percentage of the graduates do return home to fly with Indigenous-owned airlines contributing to their own communities in very positive ways.

“A high percentage of the graduates do return home to fly with Indigenous-owned airlines...”

These are exciting times at FNTI. With 4,000 graduates across all programs over the last 35 years, FNTI has alumni working in all sectors of the economy including social, health and wellbeing, administration, policy and governance, aviation technology, early childhood

education, film and media. The Institute continues to grow and evolve. Cathie Findlay, the Director of Government Relations and Communication, told me their goals are lofty and achievable.

In partnership with Ontario colleges and universities, FNTI continues to offer post-secondary programs. As a result of Ontario's Indigenous Institutes Act 2017, FNTI has received accreditation as an Indigenous Post-Secondary Institute with the ability to confer its own certificates, diplomas and degrees. New Indigenous programming ready to launch include a BA in Indigenous Social Work (BISW), a BSc in Indigenous Sustainable Food Systems (ISFS), a BSc in Indigenous Midwifery, and a BA in Indigenous Justice. In an effort to grow capacity and enhance the student experience, there are plans for a new administration and academic building, a 54,000-square-foot, net-zero campus facility, home to an incubator and research facility for communities to examine Indigenous food sovereignty, community development, environmental sustainability and social entrepreneurship. ►



“The student, Rainbow Ford, the instructor, Daniella Petitti and the examiner were all First Nations women.”

In September of 2019, the Honourable Marc Garneau, Minister of Transport, announced a government of Canada investment through FedDev Ontario of \$4.9 million over three years for FNTI to expand and increase enrollment in its aviation training programs. This investment will be used to help increase their aircraft fleet with the purchase of five new training aircraft, provide resources to hire more maintenance engineers, flight instructors, dispatch staff and academic faculty. Targets are to double the number of Indigenous students going forward to take advantage of the growing opportunities in the aviation sector projected over the next 20 years.

With FNTI experiencing unprecedented enrolment in the aviation program, particularly among women, the Institute is really setting itself apart. This is the only Indigenous-owned and governed aviation post-secondary program in Canada training only First Nations, Inuit and Metis pilots, and the only training organization I know of with nearly 40 percent female participation.

In December 2020 FNTI made history again. For the first time in an Indigenous flight program's history, on a flight exam the student, Rainbow Ford, the instructor, Daniella Petitti, and the examiner were all First Nations women. That examiner was Jo-Anne Tabobandung. The Northern Lights Aero Foundation looks forward to celebrating Jo-Anne and FNTI at the Elsie Award Gala on October 16, 2021. ✈️



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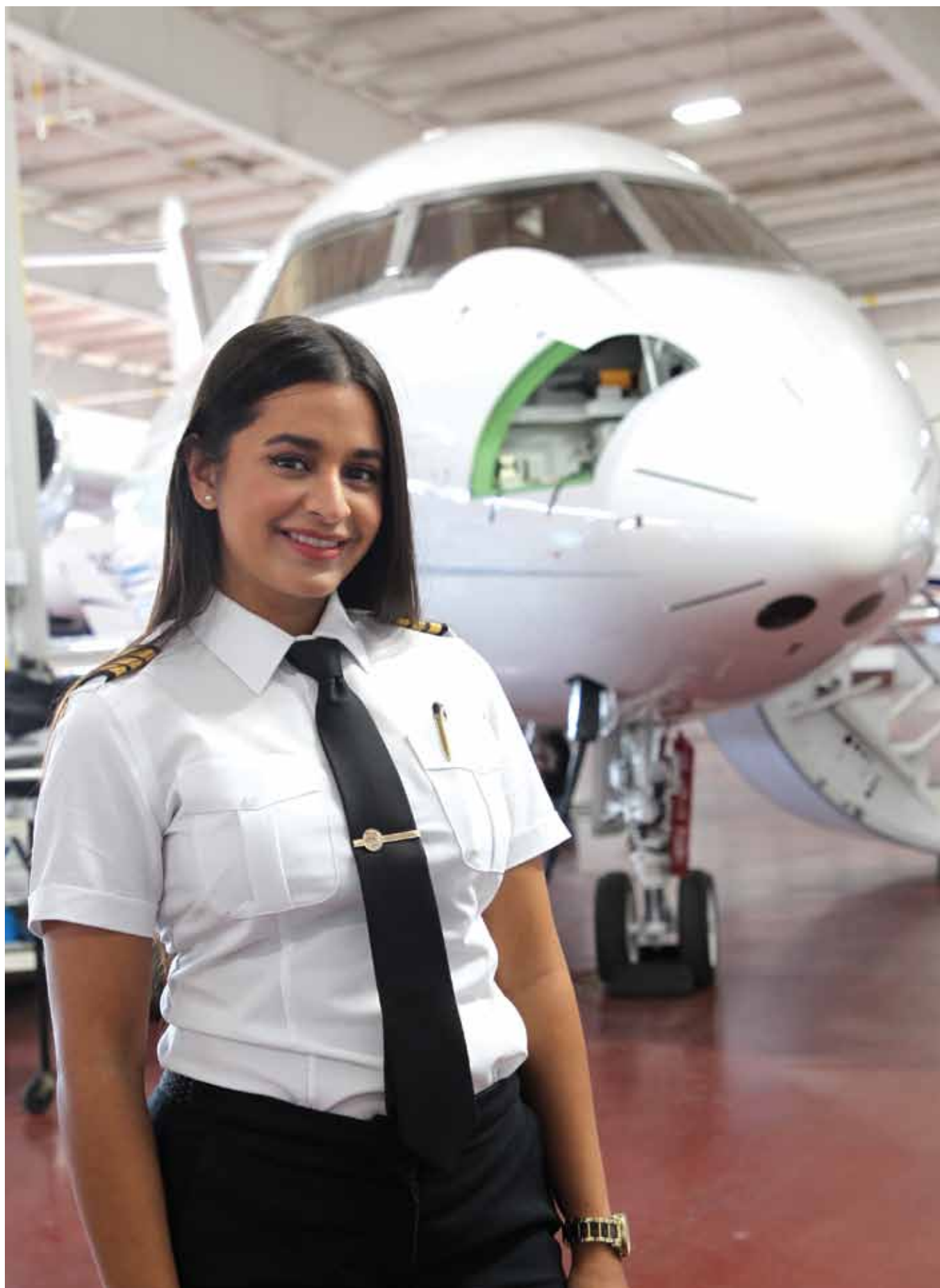


PHOTO: KEN LIN

Flight Attendant to Pilot

THE INDIRECT PATH TO MY DREAM JOB

BY ALLISON COUCH

It was two years ago when I visited Jordan where I spent a week travelling the country with the ladies from the Arabian Section of The Ninety-Nines, in town for their annual meeting. I met so many remarkable women who had achieved successful careers as pilots, and many others who were just starting out. It was their camaraderie, support and encouragement that led me to make the big leap to pursue a career as a commercial pilot. That was a defining moment for me. It was then and there when I decided to leave my job with Emirates as a flight attendant to enrol full time in professional pilot training. ▶



So, while I had thoroughly enjoyed the international experience and learning as a member of the Dubai-based Emirates team, in 2019 I made the hard decision to leave behind my career as a flight attendant as I was eager to complete my commercial pilot training. I packed my bags, returned to Canada and enrolled in the Integrated Airline Transport Pilot Licence Program at the Brampton Flight Centre, with a planned completion date of March 2021.

Following high school and wanting to pursue a career in aviation, I had studied Aviation Management at Georgian College in Barrie, Ontario. After graduation, I worked for Ornge, an air ambulance service provider, as their Aerodrome Conformance Specialist. I oversaw the inspection and maintenance of more than 80 helipads across the province of Ontario. Though wanting to be up close to real airplanes, I

“I too have now taken on the mentor role to students wishing to progress a career in aviation...”

moved into maintenance planning at Skyservice Business Aviation, where I learned about the corporate aviation sector and business aircraft.

Working full time, I was able to take up flying lessons and earned my Private Pilot Licence while completing my master's degree in Aviation Management at the same time. However, I subsequently became infected with the travel bug and joined Emirates as I needed to get out and see the world. More importantly, I needed to build up my savings to continue commercial flight training.

The international experience also taught me how to work as an integrated team member with colleagues from a multitude of cultures and backgrounds. I have been privileged to travel to more than 70 countries.

Being a flight attendant was a fun and rewarding career but Allison Couch had bigger aviation plans.

PHOTOS COURTESY ALLISON COUCH



The path from the cabin to the left seat was complicated but ultimately worth it.

Apart from flying, my father always challenged me to get out more. I followed his advice and joined Women in Aviation and The Ninety-Nines. Both are great organizations that support, encourage and mentor female pilots and, indeed, support all women wishing to enter any career field in aviation. I am Secretary for the First Canadian Chapter of The Ninety-Nines and Membership Chair for the Upper Canada Chapter of Women in Aviation. I met some incredible ladies who have been there for me, through every step of my career.

I owe a big thank you to two special ladies who mentored me with valuable guidance, tips and advice. And, more importantly, they held me accountable to achieve my goals. I too have now taken on the mentor role to students wishing to progress a career in aviation, to pay it forward for those who assisted me.

Some advice I would offer anyone interested in becoming a pilot would be, the sooner you get started, the better. I also encourage anyone with an aviation interest to get involved in the many organizations that offer comradeship and support to start and grow your career. There are many great organizations such as The Ninety-Nines, Women in Aviation, Women in Corporate Aviation, Northern Lights Aero Foundation, Elevate Aviation and, here in Toronto,





The future is bright for young pilots and Couch says the sooner they start training the better.

the Urban Pilots Network that encourage, support and mentor young aspiring aviation professionals. And don't forget, there are numerous scholarship opportunities available that can lessen the financial burden of not only flight training, but also lessen the cost of higher education such as college and university. And always, always, always network with your peers and others in the industry. As my father always tells me, "You need to get out more."

It is a small world where everyone is supportive of one another. The aviation world is made up of an extraordinary and unique group of people who share a passion for the industry with energy and enthusiasm that is not seen anywhere else. It is contagious, and a little bit crazy, but once you've been a part of it, there is no turning back.

Though I did not realize it at the time, it was all the networking that opened the door to my first flying job. I am privileged to be flying on a Pilatus PC-12 as co-pilot for a corporate operator.

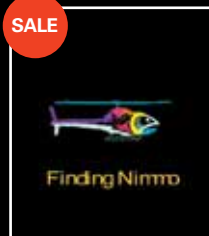
Becoming a commercial pilot can be a fulfilling and rewarding career, but it does take discipline, commitment and hard work to achieve your aspirations. Flight school is intense, and it is expensive. I must be constantly mindful to budget wisely and be disciplined in my spending habits.

I do not have much of a social life anymore and little time for personal hobbies. However, I am fortunate to have a supportive circle of family and friends who continue to support me through my training. I know the results will be totally worth it. ✈️

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GARMIN'S D2AIR

A SMARTWATCH FOR PILOTS
BY STEVE DRINKWATER



Garmin is a name that pilots have long associated with aeronautical navigation systems that incorporate GPS. Over the years the U.S.-based manufacturer designed and built portable navigational devices for a broad variety of applications beyond aviation, such as those found in the marine, automotive, recreation and outdoor adventure industries. Just as the technology in portable navigation devices has been progressing by leaps and bounds over the last few years, so has the technology in the devices we wear on our wrists. ►



Garmin began with a range of watches designed for aviation use, comprising the D2 Pilot (debuting in 2013), the D2 Bravo and the D2 Charlie, all since discontinued and followed by the D2 Delta, D2 Delta S and the D2 Delta PX. Last fall Garmin released its latest addition to the D2 family, the D2 Air.

The day the D2 Air smartwatch arrived at my home was a particularly stressful one for me. There were legal matters to attend to as well as a looming press deadline. Nevertheless, I decided to open the box midmorning and, after checking that there was some battery life left, replaced my Apple Watch with the D2 Air, which promised to be more useful to a pilot than what it was replacing.

There were a few questions I needed to answer to complete the initial setup, which is done via a smartphone app

appropriately named Garmin Connect. Among the questions it asked was if I wanted it to be paired to my iPhone (yes) and whether it could access my iPhone's Health app (again yes). Then it was back to dealing with the day's more pressing matters.

Ten minutes didn't go by before I felt a vibration on my wrist; it seemed the D2 had something to tell me. A glance at the watch face confirmed my suspicion and made me realize that this was no ordinary watch. The message read, "High Stress", and it was not lying. More on this and related functions later.

After dealing with my urgent business matters, there was time to do a bit more watch exploring. The D2 uses a touch screen (made of scratch-resistant Gorilla Glass) and one needs little reference to its manual to figure out many

Garmin's D2 Air makes for a great backup device in the cockpit.

of the basic functions as they are somewhat intuitive. There is also plenty of online support from Garmin, including YouTube videos to provide coaching on its functions.

There are the usual aviation-related features that one would expect to find in a watch meant for the cockpit, such as UTC and other time zones, alerts and timers (which I use for alternating between my fuel tanks) and a barometric altimeter, which can be set manually or to a favourite airport. It even comes with Garmin's Pulse Ox function, which monitors your SpO₂, the oxygen saturation level in your blood. This feature could prove useful should you not have another source for measuring your SpO₂ and

you find yourself, unexpectedly or otherwise, climbing to altitudes that weren't originally planned; the function's vibrating signal will alert you before you become hypoxic.

Want to check METARs and /or TAFs at your airport of departure or destination? The Air will display that for you. When linked to Garmin Pilot, an electronic flight bag (EFB) application that allows for flight planning, filing and logging, the D2 Air can serve as a stand-alone navigational instrument. Your destination and any waypoints are transferred to the Air and an HSI course needle will keep you on course. There is a 'Direct to' function that accesses a global aeronautical database, which also supplies you with airport information such as altitude, radio frequencies and runway lengths.

Flight time can be recorded simply by pressing one of two buttons on the side of the watch. At the end of the flight, pressing the same button again will allow you to end the flight recording. In the meantime, the Air automatically starts logging airtime when a customizable rate of climb is exceeded (500 fpm is the default setting). The recorded data can then be automatically transferred to your *flyGarmin.com* account.

However, given its small size, it should only be considered as a back-up — one more level of redundancy in the ever-increasing computerization of our navigation skills, a trend that leaves many pilots with a blank look on their face when challenged to navigate somewhere by using 'dead reckoning' or even much-neglected map-reading and course-plotting skills.

Non-Apple users will be pleased to learn that both the D2 Air and the Garmin Pilot app are compatible with Android devices.

Any review of the D2 Air would be remiss without a mention of the other capabilities of the D2 Air, such as Garmin Pay. However, as of this writing, no Canadian bank has signed up to participate. This is unfortunate, as being able to pay for purchases around town without reaching into my pocket, with just a flick of the wrist, has been a very useful feature I take advantage of with the Apple Watch, especially in these pandemic times.

Garmin is also a leader in fitness smartwatches. Indeed, Garmin first

entered the wearable technology market when they introduced their first fitness watch back in 2003, the Forerunner 201. Bulky by today's standards, it nevertheless opened a new product line for them. Armed with the expertise gained from their long line of fitness watches, it was a logical move to equip the D2 Air with a full suite of fitness and health monitoring features. Running? Skiing? Hiking? Working out in the gym? The D2 Air will monitor and report back to you on your progress and fitness levels. It can also be set up to record input from wireless fitness sensors.

Advance sleep monitoring is another feature that will report to you on your sleep quality (taking advantage of its SpO₂ and heart monitoring features). And, as mentioned earlier in this review, the D2 Air monitors your stress levels and alerts you when it determines that a minute or two of deep, slow breathing will help you to relax.

Are you a golfer? You can download the layouts of virtually any golf course and receive the current hole number, a map of the green, the distance to both the front and the back of the green, the selected pin location and the par for the hole.

If the smartphone that the D2 Air is paired to allows for notifications, you can also receive them on the Air, text messages included. It will also alert you to phone calls, but you will need to grab your phone to actually converse.

One area where the D2 Air really stands out is its battery life. Advertised as lasting approximately four to five days, I can attest to the validity of their claim; on this feature, Garmin greatly outperforms Apple by a factor of four.

It's obvious the Garmin wants its smartwatch to be the one you wear most, if not all, of the time. Considering its many capabilities many pilots, especially physically active ones who would take advantage of its fitness monitoring features, may well do so.

At C\$699, the D2 Air is priced at the bottom end of Garmin's aviation watch lineup. What do the other watches in the D2 family offer that the Air doesn't? The most obvious feature is a moving map. However, given the form factor, its utility in a cockpit is probably questionable.

The verdict? Suffice it to say I miss flicking my wrist to pay at the supermarket. 🐦

“Non-Apple users will be pleased to learn that both the D2 Air and the Garmin Pilot app are compatible with Android devices.”

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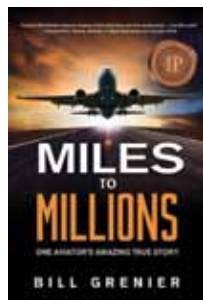
In Plain Site

Based on interviews as well as meticulous archival research in Canada and overseas, *In Plain Site* provides a comprehensive chronicle of

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Miles to Millions

The senior captain for Air Canada showed up for every flight even as he built a real estate empire worth a billion

dollars. Grenier's ready wit and the many twists and turns of a penniless 19-year-old commercial pilot's career built on perseverance and the willingness to take risks takes readers on an unusual journey, even for the the aviation industry.

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Maverick in the Sky

In *Maverick in the Sky* the author paints a fascinating portrait of flying ace Freddie McCall, one of the most successful fighter pilots of World War I. McCall's bold spirit might well have been inherited from his clan motto *Dulce Periculum — Danger is Sweet*. His amazing wartime accomplishments, his extraordinary flying skills, his fiercely independent barnstorming character and his self-reliant entrepreneurial spirit make him one of Canada's most spectacular mavericks.

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Gordon Bartsch recounts how he used skill, ingenuity, and a good share of luck to create an airline serving the Big Dipper route in the

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Author: Gordon Bartsch

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Johnny

Air Commodore John Fauquier, 'Johnny' was Canada's most decorated airman. He did it all during his flying career as a bush pilot, flying instructor, bomber pilot,

squadron commander, pathfinder, master bomber, base commander, and finally leading the legendary 'Dambusters' squadron as they dropped 22,400 lb Grand Slam bombs on Nazi targets.

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Author: Deanna Driver

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Yukon Wings

An illustrated history of the birth and development of the aviation industry in the Yukon. Filled with hundreds of superb previously unpublished

photographs, this is an astonishing book of ingenuity and determination in the face of unrelenting setbacks.

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One of the themes that runs through this book is the enigma of aircraft that disappear, sometimes within miles of busy airports and crowded cities, and cannot be found despite desperate and prolonged searches.

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Best Seat in the House

Jim Griffith and Trans Canada Airlines were both born at about the same time and

grew together over the decades. Griffith experienced the history of Canada's national airline and this book tells the story of both.

By Jim Griffith

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Riding the Fire

Riding The Fire is the biography of businessman and pilot, David McCulloch, whose adventures around the world are

covered in this book. He stacked up over 180 countries in his travels. All of his trials and tribulations are related in this biography that reads more like a novel; a rags to riches saga.

By Don Ledger

Price: \$28.95 (includes shipping)



Farm Boy to Fly Boy

Fascinating and insightful, this book will appeal to those who are fascinated by the military and flying as well as those who are simply seeking a first-

person account of what life was really like for the men and women who served in the RCAF throughout one of the most pivotal periods of twentieth-century history.

By: Col [Ret] G. Brennand

Price: \$24.75 (includes shipping)



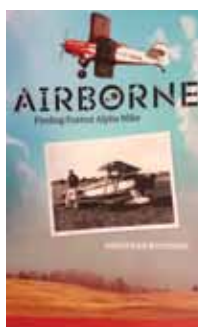
View from the Tower

The View from The Tower is a combination of humour, history, geography and memoir taking the reader through one adventure after another. An ode to

airplanes and flight and a respectful tribute to a special time in BC's history. The reader is transported to a place and time that no longer exists.

Author: Grant B Evans

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Airborne

In this story of a father and son, Jonathan decided to track down the object that had once given his father so much joy: a tiny single-seat biplane called Charlie Foxtrot

Foxtrot Alpha Mike and retrace his father's airborne life.

By Jonathan Rotondo

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Wings Over High River

As this biography was released, this remarkable pilot owned and continued to fly Tiger

Moth #1214, one of the aircraft in which he taught students during World War II. He owned and flew his beloved 1214 well into his 80s and made many contributions to Alberta and Canadian aviation.

Author: Anne Gafiuk

Price: \$51.00 (includes shipping)



Otter and Twin Otter

The compelling tale and a beautifully illustrated homage to two of the world's greatest aircrafts and of the engineers and pilots who made the Otter and Twin Otter aviation legends.

By Sean Rossiter

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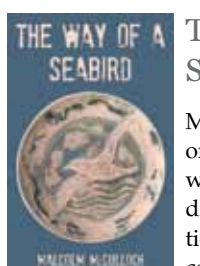
Vertical Horizons

Okanagan Helicopters achieved world renown from humble beginnings in British Columbia's interior by developing a

mountain flying technique that is still a fundamental of helicopter flight training. Featuring first-hand accounts, extensive research and a multitude of photographs, Vertical Horizons is the first-ever history of this company.

Author: Doug. Grant

Price: \$55.95 (includes shipping)



The Way of a Seabird

Malcolm McCulloch, once an airline captain with Air Canada, had dreams and aspirations for his life, which could only be realized

by resigning from his lucrative 17-year career and allowing himself to interact with events randomly and spontaneously. The author invites his readers to share the entirety of this thirty-year inspirational journey.

Author: Malcolm McCulloch

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By S.R. (Rick) Found

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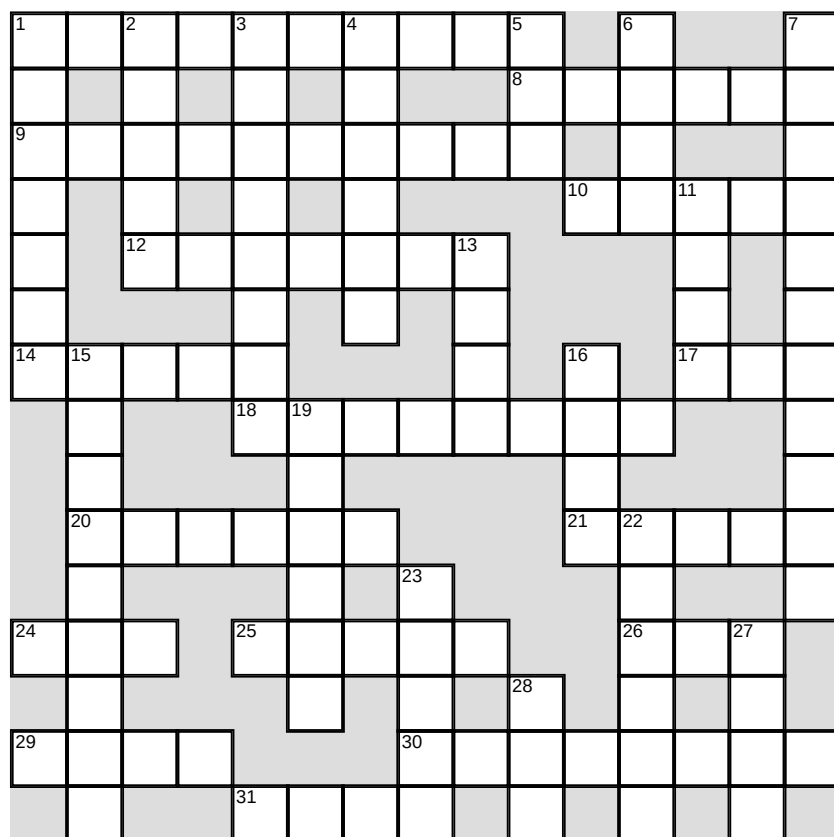
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Aviation Crossword Puzzle: *Aircraft of the British Commonwealth Air Training Plan*

In this month's puzzle there are names of nine aircraft (clues marked with an asterisk [*]), that were used in Canada during the British Commonwealth Air Training Plan (BCATP). Other clues, but not all, are aviation related.



ACROSS

- 1 Those who prevent death.
8 Where the passengers are.
9 They store an electrical charge.
10 Goodbye in Quebec.
12 Also a Texan.*
14 Walter's aerobatic design.
17 Found on an airspeed indicator.
18 A man from the North? *
20 Cause to become hard and bony.
21 It carried Aldrin and Armstrong to the moon's surface.
24 A measure of frequencies.
25 He played Colonel Hogan.*

26 *Cervus canadensis*.

- 29 During the Second World War, New Zealand was one.
30 Opposite of the Orient.
31 A juvenile deer.*

DOWN

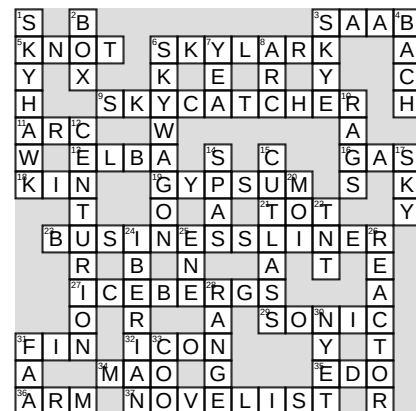
- 1 Most pilots require one.
2 Peter won a posthumous Academy Award for 'Network'.*
3 Boeing's contribution.*
4 A set of flight rules.
5 British army commando unit.
6 It was paved with yellow bricks.

7 Brought to an end, typically a court case.

- 11 International association of airlines.
13 A tenth of a dollar.
15 One who loves the exotic.
16 Famous manufacturer of padlocks.*
19 A shoe style.*
22 To-do list, sometimes hidden.
23 An AVRO that also saw post-war duty with the Royal Canadian Navy.*
27 Canada's prime minister during the Second World War.
28 Edmonton's Howard Blatchford was one.

REFRESH YOUR MEMORY

- What two principal factors influence longitudinal stability?
 - The weight of the engine and the wingspan.
 - The size and position of the horizontal stabilizer, and centre of gravity position.
 - Tail-wheel versus nose-wheel, and high-wing versus low-wing configurations.
 - The size of the cabin, and the length of the fuselage.
- An aircraft's longitudinal stability is its stability around which axis?
 - The lateral axis.
 - The longitudinal axis.
 - The normal axis.
 - The vertical axis.
- What causes asymmetric thrust?
 - The descending propeller blade's greater lift at a high power setting and a high angle of attack.
 - A sudden change from a nose-up to a nose-down attitude with no change in power setting.
 - An improperly rigged rudder.
 - Crosswinds on takeoff.
- When will an aircraft glide its furthest distance?
 - When gliding into a headwind with its nose held higher than that which gives best lift-drag ratio.
 - When it's gliding with a tailwind that is greater than 10 percent of its stall speed.
 - At its airspeed which results in an angle of attack that gives the maximum lift-drag ratio.
 - When gliding over heated ground.
- VFR over-the-top flights in Canada
 - may not be conducted in Class B Airspace.
 - may be conducted if the weather is IFR at ground level.
 - may be conducted when the departure and destination points are forecast to have VFR weather.
 - are not permitted except for pilots with an IFR rating.
- Which of the following is not a VOR frequency?
 - 126.7 MHz.
 - 117.5 MHz.
 - 113.4 MHz.
 - 115.2 MHz.
- What is the normally recommended airspeed for power-on approaches for a short-field landing?
 - The aircraft's power-off stall speed plus 10 knots.
 - The aircraft's power-off stall speed plus 1.5 times the wind speed component.
 - 1.3 times the aircraft's power-off stall speed.
 - The aircraft's power-off stall speed plus 10 percent of its best glide speed.
- High frequencies (HF) are found between
 - 3,000 KHz and 30,000 KHz.
 - 30 MHz and 300 MHz.
 - 300 KHz and 3,000 KHz.
 - 300 MHz and 3,000 MHz.



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