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ON THE COVER

Montreal-based Air Transat is currently in the middle of a fleet renewal process that will ultimately see it operating wide-body Airbus A330s (shown here) as well as single-aisle variants of the A321. **John Chung Photo**

Find this issue's bonus content at
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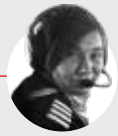

WHAT'S ONLINE?

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SOCIAL SNAP

An Air Canada Express Q400 turboprop departs through cotton candy clouds during golden hour. **Alvin Man Photo**

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COLUMN

From the Editor

BY LISA GORDON

A matter of trust

I was attending my nephew's birthday party at a trampoline park when I noticed an indoor rock-climbing wall. Now, this is something I have always wanted to try! Feeling adventurous, I got in line behind three little girls who were roughly half my height.

When it was my turn to ascend the wall, which was perhaps only 25 feet tall, the teenager overseeing the activity hooked me up to the harness and told me to give it a go. Surprisingly, the climb itself was fun and quite easy.

It was the descent that was scary. At the top of the wall, there was nowhere to go but down.

I had been told to just "let go and the rope will bring you down." But as I froze at the top of the wall, the rope seemed more than a little bit slack and decidedly untrustworthy.

Finally, I commenced a very awkward descent, banging off the wall on the way down before collapsing in a heap on the mat at the bottom. The teenager—barely suppressing his laughter—offered to let me try it again.

Straightening my shoulders, I took him up on it.

This time, when I got to the top, I put my trust in the rope and effected a much more graceful descent. I wasn't exactly rappelling, but let's just say I was more in control and managed to land securely on my own two feet!

That whole experience got me thinking about trust and what a necessary (and fragile) commodity it is, especially in aviation.

Without trust, this industry cannot prosper.

During the commercial aircraft certification process, for example, there is an inherent trust between manufacturer and regulator to share all pertinent details and identify any shortcomings. Then, there is the operator's trust in the manufacturer's product, a basic assumption that it will perform reliably and safely as advertised. And, finally, there is the public's trust in manufacturers, regulators and operators. When they board an airplane that will defy gravity and rocket them through the sky, they are trusting the manufacturer that built it, the regulator that certified it, and the operator that flies it with their very lives.

When you think about it, this entire industry is built on trust.

That's why the facts, reports, rumours and innuendos about Boeing's 737 MAX family of aircraft are disturbing on so many levels.

We have a manufacturer who allegedly accelerated the 737 MAX design program in an effort to compete for orders with arch-rival Airbus. Along the way, Boeing has been accused of missing crucial safety checks and underestimating the need for pilot training on the new model. *The New York Times* quoted a MAX wiring technician who said that during the early development stages, blueprints were "sloppy" but that he was told instructions for the wiring would be clarified "at a later date."

And then we have a regulator, the Federal Aviation Administration (FAA), whose stamp of approval was once considered the gold standard in aviation certification. Now, that golden glow is tarnished. The FAA is currently defending its March 2017 approval of the 737 MAX in Congressional hearings, in which hard questions are being asked. Connecticut Senator Richard Blumenthal submitted a letter to the U.S. Department of Transportation on March 19 demanding an inquiry into "actions that the Federal Aviation Administration (FAA) took or failed to take before approving the Boeing 737 MAX aircraft to fly, in response to any safety concerns raised after the aircraft had been approved, and during the period after the first 737 MAX 8 crash when the aircraft's deficiencies had become apparent."

Let's not forget about the many operators of the Boeing 737 MAX, whose planes are grounded indefinitely. Southwest Airlines, which operates 34 MAX 8 aircraft, said on March 28 that the grounding forced the cancellation of 2,800 flights during the period ended March 31. The carrier estimates it will lose US$150 million in revenue during the first quarter of 2019. Closer to home, Air Canada said it will keep its 24 MAX aircraft grounded until at least July 1. WestJet and Sunwing are also affected.

Will anyone compensate these and many more carriers for lost revenue as their brand-new aircraft remain chocked on airport ramps around the world?

Finally, and most importantly, what about the flying public? For years, the Boeing 737 has been heralded as the best-selling aircraft in commercial aviation history. A familiar saying among many pilots was, "If it's not Boeing, I'm not going."

One year ago, the company celebrated the 10,000th 737 aircraft rolling off the production line in Renton, Wash. A scant 12 months later, the line's reputation is in tatters. Before the U.S. and Canada grounded the MAX family on March 13, North American airlines were besieged by calls from panicked travellers who wanted to be sure they were not booked on a 737 MAX.

How long will it take before people can board an aircraft and see "737 MAX" on their seatback safety card without immediately connecting it to the Lion Air and Ethiopian Airlines disasters? How many will avoid booking on these planes no matter the cost?

The sad truth is that as reliable and safe as Boeing's 737 family has proven itself to be, it takes just one terrible incident to erase that positive track record. Boeing has had two within five months.

As I write this on March 29, there are reports that Boeing has announced a software fix and additional pilot training for the MAX aircraft that will address problems with its Maneuvering Characteristics Augmentation System (MCAS). Apparently, the system will now compare inputs from two sensors instead of one, won't repeatedly activate, and won't stop a pilot from overriding it. Let's hope this fix can be approved and installed on the global fleet quickly.

I am reminded of the old euphemism that, "Trust takes years to build, seconds to break, and forever to repair."

Just like the rock-climbing wall, without trust, it's a bumpy ride to the bottom.

Lisa Gordon is editor-in-chief of *Skies* magazine, Canada's largest and most-read aviation industry publication. Contact her at lisa@mhmpub.com.

COLUMN

In the Jumpseat

BY THE HONOURABLE MARC GARNEAU

Updating flight and duty time regulations

No matter what we do, no matter what our responsibilities might be, we can only be at our best when we're fully awake and alert.

Fatigue decreases awareness–it slows reaction times, it impairs judgment, and ultimately, it can make us lose control.

Adding to an already problematic situation, fatigue also impairs our ability to judge just how tired we really are.

Fortunately, due to scientific advances, we now have a better understanding of fatigue and its effects than we did in the past. It is important to consider and apply this knowledge in Canada.

It is with that in mind that we have now finalized new regulations on flight crew fatigue management, which were published on Dec. 12, 2018. They will be implemented over the next few years, and Transport Canada is helping the air industry adjust to the changes resulting from their implementation.

The regulations introduce new flight and duty time limits that are based on modern science. These limits are aligned with those of the U.S. and Europe, as well as the International Civil Aviation Organization's standards and recommended practices. Larger carriers have two years to implement the changes. Smaller airlines have four years to adapt to the new regulations.

The Government of Canada understands the challenges that small carriers and northern carriers face because of the complexity of their operational environment. We've taken these challenges into consideration, and this is reflected in the new regulatory regime. For example, we have exempted emergency operations from the new regulations. These operations, such as medical evacuation flights and firefighting, will continue to be covered by the previous regulations.

We know that a one-size-fits-all approach will not work under all circumstances. Therefore, the new regulations offer flexibility for operators to use a Fatigue Risk Management System (FRMS) to manage fatigue, as long as the operator can demonstrate an equivalent level of safety.

With an FRMS, an air carrier can adapt its policies, procedures, and practices to manage fatigue risk based on their particular operational circumstances. This can give operators more flexibility. However, they must demonstrate that this flexibility will not affect flight crew alertness and safety. To ensure that all safety requirements are met, Transport Canada will review all FRMSs, and provide support to all operators opting to use them.

> "Our new regulations align with modern science, as well as international standards and best practices."

To further enhance aviation safety, our "Fit for Duty" rules have also been updated. Under these new rules, all flight crew members are prohibited from working when not fit for duty because of alcohol or drug consumption, mental and physical conditions, and fatigue.

Canadians can rest assured that their safety is an important priority for the Government of Canada. Our new regulations align with modern science, as well as international standards and best practices.

Transport Canada continues to work with operators in the aviation sector, to ensure we have guidance material and tools to support their operations. Our new regulations are the result of a long and very thorough consultation process. We consulted with stakeholders, including airlines, small air operators, pilots, unions, professional associations and other industry groups.

I am grateful to everybody who contributed to this collaborative effort. We developed these new rules to ensure air travel remains safe for Canadian travellers, flight crews, and everybody in the air and on the ground.

The Honourable Marc Garneau is Canada's Minister of Transport.

COLUMN

View from the Hill

BY KEN POLE

NOISE: Are complaints ruled by a tyrannical minority?

Even the glider community isn't immune from it. Noise, that is. Those otherwise soundless aircraft generally need a piston-engined tow to reach a release altitude.

The fact is, regardless of size or engine type, our collective passion is a noisy one. And like any noisy activity, it's best to keep it down if you don't want the neighbours to complain!

More and more of us are opting to live in or near major municipal centres so it's hardly surprising that increasing population densities near airports or under flightpaths evidently are being matched by rising noise complaints from neighbouring communities.

The House of Commons Standing Committee on Transport, Infrastructure and Communities, after hearing witnesses on and off since late October, has released a report on "the impact of aircraft noise in the vicinity of major Canadian airports."

The 43 witnesses included individuals, health and aviation professionals and representatives of local governments.

Antonio Natalizio, a resident of Etobicoke on the eastern edge of Toronto Pearson International Airport (YYZ), the busiest hub in the country, acknowledged "the benefits of airports to our city and region" but urged the committee to balance "the health impacts of noise, the need for noise regulation and the need for a long-term plan."

He pressed for elimination or at least curtailment of night flights, saying that the few Canadian civil air regulations pertaining to noise were "ineffective and insufficient" and had permitted the Greater Toronto Airport Authority (GTAA) to reduce its restricted night operations window to six hours from eight.

"The GTAA wants to make Pearson the biggest international airport on the continent, and to do that, it will keep increasing night flights," Natalizio said. "Airports such as Heathrow, Sydney, Zurich, Munich and Frankfurt are leaders in aviation noise management because of government regulation."

David Kaiser, a medical officer in Montreal's office of public health, which has been working on the airport noise issue for the last decade, cited World Health Organization (WHO) guidelines published late last year and based on "high-quality evidence" about airport noise.

"Annoyance over time is something that really does affect quality of life and is related to other health impacts," he said, adding that there is growing evidence of a link between aircraft noise and sleep loss. "Even more concerning is that, in the long term, there is now moderate-quality evidence that aircraft noise specifically has impacts on cardiovascular health."

Echoing Natalizio, Kaiser called for an overnight ban at Montreal-Pierre Elliott Trudeau International Airport (YUL), which last year unveiled plans for a new $4.5-billion terminal. He wants it stopped.

Moreover, he wants the government to "take back control and monitoring of the international airports" and said Local Airport Authorities (LAAs) "have essentially become a law unto themselves on land they rent from the federal government."

There's an element of truth in that, but the LAAs are businesses and, frankly, they are running better than when they were government operations. Besides, Transport Canada has neither the budget nor, I suspect, the inclination to get back into airport management.

Back to the complaints. Yes, complaints have been increasing in recent years, but the raw numbers merit a closer look.

As Canada's largest hub and surrounded as it is by municipal build-up, YYZ was predictably the focus of the largest number of complaints in 2017, the latest year for which data are available. The total was 168,876 complaints, but 66 per cent were from just 29 callers!

At Calgary, five callers lodged 72 per cent of 5,700 complaints and just two accounted for 48 per cent. At YVR, just four individuals, including two who lived 23 kilometres from the airport, lodged 64 per cent of the 1,293 complaints. And at YUL, three individuals were responsible for 27 per cent of the 543 complaints that year.

> "Yes, complaints have been increasing in recent years, but the raw numbers merit a closer look."

Is there a pattern here? It could be argued that there's a tyranny of the minority at work—but it seems the committee is sympathetic.

Among other things, it urges Transport to "recommend" that Nav Canada, the LAAs and operators "carefully consider noise impacts" in their decisions, policies and equipment-purchasing decisions.

It also wants carriers to install noise-reducing equipment "as soon as possible as it becomes available" and to update Transport on their progress at the risk of being sanctioned for non-compliance.

Hello! Has anyone noticed the huge investments this economically-critical industry has made in newer platforms with quieter engines?

The committee also wants detailed guidelines for airport noise management committees so as to enhance public participation in LAA decisions which "may involve significant operational changes . . . affecting flight paths or any other significant decisions that could increase noise pollution."

As for the effect of noise on health, the federal government is urged to work with municipal, provincial and territorial health authorities to support research "to better understand the impact." It strikes me that the WHO guidelines referred to by Kaiser would make this unnecessary.

The committee suggests as well that airports could "rotate" runway use "in a more equitable way, where possible, in order to better manage noise" and that carriers could reduce aircraft noise with continuous descent on approaches.

Again, the skeptic in me thinks Mother Nature might have something to say about those ideas.

Ken Pole has had a life-long passion for aerospace, writing about all its aspects for nearly 40 years. The longest-serving continuous member of the Canadian Parliamentary Press Gallery, he's also an avid sailor.

COLUMN

Focal Points

BY TONY KERN

"Rarely satisfied"

I recently sat in on an employment interview for a senior executive at a mid-sized aviation firm. His background was ideal for the job he was applying for and from all aspects of his resume, he fit tongue and groove into the job opening. He had the right degrees, and the right work experience.

But this was really not much different than what we had seen in dozens of other applications. What made this jobseeker stand out was one statement at the very end of his resume, in the "personal interests" section.

Instead of the typical "I like outdoor sports and dogs" baloney you see so often, he wrote two words: "Rarely satisfied."

He arrived in a nice—but not *too* nice—suit with an open collar and appeared very relaxed. After 30 minutes of questions and great answers on leadership styles, the importance of process thinking and teamwork, I decided to probe this odd phrase I had never seen before on a job application. I asked him simply to, "Tell me about the last two words on your resume." He smiled.

He explained that he felt we live in a world steeped in mediocrity, where people tell themselves nice things about where they are in life, and what they have accomplished. He went on to say that left unchallenged, this fiction becomes reality for many people and most organizations.

"Most organizations live inside this fictional world and more than anything else, this prevents them from reaching their potential and their goals."

The group around the interview table fidgeted a little, the truth of his statement striking a little too close to home. At the end of the interview, they all agreed they needed this guy, and offered him the position.

What began as a simple interview turned into a corporate awakening, where they challenged everything they thought about their organization. All continuous improvement and problem solving began with a chronic unease that accompanied the two words *rarely satisfied*.

From a personal perspective, we should all begin to question our current state of professional readiness. Are we really as good as our track record? What have we conveniently forgotten about our past mistakes, close calls, and things we might have done better? Do we take the time or have the intestinal fortitude to be rarely satisfied with our day-to-day performance?

In the words of surgeon and author Atul Gawande in his book *Better: A Surgeon's Notes on Performance*, "betterment is a perpetual task." We all know this intuitively, and realize that in a high-risk industry like aviation the safety of our clients and employees demands the ongoing pursuit of new ways to identify hazards, train employees, and grow. Yet even with this obvious need, we far too often look to our past successes as validation that this can wait. We make this mistake at our own peril.

We need only look at the recent tragedies surrounding the 737 MAX program to see this play out in the headlines. New technology, stressed timelines for roll-out, and a host of other factors we will discover in the weeks and months to come created conditions where pilots were operating aircraft they did not fully understand and had not been adequately trained on.

> "The well documented human tendency referred to as *confirmation bias*—the selection of evidence that supports what we want to believe and the denial or exclusion of contrary data or evidence—sets the stage for failure."

When push came to shove, the manufacturer, the regulator, and the operators were satisfied that they had done enough to field the aircraft safely. They had not. The well documented human tendency referred to as *confirmation bias*—the selection of evidence that supports what we want to believe and the denial or exclusion of contrary data or evidence—sets the stage for failure.

By becoming rarely satisfied with the status quo or confirming evidence of our competence, we can sniff out barriers to our improvement and sometimes even our safety. Most of us prefer a softer way, avoiding the obstacles through self-deception about our level of performance. By being rarely satisfied, we identify the obstacles in our path.

Roman Emperor Marcus Aurelius put it this way: "The impediment to action advances action. What stands in the way becomes the way."

Standing at a wall of opposition identified in this manner can be intimidating, but it also creates motivation. As we move forward in our pursuit of excellence, let us do so by telling ourselves the hard truths about what stands in our way, beginning with our own levels of satisfaction.

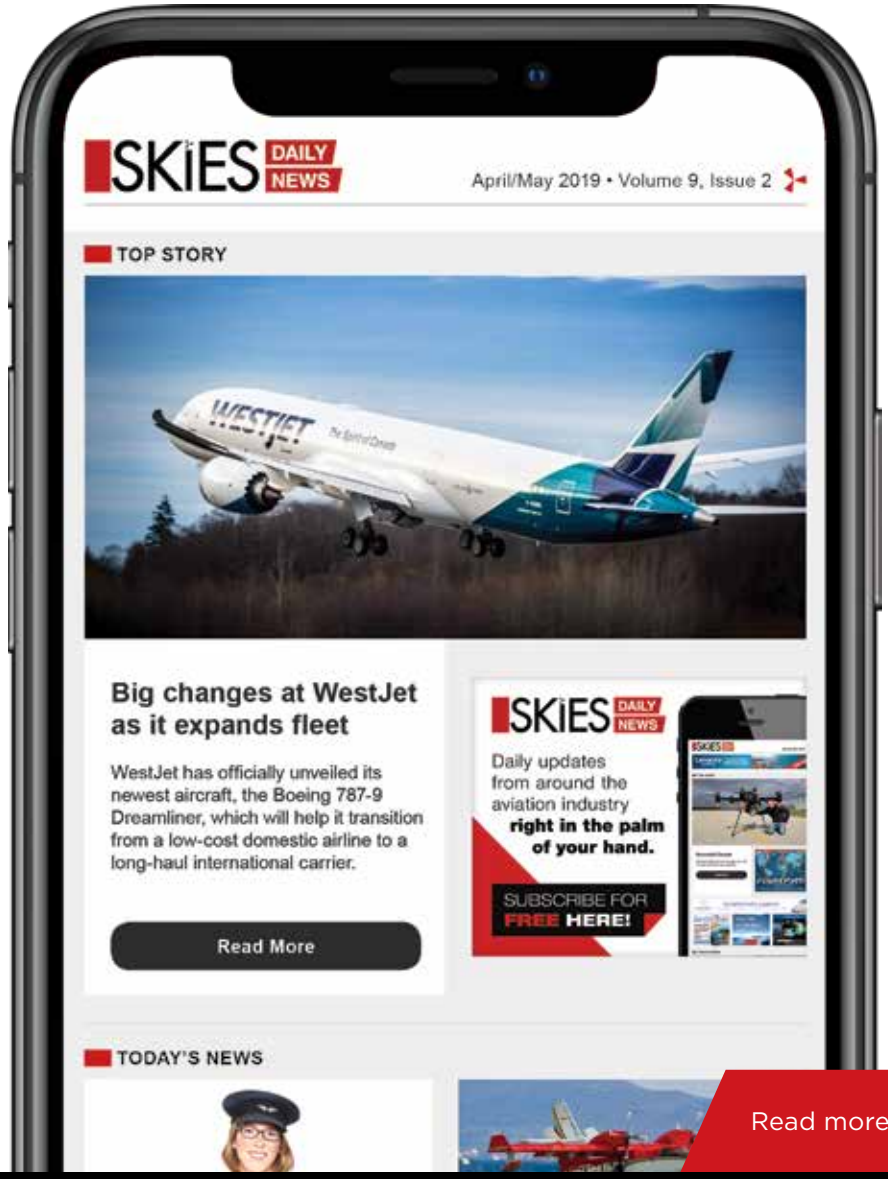
Editor of the *Controlling Pilot Error* series, **Tony Kern** is one of the world's leading authorities on human factors training in aviation. A former lieutenant colonel in the U.S. Air Force (USAF), he served as chief of cockpit resource management plans and programs at the USAF Air Education and Training Command. He is the author of three bestselling aviation books: *Redefining Airmanship*; *Flight Discipline*; and *Darker Shades of Blue: The Rogue Pilot*, all from McGraw-Hill.

SKIES DAILY NEWS TOP 10

Here's a recap of our 10 most popular online stories since our last print edition was published.

1 BIG CHANGES AT WESTJET AS IT EXPANDS FLEET

WestJet has officially unveiled its newest aircraft, the Boeing 787-9 Dreamliner, which will help it transition from a low-cost domestic airline to a long-haul international carrier.



2 5 LESSONS FROM MY FIRST YEAR AS AN AIRLINE CAPTAIN

Capt Claire Lemiski of Porter Airlines shares some lessons she's learned during her first year as a Bombardier Q400 captain.

3 SIMULATING THE 'SUPERSCOOPER'

TRU Simulation + Training has delivered the world's first CL-415 full flight simulator.

4 THE GREEN AWAKENING

Electric-powered vertical takeoff and landing (eVTOL) aircraft are multiplying at breakneck speed.

5 UNCOVERING THE PAST

Restoration work on a TBM Avenger has revealed a connection to the U.S. Navy Attack Squadron VA-55 "Torpcats."

6 CANADA BANS 737 MAX OPERATIONS

Transport Minister Marc Garneau has banned Boeing 737 MAX operations in Canada, effective March 13.

7 SENATOR CRITIQUES DEFENCE PROCUREMENT PROCESS

Senator Nicole Eaton says the procurement system is "cumbersome, bureaucratic and beset by political interference."

8 HOME-GROWN PILOTS

The aviation program at First Nations Technical Institute aims to foster industry passions that will last a lifetime.

9 A TEAAM TRIUMPH

In October, B.C.'s newest aeromedical response unit completed its first rescue mission.

10 CANADA TO TAKE 'EVIDENCE-BASED APPROACH' TO RETURNING 737 MAX TO SERVICE

Questions remain about when the Boeing 737 MAX jets will get back in the air and whether the manufacturer will be liable for operator compensation.

Read more online at **SKIESMAG.COM**

INSIDE

‘SuperScooper’ sim

The world’s first CL-415 full flight sim was designed in Montreal.

ALSO

Iskwew makes history

A new Indigenous air service has taken off in British Columbia.

PLUS

Filling seats

RCAF to target retired pilots, move desk jockeys back to cockpits.

BRIEFING ROOM

AVIATION INDUSTRY NEWS

Boeing works to restore confidence in 737 MAX

Among other things, Boeing’s proposed software fix for the 737 MAX will ensure the flight control system compares inputs from both angle of attack sensors instead of relying on just one. **Galen Burrows Photo**

KEN POLE | OEM NEWS

Two weeks after Boeing 737 MAX 8s and 9s were grounded worldwide because a controls conflict was implicated in the second MAX 8 crash within five months, the beleaguered aerospace giant announced a software update that it hopes will restore faith in the latest iterations of the world’s most successful jetliner.

The manufacturer has also created additional computer-based training (CBT) that addresses the software update. The instructional module will be available to all 737 MAX pilots once approved.

Meanwhile, with accident investigations ongoing, there likely will be no official causes identified for some time. However, *The Wall Street Journal* reported on March 29 that investigators have reached the preliminary conclusion that Ethiopian Airlines Flight 302’s Maneuvering Characteristics Augmentation System (MCAS) did in fact activate before the crash. That is the same system that has been implicated in last fall’s Lion Air tragedy, when a brand new MAX 8 jet crashed into the Java Sea shortly after taking off from Jakarta, Indonesia, on Oct. 29, 2018.

Boeing engineers have been working on a software update ever since the Lion Air incident.

Their work took on added urgency when an Ethiopian Airlines MAX 8 crashed minutes after takeoff from Addis Ababa on March 10, precipitating the global grounding of the MAX 8 and the longer-fuselage MAX 9 three days later.

Initial expert comparisons of satellite data from both flights indicated what Canadian Transport Minister Marc Garneau described as "a possible although unproven similarity in the flight profile" of the two aircraft. While other countries had already directed their operators to ground their fleets, Canada and the United States delayed until the satellite data had been reviewed.

That analysis indicated "similarities that sort of exceed a certain threshold in our minds with respect to the possible cause of what happened in Ethiopia," Garneau told reporters in Ottawa when he confirmed the grounding directive on March 13. "It is something that points possibly in that direction, and at this point we feel that threshold has been crossed."

The problem ostensibly arose from the fact that the installation of larger, more fuel-efficient engines on the 737 MAX family had shifted the new variants' centre of gravity forward. That evidently increased the risk of pitch-up on takeoff, and Boeing's solution was to incorporate the MCAS, which automatically pitches the nose down to avoid a stall flagged by the aircraft's attitude indicators.

Following the Lion Air accident, Boeing issued a Flight Crew Operations Manual Bulletin on Nov. 6, 2018 to all MAX operators. It cautioned that during manual flight only, the anti-stall sensor could produce erroneous indications about the aircraft's angle-of-attack (AOA), which could cause pilots to have difficulty controlling the plane.

Paul Bergman, Boeing's Chicago-based media relations lead on commercial aircraft, confirmed in an e-mail to *Skies* that the company had been "engaging with all 737 MAX operators and we are continuing to schedule meetings to share information about our plans for supporting the 737 MAX fleet."

Bergman also said the company had been working "in close co-operation with the FAA on the software update" while taking a "comprehensive and careful approach . . . that will ultimately lead to certification."

That process included an invitation to "more than 200 airline pilots, technical leaders and regulators" for an informational session on March 27 at its MAX plant in Renton, Wash.

"This is part of our ongoing effort to share more details about our plan for supporting the safe return of the 737 MAX to commercial service," Boeing said in a statement ahead of the Renton session, adding that it planned to contact all current and prospective MAX operators and their national regulators.

"At the same time, we continue to work closely with our customers and regulators on software and training updates for the 737 MAX. Boeing is paying for the development of these updates."

Preparations for the Renton gathering included tests of the software update a few days earlier by pilots from American Airlines (AA), a major U.S. MAX operator with 24 aircraft.

"We were confident flying the aircraft in its present state," said Roddy Guthrie, AA's 737 fleet captain. "What they've done, what was explained to us today in detail, are significant enhancements to the system."

Mike Sinnett, an aerospace engineer and Boeing's vice-president for Product Strategy and Future Airplane Development, told the gathering that the company is doing "everything we can" to ensure these types of accidents never happen again.

"The 737 family is a safe airplane family and the 737 MAX builds on that history of safety that we have seen for almost 50 years," Sinnett told reporters on March 27.

BOEING'S PROPOSED FIX

The OEM's software update will ensure the flight control system compares inputs from both AOA sensors instead of relying on just one. If they disagree by 5.5 degrees or more with the flaps retracted, MCAS will not activate, said Boeing.

In addition, if MCAS does activate under "non-normal conditions," it will now do so only once, rather than multiple times, a situation which evidently caused problems for pilots as they tried to override the system. "There are no known or envisioned failure conditions where MCAS will provide multiple inputs," said Boeing on its website.

Finally, MCAS will never be able to override pilot input to prevent manual control of the plane.

"These updates reduce the crew's workload in non-normal flight situations and prevent erroneous data from causing MCAS activation," concluded the manufacturer. "We continue to work with the FAA and other regulatory agencies on the certification of the software update."

The additional computer training for pilots will provide an "enhanced understanding of the 737 MAX speed trim system, including the MCAS function, associated existing crew procedures and related software changes."

Boeing said it will take one day to deploy the software to operators once it has been approved by regulators, and the upgrade process for one airplane will take about an hour.

CONFIDENCE IN THE PRODUCT

With some 5,000 orders on the books, the 737 MAX is Boeing's fastest-selling aircraft.

However, Garuda Indonesia recently said it planned to cancel a US$4.9 billion order for 50 of the single-aisle narrow-body aircraft, citing a lack of passenger confidence in the product. When *Skies* went to print, there were reports that Garuda was considering other Boeing products instead.

Ethiopian Airlines CEO Tewolde GebreMariam released a statement in which he promised to continue the carrier's long relationship with Boeing. "More than two-thirds of our fleet is Boeing," he wrote. "We were the first African airline to fly the 767, 757 and 777-200LRs, and we were the second nation in the world (after Japan) to take delivery of the 787-9 Dreamliner . . . Boeing and Ethiopian Airlines will continue to be linked well into the future."

He declined to speculate on the cause of the latest crash, noting that the aircraft was less than five months old.

"Many questions . . . remain without answers, and I pledge full and transparent co-operation to discover what went wrong."

He fully supports the decision to ground all MAX 8s and 9s because "until we have answers, putting one more life at risk is too many."

A total of 346 passengers and crewmembers died in the two crashes.

GebreMariam also said that after the Lion Air crash, Ethiopian Airlines MAX 8 pilots had been "fully trained on the service bulletin issued by Boeing and the Emergency Airworthiness Directive issued by the U.S. FAA. Among the seven full flight simulators that we own and operate, two of them are for the B-737 NG and the B-737 MAX. We are the only airline in Africa—and among very few in the world–with the B-737 MAX full flight simulator. Contrary to some media reports, our pilots who fly the new model were trained on all appropriate simulators."

For now, questions remain about the overall financial impact on Boeing, including whether it will be liable for compensating operators for lost business and passengers for changes to travel plans. Southwest Airlines said on March 27 that it expects to lose US$150 million in revenue during the first quarter of 2019, due in large part to the MAX grounding.

There also is the question of how soon the 737 MAX variants might be flying once the software update is certified and installed. When *Skies* put that question to Garneau on March 13, he deferred to Aaron McCrorie, his acting assistant deputy minister for Safety and Security, who echoed the minister's assertion that Transport would take "an evidence-based approach" to that decision.

"Part of trying to understand what happened in Ethiopia is to understand to what extent the software patch would help address that," explained McCrorie. "They'd have to go through a normal certification process . . . We're waiting for the software patch, so we're dependent on the manufacturer to bring that information to us, but our flight test engineers will be engaged."

As *Skies* was going to press, the FAA had only begun to review the updates as a part of formal certification, which would clear all MAX 8 and 9 variants for a resumption of service in the U.S.

Regulators elsewhere, including Canada and Europe, have said they will conduct independent evaluations of Boeing's updates to the 737 MAX family. Aircraft will be grounded until each country's aviation regulatory body has approved the fix.

The world's first CL-415 Level D full flight simulator replicates not just air and water operations, but also various types and intensities of forest fires and changes in related environmental conditions. **TRU Photo**

Simulating the 'SuperScooper'

TRU Simulation + Training has delivered the world's first CL-415 full flight simulator, a device that replicates the iconic waterbomber in the air and on the water.

LISA GORDON | FIREFIGHTING NEWS

The Viking CL-415 "SuperScooper" is more akin to a pick-up truck than a sports car.

It's a hardworking, amphibious turboprop that was built to fight wildfires.

It flies low, battling blistering heat and blinding smoke, before releasing 13,500 pounds of water in six seconds—and then returning to a nearby lake where it skims the surface to reload.

Introduced in 1993 by Bombardier, the CL-415 was essentially a turboprop version of its predecessor, the piston-powered CL-215. Today, there are close to 170 CL-215/415 aircraft in operation, mostly in Europe and North America. They are now supported by Victoria, B.C.-based Viking Air, which acquired the program from Bombardier in 2016.

Pilot training in the CL-415 has historically been done in the aircraft, but TRU Simulation + Training says that due to the unique mission it performs, those training flights can be dangerous.

The South Carolina-headquartered company is a division of industry giant Textron Inc., and was formed following the amalgamation of several specialty flight simulation and pilot training companies, including former

Montreal-based Mechtronix.

About two years ago, TRU's commercial aviation division in Montreal began designing the world's first CL-415 full flight simulator (FFS) with the capability to replicate operations not only in the air, but also on the water. The company was able to draw on its recent experience of successfully

TRU's CL-415 FFS was delivered to Italy's Ansett Aviation Training in September 2018 and certified by EASA in December to Level D standards. **TRU Photo**

building a Twin Otter Series 400 FFS for Canada's Pacific Sky Aviation in Calgary, Alta.—the world's first seaplane simulator with water-handling capabilities.

"Before the Twin Otter project, hydrodynamic modelling is something we hadn't done before," acknowledged Thom Allen, TRU's vice-president of Technology and Innovation. "It's like a boat simulator because you're modelling the buoyancy of the floats or the fuselage in the water. Interestingly, our engineers working on the Twin Otter program actually went to the library and researched how boats work on the water. Mixing the boat sim with the

aerodynamic sim is the whole package."

He said the CL-415 experience took things one step further by adding the mission component—scooping the water—to the Twin Otter build.

"From a safety point of view, the types of missions you do in a waterbomber are quite a bit different from a commercial aircraft. When you're scooping water and dropping it over a fire, training in those conditions is very dangerous. The tradeoff has always been between the quality of the training and the danger of doing that sort of training."

TRU's CL-415 FFS was delivered to Ansett Aviation Training in Milan, Italy, in September 2018 and certified by the European Aviation Safety Agency (EASA) in December to Level D standards. Although training courses have yet to be completed in the simulator, the hope is that both initial and recurrent pilot training will be done exclusively in the device.

Allen said the operational characteristics of a CL-415 are complex and unique.

"When you're flying over a very hot fire, you drop your water and the mass of the aircraft is cut in half. The turbulence effect is quite significant when you hit the updraft. The fire is creating turbulence, smoke, reduced visibility—and pilots are dropping every five or 10 minutes repeatedly, usually in rugged terrain at low altitudes. This is the part that made this project something new."

To gather accurate performance data, TRU rented a CL-415 and equipped it with flight test instrumentation.

"We weren't doing fire drops with our engineers on board, but we did all the manoeuvres around that, and we brought in a number of senior CL-415 pilots to evaluate our work."

The result is the world's first high fidelity CL-415 simulator with the capability of replicating not just air and water operations, but various types and intensities of forest fires and changes in related environmental conditions. The cockpit noise level is accurately reproduced by a secondary audio system that—like the real aircraft—requires crewmembers to wear a noise-cancelling headset.

TRU said the simulator comes at a time when the number of wildfires is increasing worldwide, and the demand for waterbomber pilots is high.

Ansett Aviation, named as a member of Viking Air's amphibious aircraft division support network in 2017, is now working with customers to begin its formal training program.

"Because it's the only sim in existence for that aircraft, now that it's available, people will be coming from all over to train," predicted Allen. At some point, he expects there will be a business case for another CL-415 simulator in North America.

TRU has customer support personnel onsite in Milan and simulator upgrades will keep pace with the evolution of the worldwide fleet. [In March, Viking announced an avionics upgrade program for the CL-215T/CL-415 fleet that incorporates modernized technologies in an integrated platform featuring the Collins Aerospace Pro Line Fusion suite.]

Allen said the CL-415 simulator project was both challenging and exciting for TRU.

"During the qualification with EASA, one of the senior authorities said this was one of the most exciting qualifications he'd ever done," he concluded. "The reaction with the water, the fire, the mission aspect of it, has been very positive. It's quite unique and exciting."

Teara Fraser, Iskwew Air CEO, has always wanted to start a small charter airline rooted in Indigenous tourism. **Josh Neufeld Photo**

Iskwew Air makes history

Canada's first air service founded and owned by an Indigenous woman is ready for takeoff.

Iskwew Air's eight-seat Piper Navajo aircraft. **Iskwew Air Photo**

Supporters celebrate the launch of the new air service on March 8 at Vancouver International Airport. **YVR Photo**

BEN FORREST | OPERATOR NEWS

As a small plane carried Teara Fraser over the Okavango Delta, a vast, meandering wetland in the Kalahari Desert in northern Botswana, she felt her heart come to life in a way it never had before.

It was the early 2000s and Fraser was 30 years old, a single mom with two young children and no post-secondary education. She had never flown in a plane so small before, and it fascinated her.

"I wanted to touch everything in the aircraft and know what everything was, and how everything worked," said Fraser, now 47 and CEO of Iskwew Air, the first airline in Canada founded and owned by an Indigenous woman.

"I think this is why I'm so passionate about supporting others in finding their passions," she said.

"There's a sense of knowing that it's the right thing for you, that it's the right path for you. There's something in that that liberates a sense of possibility."

Fraser returned to B.C., got her pilot's licence and started flying for commercial operators, eventually launching her own aerial surveying company, Kîsik Aerial Survey Inc., which she sold in 2016.

At the time, she considered retiring from aviation, daunted by the possibility of starting another business from scratch.

But she had always wanted to start a small charter air service, rooted in Indigenous tourism, that would connect visitors to B.C. with remote First Nations communities.

"I started dreaming it, designing it, and now we're doing it," said Fraser, who launched that airline—Iskwew Air—with a ceremony at Vancouver International Airport (CYVR) on March 8, 2019.

Iskwew (pronounced IS-KWAY-YO) is the Cree word for "woman," and Fraser chose it as a way of reclaiming womanhood, matriarchal leadership, and First Nations languages.

It was a bold decision, and women are well-represented in the airline's small-but-dedicated group of staff, advisors and company "champions."

Still, Fraser stressed Iskwew is an airline for everyone, with a mission to connect people with each other and to the land.

"Of course, we will champion women and we'll champion Indigenous peoples, and we'll support Indigenous tourism as part of the original vision," she said.

"But the vision is much bigger now; humble start, big vision."

Iskwew Air is launching with a single eight-seat Piper Navajo aircraft, with Fraser as accountable executive and operations manager.

The first chartered flights are expected in the next few weeks, providing remote nature tours with a tourism company in Campbell River, B.C.

Iskwew Air will operate out of the South Terminal at YVR, with plans to also offer short-term flights to other parts of B.C., as a partner with other tourism operators.

"I'm interested in partnerships, and aligning the work that we do as much as we can with our vision and our values," she said.

Although growth is part of the plan, there are no specific targets for the number of aircraft Iskwew will operate, or the number of employees and flights per week it will ultimately have.

As Iskwew Air ramps up for the busy summer tourism season, Fraser is also laying the foundations of a new organization called Give Them Wings, which aims to inspire Indigenous youth to pursue careers in aviation.

Give Them Wings held its first major event on March 16, 2019, giving visitors the chance to sit in a flight simulator, take a walking tour of aircraft at YVR, learn about aviation careers, and take discovery flights.

CAE concludes acquisition of Bombardier's bizav training business

CAE confirmed on March 14 that it has concluded the previously announced acquisition of Bombardier's Business Aircraft Training (BAT) business for an enterprise value of US$645 million. All the required conditions for closing have been met.

The acquisition of Bombardier's flight and technical training operations expands CAE's ability to address the training market for customers operating Bombardier business jets, which at more than 4,800 aircraft, is one of the largest and most valuable in-service fleets of business aircraft in the world.

The acquisition also serves to expand CAE's position in the largest and fastest-growing segment of the business aviation training market, involving medium- and large-cabin business jets. It provides CAE with talented people, a loyal customer base, and an established recurring training business which is highly complementary to CAE's network.

The Bombardier BAT business includes a modern fleet of full flight simulators and training devices covering the Bombardier Learjet, Challenger and Global product lines, including the latest large cabin Global 5500, 6500 and 7500 business jets.

"We are pleased to welcome Bombardier customers and employees to CAE," said Marc Parent, CAE's president and CEO. "Bombardier business jet customers will have access to a seamless training experience in our global network of training centres, providing the most advanced training solutions on the market by leveraging our continued investments in training."

With this agreement, CAE will be adding 12 Bombardier business aviation full flight simulators located in Dallas and Montreal to its training network (including one deployment already planned for CAE's fiscal year 2021), for a total of 29 Bombardier business aviation full flight simulators available for training worldwide, with further growth planned in the near- to mid-term.

A Bombardier Challenger 604 full flight simulator ready for training at CAE in Dallas. CAE will be adding 12 Bombardier business aviation full flight simulators located in Dallas and Montreal to its training network. **CAE Photo**

Canada's airports have wide-ranging impact: CAC

A 2017 study showed that domestic airport terminals, including Halifax Stanfield International, generated $48 billion in economic output and employed 194,000 people. **HIAA Photo**

BRENT JANG | AIRPORT NEWS

As the Canadian Airports Council (CAC) prepares for its biennial conference in May, Daniel-Robert Gooch is optimistic about good vibes for air travellers while acknowledging room for improvement to decrease frustration.

Gooch, who has been the CAC's president since 2011, is overseeing the roll-out of a marketing campaign aimed at increasing consumers' understanding of the opportunities and challenges facing air terminals.

The digital campaign, called "Wonder Takes Flight," is designed to appeal to frequent fliers.

"We really need to connect emotionally first. Frequent fliers are most often at Canada's airports, and those are the individuals who experience first-hand whether an airport is easy to go through or not," said Gooch in an interview. "We want to reignite their passion for aviation. It used to be exciting for everybody, but once you become a frequent flier, it starts to become mundane."

The first phase of the campaign began in February and runs through June. It will be followed up this fall with the start of a series of informational segments, covering topics such as airport ownership models and economic impacts.

On screens and billboards at 17 airports across Canada, as well as through social media, "campaign ads capture the awe and enthusiasm a child feels when visiting an airport for the first time," the CAC said in a news release.

Gooch and other aviation industry delegates will be at the CAC's biennial conference, to be held this time in Kelowna, B.C., from May 29 to 31.

He is hoping that air travellers will ultimately gain a greater appreciation for the CAC's efforts to make Canada's terminals more efficient and less of a headache for consumers.

An upcoming phase of the marketing campaign will turn attention to how key airports are operated by local authorities and not by the federal government. Gooch noted that basic information is important because surveys show that many Canadians still don't realize that under the national airports system (NAS) of 26 terminals, the operations were transferred from federal to local responsibility of airport authorities beginning in the 1990s. (The City of Kelowna runs its airport through a long-term lease with Transport Canada.)

Transport Canada owns 23 of the airports and charges ground rent, while operations in Yellowknife, Whitehorse and Iqaluit are owned by their respective territorial governments.

The opening topic at May's conference will be the wide-ranging impact of Canadian airports, with a study from 2017 showing that domestic terminals generated $48 billion in economic output and employed 194,000 people.

"Once an airport gets booming, that helps take care of things because more passengers bring more money," said Gooch. "But when they're very small, it's quite challenging to cover the cost of operations and the cost of ongoing maintenance. Runways need to be resurfaced every 10 years or so."

But competitiveness is about more than simply costs, with travellers seeking ease of travel. That includes going through Vancouver International Airport and Toronto's Pearson International Airport, where there have been programs for many years geared toward speeding up travel for connecting passengers from certain Asian countries, without Canadian visas, heading to the United States with valid American visas.

Another topic at the conference is titled "Politics and the Airport."

Canada's airport and airline sectors have tried unsuccessfully for years to persuade the federal government to eliminate ground rent charged to larger terminals.

The federal government has been collecting revenue from larger air terminals since the early 1990s.

While the CAC previously lobbied the federal government to cancel ground rent to all the affected airports, the organization has switched its focus to arguing that rent be dropped for terminals that attract fewer than three million passengers a year. If that proposal were to be implemented, it would leave airports in eight markets still paying rent: Toronto, Vancouver, Montreal, Calgary, Edmonton, Ottawa, Winnipeg and Halifax.

"As a group of airports, we haven't been talking about airport rent for quite some time," said Gooch.

Another contentious issue is screening conducted by the Canadian Air Transport Security Authority (CATSA).

"The government has been collecting a lot of money out of travellers such as the security charge, and we want to ensure that the money being collected will be used to benefit the aviation sector," said Gooch.

STARS receives $65M for new H145 helicopters

KEN POLE | HELICOPTER NEWS

There was good news for Canada's western provinces and the helicopter industry in the Liberal government's latest budget, tabled March 19 in the House of Commons. The federal government is funding the purchase of five medevac-equipped Airbus H145 helicopters for Shock Trauma Air Rescue Service (STARS), based in Calgary, Alta.

"For people in . . . parts of Western Canada who are critically ill or injured and need emergency medical help, we are investing $65 million in new emergency ambulance helicopters for the region's Shock Trauma Air Rescue Service," Finance Minister Bill Morneau said toward the end of his budget speech.

STARS, which began operations in 1985, has been looking to acquire nine H145 helicopters to replace its aging fleet of eight Airbus BK-117s and three Leonardo AW139s.

Five of the air ambulance service's new H145s will operate from its three Alberta bases, three will be located at its two Saskatchewan bases, and the final H145 will be based in Manitoba.

There are currently two H145s being assembled and completed at Airbus's Fort Erie, Ont., facility for delivery to STARS this spring; the first two helicopters will replace STARS' AW139s.

STARS will be able to purchase five H145s with the $65 million investment from the Canadian government. **Airbus Photo**

STARS services Canada's three Prairie provinces as well as eastern and central British Columbia—including remote Indigenous communities and in the region's mostly mountainous national parks, where surface access is routinely difficult and frequently impossible. "When tragedy strikes, every second counts," the budget document points out.

On background in the budget media lockup, a Finance Department official told *Skies* that the federal government had been involved in discussions with STARS management, who were aware that the funding through Public Safety Canada had to be locked in by March 31, the end of the 2018-2019 fiscal year.

The federal government said the $65 million is "a one-time investment."

The Alberta government also announced in early March it is providing $13 million to STARS for the purchase of one H145 helicopter, which brings the total number of funded H145s to six. It is not yet known whether STARS will be purchasing Airbus's new five-bladed H145 helicopter, or whether the air ambulance service will have a mixture of the current H145 and the new H145.

Bell seeing strong demand for 505 short light single

ELAN HEAD | HELICOPTER NEWS

Bell has seen a "bounce" in its commercial market thanks in large part to strong demand for the Bell 505 Jet Ranger X, which is built at the company's plant in Mirabel, Que.

According to CEO Mitch Snyder, Bell saw a 44 per cent increase in commercial deliveries from 2017 to 2018—from 132 to 192. Of those deliveries, 116 were the Bell 505 short light single.

"It's performing well, and [with] the amount of deliveries we're making, the customers love it," Snyder told reporters in a conference call on March 1, adding that the 505 fleet has now surpassed 13,000 flight hours.

According to CEO Mitch Snyder, Bell saw a 44 per cent increase in commercial deliveries from 2017 to 2018—from 132 to 192. Of those deliveries, 116 were the Bell 505 short light single, shown here. **Skip Robinson Photo**

Bell recently delivered the first 505 in a law enforcement configuration to the Sacramento Police Department, and will soon announce delivery of a similarly equipped 505 to another California law enforcement agency, the Stockton Police Department.

Meanwhile, the 505 has also moved into the electronic news gathering segment with Helicopters Incorporated.

Snyder said that the company is also seeing significant demand for its "long light single," the Bell 407, reflecting growth in the helicopter emergency medical services market and an increase in near-shore flying in the Gulf of Mexico.

Although Snyder declined to forecast deliveries for 2019, he said that prospects are "looking pretty good" for the 505, as well as for the 407 and the Bell 429 light twin.

"We're still seeing a strong demand for those particular aircraft, which shows us that the market for us is still increasing," he said.

Coulson Aviation and Unical partner on next-gen firefighting helicopters


The first painted Coulson-Unical CH-47 Chinook, to be called the CU-47. **Rob Reyno Photo**

DAYNA FEDY | HELICOPTER NEWS

Coulson Aviation is expanding its rotary-wing capabilities and has entered into a joint venture with Unical Aviation to bring what they claim will be the most advanced firefighting Chinook and Black Hawk helicopters to the market.

Unical, based in Industry, Calif., currently owns a fleet of 12 Boeing CH-47 Chinooks and more than 30 Sikorsky UH-60A Black Hawks—with plans to purchase additional UH-60s as they become available. The company has also purchased numerous Black Hawk part inventories as well as the entire Canadian Forces CH-47D Chinook parts inventory. Unical will provide the aircraft, parts and heavy maintenance in the joint venture, and Coulson Aviation will take on the modifications planned to significantly upgrade the aircraft for fire-fighting and utility operations.

The Black Hawk and Chinook modifications follow Coulson Aviation's recently-completed, large-scale project to modify Boeing 737s into multi-use air tankers. B.C.-based Coulson is the first in the world to modify the 737 into what it is calling the Fireliner. The company has acquired 737s from Southwest Airlines and also operates a Sikorsky S-76B, a fleet of S-61 helicopters, Lockheed C-130 Hercules, and Bombardier Challengers.

"I've got our design team here that just did the biggest mod ever done to a 737," said company vice-president Britt Coulson, "so we thought with [Unical's] huge fleet of 47s and Black Hawks, it'd be a great opportunity to take a look at this project and work together to create the best helitankers in the industry."

Currently, all firefighting Chinook and Black Hawk helicopters with internal tanks drop water or retardant through the square, and relatively small, hook well, which Britt Coulson said restricts the tank's flow rate and degrades the drop pattern.

Coulson Aviation plans to use the same design of its own proprietary advanced suppressant tank that is used on the Hercules and 737, known as the Retardant Aerial Delivery System, or RADS, and adapt it for the Chinook and Black Hawk. The tank features a linear door system—a longer, rectangular hole—that releases water or retardant in a stretched out, curtain-like pattern.

Coulson Aviation plans to modify the fuselage on the CH-47, cut the floor of the aircraft and install a 3,000-gallon tank, called the RADS-L (large). "It's going to be a newer generation Skycrane tank," Britt Coulson said, adding that the tank in the Chinook can be removed in a two-hour time period.

The company will do the same modifications on the Black Hawk, but with a smaller, 800- to 1,000-gallon removable tank, called RADS-M (medium).

The modified UH-60As and CH-47s are to be known as the CU-60 and the CU-47; both aircraft will be type certified and FAA approved.

The first CH-47 Chinook from Unical is now at Coulson Aviation's facility in B.C. for modifications, and the company was expecting a Black Hawk to arrive when *Skies* went to print.

New museum attraction brings history to life

LISA GORDON
GENERAL AVIATION NEWS

BBC reporter Wynford Vaughan-Thomas flew along on a Lancaster bombing mission in September 1943. Visitors to the Canadian Warplane Heritage Museum can now experience that same flight through virtual reality. **CWHM Image**

The sense of relief is palpable as the English coastline comes into view, the Lancaster's four big Rolls-Royce Merlin engines droning reassuringly in the dawn's early light.

Skipper Ken Letford asks for the nav lights to be turned on. Someone in the back calls for the flight engineer, Charlie Stewart, to sing a song. He obliges.

It is the wee hours of Sept. 4, 1943, and the crew of Royal Air Force Lancaster bomber "F for Freddie" is coming home from a raid over Berlin. Of the 316 Lancaster bombers that took off the previous evening, 22 never made it home. This crew was one of the lucky ones.

The cockpit scene fades from view and I take my virtual reality (VR) headset off, blinking as I am instantly transported back to 2019. I'm inside the Canadian Warplane Heritage Museum (CWHM) at Hamilton International Airport, where I've been immersed in its latest exhibit, the British Broadcasting Corporation's VR presentation of the 1943 Berlin Blitz.

On board "F for Freddie" that night in 1943 were two additional passengers, BBC reporter Wynford Vaughan-Thomas and his engineer, Reg Pidsley. Armed with only a microphone and a BBC midget recorder that used direct cut acetate disks, the two men produced one of the most detailed eye witness accounts of a wartime raid.

"It was certainly the most terrifying eight hours I've spent in my life, because I didn't know what was coming," said Vaughan-Thomas in a post-war interview. "Berlin burning seen from 19,000 feet was the most beautifully horrible sight I've ever seen."

The terror and the danger of the eight-hour mission is evident in the recording—as is the relief and joy to be returning home unscathed.

The BBC took Vaughan-Thomas' original audio recording and built a masterfully animated VR presentation around it, bringing the viewer on board "F for Freddie" for a 360-degree immersive experience.

It is as close as we will ever get to flying in a Lancaster during the Second World War.

As CWHM's marketing manager, Al Mickeloff, said, "If someone has a connection to the Lancaster—say their grandfather flew one—now they can see and feel what that was like."

Released six months ago, the 1943 Berlin Blitz experience is currently available in England, although the CWHM is proud to host its North American debut.

Staff at the museum designed and built a display space to host the attraction, complete with period artifacts and info-graphics that discuss the September 1943 night raid on Berlin, which killed more than 400 people on the ground.

The new exhibit will be available until the end of August, and it's expected to be one of the museum's most popular attractions.

While it is restricted to ages 13 and over, there is no additional charge for museum visitors other than the price of general admission.

The RCAF is reaching out to retired Canadian Forces personnel and other serving pilots from staff jobs in hopes that they'll get back in the cockpit; this is part of an effort to retain pilots. **Cpl Melissa Spence Photo**

Air Force focuses on pilot retention

Retirees are being invited to join the Reserves and pilots are being moved from desks back to cockpits as the RCAF aims to retain its workforce.

CHRIS THATCHER | MILITARY NEWS

The Royal Canadian Air Force (RCAF) is hoping to attract retired pilots into the Reserves and move serving pilots from staff jobs back into cockpits as part of a broader effort to retain a critical workforce, according to the vice chief of the defence staff.

"We're reaching out to retired individuals from the Canadian Forces and seeing if they'd like to join," LGen Paul Wynnyk told the House of Commons defence committee in late February. "[We want to] make it more flexible for pilots who have retired to go into the Reserves, to perhaps look at ways of getting into [4 Wing] Cold Lake or [3 Wing] Bagotville or wherever we need to fly them, and potential bonuses."

Wynnyk was responding to a question on the retention of fighter and helicopter pilots, both of which have been heavily affected by the lure of the commercial sector.

"This is not a problem that's unique to Canada," he acknowledged. "There's a lot of pressure on the Five Eyes countries [Canada, U.S., U.K., Australia and New Zealand] . . . The big draws are the civilian airlines as they increase substantially."

Promotion in the Air Force invariably involves a move from the aircraft to staff jobs in various headquarters. Wynnyk said the military was talking with allies about options, and considering ways to encourage those who just want to fly to remain in the service.

"[M]aybe there's a career stream where you will not necessarily progress in rank, but will get to fly more," he told the committee.

Wynnyk was one of six senior officials from the Department of National Defence, along with Defence Minister Harjit Sajjan, to appear as part of a discussion on the budget supplementary estimates for 2018-19 and the interim estimates for 2019-20.

Committee members were also concerned about "a rumour" that the department was returning the engines of the F/A-18 Hornets it has begun receiving from Australia as part of an interim measure to fill a gap in Air Force capability.

"We are in fact sending the engines back—that model of engine," confirmed Patrick Finn, assistant deputy minister of materiel. "We have sufficient spare engines, so we dropped the engines . . . and we're using our spare engines to re-engine the aircraft."

Though the government announced it would acquire 25 Hornets from the Royal Australian Air Force—18 for operational aircraft and seven for spare parts—Finn said the seven spare jets might not be necessary.

"What we're finding is that the number of spares they've been able to provide to us is more than adequate," he explained. "Rather than take aircraft apart and go through that cost, we're taking the spares. We may not in fact, at this point, look at any of the seven."

Finn confirmed the Air Force was still analyzing options to upgrade the combat capability of the current fleet of 76 CF-188 Hornets, as well as the interim jets. Enhancing combat systems was not included in the approximately $360 million budget to acquire and bring the Australian jets up to the same standard as the Canadian Hornets.

"We're looking at some upgrades around IFF, Link-16, and that's across the entire fleet," he said. "That is the next wave that will happen . . . We are replenishing missiles, looking at different areas, and the Air Force, I'd say, is in the beginning of that next phase of what they would need to do."

Asked whether Canadians should have confidence in the military's ability to meet its commitments, based on the state of a number of equipment procurement projects, Jody Thomas, deputy minister of National Defence, said that, with respect to the fighter jet file, the department was meeting its targets.

"The [request for proposals] for the future fighter capability project will be on the street in the spring. We are meeting every single milestone that we have laid out for that project. [And] we are working on a program to recruit pilots and to improve the number of technicians in the Air Force," she said.

HAVE NEWS? If you would like to submit a press release or if you have a new product or service that you believe is newsworthy, please email our news editor at **news@skiesmag.com**.

Photographer **Will Ross** captured this Air Inuit Boeing 737 departing Runway 24L in Montreal.

Photographer **Matt Fansher** says this photo of CAVOK Airlines' AN-12 is one of his "coolest catches" at Toronto Pearson. The Ukrainian operator specializes in air cargo and charter services.

Skies highlights photos posted on Instagram @skiesmag and facebook.com/skiesmag.

Canada's two Arctic airlines: Will they become one? After receiving a report from Canada's Competition Bureau recommending against the merger of Canadian North and First Air, Transport Minister Marc Garneau must now take the merger deal to Cabinet to decide its fate. **Mark Taylor Photo**

An Emirates Airbus A380 takes off with a snowstorm looming right behind it. **Jeff Wilson Photo**

FLYING THE LAST FRONTIER

Enterprise Aviation Group has been operating Basler BT-67 turboprops at the bottom of the world since 2001. While Antarctic flying may not be for everyone, some pilots don't mind roughing it in exchange for the ultimate freedom of flight.

BY LISA GORDON | PHOTOS BY CULLEN BURCHARTZ

Enterprise Aviation Group of Oshawa, Ont., transports tourists in Antarctica for luxury tour operator White Desert, using rugged ski-equipped Basler BT-67 aircraft.

When you step off the plane, it's like you've landed on the moon. Your eyes have no perspective as they gaze at a stark white landscape that seems to stretch to infinity. The air is crystal clear and breathtakingly cold, without moisture, and the sun shines around the clock.

This is Antarctica in the summertime. And when you're a pilot flying over that inhospitable but stunningly beautiful continent, it can feel like the last frontier.

"It's up to the pilot to make a lot of the operational decisions down there," said Brian Burchartz, co-founder and chief pilot at Oshawa, Ont.-based Enterprise Aviation Group. "There isn't a whole lot of support. And of course, the snow conditions can be a problem. You can get a three-day storm where it's blowing 50 knots. That's when you really have to make sure the planes are tied down."

Burchartz has been flying for decades, racking up more than 17,000 hours of flight time on various aircraft types, with more than 20 years of experience operating in polar regions.

In March, he returned from his 11th season flying in Antarctica, the ice-covered land mass that is known as the home of the Geographic South Pole and Emperor penguins—and not much else.

Burchartz has been flying Douglas DC-3 aircraft for 33 years. A former employee of Skycraft Air Transport in Oshawa, he flew piston-powered DC-3s that hauled car parts for the nearby General Motors plant. When Skycraft closed in 1994, he and business partner Manny Rosario founded Enterprise that same year, picking up the expedited air cargo work for GM until things slowed down post-9/11.

"We then got involved with a tourism company in Antarctica, and operated a turbine DC-3 for them in 2001," he recounted. "We started working for a few other companies down there; we've done 11 seasons there in total. The last couple of years have been with a company called White Desert."

White Desert is a luxury travel provider that offers one- to eight-day excursions to Antarctica during the austral summer months (November to January).

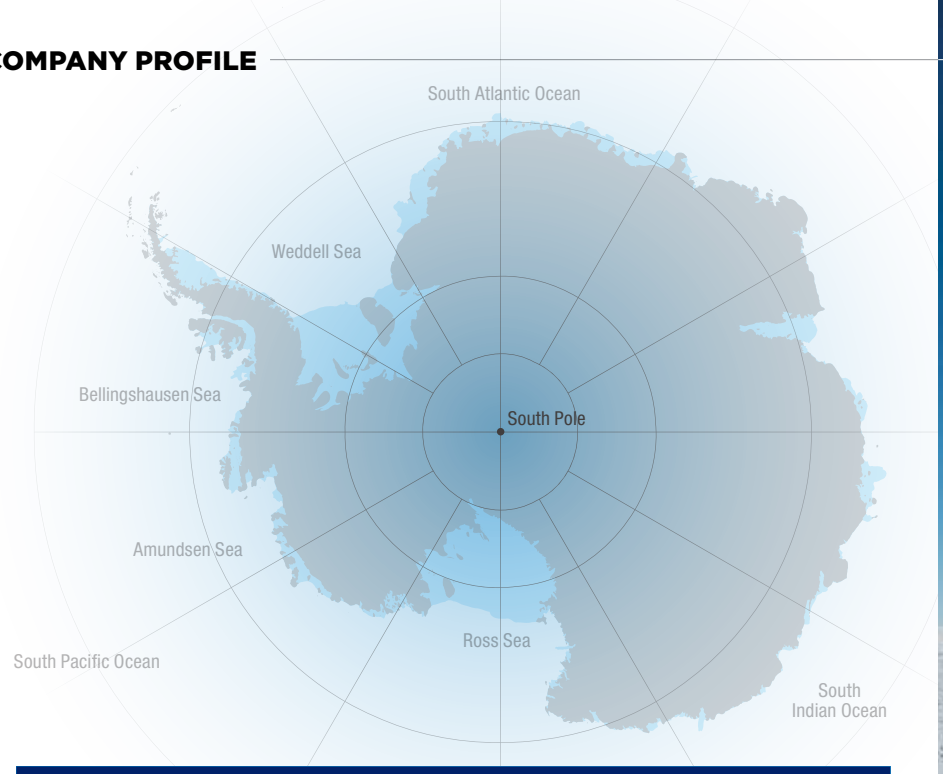
Departing from Cape Town, South Africa, groups of up to 12 guests are flown on the company's Gulfstream G550 jet to Wolf's Fang Runway, a private 8,200-foot blue ice runway owned and operated by White Desert.

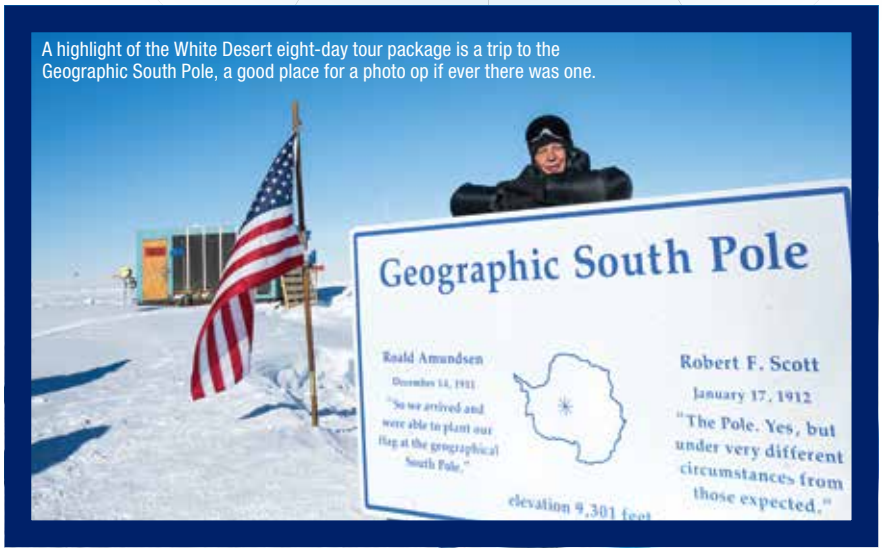
That's where they meet Burchartz and his fellow crewmembers, who fly them to their camp. Guests are loaded onto an Enterprise-operated Basler BT-67—a beefed-up version of the DC-3 that boasts Pratt & Whitney Canada PT6A-67R turbine engines with Hartzell five-blade aluminum reversing propellers.

The characteristics that made the original DC-3 legendary—rugged construction, impressive short-field performance and admirable payload capacity—have been augmented by Basler Turbo Conversions of Oshkosh, Wis. The company improved upon an already good thing with the addition of several upgrades, including all-new avionics and electrical systems, the aforementioned turbine engines, a fuselage stretch with structural reinforcement, and an improved fuel system.

"The turbine DC-3 is really robust," said Burchartz. "These planes were originally designed as bush planes and they are certified on skis, which makes them perfect for operating in Antarctica. Other than Wolf's Fang, we need to land on skis pretty much everywhere else."

The flight from Wolf's Fang to the guests' quarters at Whichaway Camp takes about 20 minutes. Situated on the coast beside a





A highlight of the White Desert eight-day tour package is a trip to the Geographic South Pole, a good place for a photo op if ever there was one.

Curious Emperor penguins, the ambassadors of Antarctica, seem to be discussing the big new bird on the field.

The characteristics that made the original DC-3 legendary—rugged construction, impressive short-field performance and admirable payload capacity—have been augmented by Basler Turbo Conversions of Oshkosh, Wis. The BT-67 boasts all-new avionics and electrical systems, turbine engines, a fuselage stretch with structural reinforcement, and an improved fuel system.

200-foot ice cliff, the outpost consists of six double-occupancy luxury sleeping pods, about 20 feet in diameter, that contain a bed, writing desk, wash area and toilet.

Whichaway also offers shower and kitchen pods, as well as lounge and dining room structures. The camp operates according to strict environmental guidelines to minimize its impact on the environment.

ADVENTURERS WANTED

At eight days in length, White Desert's signature US$92,500 excursion includes two big highlights: a visit to the Geographic South Pole and a 2.5-hour flight from camp

to Atka Bay to see more than 6,000 majestic Emperor penguins and their young chicks.

"We do two flights for them. The South Pole flight is a two-day trip with a stop for fuel on the way back. We get rest there and continue back to Whichaway the next day," said Burchartz.

That "night"—the continent is bathed in 24-hour sunlight at that time of year—is spent in small tents pitched on the Antarctic Plateau, where guests exercise their adventurous spirit while dining on rehydrated food. The experience is not for the faint of heart, with temperatures at the South Pole averaging -30 C in the summer months when tours are operated.

Burchartz and the other pilots are used to sleeping in tents, however. During the Antarctic tourism season, they camp out at Wolf's Fang, where conditions are decidedly more basic than at Whichaway.

"It does take a bit of getting used to," he said. "We stay in little mountain tents and there is a mess and lounge. There is no Internet. We have occasional email through a sat phone, so it's quite limited."

The Wolf's Fang camp is home to about 12 people, including pilots, a cook and two aircraft maintenance staff. There is no hangar to shelter the planes, so inspections must be done outside in the open air—hopefully on days that are less windy.


The South Pole flight is a two-day trip from Whichaway camp, with a fuel stop and overnight rest on the way back.


There are 18 species of penguins, four of which live in Antarctica. These Emperor penguins breed on the shores of the Antarctic continent and nearby islands.


There are no hangar facilities in Antarctica. Aircraft maintenance engineers must work on the planes outside and hope they get a day that isn't too windy.

A Herman Nelson heater is used to warm up the tools.

When bad weather does roll in, crews hunker down and pass the time reading books, watching previously downloaded movies, listening to music, and catching up on sleep.

But the isolation doesn't seem to bother Burchartz, who told *Skies* he enjoys Antarctic flying.

This year, he said the weather at Wolf's Fang was quite good and none of the excursions were cancelled. For this season, the Enterprise team had one leased BT-67 on site as well as a backup DHC-6 Twin Otter leased from Yellowknife, N.W.T.-based Summit Air.

"We have to fly the planes down, and that takes about a week to get there. We go through South America to Punta Arenas


The BT-67 is a workhorse that is well suited to Antarctica's harsh environment.

"It's up to the pilot to make a lot of the operational decisions down there. There isn't a whole lot of support."

[Chile], and make our way around to our base at Wolf's Fang."

He said that two BT-67s will be needed next year to handle planned White Desert expansion, especially because a Twin Otter doesn't have the range to do the South Pole excursion.

DIVERSE OPERATION

In addition to its work in Antarctica, Enterprise Aviation Group operates several divisions from its headquarters at the Oshawa Executive Airport (CYOO), including a fixed-base operation (FBO) and Durham Flight Centre flying school.

The company's approved maintenance organization (AMO) services a wide variety of aircraft, among them the Beechcraft King Air, Douglas DC-3 and Basler BT-67, de Havilland DHC-6 Twin Otter, Piaggio P-180 Avanti, Pilatus PC-12, Dassault Falcon 10, Falcon 20, Falcon 50, Falcon 900, and smaller piston-powered planes. The AMO also holds ratings for avionics, components and sheet metal structures.

Aircraft charters are available on Enterprise's Dassault Falcon 10 business jet or Beech King Air 90 turboprop.

The company also offers private aircraft management services, including managing three Basler BT-67s for Bell Geospace. Often, it is one of those aircraft that is flown to the South Pole for the White Desert contract.

In total, Burchartz said Enterprise employs about 40 staff members and operates 15 aircraft, including those at the flight school.

But although the company is incredibly diverse, he still prefers flying in Antarctica. This year his son, Cullen Burchartz, joined him.

At age 24, Cullen has about 600 hours

Pilot Brian Burchartz and the other crew members camp out at Wolf's Fang in small mountain tents. "It does take a bit of getting used to," said Burchartz.

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Although Enterprise tracks its aircraft while they are operating in Antarctica, Burchartz said pilots make the final operational decisions.

Whichaway Camp consists of a group of six double-occupancy luxury sleeping pods, perched on rocky coastal ground beside a 200-foot ice cliff.

After a cold day of exploring, the warm lounge pod is a welcome retreat.

Guests fly in on White Desert's G550 jet, at right, and transfer to the BT-67 for a quick flight to their base camp at Whichaway. **Cullen Burchartz Photo**

"When bad weather does roll in, crews hunker down and pass the time reading books, watching movies, listening to music, and catching up on sleep."

on the BT-67 and 1,600 total hours. For someone who has been hanging around the airport as long as he can remember, it was a thrill to ship out to Antarctica last year when a second crew was needed.

This year, he went down for a full season, leaving Nov. 16, 2018, and returning on Feb. 2, 2019.

For a young person accustomed to today's uber-connected world, Cullen said working in Antarctica was a strange experience.

"It was kind of neat but definitely weird for the first while," he said. "It's interesting. You're not on your phone. There is no Internet. Sometimes you just accepted it, the boredom. You could go out cross-country skiing and try to help out around camp. But once the chores are done, you're just sitting around.

"One thing I did find out is that Spotify accounts stop working after 30 days of not being connected!"

Crews at the Wolf's Fang camp do get over to Whichaway for occasional meals and showers, but for the most part they are roughing it.

While it's definitely not for everyone, Burchartz told *Skies* he enjoys Antarctic flying.

"You're in control. It's the scenery, and the people you work with. It is like flying the last frontier."

Lisa Gordon is editor-in-chief of *Skies* Magazine. Contact her at lisa@mhmpub.com.

FLYING WITH THE Stars

Air Transat is in the middle of a fleet rationalization that will be completed in 2022. Eventually, it will fly only wide-body Airbus A330s (shown here) and single-aisle A321s. **John Chung Photo**

From a modest start in 1987, Air Transat now employs more than 600 pilots and 2,000 flight attendants. Despite its growth, the Montreal-based airline still takes pride in cultivating a family atmosphere.

BY HOWARD SLUTSKEN

It's been over 30 years since Air Transat's inaugural flight departed Montreal, bound for Acapulco, Mexico.

And when the airline's only plane, a Lockheed L-1011 TriStar, returned to Mirabel Airport after that November 1987 flight, the maintenance team had to scramble to service the aircraft.

"They were down to the last cent on that particular flight and actually had to borrow a case of oil because they had to replenish the engines," said Marc Gilbert, Air Transat's director of flight operations, in a recent interview with *Skies*.

The flight was the culmination of the work of Jean-Marc Eustache and the team at Trafic Voyages, a Quebec-based travel agency that, along with a group of 25 ex-Quebecair pilots, decided to start an airline.

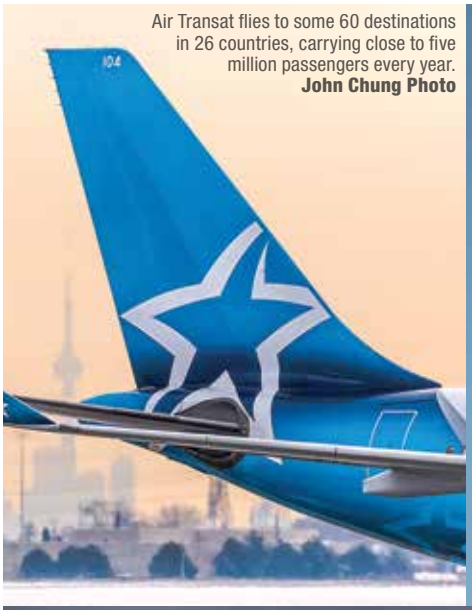
More TriStars soon joined the fleet, "and then, the airline needed smaller airplanes to serve other markets, so they acquired Boeing 727-200s, which were ex-Air Canada airplanes. That's when I was hired, in September 1991, when the 727 was introduced," said Gilbert.

Now part of Transat A.T., one of the world's largest travel providers, the Montreal-based airline flies vacationers and "family-and-friends" travellers to Europe, the Caribbean, Mexico, the United States, and other destinations from airports across Canada.

Air Transat has had a particularly eclectic fleet throughout its history, one that brings joy to plane spotters through their camera viewfinders, but one that can also make airline operations a challenge.

Over the years, the airline flew as many as 20 TriStars, along with Boeing 727s and 757s. The current fleet includes the

At its 30th anniversary celebration in 2017, Air Transat unveiled its new livery. Shown here with an A330 aircraft are (L-R) Jean-François Lemay, president of Air Transat; Annick Guérard, chief operating officer of Transat; Dominique Anglade, Quebec deputy premier, minister of economy, science and innovation, and minister responsible for the digital strategy; and Jean-Marc Eustache, president and CEO of Transat, with flight crew members in the background. **Transat A.T. Photo**



Air Transat flies to some 60 destinations in 26 countries, carrying close to five million passengers every year. **John Chung Photo**

Air Transat's A330 pilots are in the process of being cross-qualified on the A320-series (shown here), which includes the A321 and A321LR. **John Chung Photo**

From its first flight in 1987, Air Transat has grown steadily. In 2018, it was named World's Best Leisure Airline by Skytrax. **John Chung Photo**

Based in Montreal, Air Transat employs some 3,000 people. **John Chung Photo**

Workers load cargo onto an Air Transat flight. **Air Transat Photo**

Boeing 737-700 and -800, and the Airbus A310, A321, A330-200 and -300.

Historically, Air Transat has "flexed" its fleet, adjusting seasonal capacity through leases. In the 2018-2019 winter exchange program, four Air Transat A330s flew with the European-based Thomas Cook Airlines Group, while eight of that organization's A321s were on this side of the Atlantic.

SUNSET FOR THE A310

Air Transat is still one of the world's largest operators of the venerable Airbus A310, with six in the fleet.

The airline isn't the only Canadian operator of the A310. The Royal Canadian Air Force has five of the planes—designated as the CC-150 Polaris—in tanker and transport configurations, along with the VIP-outfitted "Can Force One" that flies Prime Minister Trudeau on international missions.

Mauricio Diaz, Air Transat's manager, Commercial Operations Control Centre (OCC), explained that parts are available and that the airline's mechanics are certainly experienced with the A310s, but that the planes aren't necessarily airborne as much as some of the newer jets in the fleet.

"We try to keep them [flying] under a hundred hours per week. When you do that, you're able to find ground time to be able to fix little things here and there," said Diaz, who has been with Air Transat for over 22 years.

After years of safe and efficient operations, Air Transat's A310s are being phased out, as each plane approaches its next extensive "C-check" maintenance overhaul.

As the A310s fly off into the sunset, the airline is embarking on a fleet rationalization project that will be completed in 2022. To reduce the complexities of crew training, scheduling, and maintenance on a varied mix of planes, the airline has decided to streamline its flight operations with an all-Airbus fleet.

That decision was far from simple, according to Gilbert, because of the difficulty in finding a new plane that matched the operating economics of the 245-seat A310.

"That was the big dilemma. The A310 is essentially the perfect airplane for us, for Europe, because it has the perfect number of seats. It was very difficult because there is not a single airplane that can replace the A310 in capacity and range. The closest aircraft was the A321LR."

Air Transat still operates six Airbus A310 aircraft, although they are being phased into retirement. "The A310 is essentially the perfect airplane for us, for Europe, because it has the perfect number of seats," says Marc Gilbert, Air Transat's director of flight operations. **John Chung Photo**

EFFICIENT LRs

Over the next four years, the A310s and 737s will leave Air Transat, and the airline will ultimately operate a star-liveried fleet of wide-body A330s and single-aisle A321s. The narrow-bodies may end up as a mix of A321ceo, re-engined A321neo, and A321LR aircraft, explained Gilbert.

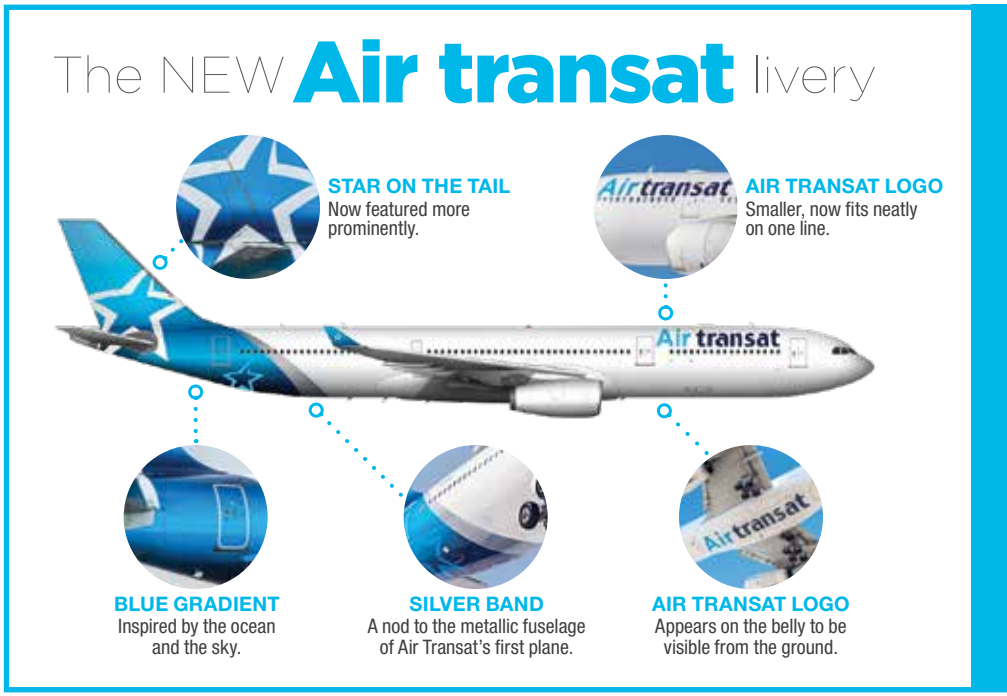
Air Transat will configure its A321LRs with 199 seats, even though the plane is certified to carry up to 240 passengers.

The efficiency of the A321LR far exceeds the twin-aisle A310s, even with a 19 per cent reduction in seats. "Even if you prorate that to the fuel burn difference, we're saving 36 per cent in fuel burn on every single flight," said Gilbert. "The LR is a great airplane because it's versatile. We'll be able to fly to all our small markets, and it has the range to serve France and the U.K."

NEW DESTINATIONS

"We'll get our first A321LR in April 2019, and the second one two months later. It will be a milestone in our company," said Gilbert.

Historically, Air Transat has "flexed" its fleet, adjusting seasonal capacity through leases. **Scott McGeachy Photo**



Air Transat's Operations Control Centre follows each aircraft around the clock. The company says a "passenger first" mentality drives delay-related decisions. **John Chung Photo**

The capabilities of the A321LR will allow Air Transat to add new routes to destinations that couldn't previously support a wide-body passenger load. But the airline doesn't make those decisions unilaterally.

Transat Travel's marketing team will first explore a new destination, looking to set up relationships with hotels and activity providers in order to create new packages for holiday travellers. But the airline is brought into the planning process early, to ensure that the new service can be launched.

"We here at Flight Ops will work with our performance engineers and create a risk analysis," said Gilbert. That analysis lays out the operational guidelines for the new service, along with any issues or restrictions due to airport or airspace concerns.

PASSENGERS FIRST

Having a far-flung and relatively small fleet can be challenging for Diaz's team in Air Transat's OCC, when aircraft have maintenance issues at destinations that are served at a low flight frequency.

Co-ordinating with flight dispatch, maintenance control, passenger support services, and crew scheduling, the OCC monitors the airline's fleet around-the-clock.

"We follow every flight, all the time, and if there's any issues with the aircraft, whether delays or maintenance, we have to make decisions to fix the problem," said Diaz.

He described his team's decision-making process during a recent maintenance issue with one of the airline's jets. "So, what do you do, what are the options? Do you have another airplane you can send, or do we have parts to fix the airplane? We couldn't fix it right away, so we had to take about a 20-hour delay until the next day, and we sent the passengers to a hotel. We sent parts and a mechanic and fixed the plane."

Delays are a fact of life in the airline world, but Diaz's multi-functional team has one priority.

"Every time we have a delay, we're always trying to think of the passenger first. Even

if you may have a chance to fix the airplane, or to send another one, it may be better for the passengers to send everyone to a hotel, quickly," said Diaz.

"Having a big delay isn't a problem if you treat passengers well, if you communicate with them and if you tell them what's going on. But there's some delays where you're stuck in places where it's difficult to function, where passengers are waiting at the airport, or with problems like we had in Ottawa [in July 2017]."

And not that he expects flight delays to be a thing of the past, but Diaz recognizes that Air Transat's fleet plans will have a positive impact on the airline's operations. "I think it will be simpler for us to have the same family of airplane. And it will make our job a little bit easier, for sure."

A FLEXIBLE FLEET AND PROFICIENT PILOTS

Air Transat's A330 pilots are in the process of being trained on the A320-series, which includes the A321 and A321LR. After completing a one-week Cross Cockpit Qualification (CCQ) course, the pilots will be checked out to fly either the narrow-body A321 or the wide-body A330.

This isn't a new concept—pilots can cross over between the single-aisle 757 and the twin-aisle 767, an operational feature that Boeing factored into the design of the two 1980s-vintage aircraft.

"It's what we call MFF, or mixed fleet flying," explained Gilbert. "For example, a pilot can fly an A330 from Montreal to Paris, overnight there or deadhead, say, to Bordeaux. Then the next day, the pilot can bring an A321 back from Bordeaux to Montreal. That gives us flexibility."

A330 captain Martine Olivier is one of the airline's pilots who will be heading to the CCQ course. Olivier has been with the airline since 1993, first as a flight attendant, then as a pilot, after flying with several other Canadian airlines.

She got the flying "bug" when she was invited to watch a landing from the jump seat of a 727 during a holiday flight, back when flight deck visits were permitted. "That was the most magical moment for me and that's when I decided this is what I wanted to do."

In 2011, Olivier was part of the first all-female crew on an Air Transat flight. "It was a special day for all of us. One of our flight

An Air Transat A321LR in the final position in the Airbus Hamburg assembly line. The A321LR (Long Range) will let Air Transat expand its route map by reaching new destinations. **Howard Slutsken Photo**

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attendants put a sign on the flight deck door–'No Boys Allowed!!!' The whole crew was very proud, the passengers were happy, and everyone had a good laugh. I'll remember that day as one of the best moments of my career!"

Making the decision to return to Air Transat as a pilot was an easy one for Olivier, in large part because of the airline's culture and size.

"What makes it special is the people that I work with—I have the most extraordinary colleagues. There's always a positive energy between us since we all know each other and there is a real close family atmosphere," said Olivier.

Both Diaz and Gilbert echo those sentiments. "I think people here really do care," said Diaz. "We went through tough times and always find a way to make it work. It's like a family for us here. People come from other companies to work here, and one of their first comments is that it's like a small family here. Well, now it's a bigger family!"

Gilbert agreed. "Today it's over 600 pilots and 2,000 flight attendants—and we're hiring eight to 10 new pilots a month. In their interviews, we ask, 'Why do you want to work at Air Transat?' They say, 'We hear that it's like a family company and everybody's well treated.' And we love that."

For Olivier, it's clear that Air Transat is her home.

"As we say here, I've always had the Air Transat star tattooed on my heart—l'étoile tattouée sur le coeur."

Howard Slutsken | A pilot who loves to fly gliders and pretty much anything else with wings, Howard is based in Vancouver, B.C.

Air Transat is a business unit of Transat A.T. Inc., an international tourism company specializing in holiday travel and offering vacation packages, hotel stays and air travel. **Galen Burrows Photo**

RETURN S

Roger Hadfield bought this elegant Stampe biplane in 1977. Following a lengthy restoration, the plane took to the air once again in the summer of 2018, with Roger at the controls. "No one knows a Stampe better," writes his son, Dave Hadfield.

OF THE STAMPE

After a two-year restoration, pilot Roger Hadfield took to the skies once again in his Belgian-made Stampe SV-4B. Here, his son Dave Hadfield tells the story.

BY DAVE HADFIELD | PHOTOS BY ERIC DUMIGAN

I've been married to Robin for 37 years. It would be misleading to say I won her in a Stampe biplane, but it's true, in a way.

It was 1980. Robin had begun flying training and had met a group at Maple Airport (in Vaughan, Ont.) who intrigued her with loops and rolls in a Decathlon and a Pitts. She became an accredited judge at aerobatic contests.

I was a young DC-9 first officer borrowing my Dad's Stampe-Vertongen SV-4B and learning the Sportsman sequence.

Our paths crossed at the Canadian Open at Centralia, Ont. I noticed she arrived in a Pitts S2. She noticed I was there with the Stampe. Each of us thought the other owned the airplane! We were both wrong, but we didn't let that stand in the way.

Two months later, we were buying a house together and a year later, we were married. And we have been flying together ever since.

But the Stampe named "Mam'selle" was key.

Dad (Roger Hadfield) bought the elegant biplane in 1977, when he was 43. Almost no one in our neck of the woods had ever heard of one before. But aerobatics fascinated him. At the time he was inverting the family Citabria, but itching to do more.

Stampe #16 served as a basic trainer with the Belgian Air Force from 1948 to 1968. A few years later, it was purchased by RCAF personnel serving nearby, and along with four other machines was brought to Canada in the belly of an empty CC-130. (The good old Air Force!)

De Havilland guru Watt Martin peeled the fabric, repaired as necessary, recovered it, and overhauled the late-model Gipsy 10 engine. After only a year or two the owner, Glen Beiderman, decided to move on, and Dad bought the aeroplane, registration C-GOMD.

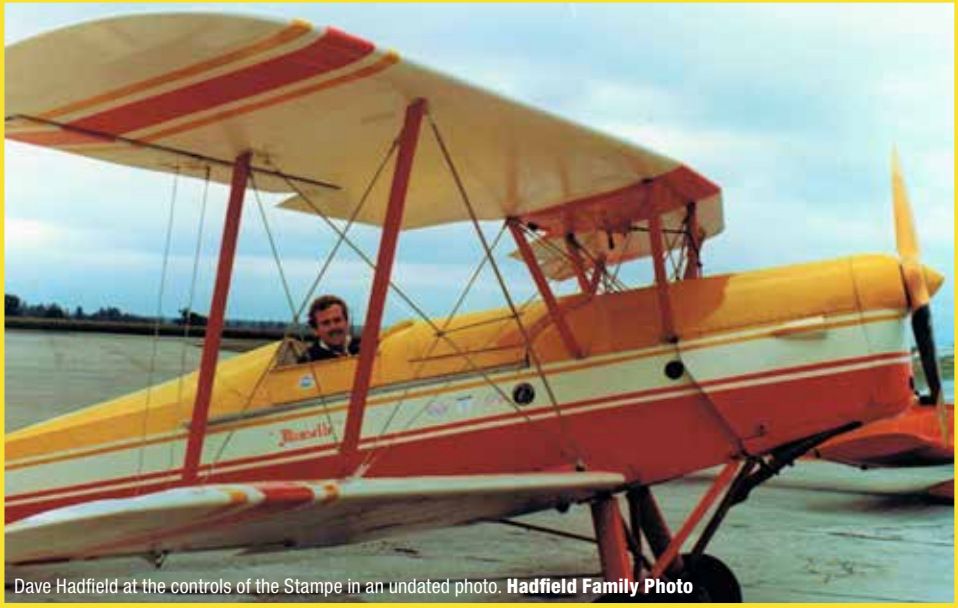
LIKE A TIGER MOTH, ONLY BETTER

Jean Stampe was a First World War aviator and King Albert of Belgium's personal pilot. In peacetime, he formed a company with financier/pilot Maurice Vertongen and designer/builder Alfred Renard, and started a flying school. In 1927, they became the Belgian dealer of de Havilland products. But by the 1930s, he decided to build a better trainer. The story is he wanted to create a biplane with none of the faults of a Tiger Moth—he wanted to take its strengths and improve upon them.

Renard had left to form his own company by then, and Georges Ivanow was hired to design the new aircraft. It was called the SV-4.

Post-restoration, the brilliant new paint and the sweetly-barking Gipsy 10 were a feast for family and friends.

Roger Hadfield, centre, with sons Chris, left, and Dave.



Dave Hadfield at the controls of the Stampe in an undated photo. **Hadfield Family Photo**

The Hadfields and their Stampe in Centralia, Ont., in 1979. **Hadfield Family Photo**

Stan and Sheila Vander Ploeg of Grand Valley Aircraft Restorations worked their magic during the Stampe restoration. **Dave Hadfield Photo**

Only about 35 were built before the Germans invaded, but after the war the Belgian Air Force contracted for 65 more, with the latest DH Gipsy 10 engine. They served as basic trainers until the late '60s. The French Air Force also liked the design and 840 of them were built by Farman as the SV-4C, powered by the Renault 4 Pei.

When you first see a Stampe, you tend to ask, "Which model Moth is that?" There is certainly a general resemblance. But it's subtly different in every line. There are four ailerons, not two. The wing sweep and dihedral have changed. A different airfoil was used. The fin is larger and so is the rudder. All the tail feathers have significant airfoil sections. Control gearing is utterly different—the strange de Havilland aileron rotary gearing was scrapped. The aircraft is shorter in wingspan and length.

The result is a far more nimble beast. It delights. There is a wonderful quality of grace in the way it flies, a feeling that comes to you through the stick. Its roll rate doesn't match modern fire-and-brimstone airplanes, but it goes up on a wingtip on a mere whim. All you need to do is guide it around. Control forces are fingertip-light. It's impossible to fly one straight and level. You merely think about manoeuvring, and you're there.

The late '70s and early '80s saw Dad in the sky west of Milton, Ont., on most of the flyable days that he wasn't piloting a DC-8. In his first year, he won in the Sportsman category. In 1978, he won Intermediate, beating seven Pitts aircraft for the trophy. (He'd learned to "fly for the judges.") In 1980, we each won in our categories.

A Stampe has nothing like the vertical performance of a Pitts. Each foot of altitude must be laboriously gained and preciously husbanded. Any crude mistake costs. To match one up against a modern aerobatic aircraft—and win—requires you to finesse every manoeuvre. Each pull to the vertical must be just right; too hard and the drag kills your speed, too gentle and you don't have time to draw an upward line. You nurse it around the tops of Cubans—it seems to keep flying with zero airspeed. It can be "floated" through some manoeuvres. The roll rate is good for a '30s biplane, but it doesn't compare to a Pitts. For Dad to gain competition victories in the Stampe was a testament to skill and smoothness and endless practice.

He was also ruthless about weight, yanking out the starter, generator, front cockpit instruments, battery—everything he didn't absolutely need. We boys learned to hand-bomb a prop—safely!—as soon as we were tall enough to reach it.

SHE'S A QUIRKY ONE

The Stampe does have some quirks: The brakes are like the early de Havilland aeroplanes, applied with a hand-bar on the left side of the fuselage. Pull that and both wheels will be braked evenly if the rudder is centred and the cables are set up correctly. (Two big "ifs!")

If you pull it when the rudder is displaced, you get braking on that side. In real-life, especially in a crosswind landing, that system only works if you have three hands (throttle, stick, and brake). Dad learned quite early to rig the brakes so that if you went hard-over with the rudder, right-to-the-stop, you got almost enough braking to stop a wheel. (And that's without pulling the brake lever at all.) This allows instant correction. No fumbling. It has kept the aircraft intact during many troublesome crosswinds.

"There is a wonderful quality of grace in the way it flies, a feeling that comes to you through the stick."

Another weirdness is the "inverted" fuel system. It's controlled by four levers on the quadrant on the cockpit left side. The top lever is just the butterfly-valve of the throttle, like most carburetors. The lever underneath it [black] controls a needle-valve which squirts raw fuel under pressure into the manifold intake. This is the pressure "inverted" system. When in use you handle the two levers at the same time in the palm of your left hand. If you want a richer mixture, you lead with the heel of your hand pushing the lower lever forward. If the engine is making black smoke—running too rich—you lead with the upper lever; the ball of your hand. (This is a similar concept to some First World War rotary engines.)

And all that would be fine except that this pressure system is too crude to allow the engine to idle. For idle-power manoeuvres, such as spins, you must be on the normal system! Which means you have to consider how long it takes for the carburetor bowl to fill, or empty (because you can't run on both) during your display. An example: If you want to loop after a spin, you must start out on the normal system. But well before entering the spin, you must push the bottom lever [orange] forward, which shuts off fuel to the carb bowl. If you time it right, the bowl empties as the aircraft recovers from the spin. The engine quits but instantly you bring the pressure-system lever forward and the engine immediately catches again. Quite something to remember during a sequence!

The other lever, third from the top [blue], is the mixture control for normal flying, but in inimitable de Havilland fashion it works *not* by reducing fuel, but by adding air to the fuel-air mix. It's moved back for rich.

For another 30 years, the Stampe was part of the family. All five of us siblings knew it intimately—through wiping oil off the belly, and lovely cavorting flights off the farm or cottage strips. My son, Austin (now an Airbus A320 captain with Air Canada) spent a month in it with his grandfather during summer break from Sault College. They tried to visit every grass strip in southwestern Ontario. Austin soloed it – a rare honour.

SPARKLING AND RENEWED

By 2015, C-GOMD was getting tired. It was clearly time for rejuvenation. I put Dad in touch with Stan and Sheila Vander Ploeg of Grand Valley Aircraft Restorations, northwest of Orangeville, Ont. I'd seen them repair and recover the Edenvale Classic Aircraft Foundation Tiger Moth in just one winter. They are wood-and-fabric specialists, a great team, and I was impressed.

After a few meetings, a deal was struck. OMD was disassembled in the hangar at the farm and trucked to their place.

It's vital to have a clear understanding between all parties before starting a project like this. Both Stan and I made it very clear to Dad that the work would cost much more than the resale value of the aircraft. And, it would occupy two winters.

His solution was to say, "Get started," and then he bought a C-170B to fly while he waited.

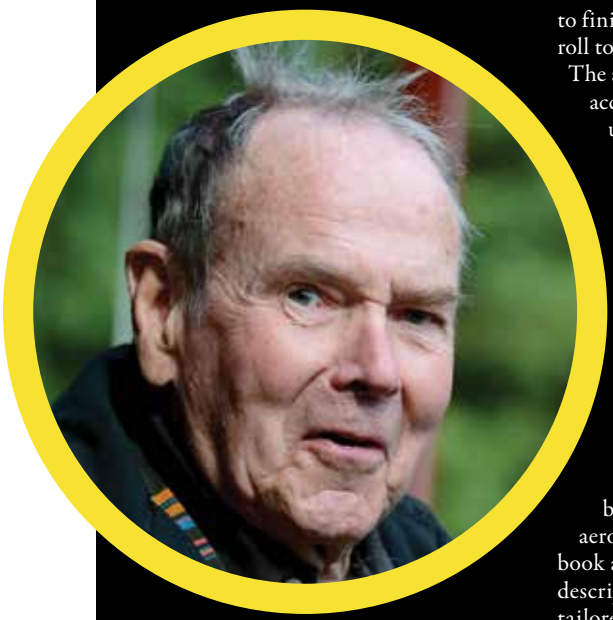
This turned out to be a great move. It had been a long time since Dad had owned a cabin airplane. With only him and Mom on board, the 170 made easy work of the 1,600-foot farm strip. They ranged all over southwestern Ontario, chasing the perfect lunch. Fly-ins, airshows and pancake breakfasts lured them out.

We had a hangar built at the strip near the cottage (Corunna, Ont.), and parked the aircraft indoors, along with my Fairchild 24W or Robin's RV6A. Chris woke up his taildragger feet in response to Dad's thorough checkout, and soloed it. (Which in September 2018 led to

Roger Hadfield flies the Stampe over southwestern Ontario. "It is a wonderful experience for me, in my 85th year, to fly "Mam'selle" again, fresh from recover-and-repair and flying like a dream," he writes.

THE STAMPE: A JOY TO FLY

BY ROGER HADFIELD



The Stampe is a luv!

The aircraft's appearance is similar to a Tiger Moth in that it is a swept-wing biplane with a Gipsy Major inverted engine. But there the similarity ends!

It has a shorter span, shorter chord, four ailerons, and an inverted fuel system, but most important is its flying tail. Both tail surfaces are airfoil both ways, which allow the pilot to make something out of nothing in aerobatic displays. The airflow from the prop flows undisturbed back along the flat sides of the fuselage and keeps the tail effective well below minimum speeds.

With the meagre 142 horsepower (on a good day) you can't power your way through or out of any figure. It is essential to make use of every bit of kinetic energy available as you enter and ride through a manoeuvre.

For instance, the Stampe will not fly knife edge. However, I've done many knife edge passes low and close to finish a sequence and quarter roll to push out in an inverted turn.

The apparent knife edge flight is accomplished by humping the nose up as you quarter roll to knife edge attitude, allowing the aircraft to ride a parabolic arc on the kinetic energy of the quick pull up.

To fly a snap roll without undue G and strain it is essential to accelerate from about 60 knots to 80 and enter the snap riding on the energy created by the acceleration.

I was blessed, 42 years ago, with Neil William's book *Aerobatics* as my bible for aerobatic training. He wrote the book around the Stampe and his description of figures were precisely tailored for the Stampe.

I would read the instructions, then go up and try the figure and then, usually, come back down to read it again to see what I did wrong. The second flight was often much better.

All rolling and looping manoeuvres can be flown right in front of the crowd, and the lovely round figures flown at low speeds with a good margin of safety are most pleasing to the eye.

All fine flying aircraft tend to become an extension of the pilot and the aeros are flown often without conscious inputs. With the Stampe this is especially so and makes the aircraft a joy to fly!

It is a wonderful experience for me, in my 85th year, to fly "Mam'selle" again, fresh from recover-and-repair and flying like a dream.

Thanks to Grand Valley Aircraft the rigging was perfect, first time, and the Stampe seemed eager to display her fine manners.

Then, with my son Chris flying the photo C-170, Eric Dumigan captured the beauty of a Stampe in flight.

A Stampe has nothing like the vertical performance of a Pitts. Roger Hadfield's competition victories in the Stampe are a testament to skill and smoothness and endless practice.

flying Mike Potter's new Spitfire.) So did brother Phil, a 787 captain.

In the meantime, the Stampe progressed. Stan looked a little blank when I presented him with full drawings and notes written in Belgian technical French, but persevered. There were endlessly time-consuming repairs to the 75-year-old wood of the wing ribs and trailing edges. Sheila became an expert at drawing 25W60 engine oil out of the fuselage wood.

I sourced parts all over the world and Stan put his contact list to good use for items that needed specialist repair. But there were no surprises, just labour, and she came together steadily.

The ceconite fabric went on beautifully. ("A couple that stitch together, are fixed together!")

The doping was interminable, particularly when the coloured coats began to go on. Dad wanted exactly the same paint job, which meant miles of masking tape. Stan and Sheila worked together, hands-on, and it showed.

The wings went on and the engine first fired up in June 2018, right on schedule. The brilliant new paint and the sweetly-barking Gipsy 10 were a feast for family and friends. For us, it was like stepping back in time.

Dad is well into his '80s, but no one knows a Stampe better, and he did all the test flights. "Dave," he later said to me, "it flies better than it ever did. They got the rigging right—first try!"

Soon the Stampe was at the cottage airstrip, and the summer of 2018 saw the aeroplane gamboling over the fields south of Sarnia like it always had!

Recently, at a gathering south of Tillsonburg, Ont., we linked up with Eric and Bernadette Dumigan for an air-to-air photo session. Eric had captured the Stampe 20 years ago during a similar flight from Geneseo, N.Y., and it was sweet to do it again with the aircraft fresh and new. Chris flew the 170 as the camera plane, and Bernie and I flew chase in the RV6A.

We landed and felt a wonderful sense of turning back time. We shook hands, laughed, took photos, and delighted in the moment.

To share in the return of the Stampe, still in the hands of her owner after 42 years, sparkling and renewed, was a life memory to treasure.

Dave Hadfield is a 27,000-hour retired airline pilot who recently flew Mike Potter's Spitfire IX on a 5,000-mile trip from Gatineau, Que., to Comox, B.C., and back. A singer-songwriter, his most recent album, "Climbin' Away," was released at Oshkosh last summer. He lives near Barrie, Ont., flies his Fairchild 24W, and his wife Robin is a director of the 99s, and flies her RV6A. www.hadfield.ca.

The Stampe does have some operational quirks, including hand-bar brakes and an "inverted" fuel system.

AVIONICS

With a multitude of available systems on the market, operators who are stepping up to the next generation of avionics equipment must weigh their options carefully.

BY SCOTT M. SPANGLER

The Garmin G5000 integrated flight deck for the Citation Excel/XLS series features three high-resolution touch-screen displays and the latest satellite navigation and digital flight management tools. **Garmin Photo**

TRANSITIONS

Operating in times of technical transitions is never simple, easy, or inexpensive, especially when operating turbine-powered aircraft, which have stringent certification requirements when it comes to essential systems like avionics.

Analog to digital systems was one transition, and the overlapping generations of new digital technology is another. Along the way, what was (briefly) innovative technology is now an orphaned avionics system in an airframe that is a decade old, give or take, which further complicates the return on investment equation when considering an avionics upgrade.

To operate efficiently and economically in—and take advantage of—the world's 21st century airspace, which everyday depends on satellite connections, operators must calculate the return of their avionics upgrade options.

Garmin recently certified its G1000 NXi retrofit for the Cessna Citation Mustang. **Garmin Photo**

Perhaps the first decision waypoint is whether to focus only on systems currently certified for a particular airframe or, if the fleet numbers work, to certify a system custom engineered for an operator's specific needs.

Avionics upgrades need not be all-or-nothing efforts because technology's transitions take time. Operators should add this variable to their upgrade return on investment equations. In ordering upgrade priorities, if an operator does not have an imperative need for a system such as automatic dependent surveillance – broadcast (ADS-B), whose ultimate requirements Canadian regulators have not yet firmly specified, it should probably wait for the installation of more established and beneficial systems.

Given the spectrum of turbine-powered (both prop and fan) aircraft, one system will not fit all of them, so let's consider them by category and in alphabetical order by manufacturer.

INTEGRATED UPGRADES

Avidyne Corporation—Avidyne continues to expand its Cessna Citation retrofit program for IFD5-Series flight management system (FMS) navigators. The integration of its IFD550/545 FMS navigator brings localizer performance with vertical guidance (LPV) approach capability, electronic approach charts, wireless connectivity, and ADS-B compliance. With the successful integration in the CJ-525 and 525A, Avidyne is actively working on certification programs for Cessna CJ1+, CJ2+, and CJ3.

The IFD FMS system features Avidyne's new GPS LegacyAviation System (GLAS) protocol that interfaces directly with the legacy avionic systems in these CitationJets without the extra cost of an external adapter or translator box or electronic flight information system (EFIS) factory upgrade. With the IFD-series FMS upgrade, CJs will get hybrid-touch FMS capability, autopilot-coupled LPV approaches, 3D synthetic vision of terrain, obstacles, and traffic, and Wi-Fi connections to the IFD100 and many third-party apps, including ForeFlight. ADS-B Out compliance, provided by dual remote or panel-mount SkyTrax transponders, is optional.

With a building-block architecture, Universal's integrated system can employ up to five displays, like this EFI-1040. **Universal Avionics Photo**

BendixKing—Derived from Honeywell's Primus Epic and Apex avionics systems, BendixKing has tailored its integrated AeroVue for retrofit in Part 23 class III and IV, and Part 25 aircraft. Pilot and co-pilot have a dedicated primary flight display (PFD) and they share a multi-function display (MFD). The screens replace all legacy mechanical equipment and include SmartView synthetic vision, FMS, radios, ADS-B compliant transponder, and autopilot. Options include weather radar, XM weather receiver, radar altimeter, traffic alert, and ground proximity warning system.

Garmin—King Air 200/300 series and Cessna Mustang owners can upgrade their original G1000 integrated systems with the next generation G1000 NXi, which enhances the system with faster processors, brighter high-resolution displays, Wi-Fi, HSI mapping, WAAS LPV approaches, and autopilot-coupled visual approaches. Options include ADS-B Out and In, and database and flight plan transfer from a tablet or phone.

The G2000 is an advanced flight deck for high-performance piston aircraft. The high-resolution displays include synthetic vision

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and split-screen displays of multiple systems and sensors. The touch-screen interface has shallow menus. It controls Automatic Flight Guidance and Control Systems and includes weather, charts, traffic, terrain, and global connectivity with an optional Iridium satellite data link and subscription.

An advanced integrated flight deck, the G5000 is approved for the Beechjet/Hawker and Citation Excel/XLS series business jets. With three high-resolution touch-screen displays, it features integrated engine-indicating and crew-alerting system and the latest satellite navigation, digital flight management tools, and support for future next generation technology.

Sandel Avionics—Employing next generation technology, Avilon is a fully integrated touch-screen flight deck retrofit for the Beech King Air, with future support for the Citation series. It provides redundancy and reliability in communication, navigation, surveillance, and flight guidance. Like the other members of this generation of integrated systems, Avilon meets today's performance-based requirements and is designed to incorporate new technology as it comes online.

Universal Avionics—Employing a building-block architecture that meets an operator's specific needs, Universal has approved systems for so many aircraft, its website has a dedicated page that simplifies searching for them. Its InSight integrated flight deck delivers all of the necessary performance-based capabilities and information while interfacing with a large number of existing components such as sensors, air data computers, radars and autopilots.

DIGITAL PREDICTIVE MAINTENANCE

Not specifically an avionics system per se, predictive engine maintenance programs take advantage of all the data integrated flight decks and/or engine monitors collect as part of their real-time display of all the necessary parameters of powerplant performance. It is a collaborative effort that relies on three data sets.

Reference data is the first. It includes manufacturer test and design data, maintenance and operating data that establishes the engine's baseline for normal operation. Analysis programs compare this reference data to operational data collected by the avionics system on every flight.

Differences between the two recognize performance trends that detect inefficient operation, deterioration, accelerated wear and other factors that lead to failures if the operator does not address the identified causes. This leads to the third data set, maintenance manuals that enable technicians and engineers to address the issues revealed by the analysis before the problem migrates from inefficiency to engine damage.

Appearing simple and straightforward, because the entity that creates the data owns it, predictive maintenance can be a complex data-sharing relationship. Operators own the operational data. Engine OEMs are the primary source of the first and often the third sets of data, with maintenance, repair, and overhaul (MRO) organizations as another source of maintenance data.

Upgrading to an integrated flight deck is one way to tap into the operational data stream. If upgrading an airframe to an integrated system isn't an option, a system dedicated to this specific task is an economical alternative. Latitude Technologies' modular system of monitors and communication devices adapts to most operators' requirements.

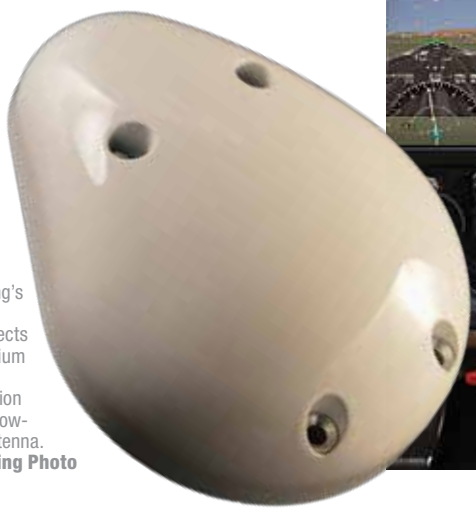
The ENode data acquisition system works with the IONode flight data recorder to collect information for flight data monitoring and fuel management programs. In addition, it corrects the data for atmospheric conditions and will, with a communication module like its Iridium-based SkyNode S100, automatically transmit the data to the analyzing service provider.

A number of organizations provide analysis, as do engine manufactures. Pratt & Whitney Canada offers its turnkey FAST solution and GE Aviation provides a number of programs, including Prognostic Health Management+.

With maintenance being the final step in the process, the MRO that maintains an operator's aircraft is often the place to start when considering a predictive maintenance system.

Avidyne's IFD550/545 FMS delivers navigation, LPV approaches, and electronic charts to Cessna CJs. **Avidyne Photo**

Derived from Honeywell Primus Epic and Apex systems, BendixKing's integrated AeroVue flies in this King Air. **BendixKing Photo**



BendixKing's AeroWave 100 connects to the Iridium satellite constellation with this low-profile antenna. **BendixKing Photo**

Sandel Avionics' Avilon flight deck is a fully ADS-B compliant integrated King Air avionics package that the company says utilizes current technology from "back to front." **Sandel Avionics Photo**

ADS-B DIVERSITY

There is no better example of the challenges imposed by avionics technology transitions than ADS-B. That's doubly true here in Canada, where ADS-B not only relies on satellite-based augmented navigation as its position source, but also on satellite-based ADS-B listening posts.

Given the vast reaches of territory where building and maintaining ADS-B ground stations is not feasible, Nav Canada, with other air navigation service providers, is part of the Aireon joint venture. Participants are working with Iridium Communications, which just completed its constellation of 66 new Iridium Next satellites in low earth orbit that will provide global ADS-B coverage.

The new service goes online this spring, and Nav Canada controllers in the Edmonton and Gander Flight Information Regions will be among the first to receive the aircraft position reports it will provide. After establishing its presence in domestic airspace in these regions, operational trials will begin in the North Atlantic, the world's busiest oceanic airspace.

The benefits of global surveillance, tracking, and traffic management are clear. No matter where they are, controllers will see on their scopes the position and related data of any aircraft equipped with an ADS-B Out 1090ES transponder.

And that is the challenge. Like any device that communicates via radio frequency, optimal performance comes with an unobstructed line-of-sight between antennas. Ideally, antenna diversity, a dorsal antenna for satellites and a ventral antenna for ground stations, will provide optimal ADS-B performance.

Unfortunately, ADS-B transponders capable of this diversity are much more expensive than their single-antenna cousins. The involved parties, Transport Canada, Nav Canada, and aviators who use the system, are still debating the aircraft-specific antenna diversity requirements. Until the regulators conclude this discussion operators should, perhaps, delay the installation of this system, unless they regularly fly in the U.S., where ADS-B will be mandated as of Jan. 1, 2020.

> "Avionics upgrades need not be all-or-nothing efforts because technology's transitions **take time.**"

IN-FLIGHT CONNECTIVITY

BendixKing—AeroWave 100 HDU is an Iridium-based satellite communication system that allows the cockpit and cabin to send and receive text messages, make phone calls, and connect to the Internet anywhere in the world. With a bandwidth of 200 kbps, it will download text and graphical weather in-flight. And with the AeroWave 100 Wi-Fi Router, passengers can use their smartphones and tablets. The system also allows constant contact with an operator's flight operations department to co-ordinate weather deviations or changes in destination. The system weighs less than 10 pounds and the antenna measures 5.6 by 4.4 by 1.9 inches. Data and voice subscriptions apply.

Garmin—The GSR 56 Iridium satellite data link connection for the company's Connext flight connectivity systems provides subscription-based talk, text, on-demand weather, on-demand weather reporting, and transmission of aircraft maintenance reports. Mobile devices connect to it though the Flight Stream 510 Wi-Fi portal.

GoGo Business Aviation—Providing voice and in-flight Internet service, the Avance L3 system has three configurations to meet an operator's needs. Core provides email, voice, and light Internet browsing for up to five devices. Plus steps up to full Internet connectivity for seven devices. Max provides all this service for up to 25 devices. Internet service provides email, VPN, browsing, and smartphone text and voice. The system includes a Wi-Fi router for the cabin and a 4G/LTE terrestrial modem for on-ground connectivity.

Thales Group—Thales is working with both satellite systems that cover the globe today, the 66 new Iridium Next satellites in low Earth orbit and Inmarsat's 13 geostationary orbits. FlytLINK provides voice, text, and web connections for the cockpit and crew (1.4 mbps download, 512 kbps upload) through the Iridium network. Thales is developing systems that will connect with Inmarsat's Swift Broadband and GX Aviation services.

The pace of technology's transitions continues to increase. OneWeb, the global communications company whose mission is to bring broadband connectivity to everyone, everywhere, successfully launched the first six satellites of its constellations. There are no aviation connections to it, yet.

An instrument-rated commercial pilot forever curious about all things aeronautical, **Scott M. Spangler** has been an aviation journalist, editor, and photographer for three decades.

The CH-148 Cyclone's first operational deployment was successfully concluded on Jan. 21, 2019. The new helicopter performed "beyond our expectations," said Maj Erik Weigelin, commander of the helicopter air detachment on board HMCS Ville de Quebec. **Cpl Jessica Fox Photo**

LEADING

THE WAY

As the first and only operator of the CH-148 Cyclone maritime helicopter, the Royal Canadian Air Force is blazing an operational trail and learning new lessons every day.

BY LISA GORDON

On July 18, 2018, hundreds of people gathered on a Halifax jetty to say goodbye to 240 military personnel on board HMCS Ville de Quebec.

Amidst thick fog and rain, families and friends waved goodbye to the Royal Canadian Navy frigate that was making history as it carried the new CH-148 Cyclone maritime helicopter on its first operational deployment.

The ship was setting course for Operation Reassurance, where it joined Standing NATO Maritime Group Two (SNMG2) in the Mediterranean Sea. During the six-month deployment, Ville de Quebec (VDQ) and its Cyclone conducted surface patrols and subsurface surveillance while participating in training exercises to ensure combat readiness.

The helicopter–callsign "Avalanche"–flew more than 500 hours and 170 missions while at sea with VDQ.

By all accounts, its first operational deployment was a resounding success.

Maj Erik Weigelin commanded the ship's helicopter air detachment (HELAIRDET), which included 21 members of the Royal Canadian Air Force (RCAF)–eight aircrew, one mission support member, and 12 technicians from the aviation systems, avionics systems, aircraft structures, and air weapons trades. All were members of 423 Maritime Helicopter (MH) Squadron at 12 Wing Shearwater, N.S.

"This first operational deployment of the Cyclone has been a great experience for the members of the HELAIRDET and myself, as we have all been involved in the Cyclone project for many years," said Weigelin following the mission's conclusion on Jan. 21, 2019.

"The maritime helicopter community has long been waiting to finally see the Sea King replacement in action. The Cyclone has performed beyond our expectations for a first deployment, and that success is a direct result of the motivation and dedication of the members of the detachment. To be the ones who deliver the new 'Wings for the Fleet' was a great honour."

While aboard the ship, the HELAIRDET marked several impressive firsts, including carrying out the first-ever 400-hour Cyclone inspection. In October, the detachment honed its interoperability with Allies while participating in Exercise Trident Juncture, which allowed it to work and train with naval ships, submarines, helicopters, and fixed-wing aircraft from Canada, Norway, Spain, Japan, the United States, and the Netherlands.

HMCS Ville de Quebec's CH-148 Cyclone, callsign "Avalanche," hovers while performing a forecastle transfer in the Atlantic Ocean during Operation Reassurance. On its first operational deployment, the helicopter flew more than 500 hours during 170 sorties. **MCpl Andre Maillet Photo**

The Canadian maritime helicopter community has long been waiting to see the Sea King's replacement in action. **Cpl Jessica Fox Photo**

The first Cyclones were accepted by Canada on June 19, 2015. After three years of testing, including hoist trials shown here, the aircraft had its first operational deployment last summer. **MCpl David McCord Photo**

Engine tests are conducted on a CH-148 Cyclone at Naval Base Guam on March 3, 2019. Repairs were necessary following a Feb. 18 "hard landing" incident. **Cpl Stuart Evans Photo**

MISSION READY

At the beginning of 2018, 12 Wing commander Col Sid Connor told *Skies* that the Wing was focused on wrapping up the new helicopter's operational testing while transitioning aircrew and maintainers from their previous roles with the Cyclone's predecessor, the CH-124 Sea King.

Their goal was simple: to be mission ready.

Last June, the new helicopter achieved initial operational capability (IOC), a milestone that paved the way for its first deployment on VDQ in July.

And while Canada's entire fleet of Cyclones flew about 1,200 hours in fiscal year 2017 (April 2017 to March 2018), those numbers increased by two-and-a-half times to 3,000 hours for fiscal year 2018, which concluded on March 31.

"It is a ramp-up for sure," Connor said in a recent interview. "As we train these additional crews and technicians, we're expecting those hours to increase rapidly."

At the time of writing in late March 2019, there were two HELAIRDETS on deployment, and Connor said that is the operational tempo the Wing expects to see over the next few years.

Once the Cyclone program is granted full operational capability (FOC)–targeted for late 2022–it is expecting to have 11 operationally-ready detachments. This includes six at 423 MH Squadron in Shearwater and five more at 443 MH Squadron in Patricia Bay, B.C.

The West Coast squadron received its first Cyclone in August 2018 and flew it alongside the CH-124 Sea King last fall. On Dec. 17, 2018, Canada's last four Sea Kings flew over Victoria to mark the type's final in-service flight.

Today, there are three Block 2 Cyclones allocated to 443 MH Squadron. At the time of writing, one was deployed on HMCS Regina while the other two were being used for training.

PREPARING FOR FOC

In order to reach full operational capability, Connor explained that both mechanical and human components will need to be ready.

On the mechanical side, that means taking delivery of all 28 CH-148 Cyclones ordered by Canada, with all of them in the final Block 2.1 configuration.

Currently, 17 aircraft have been received so far. Thirteen of those are at the Wing, with four back at Sikorsky for upgrades.

The helicopters on operational deployment are in the Block 2 configuration, while 406 Maritime Operational Training Squadron at 12 Wing is using older Block 1 models for instructional purposes.

"As we work with the Block 2, we're anticipating the jump to the final configuration of 2.1," said Connor. "That period will start in 2020."

To reach FOC, 12 Wing's people must also be ready.

A Cyclone crew includes two pilots, one tactical operator (TACCO) and one sensor operator (SENSO).

Aircrew conversion training began at the 12 Wing "schoolhouse" in September 2017 and has continued to ramp up. Pilot conversion training takes about five months, while TACCO and SENSO courses are around six months long.

"We're making good progress on training. We have aircrew courses graduating through this month and when they're done, we'll have 44 pilots trained on the Cyclone," said Connor in March.

He added that 19 TACCOs and 18 SENSOs have also been trained.

On the maintenance side, 375 technicians have finished their basic servicing course for Cyclone towing, refuelling, marshalling, and starts/shutdowns. In addition, 167 aviation systems (AVN), 112 avionics systems (AVS), 24 aircraft structure (ACS) and 16 air weapons systems (AWS) technicians have been certified.

"What that means numbers-wise is that we are about 50 per cent there for aircrews and about 70 per cent there for technicians," explained Connor.

The HMCS Regina's air detachment facilitates the return of its CH-148 Cyclone, callsign "Bronco," after repairs were made during Operation Projection in the Pacific Ocean. **Cpl Stuart Evans Photo**

Cyclone training is conducted on board the HMCS Regina during Operation Projection. "As a community, we're operating in discovery mode to learn as rapidly as we can, to learn the idiosyncracies of the new platform," said 12 Wing commander Col Sid Connor. **Cpl Stuart Evans Photo**

LESSONS TO LEARN

Over the five-and-a-half decades that Canada flew the Sea King, countless lessons were learned. In fact, you could comfortably say that 12 Wing was an authority on the venerable maritime helicopter. And if they didn't have the solution to a given situation, it was a sure bet that someone in the global community of Sea King operators would.

It's a different story with the Cyclone. As the type's first operator, Canada is blazing a new trail in maritime helicopter operations. Yet as much as it is learning the ways of the Cyclone, 12 Wing is at the same time the world expert on the platform.

"There are lessons to be learned with this new type that did not apply to the Sea King," said Connor. "As a community, we're operating in discovery mode to learn as rapidly as we can, to learn the idiosyncrasies of the new platform. We need to distribute those lessons among the entire Cyclone enterprise, to set new TTP–tactics, techniques and procedures."

Many of those lessons come from deployments, and the Wing commander said those are transmitted in "real time" back to Shearwater.

"The detachment on VDQ was in constant contact with 423 Squadron to let folks know what they were encountering and how they were dealing with it."

He cited that first 400-hour inspection at sea as being of particular value to 12 Air Maintenance Squadron back in Shearwater.

"The [HELAIRDET] technicians worked out a plan to minimize the amount of down time. They actually did the inspection in five full work days, which was less than we expected," noted Connor. "They used those lessons for the second 400-hour inspection back at Shearwater. The maintenance team there used the feedback to get that inspection done."

Aircrews also encountered "other entities" while on deployment, and were able to use their communication and sensor equipment to track them. Feedback was transmitted to the schoolhouse so training could be modified accordingly.

Further lessons will no doubt be learned from a Feb. 18 incident where a Cyclone helicopter deployed with HMCS Regina experienced what the Air Force called a "hard landing" on the deck of naval replenishment unit (NRU) Asterix. No personnel were seriously injured in the incident, which took place west of Kauai, Hawaii.

The Cyclone delivers a wealth of information to its operators. Maintenance data is downloaded from the helicopter as well as operational information collected from its various onboard sensors. Much of this information is passed directly back to 12 Wing to inform training and maintenance programs at the base. **Cpl Stuart Evans Photo**

Connor said the incident happened while Asterix–a new vessel–was in the midst of ship-helicopter operational limitations (SHOL) testing to qualify its deck to accept helicopters.

On the day of the occurrence, tests were being done in an expanded wind and ship motion envelope. Connor said those included Sea State 3 conditions with waves up to 1.25 metres high and winds of about 20 knots or 40 kilometres per hour.

"Engineering test and evaluation (ET&E) needs to be done by AETE [DND's Aerospace Engineering Test Establishment]," he explained. "So what we were doing there was an AETE test. During the prep, AETE did not have access to a test pilot. So they invoked an MOU [memorandum of understanding] between AETE and Transport Canada, where they used a Transport Canada pilot to do those tests."

The pilot flying the Cyclone at the time of the incident was a former Sea King and AETE pilot who was current on the CH-148 and had flown much of the ET&E for its development.

During the landing, Connor said the Cyclone sustained damage to two main rotor blades and the tail pylon, "the part of the tail after the hinge."

While an investigation is ongoing, he added that the incident was not caused by an issue that would affect the entire fleet.

"Repairs were done in Guam. It was an impressive operation where we had East Coast, West Coast and HMCS Regina techs working, with the assistance of Sikorsky, to take a tail pylon off an aircraft on the East Coast. They designed a shipping container for it, and flew it on a CC-177 to meet the ship in Guam."

The helicopter was repaired on board the Asterix while it was docked in Guam, and it is now back at sea.

The Cyclone operates with a fly-by-wire system that replaces traditional mechanical flight controls found on older helicopters such as the Sea King.

An article published by *The ChronicleHerald* after the hard landing incident quoted a retired military helicopter pilot who said the fly-by-wire system means a Cyclone co-pilot would not be able to intervene "quickly enough to stop something like this from happening."

But Connor said that is not exactly true. While the more experienced pilot sits in the right seat of the helicopter–and that's where the AETE pilot was sitting on day of the

A Cyclone's tactical operator (TACCO) and sensor operator (SENSO) co-ordinate tactical movements and operate the extensive sensor suite of the helicopter. Here, a crew works during Exercise Trident Juncture 18, while deployed on Operation Reassurance in October 2018. **MCpl Gabrielle DesRochers Photo**

occurrence–"the left seat pilot can put their inputs in and they'd be recognized."

The Air Force does have the ability to deactivate the left seat controls for training purposes, "but that's not normal."

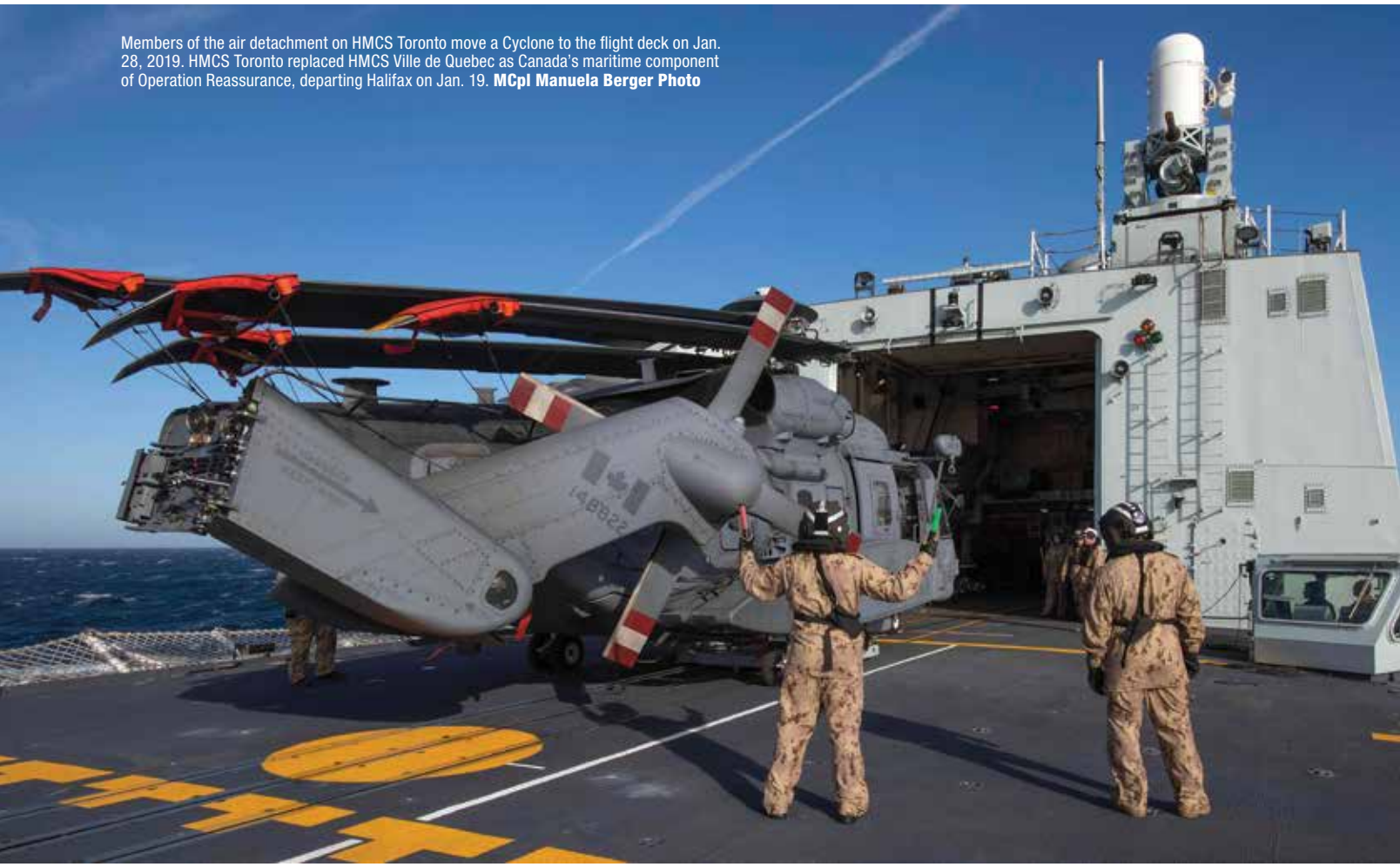
MINING THE DATA

Along with operational lessons, the RCAF must also learn how to manage the vast amounts of data produced by its new maritime helicopter.

The Cyclone flies further and faster than the Sea King so it covers more area, effectively expanding the eyes and ears of the ship. Its modern electro-optical/infrared (EO/IR) system, along with sonar, sonobuoy processing and imaging radar, generates a plethora of valuable operational data that 12 Wing is learning how to mine.

"Our limitation isn't the equipment, it's our level of experience so far," said Connor. "There is a lot more data being collected and recorded compared to before, and that's across all the sensor systems and the aircraft itself."

While data is downloaded from the aircraft and used to inform the maintenance computer system, there is also mission-related information being generated from the various onboard sensors.



Members of the air detachment on HMCS Toronto move a Cyclone to the flight deck on Jan. 28, 2019. HMCS Toronto replaced HMCS Ville de Quebec as Canada's maritime component of Operation Reassurance, departing Halifax on Jan. 19. **MCpl Manuela Berger Photo**

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"That sensor data is recorded and stored. It is sent back to central agencies in Canada to be examined more thoroughly. Before, we weren't recording mission sets like that, and so part of it is just working the procedure to figure out to what extent that analysis should be examined."

Connor added that the Cyclone's operational data is also used to inform the crews of other RCAF platforms.

"Every time we fly, we enrich our databases with more information."

While current Cyclone HELAIRDETs are concentrating on traditional roles such as anti-submarine warfare and search and rescue when required, Connor said he fully expects crews to be asked to do more in the future because of the helicopter's extensive range of capabilities.

GROWING SYNERGY

As it works to reach FOC with the Cyclone, 12 Wing will need every one of its experienced personnel. Luckily–unlike other Air Force squadrons–very few pilots and maintainers are being lured away by civilian jobs.

In fact, Connor said the Wing has lower attrition rates than in the past, something he attributes to the excitement of working on the cutting-edge Cyclone.

"Folks are very excited about this capability and once we get aircrew trained on this new equipment, they are keen to operate and deploy. We are not experiencing attrition that we would have considered normal even five years ago."

Looking ahead, Connor said 12 Wing will continue to prioritize training.

"That being said, deployment is part of that force generation priority. Until these folks have gone out and used this capability on operations, their learning isn't complete."

As he looks back on the recent experience gathered from the Cyclone's first operational deployments, Connor said the progress over the past year has been amazing.

"It's been really satisfying to come up with innovative ideas and turn around good results repeatedly. Our synergy is established and growing."

There's no doubt Connor is proud of the hard work that's been done at 12 Wing, and he's always happy to discuss the new maritime helicopter.

"If people give me a chance to talk about the Cyclone, I'd do it all day."

Lisa Gordon is editor-in-chief of *Skies* Magazine. Contact her at lisa@mhmpub.com.

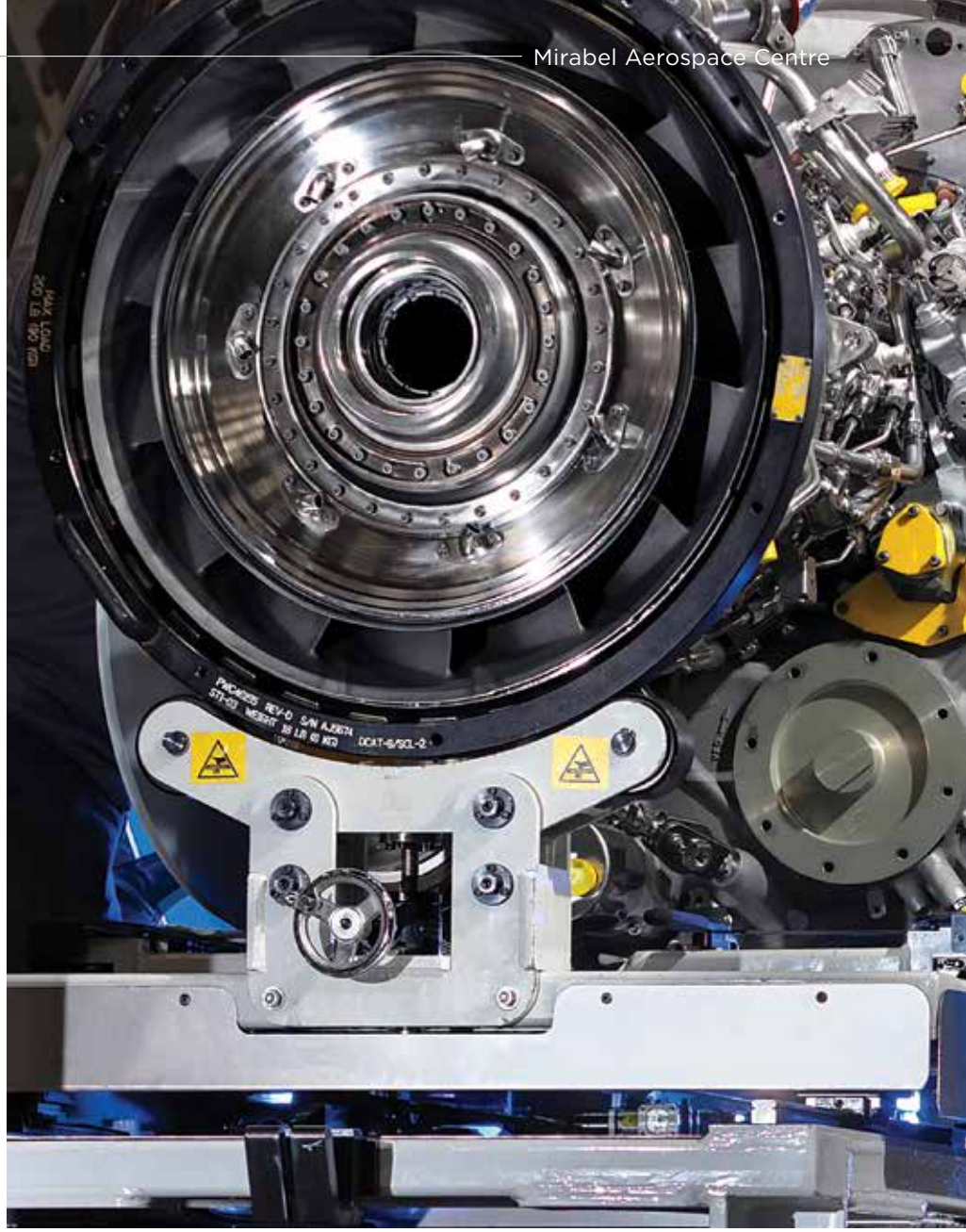
NEXTGEN MANUFACTURING

The 300,000-square-foot Montreal Aerospace Centre includes a turbofan engine manufacturing facility and the global base for Pratt & Whitney's turbine engine flight testing.

Pratt & Whitney Canada's Mirabel Aerospace Centre is a shining example of avant-garde thinking when it comes to aerospace manufacturing.

BY FREDERICK K. LARKIN | PHOTOS COURTESY OF PRATT & WHITNEY CANADA

Mirabel Aerospace Centre



Greater Montreal is home to more than 200 aerospace companies. Ranging from small private outfits to massive corporations with operations around the globe, its residents together represent one of the world's most important aerospace nodes.

Examples of its leading players include Airbus, Bell, Bombardier, CAE and Pratt & Whitney Canada (P&WC). A jewel in this industrial crown is the latter's Mirabel Aerospace Centre (MAC).

Located at Montreal-Mirabel International Airport, 40 kilometres (24 miles) northwest of Montreal, it is comprised of a leading-edge turbofan engine manufacturing facility and the global base for P&W's turbine engine flight testing.

BACKGROUND

Pratt & Whitney Canada has long had a substantial presence in the Montreal area. Incorporated in November 1928, it was established on the south shore of the St. Lawrence River at Longueuil. Ninety years later, P&WC's head office and primary manufacturing plant remain there.

In March 2004, Bombardier began to evaluate the possibility of creating a new generation airliner to replace the thousands of aging Boeing 737s and McDonnell Douglas DC-9s that were in service. The key selling point of such an aircraft would be its reduced operating costs. A large contributor to that improved economic performance would be more fuel-efficient engines. Subsequent to a thorough analysis, Bombardier selected Pratt & Whitney to be the sole engine supplier for the new airliner.

The engine was the new PW1524G geared turbofan. The aircraft would evolve into the C Series family with two models–the 100-to-130-seat CS100 and the 130-to-160-seat CS300.

MAC MENU

Here is a list of the engines produced at P&WC's Mirabel Aerospace Centre.

PW1500G

Thrust Range (lbs):
19,775 – 24,400

Aircraft Models:
Airbus A220-100 / Airbus A220-300 (former C Series family)

PW1900G

Thrust Range (lbs):
17,000 – 23,000

Aircraft Models:
Embraer E190-E2 / Embraer E195-E2

Instead of being assembled at fixed workstations, the engines at the MAC proceed along an overhead assembly line. As they progress, each engine is rotated so that assembly personnel do not have to climb above it when installing components.

PW1200G

Thrust Range (lbs):
15,600 – 17,600

Aircraft Models:
Mitsubishi MRJ70 / Mitsubishi MRJ90

PW800

Thrust Range (lbs):
13,000 – 16,000

Aircraft Models:
Gulfstream G500 / Gulfstream G600 / Dassault Falcon 6X

With P&WC onboard the Bombardier program, a decision had to be made about where the new engine would be produced. While its Longueuil facilities may have provided the required capacity to start out, P&WC wanted to develop a clean sheet facility that utilized the latest manufacturing methodologies, known as lean manufacturing. Around this time, P&WC was upgrading its fleet of flying test beds (FTBs) from a pair of Boeing 720s to a pair of rare Boeing 747SPs.

In late October 2004, the expansive airfield at nearby Mirabel became a cargo-oriented airport with the cessation of passenger services. Airport and government authorities wanted to stimulate Mirabel's economy by attracting corporations that would benefit from being onsite. Bombardier Aerospace was already producing its successful family of regional jets (CRJ200, CRJ700 and CRJ900) there, so when it announced that the C Series models would be built there another piece of the puzzle fell into place for P&WC.

manufacturing plant and two large jet engine test cells. Each cell is 92 metres (300 feet) long and 35 metres (115 feet) tall. They can accommodate engines that produce up to 35,000 pounds of thrust.

The MAC's total footprint of 27,800 metres (300,000 square feet) also includes machine, paint and metal-working shops; administrative offices; a medical centre; and a kitchen/cafeteria. The entire complex was designed to meet Leadership in Energy and Environmental Design (LEED) standards. For example, it has a large passive solar wall, energy efficient lighting and expansive glass panels that enhance the use of natural light. The total cost of the development was approximately $600 million, of which some $90 million was for the first phase.

Given that it was a clean sheet design, P&WC wanted the manufacturing facility to have "next generation" capabilities. This meant the use of advanced manufacturing technologies and the implementation of

ABOVE: The total cost of the MAC development was approximately $600 million, of which some $90 million was for the first phase.

Furthermore, Mirabel's long runways and lack of air traffic congestion made it an ideal base for P&W's FTB operations. The availability of suitable real estate for both a hangar complex and a new manufacturing plant was another positive. In addition, the new complex would be located within the Montreal Foreign Trade Zone at Mirabel. As such, it would qualify for special tax-related benefits. Finally, the provision of supplemental funding of approximately $150 million towards construction and equipment costs from the Province of Quebec was granted.

In October 2008, the go-ahead was given to develop the MAC in two phases. The first phase was inaugurated in October 2010 and contained P&W's global flight test operations base. Its large two-bay hangar houses the pair of specially modified 747SPs.

The MAC's second phase was officially opened in May 2011. It contains the

the latest production principles to ensure efficiency, flawless quality and a perfect environment, health and safety (EH&S) culture for its employees.

To meet these objectives, P&WC studied the manufacturing operations of more than two dozen major corporations across a broad range of industries to determine the best practices employed around the world. Suppliers were then asked to advise on the design and operating methods of the required equipment. Production processes were then simulated and validated before being installed.

Equipment is only half of the production equation. Human talent is the other. An achievement-oriented culture among the employees is mandatory. The company worked with union managers and aerospace educational institutions to define job descriptions, candidate identification guidelines and employee selection methods. In addition, training programs were developed.

P&WC studied the manufacturing operations of more than two dozen major corporations across a broad range of industries to identify global best practices. Then, production processes were simulated, validated and implemented.

"The MAC's assembly line was designed to significantly reduce the movement of parts and components on the shop floor during the manufacturing process."

EVOLVING PRODUCTION PROCESS

The traditional manufacture of a given product typically involved hundreds of suppliers that provided thousands of parts for that product.

These parts were held in inventory by the manufacturer, then were delivered as required for final assembly. Today, tens of suppliers provide tens of modular components (each consisting of hundreds of pre-assembly parts) for the same product. As a result, the manufacturer has significantly reduced parts inventories, has fewer production responsibilities and shorter assembly times.

Some companies have progressed further by introducing so-called lean manufacturing techniques. A key tenet of lean manufacturing is that production levels of a particular product shift as customer demand dictates. As a result, the time to produce each unit is reduced, inventory levels of parts and finished goods decline, productivity increases and the utilization of assets (plant and equipment) is enhanced. This methodology is said to result in a 20 per cent improvement in production output compared to the traditional process.

MANUFACTURING AT THE MAC

Instead of being assembled at fixed workstations, the engines at the MAC proceed along an overhead assembly line that moves according to programmed pitch increments. This pre-set speed can be modified as needed to deal with any production-related issues on the line.

As it progresses down the line, each engine is rotated so that assembly personnel do not have to climb above it when installing components. This greatly reduces the potential for injuries. The specially trained workers are multiskilled, thereby improving shop floor productivity.

The work environment at the MAC is different than most workplaces, as it is paperless. Communication with the operators on the floor is done via wireless workstations. Information such as the daily task list, specific assembly instructions and production status is provided on screens rather than sheets of paper.

The MAC's assembly line was designed to significantly reduce the movement of parts and components on the shop floor during the manufacturing process. Tools and parts

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Cover photo courtesy of Tourisme Montréal © Loïc Romer / Photo de couverture courtoisie de Tourisme Montréal © Loïc Romer

2019

> "Given that it was a **clean sheet design,** P&WC wanted the manufacturing facility to have 'next generation' capabilities."

required by personnel are delivered to their workstations by robotic vehicles. Furthermore, it is a clean space. Jewellery of any type, personal electronic devices (including cell phones), food and beverages are not allowed on the production line. This eliminates the risk of accidental damage to or contamination of an engine. It also removes potential distractions from the tasks at hand. All this is to ensure that each engine is completed without any quality or performance issues.

Once an engine is completed, it has to be inspected and then tested prior to delivery to the customer. After a visual inspection, each engine is transported by a laser-guided mobile robot (automated guided vehicle or AGV) from the assembly line to one of the two engine test cells. There it has test instrumentation fitted to it prior to entering the cell. Once it has undergone a series of rigorous tests, it is prepared for shipment to the customer.

The MAC's manufacturing facility currently has approximately 300 employees. Only a small number of those are on the shop floor at any given time. When *Skies* visited the facility, a survey of the production line from a boardroom above revealed a very clean and efficient work environment. The plant operates seven days a week, with two shifts every weekday and a single shift daily during the weekends.

Marc Gravel, the MAC's director, took obvious pride in the performance of his team. When asked how he screens potential hires, he explained that strict hiring criteria are used to vet candidates. This includes theoretical exams, practical situational reviews, psychometric tests and face-to-face interviews. The latter are used to determine how an individual would react in a challenging situation. Clearly, academic achievement alone does not guarantee a position on this team.

FUTURE PROSPECTS

When asked about the future of the MAC's production business, Gravel noted that the plant currently produces approximately 250 engines per year. The facility has the capacity to double that output. He said that such an expansion would be dependent on two factors.

First, given the growing demand for jet engines that are more fuel efficient, produce lower emissions and are quieter, P&WC's current products are very well positioned. Going forward, there may be additional models as market demand dictates.

Secondly, the four families of engines currently produced at Mirabel are associated with aircraft models that have either recently entered service or are still in the process of being certified.

Pratt & Whitney's decision to develop the Mirabel Aerospace Centre has proven to have been a fruitful exercise. Thanks to its leading-edge facilities and its highly motivated team members, the MAC will likely achieve impressive results going forward.

Frederick K. Larkin | Licensed to fly before he could drive, Ted Larkin has closely followed the airline, business aviation and aerospace industries for more than 50 years. During nearly three decades in the investment business, he advised institutional investors in North America, Europe and Asia on their holdings in aviation-related corporations.

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COLUMN

In the Circuit

BOUNDARY BAY AIRPORT (CZBB) | BY DAYNA FEDY

Small, but mighty


Glenn Stott Photo

Mike McHolm Photo


Mike McHolm Photo

While Boundary Bay Airport is modest in size, it has had no trouble maintaining its position as Canada's fifth-busiest airport for total aircraft movements.

When it comes to substantial airport traffic, it's no surprise that the major airports in Canada's metropolises top the list. But situated in British Columbia's Lower Mainland is an airport that, while modest in size, maintains a healthy flow of traffic.

Delta, B.C.'s Boundary Bay Airport (CZBB) ranks fifth in Canada in total aircraft movements, as it broke 175,000 total movements in 2017 and logged close to 200,000 civil aircraft movements in 2018, according to Statistics Canada.

"A lot of people in British Columbia don't know that Boundary Bay Airport is the fifth-busiest airport in Canada—right after Calgary [International Airport]," said Melissa Sayers, Boundary Bay Airport's general manager. "We'd like more corporate aircraft flying out of Calgary, Toronto, Phoenix and Los Angeles to choose CZBB as their access to Vancouver for the service and convenience we can offer with our state-of-the-art terminal building."

Owned by the City of Delta and operated by Alpha Aviation Inc. through a long-term lease, Boundary Bay Airport is open to general aviation aircraft with a unique, end-to-end operating model, providing integrated fixed-base operator (FBO), fuelling, terminal and airport operations.

The numerous flight schools on the property account for a large number of the airport's local movements. In 2017, CZBB recorded 106,596 local movements, ranking it number one in that category in Canada. Sayers said within the last year, one of the flight schools at the airport has experienced a 15 per cent increase in traffic.

With the airport's traffic growing, so too has its infrastructure. Alpha Aviation has invested upwards of $10 million in Boundary Bay Airport's facilities over the last five years—on the airside alone. The airport's two runways have been extended to over 5,600 feet with new LED lighting for the benefit of business and corporate aircraft, as well as to provide increased options for training flights; the runway extensions include new precision approach path indicators (PAPI), updated signage and GPS approaches.

Sayers said more than 20 hangars have been constructed at CZBB in the last 10 years to meet growing demand, and one of the airport's current major projects is the construction of a 30,000-square-foot hangar, known as Argus 4.

The airport is also home to a Second World War-era landmark, Heritage Hangar, which was recently restored by the City of Delta in an effort to protect the community's heritage and the airport's history.

The airport itself originates from the Second World War, though it closed for a period post-war until reopening in the late 1980s.

"Transport Canada opened [Boundary Bay Airport] in 1987 to relieve flying training that was occurring at YVR," said Sayers. "What Alpha Aviation has done is continue the role as a reliever to YVR, but [has] now expanded that role to take small corporate jets and business aircraft in addition to the flight schools."

Over the last three years, roughly 10 corporate/business jet aircraft have set up operations at Boundary Bay Airport, she told *Skies*.

Another development that could increase traffic, and greatly improve access to the airport, is the construction of the Massey Bridge—a project that is currently being considered by the B.C. government. Sayers said the existing route from YVR to Boundary Bay Airport is through the George Massey Tunnel, which is congested during rush hours.

"A new bridge would really improve access to Boundary Bay Airport and make relocating either a small carrier or more business aircraft to CZBB more attractive," she added.

As for what a typical day at Boundary Bay Airport looks like, Cessna Citation and Gulfstream business jets are frequent visitors, as well as turboprop King Air and Pilatus aircraft. "The plane watchers can see these all day long," Sayers said.

On the training side, Cessna 150, 172 and Diamond aircraft are a frequent sight as well as multiple private aircraft stationed at the airport.

Every July, less common—but no less exciting—aircraft can be seen in the skies above Boundary Bay Airport during the free airshow put on by Alpha Aviation and the City of Delta.

The Boundary Bay Airshow draws up to 20,000 people who get the chance to see Royal Canadian Air Force (RCAF) aircraft, biplanes, and other historic airplanes. This year, CZBB is welcoming the famous Canadian Forces Snowbirds and the CF-18 Demo Hornet to the airshow.

With the community being one of CZBB's priorities, Sayers said the City of Delta is in the process of building one of its fire stations on airport property. "That will be a benefit to both the community and the airport," she added.

As Boundary Bay Airport progresses into the future, it remains focused on growing corporate traffic and continuing as an important community asset.

Sayers concluded: "We are very customer focused, and we look forward to welcoming both visiting and permanent corporate and private aircraft owners to the airport as we move forward."

COLUMN

Instrument IQ

BY JOHN MONTGOMERY

Sharpen your IFR skills

Test your instrument flight rules (IFR) proficiency and sharpen your piloting skills with this exclusive *Skies* feature!

Examine the following approach plate and take your best shot at the accompanying questions—answers can be found at **www.skiesmag.com/iq**.

CALGARY/SPRINGBANK, AB (CYBW)

ILS RWY 35 APPROACH

1. Is RWY 35 equipped with an approach lighting system? If so, what action must be taken to turn them on at 0300 hours local?

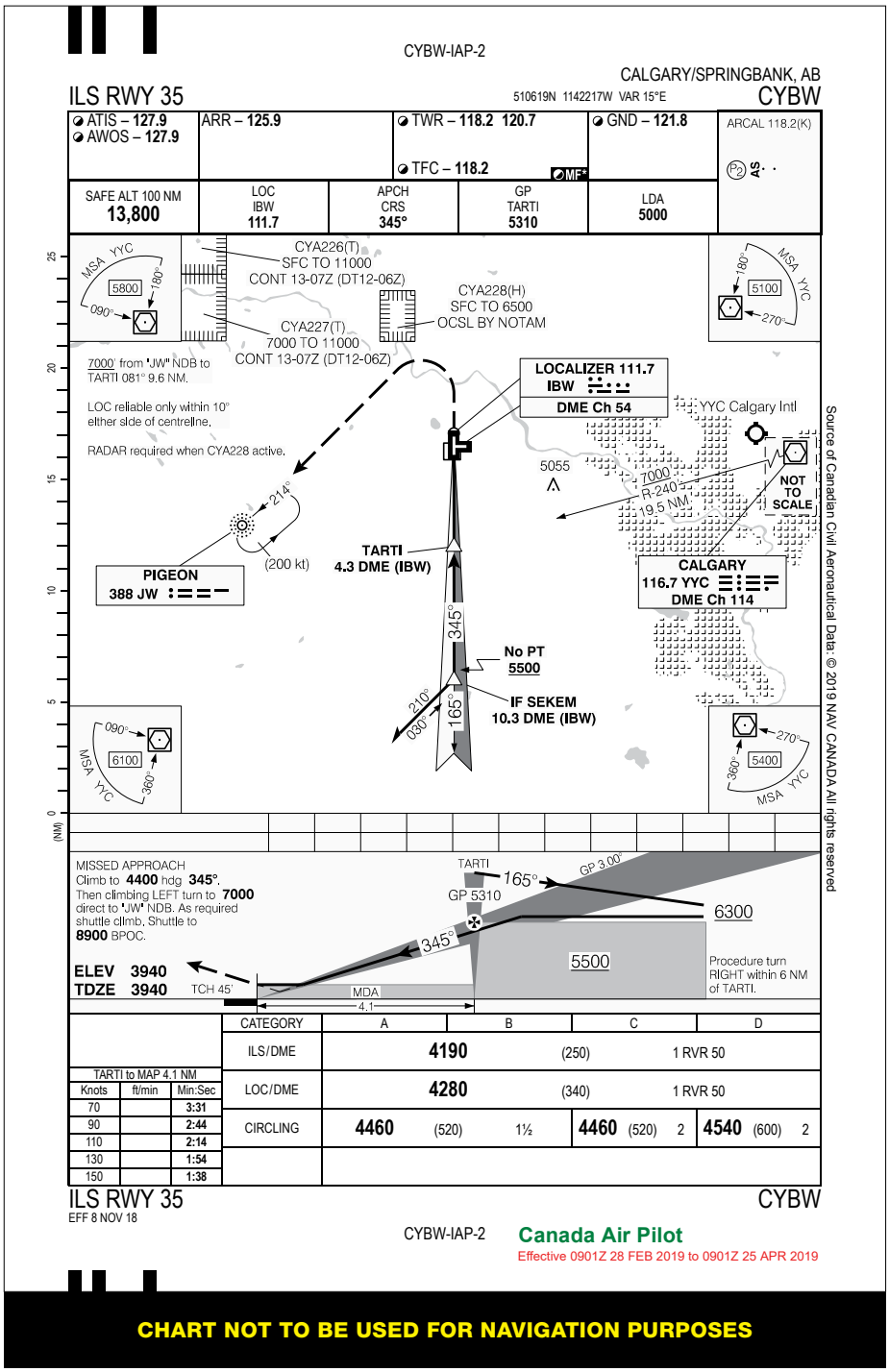
2. Arrival control's radar is U/S at the time of the approach and CYA228 is active. What (if any) effect does this have on the approach?

3. Landing minima for ILS approaches is normally 200 and ½. For what reason are they 250 and 1 on this approach?

4. You are level at 7,000 feet inbound on the 240-degree transition to TARTI from YYC for the full procedure ILS approach. The procedure turn must be accomplished within ___ NM of TARTI.

5. What is the clearance limit of this approach, and what should be your course of action if you arrive there prior to receiving further clearance?

6. Your aircraft is equipped with a new generation avionics system but it is not ADF equipped. How does this affect you with respect to flying this approach?



John Montgomery is the founder and president of Professional Flight Centre in Delta, B.C., which was established in 1986. A 12,000-hour ATPL pilot and multi IFR instructor, he also specializes in ground school and seminar instruction. John can be reached at john@proifr.com.

COLUMN

Faces of Flight

BY LISA GORDON

Meet Robyn Shlachetka, Missinippi Airways medevac pilot

"If you can't find a role model, just become one."

As an Indigenous female pilot, Robyn Shlachetka has been inspired by those words of encouragement more times than she can count.

They came from her dad, a float pilot who worked for Cross Lake Air in their hometown of Wabowden, Man., a small community of about 500 people located 600 kilometres north of Winnipeg.

Growing up, Shlachetka hung out on the floatplane dock, fuelling her dad's plane and pumping water from the floats after sightseeing flights and fishing charters.

She traces her interest in aviation back to the summer of 1989, when wildfires ravaged the province. More than a thousand separate fires devoured 3.28 million hectares of land, forcing the evacuation of 24,500 people from central and northern Manitoba.

Wabowden was evacuated. Four-year-old Shlachetka and her family flew to safety in a DHC-2 Beaver with her dad's boss, George Dram. Along the way, he let the young girl put her hands on the controls.

"That was my first and only attempt to barrel roll a Beaver," joked Shlachetka during a recent presentation at the Regina Flying Club in Regina, Sask. "That rush of flying, the thrill and the excitement, was something that never left me. Neither did my sister's fear of letting me fly!"

Today, at 33, Shlachetka lives in Thompson, Man. She and her boyfriend, Kevin, are busy with four kids, a Great Dane and a cat in the house, and she has a rewarding career as a Beech 200 medevac captain with Missinippi Airways.

About a year ago, she and first officer Raven Beardy, another female Indigenous pilot, were catapulted into the public eye after Shlachetka's mother posted a photo of the two of them in the cockpit on her Facebook page. The photo went viral, reaching people across Canada, the United States and even Australia. The pair was heralded as Manitoba's first female Indigenous medevac crew.

"At this point, I had been well over a decade into my career and had never personally met another female Indigenous aviator," said Shlachetka, who added that Beardy had filled in on that flight for her regularly scheduled first officer.

But while she may now be more well-known, there is no doubt that getting her career off the ground has been a tough slog.

With her family's help and support, Shlachetka finished her commercial pilot licence and multi IFR rating in 2005 at Harv's Air in Steinbach, Man., before moving to Thompson to work for Skyward Aviation. But the company closed its doors before she could start, and she had to take a job as a waitress. One day, a medevac crew came in from Perimeter Aviation, and after talking with them she applied and landed a check-in and reservations job at the company.

"Then I went on maternity leave with my first daughter at age 21, took minimal time off, and returned to work for another year on the ground."

She got into the right seat of a Beech 99 and after two years it looked like it was time for her captain's upgrade. But then two things happened: Perimeter made plans to decommission its Beech 99s and Shlachetka lost her medical when she was diagnosed with supraventricular tachycardia, a heart arrhythmia characterized by bursts of an abnormally fast heartbeat.

"After six months off work and fighting to see a specialist, I spent three hours getting a cardiac ablation done to get my medical back," she said. "I was so excited to get back in the air, as my hours were high and my seniority number was climbing."

But getting a captain upgrade on Perimeter's Fairchild Metroliner III was not in the cards. Shlachetka said she was discouraged from pursuing it because having a family would prove "too distracting to fly a Metro."

It was a bitter disappointment. But as that door closed, another opened.

Creeway Aviation, a small charter company in Thompson, was looking for a pilot to fly a Piper PA-31 Navajo. The job was a perfect fit.

"It was a much more stress-free environment. It was a lifestyle job, Monday to Friday. After I had enough time, I become chief pilot."

It had taken almost six years from the time she earned her commercial licence for Shlachetka to finally captain an aircraft. She moved on to fly a Beech 100 at Wings Over Kississing before a medevac position came up at Missinippi Airways, northern Manitoba's only wholly First Nations-owned airline.

"I hadn't done that type of flying before," she said, before adding that it is rewarding work. "You're there for a reason. You're not hauling freight. The charters I used to do weren't bad work, but there is something to be said about helping people in the community. Nobody likes being woken up [for a flight] at 2 a.m., but you know it's because someone really needs your help."

With more than 6,000 hours in her logbook, Shlachetka has no desire to fly for a major airline.

"I never had dreams of flying overseas. I want to have a comfortable job at a base where I'm able to be home as much as possible and make enough money to support my family," she explained. "Those were my goals in the beginning and they are still my goals."

By flying in the north, Shlachetka feels she has a chance to make more of an impact on Indigenous communities, too. People talk to her when she's at airports; she's even inspired one mother to go back to finish off her high school diploma.

"People from our communities tend to get really excited about it. It's rare. But I hope that eventually it will be mainstream to see me walking around at an airport. And when girls are growing up and thinking about what they want to be, maybe it won't seem so far-fetched anymore."

Becoming a role model for female Indigenous aviators hasn't been easy. Shlachetka remembers the 5 a.m. mornings as a dispatcher, when she was bundling her 10-month-old daughter up to go to a daycare she could barely afford.

"I've learned it can be very difficult to do things first," she concluded. "Everyone behind you is looking at you.

"But another thing I've learned is that there is more than one way to do it. You know the goal is there and you just keep going."