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Air Tindi Twin Otter, C-FATO, at Gibraltar Point on the East Arm of Great Slave Lake. Air Tindi operates five Twin Otters on floats, skis, wheels and tundra tires servicing partner communities, exploration, tourism, mining, local government, scheduled services and charters. Air Tindi started with the Twin Otter over 30 years ago and while the fleet has grown, the Twin Otter is still the backbone of the company. **Gabriel Vaughn Vianna Photo**

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COLUMN

# From the Editor

BY LISA GORDON

## Change is in the air

**A**s I write this, Canadian aviation and aerospace are undergoing a metamorphosis.

In Montreal, Bombardier has pared down to a lean, mean bizav machine. Now that it has shed its final commercial aircraft program – the CRJ regional jet was sold to Mitsubishi Heavy Industries Ltd. in June 2019 for US\$550 million – the OEM’s aerospace arm is free to focus on business jets.

In 2018, Bombardier delivered 137 business jets, with the Challenger line representing the lion’s share of those orders. Industry-wide, total business jet deliveries improved last year, from 677 to 703 units. Those numbers are likely to keep rising, driven by the recent certification of several new business jets – notably Bombardier’s Global 5500, 6500, and 7500; Gulfstream’s G600; Textron’s Cessna Citation Longitude; and the Pilatus PC-24.

The future looks bright. With a sharpened focus, there is a sense of optimism as Bombardier nears the end of an eventful year.

The Montreal aerospace landscape is further shifting, as Mitsubishi Aircraft Corporation announced in September that it will be coming to town, looking to tap into local expertise in the regional jet market. Mitsubishi is launching its own offering, the SpaceJet, and intends to hire about 100 people to assist with the plane’s certification and entry into service.

Meanwhile, on the commercial front, WestJet announced at the CAPA Canada Aviation Summit in September that the airline would be pulling back from its previous aggressive expansion rate.

“Between 2013 and 2018 WestJet grew too big, too fast. We were inducting aircraft at a rate of 15 per year. Adding 75 aircraft over five years was difficult to sustain,” explained WestJet CEO and president, Ed Sims, at the event.

Moving forward, WestJet plans a more cautious approach with the addition of five aircraft per year. Additional growth will be driven by new partnerships signed with Delta Air Lines, among others.

For its part, Air Canada is basing its long-term growth on the development of three primary hubs – Toronto, Vancouver and Montreal. Its Rouge operation has proven to be a tremendous asset, as the carrier is able to compete with new ultra-low-cost carriers while shifting from winter sun destinations to summer transatlantic travel. Air Canada, too, plans to continue growth through its Star Alliance partnerships.

In Ottawa, all procurement programs have been paused as political parties campaign for the upcoming federal election on Oct. 21. It’s impossible to predict how the focus on Parliament Hill will shift come Oct. 22. Here’s hoping we don’t lose the progress we’ve painstakingly achieved so far with the Future Fighter Capability Project, for example. We owe our men

and women in uniform a fair, comprehensive and thorough competitive process with a timely conclusion. Going backwards should not be an option. Let’s just get it done!

Finally, on the regulatory front, there have been further shifts as some national aviation regulatory bodies have come forward – including Transport Canada – to say they will perform their own independent review before returning the Boeing 737 Max to the sky. While they will work with Boeing and the U.S. Federal Aviation Administration, FAA approval no longer seems to be the unquestioned gold standard. It’s unclear whether the U.S. agency will be able to restore its tarnished reputation in the future.

As I write this, the *Skies* team is preparing to attend the 2019 National Business Aviation Association’s Business Aviation Convention and Exhibition in Las Vegas, Nev. This issue will be on display at the show, and it’s packed with some great bizav content.

We speak with a panel of prominent Canadian business aviation operators about the day-to-day challenges they face; take a closer look at Pilatus Aircraft’s popular new PC-24 twinjet; and visit Flying Colours in Peterborough, Ont., where custom business jet completions and refurbishments come to life.

To round things out, we examine flight simulator options for *ab initio* training schools, evaluate a new Turbine Otter engine upgrade at Vancouver Island Air, and shed some light on the key considerations of the fighter jet selection process. Finally, we examine the possible ramifications for general aviation operators if they are required by Nav Canada to equip with antenna diversity-type avionics.

Yes, change is in the air.

Don’t forget to flip to page 95 to test your Instrument IQ – and while you’re there, turn the page to meet George Kirbyson and read about his impressive 30,000-hour aviation career.

If aviation is your passion, there’s something in here for you. Enjoy!

**Lisa Gordon** is editor-in-chief of *Skies* magazine, Canada’s largest and most-read aviation industry publication. Contact her at [lisa@mhmpub.com](mailto:lisa@mhmpub.com).

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COLUMN

# In the Jumpseat

BY JEAN CHAREST

## A pivotal moment for Canadian aerospace

**L**ast October, it was my pleasure to lead a consultation for the Aerospace Industries Association of Canada (AIAC) called Vision 2025: a pan-Canadian mission bringing industry partners together to reaffirm Canadian leadership in the global aerospace sector.

Over the course of the year, I travelled the country listening to stakeholders, industry and government while gathering information. Time and time again, I heard that we've reached a pivotal moment for Canadian aerospace. Around the world, nations are seeing the potential of aerospace to transform their economies and create new opportunities for their citizens.

Tremendous growth is predicted over the next 20 years and global competition has never been fiercer. Canada is at risk of losing its share of this growth to aerospace industries in countries with high levels of government support, planning and investment. They want what we have, and they are acting boldly and strategically to claim it.

This is the new reality. And if we don't adapt our approach, we will continue to lose ground.

On the flip side, opportunities have opened up. There are global companies that – if they know Canada remains serious about aerospace – will choose to do business here. We can't stand back and lose out.

After consulting in Toronto, Montreal, Ottawa, Winnipeg, Vancouver and Halifax, a few major themes emerged and it became clear what needed to be done. Canada has all the elements for success, but we need the commitment of industry and government to confront the new global realities and take hold of emerging opportunities together.

*Charting A New Course*, our resulting report, outlines the priorities and actions necessary for Canada to be a global aerospace champion.

Key recommendations include increasing support for the aerospace workforce; ensuring small- and medium-sized businesses thrive and grow; using innovation to capture new opportunities including carbon-neutral flight and unmanned vehicles; investing to maintain Transport Canada's internationally recognized status for aircraft certification and regulations; maximizing Canada's leadership at the forefront of space; and maximizing defence procurement and government partnerships to drive new industrial growth.

Our goal was to define a common vision and priorities for the industry and then identify opportunities for greater industry-government collaboration to achieve our targets. Vision 2025 is the roadmap for moving forward. It is an ongoing engagement.

This is especially true when it comes to industry-government collaboration. Canada's aerospace industry stands as one of our nation's proudest achievements, contributing nearly 215,000 jobs and \$25.5 billion annually to the Canadian economy. This didn't happen by accident – and it can be lost if we ignore it.

By the time you read this, Canadians may have elected a new federal government. Whatever the political stripe, it is imperative that those in power appreciate the new reality facing the industry and take urgent steps to act.

The town hall discussions I moderated this fall provided an ideal opportunity for interested stakeholders and industry to hear directly from each party, prior to the election, about their campaign platforms and commitments with respect to the Vision 2025 priorities. Getting a sense of where each of them stands, and how they will help support AIAC's newly restructured technical committees in ensuring the collaborative ideas set out in Vision 2025 are acted upon, was very insightful.

Over the course of my political career – both federally and provincially – I've seen the powerful contribution aerospace makes to this country. It is a job-creating industry that crosses partisan lines. We need all politicians engaged.

AIAC's "Bring your MP to Work" days have been another avenue for engagement. Aerospace companies across Canada have been matched with their local member of Parliament and candidates for facility tours and other company events. These continue to be excellent opportunities to showcase Canadian aerospace and demonstrate up-close the impact these businesses have on their local communities.

We're just getting started. It was my privilege to lead the consultations for Vision 2025. The priorities and areas for increased collaboration identified in *Charting a New Course* represent tangible steps in order to seize the opportunities that lie ahead for the aerospace industry.

Industry and government have to work more closely together and leverage what each has to offer. Industry understands which programs work and which do not, both domestically and in other jurisdictions. Government can utilize its macroeconomic power and expertise in program design to support initiatives that are cost-effective and accountable.

Ultimately, Canada's success will be measured by how much of the growing global market Canadian firms are able to capture, to the benefit of all Canadians. Our history of past accomplishments gives us significant advantages, but it does not guarantee success.

Government representatives at all levels have the opportunity to leave a lasting mark on the prosperity of Canada for decades to come. More than anything, this is about new partnerships in an aggressive pursuit of new jobs, new innovation and new growth. If government and industry commit to this new vision, Canada will be a global champion of the sector. That's what this next phase of Vision 2025 is all about and we are excited for what the future holds.

For more information on Vision 2025 or to read the full report, go to <https://aiac.ca/vision2025/>. 📄

With a public service career spanning almost 30 years, **Jean Charest** is one of Canada's best-known political figures. He is also a partner at McCarthy Tétrault, a leading Canadian law firm.

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COLUMN

# View from the Hill

BY KEN POLE

## Flygskam and FF2020: Picking the low-hanging fruit

**I**n the first two weeks of December, representatives of Canada and nearly 200 other signatories to the United Nations Framework Convention on Climate Change will gather at UN headquarters in New York. It'll be the 25<sup>th</sup> Conference of the Parties (COP25) to the global "accord" which was negotiated in 1991-1992.

I think "discord" is more appropriate. It took the UN two more years to collect enough national ratifications to be able to declare the Convention in effect in 1994. A quarter of a century later, there are still deep divisions as national priorities prevail. Yet this roadshow, held in a different venue every year, clearly must go on.

COP26 is scheduled a year hence in Glasgow. Like earlier iterations, it will draw thousands of participants and delegates, many of whom will arrive in Scotland by air. I'm willing to bet that progress from this well-intentioned circus will remain incremental at best.

A main reason is the current state of battery, solar, fuel cell and other renewable power technologies as alternatives to fossil fuels. Without a quantum leap in any or preferably all of them, commercial air travel will continue to rely on turbines, which are becoming more efficient with less of a per capita environmental footprint.

The fact that international air traffic continues to grow means emissions overall continue to rise. That's a challenge for regulators such as Transport Canada and the air transport industry, which are pressed continuously from ostensibly well-intentioned parties to come up with policies and practices to curb greenhouse gas (GHG) emissions, the key driver of global warming.

The International Civil Aviation Organization, a UN body, puts aviation GHGs at two to three per cent of the global output. Compare that to coal, which many countries still consider economically critical. Canada produced 62.3 million tonnes in 2018, most of it in Alberta and British Columbia, and mostly exported for coke production in the steel industry.

U.S. President Donald Trump is a professed supporter of the coal option. In Australia, the Queensland government recently cleared the way for a massive mine to feed India's insatiable coal appetite by simply wiping long-standing aboriginal land titles in the region to be mined.

Electricity and heat production account for some 25 per cent of global GHGs, land use such as agriculture and forestry accounts for 24, industry for 21, and all transportation modes total 14 per cent, with the rest attributed to sundry other sources.

So, aggressively pursuing aviation's single-digit contribution is a classic case of picking low-hanging fruit. An easy target.

Ironically, as Britain's Prince Harry recently put it when launching a "sustainable travel initiative" after he was criticized for minimal

use of private jets for security reasons, "Travel has the unparalleled power to open people's minds to different cultures, new experiences and to have a profound appreciation for what our world has to offer."

And then there's the huge commotion about a Swedish teenager who travelled by sailboat to (yet another) UN climate conference in New York. Much was made of her ostensibly emissions-free attempt to highlight aviation's environmental footprint.

I don't question her altruism, but consider the energy input used in building that 18.3-metre boat and the fact that two crew had to be flown to New York for the return trip. Huge amounts of energy go into manufacturing batteries, wind turbines and solar panels, etc. Sophistry, perhaps, but those are facts.

Then there's the "climate shaming" phenomenon, a social media vehicle designed to send the travelling public on a guilt trip. This flygskam movement, which began in Sweden, apparently has been slowly gathering momentum in Europe.

**"Aggressively pursuing aviation's single-digit contribution to global greenhouse gases is a classic case of picking low-hanging fruit."**

Essentially tagging air travellers as environmental terrorists, the shamers say trains and buses are a key part of the solution. Discounting the carbon footprint of those modes – which is admittedly smaller per capita than air travel – that may work in Sweden and elsewhere across the pond. It might also work between major centres here, but it tends to ignore geography and, frankly, sundry governments' historical reluctance to fund true high-speed rail.

Many European cities are only an hour or two apart by air, but flying to Hawaii from Vancouver, for example, takes about six hours. That same trip by sailboat with some friends years ago took 29 days;

progress was stymied by a vast standing high-pressure region which glassed the Pacific for extended periods. Not the most efficient mode of travel but it was, and is, memorable!

Piggy-backed on the shame-game is the Swedish-founded Flight Free 2020 (FF2020) campaign, whose disciples try to bring together 100,000 people in each country who pledge not to fly for a year, making "a collective difference" environmentally. FF2020 seems to have gained a toehold, albeit a small one, in Canada as well as in half a dozen other countries.

All very benign, maybe, but is it a worrisome trend? Consider the numpties who threatened to fly unmanned aerial vehicles within London Heathrow's restricted zone in mid-September. Their protest fizzled when two were arrested early, but this kind of nihilistic denial of air transport's global economic importance is dangerous. 🚫

**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.

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COLUMN

# Focal Points

BY TONY KERN

## Reluctant risk managers

**A**viation professionals are justifiably proud to point out that flying is one of the safest modes of transportation in the world. I've heard a statistic that someone is more likely to be struck by lightning than to be involved in an aircraft crash.

As far back as 1989, Les Lautman, then the safety manager at Boeing Commercial Airplane Company, told the world, "If you were born on an airliner in the U.S. in this decade and never got off, you would encounter your first fatal accident when you were 2,300 years of age and you would still have a 29 per cent chance of being one of the survivors."

I'm not a mathematician and can't vouch for the statistical precision of these claims, but their point is clear: *aviation is safe*. However, not all operators are equal.

Western airlines are incredibly safe, and for good reasons. They have entire staffs organized around identifying hazards and reducing risks. They have large labour organizations such as the Air Line Pilots Association and others that stress safety as much or more than the management of the companies they work for. They have predictable routes and schedules, and extremely experienced and well-trained personnel. But significant safety issues still exist in the non-airline environment.

Charter operations, especially related to tourists, are having a bad year. Non-western airlines continue to struggle, as does business aviation, air ambulance services and, of course, general aviation. The major difference between the crazy safe organizations and the rest of us is the level of effort put into risk management.

At every step of our century-long journey into the sky, smart men and women have sought new and better ways to manage

risk. Better aircraft design, engineering, engines, improved air traffic control, and a myriad of safety devices such as ground proximity warning and collision avoidance systems have achieved unprecedented levels of safety.

But now, we have reached a point where the human is the last and most significant risk to safe operations, and no amount of engineering acumen can solve this challenge for us. Pilots, dispatchers, maintenance professionals and managers at all levels need to think hard about this.

**"We have reached a point where the human is the last and most significant risk to safe operations."**

And yet, we don't. We remind ourselves we are part of a "safe" industry, hiding behind statistics that may or may not apply to our operations. At the human level, we have become reluctant risk managers.

Professional risk managers comprehend that the world is full of risks that must be avoided, or mitigated to the maximum extent possible and then rationally accepted. They sniff the wind for the first sign that something isn't right. They ask probing questions and resolve inconsistencies until they are satisfied that they fully understand a situation. They don't assume something is right; they assume it is wrong until they prove it is right. Most importantly, they are aware that they themselves are a *source* of significant risk.

Perhaps this internal risk comes in the form of fatigue or lack of proficiency. Or maybe it's the satisfaction with the status quo that leads to a creeping complacency born of long experience and successful outcomes, the sum of things we have gotten away with over the years.

To address this challenge, we need to combine an old way of thinking – basic risk management – with a new type of self-awareness that admits, "I am the risk."

The proven basics of risk assessment evaluate the *probability* of something occurring with the potential *consequence* if it did happen. Since the consequence of an in-flight risk is potentially lethal, we must be brutally honest about reducing the probability of human error. Therein lies our most difficult challenge.

Objective self and peer assessment must become as routine as checking our airspeed on final approach or the part number for a maintenance task. We must adopt a different attitude on risk, one that freely recognizes we as individuals are the source of the last major hazard between a great safety record and a perfect one.

Perfection may never be achieved, but its pursuit will close a lot of ground between where we are and what we are capable of being.

It all starts with a look in the mirror. ■

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.



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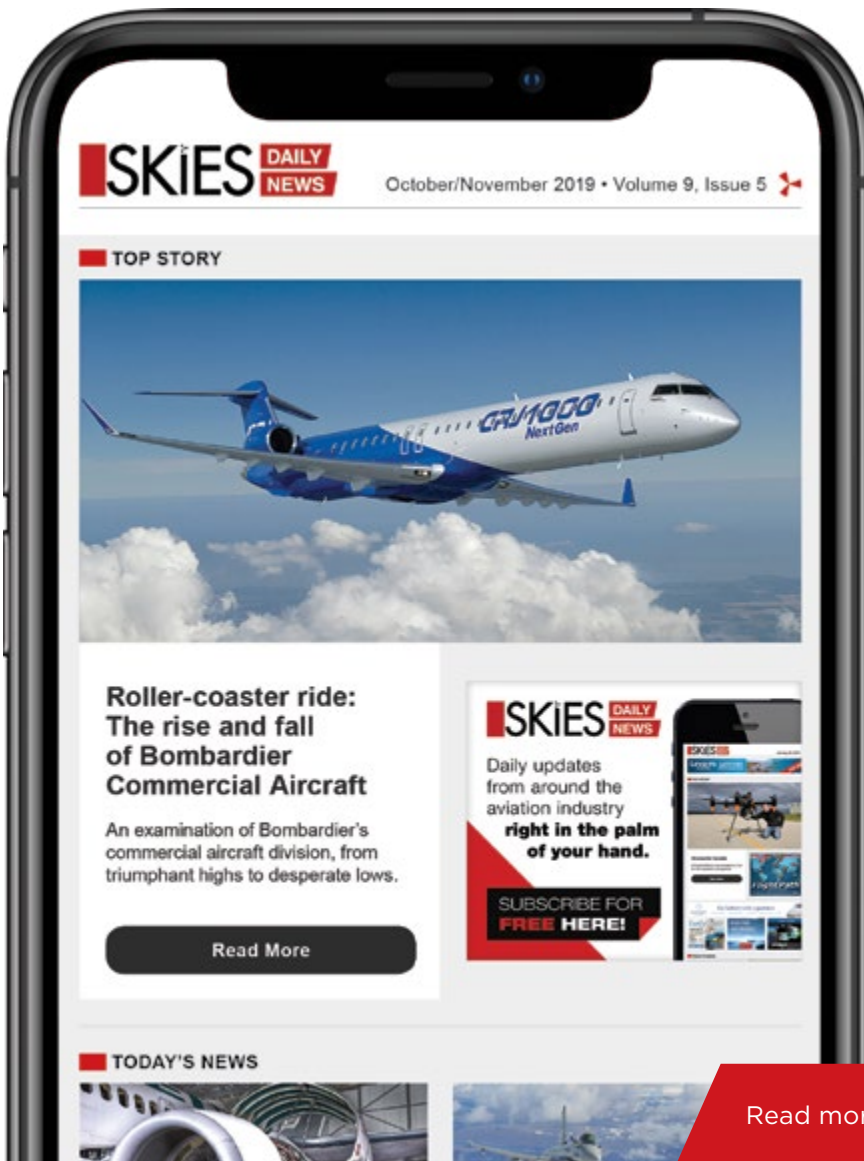
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# BRIEFING ROOM

AVIATION INDUSTRY NEWS



# Flying Colours marks 30 years with steady expansion

The company's three locations are enjoying tremendous growth as the demand for aircraft completions, modifications, painting and maintenance services continues.

► LISA GORDON | MRO NEWS



In 2018, Flying Colours completed the industry's first Bombardier Challenger 650 medevac interior for Swiss Air-Rescue Rega. **Flying Colours Photo**

Maintenance, repair and overhaul services are performed in Peterborough and St. Louis, Mo. **Flying Colours Photo**



Eric Gillespie stands in a hangar at company headquarters in Peterborough, Ont. **Lisa Gordon Photo**

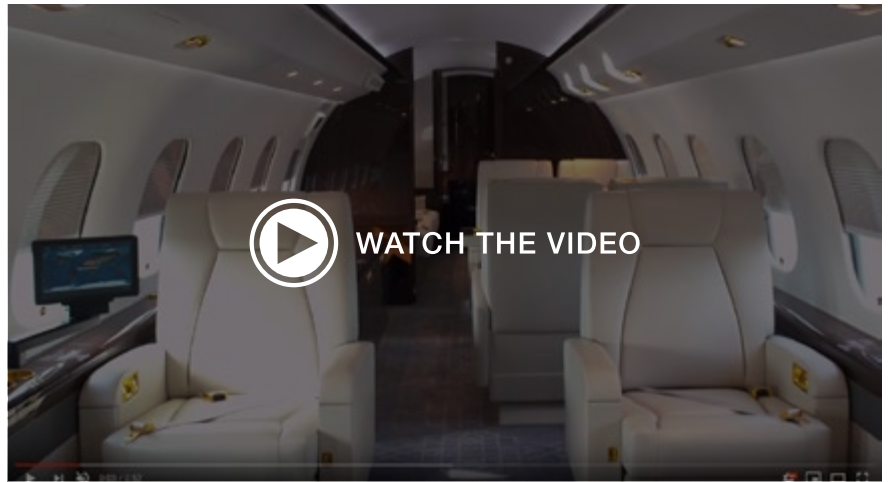


Aircraft exterior painting was one of the first services offered by Flying Colours. **Lisa Gordon Photo**





One of two new 50,000-square-foot hangars takes shape in Peterborough. **Lisa Gordon Photo**



Interior completions require hands-on craftsmanship — skills that are learned on the job. **Flying Colours Photo**

**E**ric Gillespie stood on the road and pointed at the bustling construction site. “That’s the new paint facility on the left,” he explained during a recent press tour. “The right hangar will be additional maintenance, completion, and refurbishment space, mostly for large cabin aircraft, although it’s big enough to handle an (Airbus) A220 down the road. We’re definitely in growth mode.”

Gillespie, Flying Colours Corp.’s executive vice-president, surveyed the two new 50,000-square-foot hangars taking shape against the blue September sky.

Together, they represent a \$25 million investment in the company’s Peterborough, Ont. campus, with the paint shop projected to open this October and the second hangar scheduled to be operational in mid-Q1 2020.

It’s a big year for the family-owned company that incorporated in 1989.

Back then, founder John Gillespie merged his small aircraft sales and painting ventures under the Flying Colours Corp. banner. He gradually added additional services, including maintenance, overhaul and interior completions.

Thirty years later, Gillespie remains at the helm of Flying Colours, although he’s

been joined by sons Eric and Sean, as well as daughters Kate and Lisa.

The company offers a full spectrum of green aircraft completions as well as refurbishments, VIP conversions, maintenance, repair and overhaul (MRO) services, exterior paint and avionics, special mission installations and conversions. Flying Colours enjoys affiliations with such names as Bombardier, GE Aviation, Collins Aerospace, Gogo, Honeywell and Raisbeck Engineering.

In total, the company now employs about 500 people in three locations. Besides the Peterborough headquarters, there is Flying Colours Corp. KSUS in St. Louis, Mo. — founded after the Canadian company acquired JetCorp Technical Services in 2009 — as well as Flying Colours Corp. PTE in Singapore, established in 2015.

Each site is expanding to meet growing customer demand.

In January, the St. Louis team moved into a new hangar that can accommodate up to three Global aircraft at once. A new manufacturing workshop preceded that development to support the demand for woodworking and business jet cabinetry.

Meanwhile, under the leadership of Paul Dunford, managing director of international operations, the Singapore branch now employs just over 20 people who specialize in wood refinishing, cabinetry and upholstery.

While that location — housed within the Bombardier Singapore Service Centre — does not provide MRO services, Dunford said it has completed six full aircraft interior refurbishments to date, plus another half dozen partial jobs.

“Our original mission was light interior work and cosmetic repairs,” explained Dunford. “But there is a demand to grow our services and we’ve expanded to full interior refurbishments. Having that capability in-region is a huge asset for Bombardier, us and the end user.”

Dunford said he hopes to double the employee count in Singapore by the end of next year, as the company grows alongside Bombardier in the region.

At the same time, Ian Ross, director of human resources in Peterborough, is on the hunt for 50 new hires to fill immediate job openings, primarily in aircraft completions. He and his team host open houses, attend trade shows, and visit college and trade school recruiting events.

“We’re trying to bring in people who fit the roles,” said Eric Gillespie. “There aren’t courses for the interiors side, so we evaluate whether you can do the work. A lot of it is then learned on the job.”

The St. Louis facility, which offers heavy maintenance services, CRJ 200 Execliner conversions, and ADS-B installations, is looking to hire about 25 people over the next year.

Company-wide, the average age of the workforce is 43 years old.

As the end of 2019 looms, Flying Colours can point to several big achievements this year, including the completion of its tenth Ka-band installation, as well as the completion and delivery of the first of six new multi-mission De Havilland Canada Dash 8-400s to Conair of Abbotsford, B.C.

Last, but certainly not least, the company has been marking three successful decades in business through a series of employee events at each of its locations. The anniversary celebrations are set to continue at October’s National Business Aviation Association convention in Las Vegas, Nev., where Flying Colours Corp. will once again be showcasing its products and services.

Building on John Gillespie’s values of “Integrity, Innovation and Flexibility,” Flying Colours continues to pride itself on delivering services through a robust suite of in-house capabilities.

It’s a formula that has paid dividends, and judging by the demand for its services, Flying Colours’ future looks bright as it begins its fourth decade of operations.

“Right now, we’ve got the throttle down in terms of building space to accommodate work,” said Gillespie. “We’re in a good position across the board at all three locations. Our biggest challenge now is managing the growth.” ✦



These new aircraft build on the success of the Global 5000 and Global 6000 aircraft by offering 500 and 600 nautical miles of additional range, respectively, coupled with an up to 13 per cent fuel burn advantage. **Bombardier Photo**

## Bombardier's Global 5500 and Global 6500 certified by Transport Canada

**B**ombardier announced on Sept. 24 that its two latest additions to the Global family, the Global 5500 and Global 6500 business jets, have been awarded Transport Canada type certification, paving the way for entry into service this year.

Certification by the Federal Aviation Administration (FAA) and the European Union Aviation Safety Agency (EASA) are expected to follow shortly.

“Following their dramatic unveiling last year, these aircraft continue to surprise

and surpass expectations. Thanks to a new wing design and custom-made Rolls-Royce Pearl engines, the Global 5500 and Global 6500 jets boast farthest-in-class ranges, offering unrivalled performance and unsurpassed passenger comfort, at exceptional operating costs,” said David Coleal, president, Bombardier Aviation.

The aircraft flew through a rigorous flight-testing program, completed at Bombardier’s world-class test centre in Wichita, Kan.

The Pearl 15 engine, the latest addition to Rolls-Royce’s exceptional business aviation engine portfolio, also received Transport Canada certification recently. The engine, developed at the Rolls-Royce Centre of Excellence for Business Aviation engines in Dahlewitz, Germany, was custom-designed with the most innovative technology – including enhanced aerodynamics, blade cooling and advanced engine health monitoring systems – to power the Global 5500 and Global 6500 aircraft.

With the purpose-built engines, advanced wing design and built-in systems redundancy and robustness for which Bombardier Global aircraft are renowned, the aircraft offer passengers superior safety and a smooth ride.

Equipped with the revolutionary Bombardier Vision Flight Deck, the industry’s leading cockpit, the aircraft offer a comprehensive avionics suite with ergonomics and aesthetics that provide pilots with outstanding comfort and control.

The aircraft also feature stunning redesigned cabins with exclusive features that are as innovative as they are luxurious. The Global 5500 and Global 6500 business jets also debut the Nuage chaise, a unique seating innovation that adds new dimensions to the conference suite as a lounge chair that converts into a flat surface for sleeping or banquet-style dining around the table. Bombardier’s patented Nuage seat is also exclusive to the new Global aircraft family. With its distinctive technology, the Nuage seat is ideally suited for long-range flights.

These new aircraft build on the success of the Global 5000 and Global 6000 aircraft by offering 500 and 600 nautical miles of additional range, respectively, coupled with an up to 13 per cent fuel burn advantage, contributing to highly favourable operating costs versus smaller competing aircraft with less range.

The Global 5500 aircraft can connect Sao Paulo and Paris, and Moscow and Los Angeles; the Global 6500 aircraft can connect Hong Kong or Singapore and London, and Toluca, Mexico and Madrid. ✈

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# Cessna Citation Longitude lands FAA type certification

On Sept. 23, Textron Aviation Inc. announced that its new super-midsize jet, the Cessna Citation Longitude, has achieved type certification by the Federal Aviation Administration (FAA), clearing the way for customer deliveries.

“With the broadest lineup of business aviation platforms available worldwide, today Textron Aviation welcomes the Longitude into the esteemed Citation family of products and begins a new era of best-in-class solutions for our customers,” said Ron Draper, president and CEO, Textron Aviation.

FAA type certification follows the most robust flight, structural and component qualification testing completed on a Citation to date. The experimental and demo fleet completed close to 6,000 hours of flight time. In addition to 11,000 test points during the certification process, the Longitude also completed a 31,000-nautical mile world tour, demonstrating the aircraft’s outstanding long-range performance capability and reliability in a variety of environments.

The Longitude, produced at Textron Aviation’s manufacturing facility in Wichita, Kan., benefits from state-of-the-art assembly and fabrication tools and techniques.

“The real success of the program comes from the talent and customer focus our employees bring to work every day,” said Draper. “Their hard work and dedication have been spectacular through every step of the program, from initial concept, through design and testing, production and now into product support.”

## CLASS-LEADING CABIN EXPERIENCE

The Citation Longitude is equally designed around the pilot experience, passenger comfort and overall performance, delivering an aircraft that lives up to its designation as the flagship of the Citation family of business jets.

The Longitude has one of the most thoroughly researched cabin experiences and elevates passenger expectations in the super-midsize category. The comfortable, bespoke interior of the Longitude has class-leading legroom, cabin sound levels that are nearly twice as quiet as the nearest competitor, a low cabin altitude of 5,950 feet and more standard features than competitors in this segment.

With seating for up to 12 passengers, including an optional crew jump seat, the Longitude features a stand-up, six-foot tall flat-floor cabin. A standard double-club configuration delivers the most legroom in the super-midsize class – 11 per cent more room than the nearest competitor. Fully



Pictured left to right: Paul (Vu) Nguyen, acting manager of the Wichita ACO Branch, Federal Aviation Administration, and Ron Draper, president and CEO, Textron Aviation. **Textron Photo**

berthable seats are designed and manufactured in-house. State-of-the-art cabin technology enables passengers to manage their environment and entertainment from any mobile device, maximizing in-flight connectivity and productivity.

## REVOLUTIONARY PERFORMANCE

Early in the development program, the Citation Longitude exceeded initial performance targets and achieved an improved transcontinental range of 3,500 nautical miles (an increase of 100 nautical miles) and full fuel payload of 1,600 pounds (an increase of 100 pounds). The longest-range Citation delivers a maximum cruise speed of 483 KTAS.

“The Longitude is the best flying Citation yet,” said Ed Wenninger, chief pilot for Textron Aviation engineering flight test. “The FADEC-equipped Honeywell HTF7700L turbofan engines feature fully integrated autothrottles with envelope protection and provide responsiveness and excellent power.”

The clean-sheet design of the Longitude integrates the latest technology throughout the aircraft, including the next evolution of the Garmin G5000 flight deck. The spacious cockpit incorporates easier access and an ergonomic design that fully focuses on crew comfort and efficiency. ✈

With seating for up to 12 passengers, including an optional crew jump seat, the Longitude features a stand-up, six-foot tall flat-floor cabin. **Textron Photo**



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# CBAA compensation study: How bizav measures up

◻ KEN POLE | BIZAV NEWS

Results of a new Canadian Business Aviation Association (CBAA) compensation survey suggest that flight crews and other personnel in the sector can be better off, financially and otherwise, than their counterparts at scheduled service and charter operators.

“Pay is but one of the critical elements when you’re looking at recruitment and retention strategies,” said CBAA president and chief executive officer, Anthony Norejko.

The survey garnered responses from 53 organizations – including a who’s-who of Canadian companies – with results distributed to the CBAA’s 443 members and made available for a fee to non-members.

“When comparing business aviation against, say, the airlines – which is sort of the elephant in the room – what was great to see is that, on balance, business aviation pays better and offers comparable benefits,” Norejko told *Skies*. “If anything, that’s the thing that I would point to, now and going forward.”

The latest survey was administered by The Wynford Group, a Calgary-based human resources consultancy. The response rate was 18 per cent higher than the first survey in 2017, and the CBAA plans to keep doing them biennially, possibly publishing less-detailed updates in the intervening years.

“The industry has changed in the past couple of years,” said Norejko. “The survey allows operators a better sense of what has happened since then. We’re definitely encouraged.”

He noted that business aviation is unique in the way employees can “really be part of the team.” For pilots, it means more than just saying hello to [airline] passengers once they’ve landed and unlocked the cockpit door. In contrast, being close to business aviation clients is “an opportunity to be recognized for your work.”

However, when it comes to monetary recognition, the survey compares, among other things, total cash compensation for just about every position possible. Directors of flight operations and maintenance in the business aviation sector averaged more than their counterparts in the commercial scheduled and charter world.

On the flight deck, some averages for captains and first officers were lower in business aviation than at scheduled or charter operations, but most were higher.

It evidently depended on, among other things, the size of the aircraft.

Norejko pointed out that many pilots in business aviation are not employed as “pilots” as such, but more often are part of “senior management.” Among other things, that kind of structure can come with stock options, bonuses and deferred profit sharing. All can reward pilots handsomely as a company flourishes. “A rising tide floats all the boats,” chuckled Norejko.

The money and potential extras may be nicer in business aviation, but what about job security?

“That depends,” he replied. “Sure, there could be a recession and business aviation could be impacted, but business aviation is used in three ways: you’re either in growth mode and pursuing new opportunities, or you’ve got an established business and brand, or you may be in a retraction phase.”

The latter requires a lot of corporate energy to reverse that retraction, and Norejko said a company’s flight department can be a powerful lever. Business aviation was fundamentally a better tool than airlines for getting people “out and across the country” efficiently as part of any push for recovery.

He downplayed a suggestion that difficult clients can be detrimental to

the work environment, saying only that while there may be “outliers” who are problematic, the overwhelming majority are all too aware that their pilots are the only ones who can ground their aircraft due to weather or other issues.

“It’s a fairly unique position to have. It starts on the flight deck, how your pilots provide their service, how embedded your department is.” That can go as far as making recommendations on new aircraft and even managing the acquisition. “There are some unique elements that business aviation offers.”

As for the survey itself, The Wynford Group’s analysis of no fewer than 63 jobs also includes data on recruitment, turnover and retention.

“Anyone in our sector who wants to create an effective recruitment and retention strategy will find the data invaluable,” said Norejko, urging companies and their employees “to do a deep dive into the data and rank how you compare.”

While he had no hesitation in saying that business aviation compares very well indeed, he did stress that as important as the compensation survey can be, attention to cultural fit and career progression and opportunity are also important. ✈

The business aviation survey garnered responses from 53 organizations – including a who’s-who of Canadian companies. Results revealed that on balance, business aviation pays better and offers comparable benefits to other aviation sectors. **Eric Dumigan Photo**



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# Airbus seeing 'momentum' on A220

Besides opening the new A220 line in Alabama, Airbus is also continuing with A220 production at its plant in Mirabel, Que. (shown here), which employs 2,200 people.  
Howard Slutsken Photo



## ◉ BRENT JANG | OEM NEWS

Airbus SE's new assembly line in Alabama increases the European-based plane maker's North American footprint at a time when U.S. rival Boeing Co. is struggling.

In August in Mobile, Ala., an Airbus joint venture started making the narrow-body A220, formerly known as the Bombardier C Series.

By contrast, Chicago-based Boeing is focused on returning its grounded 737 Max jets to service.

"On the A220, we see good order momentum," said Airbus chief executive officer Guillaume Faury during a conference call with industry analysts.

Airbus owns 50.1 per cent of the Airbus

Canada Limited Partnership, which is responsible for the A220. Montreal-based Bombardier Inc.'s stake is nearly 34 per cent and the Quebec government's investment agency has a 16-per-cent interest.

Faury didn't directly address Airbus's rivalry with Boeing, but acknowledged issues with the 737 Max are "something we see in the press."

In March of this year, a Boeing Max 8 flown by Ethiopian Airlines crashed after takeoff from Addis Ababa, killing 157 people. In October of last year, 189 people died when a Max 8 operated by Lion Air of Indonesia fell into the Java Sea after leaving Jakarta.

"That continues to weigh heavily on our company and we're always going to remember that," said Boeing chief executive officer Dennis Muilenburg during

a presentation to analysts in August.

"We are working with regulators around the world," he added, explaining that many approvals will be required before the grounded Max narrow-body jets return in full force to the skies.

Airbus and Boeing both have global production rates that are slower than what airlines and other customers such as aircraft lessors would like to see.

"We saw a slowdown in overall activity in 2018 driven by supply chain-related delays from Airbus," according to an analysis by Macquarie Research. "Volume for 2019 is currently lagging 2018 in terms of dollar value of transacted aircraft, given a continuation of Airbus delays as well as the global grounding of the 737 Max."

Since 2015, Airbus has done final assembly of the A320 aircraft family in Alabama.

Besides opening the new A220 line in Alabama, Airbus is also continuing with A220 production at its plant in Mirabel, Que., which employs 2,200 people.

In a Montreal press conference on Sept. 26, Faury said Airbus is looking to cut A220 supplier costs by 20 per cent over the next two years.

While Airbus concentrates on commercial aviation in Alabama, Boeing has a strong presence as the largest aerospace firm in the

state, with operations ranging from missile defence to space launch systems.

Steven Udvar-Házy, executive chairman and co-founder of Los Angeles-based Air Lease Corp., pointed out that Airbus has been facing production backlogs, including with the single-aisle, twin-engine A220.

“Based on Airbus getting control of the C Series aircraft, we made a decision to go ahead and order 50 A220-300s,” he told the Deutsche Bank Aircraft Finance and Leasing Conference in September. “We believe this is the most efficient aircraft in the 120 to 150-seat size.”

Udvar-Házy envisages a bright future for the A220, which saw its share of program development delays under Bombardier.

While there are production constraints in Montreal and Mobile, the A220’s increased popularity today contrasts with the struggles to garner customers in the past. “The airplane is getting more acceptance across the board,” said Udvar-Házy.

He noted that broadly speaking, speeding up deliveries isn’t easy, including for the long-range, wide-body A321neo: “We had discussions with Airbus, for example, to try to accelerate some of our 2024 A321neo positions into 2023.”

After tense corporate times for Airbus and Bombardier, the chronology of events eventually tilted in their favour.

In September 2017, Boeing persuaded the U.S. Department of Commerce to impose stiff duties on planned sales of the C Series in the United States.

The following month, Airbus and Bombardier signed a deal to create a new U.S. assembly line for what was then known as the C Series, targeting American customers.

In early 2018, the U.S. International Trade Commission dismissed the Commerce Department’s decision, which alleged the C Series benefited from subsidized pricing.

Fast forward to August 2019, and Airbus is touting the newly opened line for the A220 in Mobile.

“With Mobile, and our production network in Asia, Canada and Europe, we have strategically created a worldwide industrial base to better serve our customers,” said Airbus Americas chief executive officer Jeffrey Knittel in a statement.

Air Canada announced that it will deploy two of its A220-300s in the spring of 2020, with non-stop service on the Montreal-Seattle route and between Toronto and San Jose, Calif.

The A220-300s ordered by Air Canada are being built at Airbus Canada Limited’s Mirabel plant. Air Canada said it will be the first North American airline to fly the larger A220-300 version of the jet. ✈

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# Mitsubishi Aircraft to open SpaceJet Montreal Centre

Mitsubishi Aircraft Corporation has announced plans to establish a footprint in Montreal.

Having launched the Mitsubishi SpaceJet family of aircraft earlier this year and opened a U.S. headquarters in Renton, Wash., the company said it is preparing for the next phase of its global growth.

“As a Japanese company with a global market, we are building a strong global presence in order to position the Mitsubishi SpaceJet family for success,” said Hisakazu Mizutani, president, Mitsubishi Aircraft Corporation. “We have great respect for the achievements and capabilities in Quebec and are excited to be here.”

The birthplace of commercial aviation in Canada, Quebec has a long history of innovation and contribution to regional

aircraft development. It is a world-renowned aerospace hub and home to leading air and space companies, including some of Mitsubishi Aircraft’s existing partners.

“Our Montreal presence adds to our footprint in major global aerospace hubs, including Nagoya and Washington State,” said Alex Bellamy, chief development officer. “Since introducing our product family in June, we have had an overwhelmingly positive response, and we are intent on building the team that allows us to fully support our airline partners and customers. Quebec is an obvious choice for us.”

In its first year in the Montreal area, Mitsubishi Aircraft Corporation intends to create around 100 jobs focused on certification and entry into service of the Mitsubishi SpaceJet family. The company

Mitsubishi Aircraft Corporation is tapping into regional jet expertise in Quebec with the establishment of its SpaceJet Montreal Centre. Mitsubishi Aircraft Image



plans to increase employment in the following years at its Boisbriand-area office.

“This is an exciting moment for the company,” said Jean-David Scott, vice-president, SpaceJet Montreal Centre. “I am proud to be a part of the team that is focused on the future of regional aviation and bringing opportunities to the region.”

More than 1,500 hopeful job seekers attended a recruitment fair held in Montreal on Sept. 21. ✦

# Airbus forecasts need for over 39,000 new aircraft through 2038

According to Airbus’s *Global Market Forecast 2019-2038*, released on Sept. 18, the world’s passenger and freighter aircraft fleet is set to more than double from today’s nearly 23,000 to almost 48,000 by 2038. Traffic is expected to grow by 4.3 per cent annually, resulting in a need for 550,000 new pilots and 640,000 new maintenance technicians.

By 2038, of the forecasted 47,680-member fleet, 39,210 will be new and 8,470 will remain from present day. By updating fleets with latest generation fuel efficient aircraft such as the A220, A320neo family, the A330neo and the A350, Airbus believes it will largely contribute to the progressive decarbonization of the air transport industry and the objective of carbon neutral growth from 2020, while connecting more people globally.

For the 2019-2038 forecast, Airbus addresses aircraft segmentation in the small (S), medium (M), and large (L) categories to better reflect the use of aircraft within and between market segments. For example, a short haul A321 is small (S) while the long-haul A321LR or XLR can be categorized as medium (M). While the core market for the A330 is classified as medium (M), it is likely a number will continue to be operated by airlines in a way that sits within the large (L) market segmentation, along with the A350 XWB.

The new segmentation gives rise to a need for 39,210 new passenger and freighter aircraft – 29,720 small (S), 5,370 medium (M) and 4,120 large (L) – according to Airbus. Of these, 25,000 aircraft will be acquired due to growth and 14,210 will replace older models.

Resilient to economic shocks, air traffic has more than doubled since 2000.

It is increasingly playing a key role in connecting large population centres, particularly in emerging markets where the propensity to travel is among the world’s highest as cost or geography make alternatives impossible.

Today, about a quarter of the world’s urban population is responsible for more than a quarter of global gross domestic product (GDP), and given both are key growth drivers, aviation mega cities (AMCs) will continue to power the global aviation network. Developments in superior fuel efficiency are further driving demand to replace existing less fuel-efficient aircraft, said the Airbus forecast. ✦



Developments in superior fuel efficiency are further driving demand to replace existing less fuel-efficient aircraft. Airbus projects a need for 39,210 new passenger and freighter aircraft by 2038. Airbus Photo

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# CAPA Summit discusses the future of aviation in Canada



WestJet grew too fast between 2013 and 2018, said president Ed Sims. In its current five-year strategy, WestJet has decreased growth to five aircraft additions per year. **Galen Burrows Photo**

## ◻ TANIA MOFFAT | AIRLINE NEWS

**C**APA - Centre for Aviation, a global aviation market intelligence agency, held its first-ever event on Canadian soil. The 2019 CAPA Canada Aviation Summit, held in Winnipeg this September, brought together approximately 250 senior executives and leaders in the field to discuss the Canadian market.

Air Canada and WestJet have long dominated the Canadian skies, but ambitious ultra-low-cost carrier (ULCC) start-ups, new partnerships, geopolitical events, regulations and industry developments are changing the playing field.

Today, competition in the market is fierce, with more than 100 airlines operating in our skies. At the summit, leaders from Canada's two biggest airlines discussed their methods for long-term stability and how they are adapting to these competitive and external forces.

### **AIR CANADA: 82 YEARS STRONG**

Lucie Guillemette, executive vice-president and chief commercial officer at Air Canada, spoke to the company's accomplishments and plans for the

future. Strong brands, a comprehensive network, schedule and the positioning of three primary hubs – Vancouver, Toronto and Montreal – are the basis for Air Canada's long-term stability. Transatlantic growth with partners in Star Alliance has been achieved by connecting Canada's and Europe's top hubs, allowing for cross-carrier selling and a multitude of connection options for customers.

"Rouge's swing capacity from sun markets in the winter to transatlantic in the summer has been fundamental to our strategy, allowing us to compete with ULCCs, enter new markets and cement our position as the largest foreign airline in the U.S.," said Guillemette. Regional carrier Air Canada Express has grown 142 per cent year-on-year and now serves 300,000 passengers weekly. Express' focus is to build connectivity and feed network hubs.

A revamp of Air Canada's loyalty program has been underway since the acquisition of Aeroplan from Avion last year. The launch, expected in 2020 alongside the unveiling of their new reservation system, will transform how the airline interacts with customers.

The acquisition of Air Transat was approved by stakeholders but remains conditional on regulatory approvals and

other closing conditions. The transaction will benefit travellers with increased connections, destinations and flight frequencies. Air Canada plans to preserve the Air Transat brand and Montreal head office.

### **WESTJET: MAKING AVIATION HISTORY**

Onex's purchase of WestJet for \$5 billion has been called the largest private equity deal in aviation history. The acquisition has received approval from the Transport minister and the Competition Bureau of Canada, but the Canadian Transportation Agency continues to investigate Onex's foreign ownership.

"Between 2013 and 2018 WestJet grew too big, too fast. We were inducting aircraft at a rate of 15 per year. Adding 75 aircraft over five years was difficult to sustain," explained WestJet, CEO and president, Ed Sims.

In its current five-year strategy, WestJet has decreased this to five aircraft per year. "We will continue to increase our growth capacity and available seat kilometres, but a significant part of our future growth will come from our partnerships with Delta, and other joint ventures we are looking to build with Air France, KLM and Virgin Atlantic. Growth doesn't have to be on WestJet metal," added Sims.

The Delta joint venture agreement allows the carriers to expand their codeshare agreement and compete with Air Canada. “The future for WestJet is forming fewer, but deeper, relationships in joint ventures,” said Sims.

Swoop will remain a distinct, independent subsidiary competing in the ULCC market. Airfares remain 35 to 40 per cent lower than WestJet, making flying affordable for many new customers.

## MARKET DISRUPTIONS - THE MAX FIASCO

The grounding of the Boeing 737 Max in March 2019 had widespread effects on the industry, creating a massive logistical and financial impact on travel worldwide. Boeing had delivered more than 370 Maxs with 5,000 more on order.

Air Canada pulled its 36 Max aircraft from service before the grounding. Massive schedule adjustments were made to deal with the fallout – aircraft had to be changed, resulting in the suspension of various routes. Leases of planes in the airline’s fleet were extended and the early delivery of other aircraft on order was hastened. Non-essential maintenance, including Wi-Fi installation and livery painting, were deferred. Rouge and its partner operations were critical in their response. Air Canada has managed to cover 96 per cent of its flying every month from April 2019 until today.

WestJet’s experience was similar after grounding their 13 planes. Expenses continue though, as Max pilots and crew continue to be paid.

## EAST VERSUS WEST: ARE OUR SETTINGS OFF?

In an economy poised to see a massive shift in trade, are Canada’s settings off? The majority of growth over the next 20 to 30 years will be focused in Asia, particularly China. It is expected to become the world’s largest market by 2020. Canada, however, maintains an eastward focus on Europe despite the market’s lack of growth since 2017.

Air Canada and Air China secured the first joint venture between a Chinese and North American carrier in 2018. Unfortunately, a capped market has strangled growth in routes to China. Asia is highly competitive, complex and low yielding from an airline point of view. If Canada is to benefit from this market it needs to find a different way to operate within it, change policies and become more reactive.

“The challenge with Asia is that it is difficult to serve because of distance and overcapacity in the market, which translates into lower fares,” said Mike McNaney, vice-president, Industry, Corporate and Airport Affairs for WestJet.

“There is lots of growth coming from the transpacific, but the capacity is growing faster than the demand. When capacity demands are back in balance, we will launch service. One thing we are certain about is

that we will not fly profitless volume. We need deep analysis on the markets, and we will not rush into that decision.”

## OVER-REGULATED INDUSTRY

Canada remains one of the world’s most expensive jurisdictions in which to fly. Much of that has to do with the cost of air travel rates, taxes and fees. Over the last 10 years, fares have declined incrementally due to competition and changes in technology, yet the fees and tax rates faced by airlines increased at the same exponential rate over the same period.

“We face tremendous headwinds on regulatory fronts in Canada with the excessive layering of regulations – the passenger bill of rights, carbon tax rules, flight duty time and labour code amendments. Regulations are set with the right intention to protect consumers. Our concerns are that the exorbitant costs they add to an already sensitive business, airlines cannot absorb all of that cost,” explained Ferio Pugliese, senior vice-president, Air Canada Express and Government Relations.

“Regulation is excessive in this country, and we need to be very aligned when we deal with it,” said WestJet’s Sims. “It puts enormous pressure on our ability to provide competitive airfares to customers. According to colleagues in the Canadian transport industry, the new Air Passenger Protection Regulation, APPR, will impose a cost of around \$2.75 per guest. After its corporatization, CATSA will likely impose a cost of around \$0.50 per guest. This neatly adds \$3.25 to each ticket, the margin per guest that WestJet made last year.

“I am up for the difficult, but I am not up for the impossible,” he continued. “I think airport privatization needs to be discussed in Canada and is an issue that WestJet is strongly in favour of to keep airfares competitive.”

## IMPACT OF TECHNOLOGY

New developments in technology could radically change the way we fly.

“Air Canada is in the final stages of a new reservation system and loyalty plan. We

have systems that are 25 to 30 years old, and the challenge has been in replacing those underpinning systems,” said Catherine Dyer, senior vice-president and chief information officer at Air Canada. It’s a process she compares to doing a brain transplant.

Growth in artificial intelligence (AI) has the opportunity to increase travel personalization. Air Canada has begun development on two AI programs, one in cargo and the other in revenue management. They have also identified an additional 31 opportunities for AI and machine learning to augment the work of airline staff.

## FLYGSKAM

The flygskam movement, which loosely translates to “flight shame,” has been fuelled by activists in Sweden and has garnered attention worldwide. Already, politicians and governments are stepping in; France’s transport minister announced a new “eco-tax” to be charged on all flights that take off from the country, with funds to finance other modes of transportation. This is not good news for an already overtaxed industry.

“Aviation is responsible for two per cent of the world’s carbon dioxide emission,” said Sims. “Every day, the industry is working to reduce its financial footprint through the reduced use of auxiliary power units, single-engine taxiing, or increased use of battery and electric vehicles. We are already making significant steps to reduce our emissions.

“It is somewhat ironic that the world’s most fuel efficient narrow-body aircraft have been grounded,” he continued. “We need to let airlines self-regulate and self-manage to reduce emissions rather than imposing more legislation. The development of effective biofuels is something we want to pursue and promote actively, and we will be the best managers of that.”

The aviation community is a dynamic and engaging industry that is always moving at a rapid pace. In a world of over-regulation, stiff competition and hypersensitivity to global events, Canadian carriers and worldwide partners are continually correcting course to overcome the next hurdle. ✈

Rouge has allowed Air Canada to compete with ultra-low-cost carriers. The airline focuses on sun markets in the winter and transatlantic routes in the summer. **Galen Burrows Photo**



# Transat downplays aftershocks of Thomas Cook demise

When British tour operator Thomas Cook went under, so did its deal to swap aircraft with Transat AT on a seasonal basis. Still, Air Transat is 'confident' clients will not be affected.

◀ BRENT JANG | AIRLINE NEWS

British-based Thomas Cook Group PLC's liquidation left hundreds of thousands of customers stranded in September, but Transat AT Inc. is emphasizing that there won't be any immediate impact on its vacation packages.

The Montreal-based tour operator played down the effects of the early dissolution of a seven-year deal to swap aircraft on a seasonal basis with Thomas Cook.

The arrangement, signed in October 2017, worked well in the early going, with Thomas Cook agreeing to send between four and 14 narrow-body Airbus A321s in the winter to Transat's airline unit, Air Transat.

Air Transat had been expecting "no less than seven A321s this winter, as provided in the initial agreement," said Christophe Hennebelle, Transat's vice-president of human resources and corporate affairs.

While the partnership has collapsed, Air Transat is optimistic about ensuring a smooth experience for Canadian travellers flying to sun destinations such as Mexico and the Caribbean.

Hennebelle said in an email that despite the demise of Thomas Cook, "there is no immediate impact whatsoever on our operations."

Air Transat officials "are confident that there will be no disturbances for our clients," he added.

Under the now-lapsed partnership for the winter travel period, Air Transat agreed to lease one to five wide-body Airbus A330s to Thomas Cook.

"We are obviously very saddened to see such a great company as Thomas Cook collapse, and our heart goes out to them, their clients and their employees," said Hennebelle.

Industry observers are watching for when Air Canada's planned \$720-million acquisition of Transat might be

completed. The purchase could close by mid-2020, subject to conditions such as approval from Transport Canada and the federal Competition Bureau. But the abrupt end to the aircraft-swapping deal with Thomas Cook isn't expected to pose any lingering concern for the Air Canada-Transat transaction.

Peter Fankhauser, chief executive of debt-laden Thomas Cook, issued a statement to express his disappointment at the inability to resolve the financial troubles.

"This marks a deeply sad day for the company which pioneered package holidays and made travel possible for millions of people around the world," he said on Sept. 23.

Fankhauser also apologized for the hardships ahead for 21,000 employees at the once-venerable and now-insolvent Thomas Cook, whose travel company roots in Britain date back to train excursions in 1841.

Condor Flugdienst, a carrier based in Germany that had been flying on behalf of Thomas Cook, is still offering flights to Canada through its own website. While Condor suspended its operations in late September for customers of Thomas Cook, the long-term impact is unclear. Condor sought to weather the financial storm, helped by a six-month bridge loan from the German government.

Over the past 20 years, consumers have been shifting away from visiting storefront travel agencies and instead increasingly booking vacations online, said Robert Kokonis, president of airline consulting firm AirTrav Inc.

"It was a two-fold punch against Thomas Cook," said Kokonis in a phone interview. "It was the rise of online travel agencies like Expedia and also the rapid growth of low-cost carriers like Ryanair, EasyJet, Wizz Air and Norwegian."

The ascent of low-cost carriers enabled the general travelling public to tap into cheap flights, said Kokonis.

"Either through online travel agencies or through the airlines' websites themselves, it made it really easy for travellers to decide, 'We don't want a prepackaged product.' The evolution away from prepackaged products started in the early 2000s," he said. "The traditional tour operators like Thomas Cook were slow to evolve their business models."

Marc-David Seidel, associate professor at the University of British Columbia's Sauder School of Business, said it was only a matter of time before the British travel company succumbed to market pressure.

"The demise of Thomas Cook is part of a long-term trend in the travel industry that has been reducing demand of low-cost prepackaged vacations. Historically they were a leader in prepackaged travel agency packages," he said in an email. "Additionally, the growth trend of small travel providers such as individuals offering up rental units through Internet platforms also puts pressure on organizations like Thomas Cook as a portion of their revenue was based on lodging."

In late September, Britain's Civil Aviation Authority scrambled to secure planes to fly passengers back home. "This repatriation is hugely complex and we are working around the clock to support passengers," said the authority. ✈

Air Transat had been expecting at least seven Airbus A321s from Thomas Cook this winter. Now that the British tour operator is bankrupt, Transat is evaluating its options. A representative said there will be "no immediate impact" on operations. **John Chung Photo**



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## Ornge powers up fleet stretcher system with HeliMods upgrade

OLIVER JOHNSON | HELICOPTER NEWS

Ornge, Ontario's air ambulance operator, has completed the installation of a new powered stretcher system across its fleet of 11 Leonardo AW139 helicopters.

The Powered Aero Loader (known as PAL), produced by Australian company HeliMods, is a push-button operated powered stretcher loader system that allows crews to quickly and easily load and unload road ambulance stretchers into and from helicopter air ambulances.

The system is compatible with the popular Stryker Power Pro XT stretcher system, which is used by the vast majority of road ambulances across Ontario. According to HeliMods, the system allows for the transfer of patients weighing up to 700 pounds (318 kilograms) without the need for any manual lifting, achieved with the push of a button.

"This system allows for a seamless transition from the helicopter to the land system," Justin Smith, chief flight paramedic at Ornge, told *Skies*. "It's really elevated the ability for us to bring the critical care to the patient's side."

HeliMods was established by Will Shrapnel in 2002 in Caloundra, Queensland, and specializes in providing customized mission configurations in helicopters – particularly in the AW139.

The contract with Ornge represents the first large-scale commercial delivery of the company's PAL system, which itself has been in the works for several years.

The system required intensive research and development up front, with HeliMods working with local ambulance services

Throughout the Ornge fleet, the organization has already completed close to 1,000 transfers with the Powered Aero Loader stretcher system, produced by Australian company HeliMods. **Mike Reyno Photo**



WATCH THE VIDEO

in Australia to create the first-generation proof of concept for the integration. The design, which allows the entire stretcher to be fully cantilevered from the aircraft during loading and unloading, presented some difficult engineering challenges.

"It does require a lot of structural support from the aircraft," said Shrapnel. "So, our team set out to solve the engineering challenge of integrating power loading and lifting technologies into what's essentially called an aircraft interface, which then connects into the aircraft floor. It does that without tools, so the aircraft can be reconfigured quickly."

Ornge began exploring options to improve its patient transfer process a number of years ago, and called for proposals in a competitive bid process last year.

HeliMods was awarded the contract in October 2018, with a tight schedule requiring delivery of the first systems in April 2019. The company worked closely with Ornge ahead of that delivery to customize the system to the organization's exact requirements.

One of the key customizations was the design of the bridge – the mounting attached to the stretcher that houses various pieces of medical equipment, such as the cardiac monitor, infusion pumps and mechanical ventilator. The design of the previous

bridge often required the various tubes, lines, and pieces of equipment required to treat a patient to be deconstructed and reconstructed during a transfer – a time-consuming and laborious process.

"We've now got a system whereby all of our equipment stays on the equipment bridge for the duration of the transport," said Smith.

The PAL system also allows Ornge to transport bariatric (heavier) patients more effectively.

While the new system is "slightly heavier" than the previous stretcher system, Smith said the efficiency it provides is worth the extra weight.

Ornge has installed the PAL system throughout its fleet over several months, to ensure a smooth integration. The final aircraft received the new system at the end of August.

Throughout the Ornge fleet, the organization has already completed close to 1,000 transfers with the PAL stretcher system, and feedback from crews has been "outstanding," said Smith.

The PAL system has been certified by the regulatory authorities in Australia, the U.S. and Canada, and is also certified in the H145 in the U.S. HeliMods is also planning to certify it in the AW169, and potentially the Bell 429. ✚

# Leonardo delivers 1,000<sup>th</sup> AW139 helicopter

On Sept. 20, Leonardo delivered its 1,000<sup>th</sup> AW139 helicopter to Italy's Guardia di Finanza during an official celebration held at the manufacturer's plant in Vergiate (Varese, Italy).

The AW139's first flight dates back to the beginning of 2001. Today, the helicopter boasts orders of over 1,100 units from more than 280 customers, located in over 70 countries on all continents.

Almost 2.5 million flight hours have been recorded since the first delivery took place at the beginning of 2004. Usage data testifies to the extreme versatility of the AW139, which satisfies any market need: more than 30 per cent are used for public utility tasks such as search and rescue and air ambulance, law enforcement, firefighting, and disaster relief; over 30 per cent for offshore transport; around 20 per cent for military tasks; with the rest flying VIP, institutional and corporate transport missions.

The AW139 fleet has a global presence, with around 30 per cent located in Europe, almost as much in Asia and Australasia, and 15 per cent in North America, followed by the Middle East. The helicopter is produced on two assembly lines in Italy and in Philadelphia, Pa.

The AW139 has adapted to the changing needs of customers. The maximum takeoff weight increased from 6.4 to 7 tons. Almost 1,000 mission kits and equipment have been certified. With advanced protection systems against icing, the AW139 can fly in all weather conditions. This model is also the only one in the world capable of continuing to fly for over 60 minutes without oil in the transmission, twice as much as the 30 minutes

required by the certification authorities.

The AW139 represents a turning point in the rotary-wing sector through the introductory concept of the Leonardo "helicopter family." The AW139 is the forefather of a helicopter family comprising the smaller and lighter AW169 and the larger and heavier AW189.

The models share the same design philosophy, the same high performance, the same flight characteristics and the same certification standards, as well as the same

approach to maintenance and training. This concept allows operators with large diversified fleets to create significant synergies in crew training, flight operations, maintenance and logistics support. ✈

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The 1,000<sup>th</sup> AW139 was delivered on Sept. 20 to Italy's Guardia di Finanza during an official celebration at Leonardo's plant in Vergiate (Varese - Italy). **Leonardo Photo**

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Members of the RAF Red Arrows North American tour were transported on an Airbus A400M Atlas. The aircraft moved the advance guard and necessary freight to the next location on the tour, before returning to collect the remaining team members. Here, the A400M blasts off from Pearson airport in Toronto before making an appearance in the Canadian International Air Show. **Eric Dumigan Photo**



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**Patrick Cardinal** caught the Red Arrows performing their signature Gypo Break manoeuvre in Gatineau. The team travelled coast to coast across North America, conducting aerobatic displays, flypasts and ground engagements.





Under blue skies, the Red Arrows wowed thousands in a special one-day edition of Aero Gatineau-Ottawa on Aug. 13. The team last performed in North America more than a decade ago. **Joe Letourneau Photo**



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New look: A former First Air Boeing 737-400C, the first of the type to sport the new Canadian North livery, lands in Iqaluit. **Brian Tattuinee Photo**



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The Canadian corporate operators on our panel reported their aircraft each fly around 400 hours per year. Annual utilization is holding steady or even increasing, they say. **Embraer Photo**

# A matter of PERCEPTION

A candid roundtable with four of Canada's most prominent business aviation leaders reveals some of the pressing operational issues currently facing their flight departments.

► BY LISA GORDON

**I**n September, *Skies* held a roundtable discussion with four corporate aviation department managers and Anthony Norejko, president of the Canadian Business Aviation Association (CBAA).

This was different from past talks, where we've invited business aviation operators to speak on the record about their biggest operational concerns. Without exception, they've historically shied away, citing a fear of attracting the wrong kind of attention.

This time, to encourage candid discussion, we offered them anonymity in a roundtable format of their peers. The result is a stark, honest assessment of the challenges and opportunities facing Canadian business aviation – a traditionally reticent aviation sector that has always preferred to fly under the radar.

For contextual purposes, our four participants are spread across the country and each operates multiple twin-engine business jets in the super midsize category or above.

## OPTIMISTIC OUTLOOK

Generally speaking, the panel's four participants are positive about the current state of business aviation in Canada.

With hours flown holding steady or even increasing, operators see a bright future, albeit one without massive growth.

"We all want to be optimistic," said Operator B, a Western Canadian operator

of two business jets that fly roughly 400 hours each per year. "We trust there is a future in this business; we all pour a lot of time and effort into it to make business aviation a very productive and constructive component of not only our industry, but the economy overall."

While the use of a corporate aircraft has always ebbed and flowed according to business strategy, Norejko said the CBAA has recently noted "an element of seeking new business and maintaining current business" that bodes well for business aviation.

But all panel members cautioned that a sunny outlook for the sector depends largely on perception – both internal and external.

"There's not a CFO [chief financial officer] in the world that doesn't look at corporate aviation and ask its value proposition," said B.

Operator C, who flies two jets based in Eastern Canada, agreed. "In business aviation, it's often about perception versus reality. And those perceptions and challenges come not just from the public but internally as well. We can't become siloed within our own companies; when a new CEO comes on board, you have to legitimize the operation to them all over again – it's a business tool."

Very quickly, executives come to realize the inherent benefits of business aviation.

"I found that individuals who understand the value of time understand the value of a business aircraft – security and safety, internal networking," commented Operator D,

also based in the West. "At the end of the day, they support the company's bottom line and growth. There is a huge value here and that's why most of the world's large companies have corporate aircraft."

But while company executives soon come to realize that a business aircraft is essentially a time machine – a tool, just like an iPhone, according to Norejko – the general public is less easy to convince.

Although it's been 11 years since the CEOs of Chrysler, Ford and GM flew in their business aircraft to Washington to request taxpayer bailouts, that single event in November 2008 set off a shockwave of anti-business aviation sentiment. While that tide has since been turned back through education campaigns run by associations like CBAA and U.S.-based National Business Aviation Association (NBAA), the public perception of business aviation remains skeptical – and that's difficult to change.

"I think we're seeing a bit of an upward trend with bizav being more accepted. I think it's improving, but there is a long way to go," commented D.

"It's a challenge on a few different fronts. It is an industry that is often not understood and forgotten by many. The overall bigger perception of business aircraft is sometimes that they are toys for the wealthy. And [executives] don't want to open themselves up to that criticism," he continued.



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ABOVE: Business aviation wants equal access to Canada's major airports, especially during periods of construction or runway work. "Their default is airlines can come and go as they please, and we'll put bans in place for non-airlines," said one operator.

**Eric Dumigan Photo**

RIGHT: The business aviation "time machine" enables employees to reach multiple destinations in a single day, enhances customer relations, and allows companies to access remote operations quickly.

**Paulo Fridman Photo**

While some business professionals might avoid discussing the company jet, research published by NBAA says they shouldn't.

"Business aircraft users have a dominant presence on 'best of the best' lists for the most innovative, most admired, best brands and best places to work, as well as dominate the lists of companies strongest in corporate governance and responsibility, revenue growth and market share, indicating that business aviation is the sign of a well-managed global company," according to the association's *Business Aviation Fact Book*.

There is definitely a case to be made for bizav, said Norejko.

"It's clear, if you deploy this asset the right way, you get time, freedom, flexibility and efficiency," he said. "We choose to pay for business tools and, in this case, you make the cost/benefit analysis," he explained.

According to the CBAA's 2017 economic impact report, Canada's 1,900 business aviation operations generate 23,000 jobs in Canada and are responsible for a \$3.4 billion contribution to gross domestic product and \$7.8 billion in economic output.

## OPERATIONAL CHALLENGES

*Skies* asked the panel to discuss their three biggest operational challenges. In no time at all, a few common concerns emerged.

One is simply keeping pace with regulatory changes to ensure compliance.

"The biggest challenge that is always on our minds is around changes in the regulatory environment," said A, an Ontario-based operator of two mid-size corporate jets. "That always brings with it some angst. We'll always figure it out and do what is required, but it's commonplace that those changes are not necessarily put in the context of our world."

Operator D said it's sometimes difficult to keep up with the sheer volume of regulations from different agencies.

"It's never simple," he said. "There isn't necessarily one place to go to get the information. You have to keep up with Transport Canada, the Canada Labour Code, and Occupational Health & Safety. Falling behind could result in a penalty. The CBAA is a big resource for an operator



Last year, C was seeking a special authorization from Transport Canada. While his contact at the agency was as helpful as possible, he had no corporate or airline experience to draw upon.

“My experience is that Transport is very helpful. You get to know your local people, but they can’t do everything,” said C. “Retirements are causing high turnovers. People are leaving to fly because the opportunity is there now. You can really see the lack of experience and manpower to turn around files.”

B agreed, noting that the regulatory element can be tied back to the issue of perception and a general lack of understanding

“We continue today to struggle in Canada with the public, regulator and airport authorities’ perception of business aviation,” he said. “We find ourselves constantly having to make our case for inclusion, to make sure we have the access that we need, and that regulations when introduced are not simply adopting an airline model to business aviation. We are constantly having to preserve our position in the industry. A lot of the challenges we face are embedded in that reality.”

C pointed out that it’s not just domestic regulations that pose challenges.

“I would say there’s a fairly large percentage of corporate operators who operate across the Atlantic intermittently. It can be challenging because the EASA [European Union Aviation Safety Agency] regs continue to change. It takes an immense amount of flight preparation to head off any issues.”

Despite these challenges, Norejko pointed

out some positive progress with the regulator. He credited Transport Canada for working with CBAA on the request to delegate authority to the association to approve aircraft minimum equipment lists (MELs) for bizav operators.

I’m cautiously optimistic,” continued the CBAA president. “If we look at the MEL experience as a toehold, we are hopeful. . . . We are not asking to change the regulations or their oversight responsibility – we’re simply asking them to delegate the subject matter experts, in direct contact with Transport Canada, the ability to get this work done.”

## EQUAL ACCESS

Perhaps one of the biggest sore spots for operators is ensuring business aviation access to Canada’s major airports, an issue that CBAA has been actively promoting for years.

“If we’re talking about the use of an asset, in this case airports, it’s that you have a business model that fits around the airlines,” said Norejko. “But the thing that airports serve is Canadians – and that includes businesses that fly in and out. We have to contend with a business model that is more favourable to the airlines.”

The association has been making progress with the YYZ Airport Technical Working Group to ensure business aviation access to Toronto Pearson International, as well as with the Montreal airport operator, Aéroports de Montréal, among others.

While our panellists all appreciate the association’s lobbying efforts, it’s clear this is a frustrating issue.

to tap into in that regard. But, at the end of the day, it’s the operator’s responsibility to make sure they follow through.”

In general, operators feel business aviation is forced to adapt to regulations that are crafted with the airline sector in mind – regulations that in most cases do not fit their unique operational realities.

“We can talk about the new [CARS] 604 guidelines through to fatigue management; it’s a reflection of the regulator’s failure to understand and facilitate this sector,” said A.

“I have had conversations lately with people who interact with Transport Canada and the trajectory is not good,” he continued. “It’s a regulator in decline and I don’t think we’ve reached the bottom yet. [As a mature flight department,] I have very little interaction with Transport Canada and I’m happy with my relationship with my POI [principal operations inspector]. But that isn’t everyone’s experience.”



“We continue today to **struggle in Canada** with the public, regulator and airport authorities’ perception of business aviation.”

“We could spend hours talking about Toronto and Montreal right now, which are trying to make it more complicated for us to access those airports,” said A.

Operator C said access to Montreal is simply “brutal.” His operation runs a quasi-scheduled service to Montreal and has recently found those flights hampered by runway construction and restrictions to general aviation aircraft.

“I don’t believe we fall into that criteria, but as far as the airport authority is concerned, we do,” said C. “We’ve had to adjust our schedule and will start operating from St. Hubert instead of Trudeau. It’s a real inconvenience to our passengers.”

Operator A is clearly frustrated with the situation.

“If there is a limitation at an airport for construction or runway work, their default is airlines can come and go as they please, and we’ll put bans in place for non-airlines,” he commented. “I find that very frustrating. The idea that we’re just a less worthy customer is offensive to all of us and they appear to have no remorse for doing that. We’ve gone through that in Toronto, Montreal and Calgary.”

He added that clearances will sometimes change en route; diversions become a possibility.

“My job in management is to eliminate and reduce distractions so my pilots can fly safely – then we get thrown these curveballs and

it just adds stress where it’s not needed,” said A. “We’re all about mitigating risk.”

The CBAA’s Norejko reiterated that airports are federal assets for all Canadians to use. Restricting bizav access also affects fixed-base operators who rely on this traffic, he added.

One operator suggested airport authorities and Transport Canada should be “taken to task” because they are failing to advocate for business aviation.

“We promote the value of what we do because we see it,” he said. “They have an obligation [to understand and] to advocate for us. We shouldn’t constantly have to advocate for our positions.”

Operators pointed out that a lot of behind-the-scenes planning goes into transporting the CEO to an important meeting. A sudden change to airport access can cause a trip cancellation or lost revenue for the company.

**ICY RELATIONS**

As the winter season approaches, business aviation operations are still fighting for equal – and affordable – access to airport deicing facilities. In every case, operators must plan ahead.

In some cases, smaller airports that don’t have regular scheduled service reserve their deicing fluid for the occasional airline traffic that does come in – telling business aviation that it must wait.



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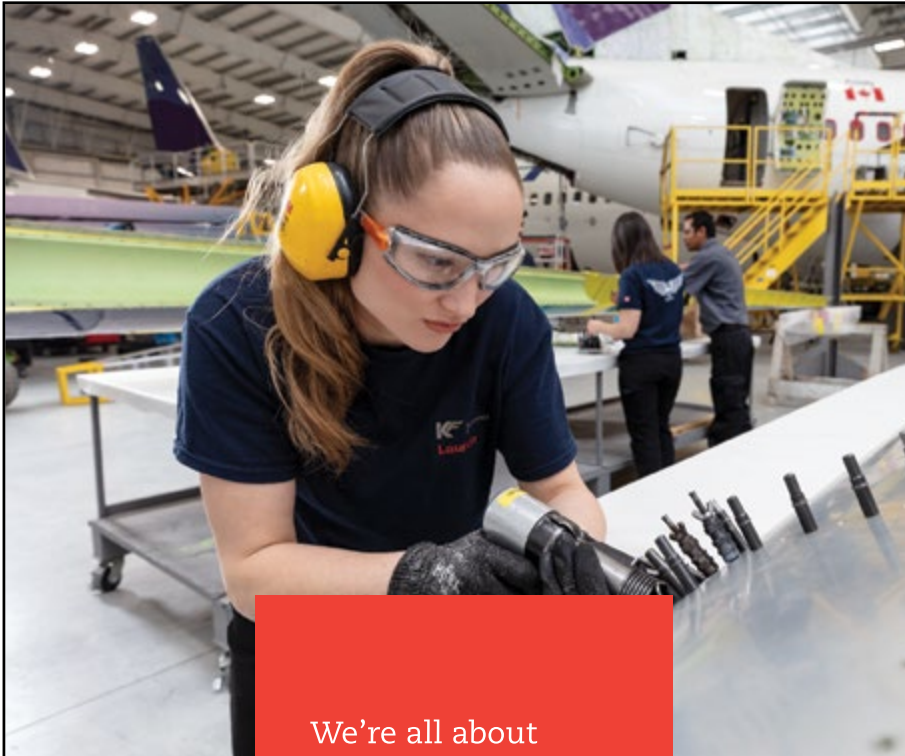
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“It’s not uncommon for a business jet to pay upwards of **\$8,000 to get deiced,** depending on the airport and the level of contamination.”



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“Often the airlines will engage a third party on the field to provide deicing,” said Norejko. “The individual bizav operator often faces much higher prices. And this exposes the problem we have: One, the airports having the equipment; and two, we don’t have the volume and therefore we pay double or more than the airlines pay.”

In fact, it’s not uncommon for a business jet to pay upwards of \$8,000 to get deiced, depending on the airport and the level of contamination.

Operator D said it pays to be proactive and his flight department tries to make arrangements ahead of time.

“We personally do everything we can to not have to deice without compromising safety,” he said. “That includes hangarage, if available. We also carry our own deicing equipment along with us for minimal contamination if needed. We put the onus on the flight crews to be very proactive to look at weather. We are second-class citizens to the airlines when it comes to deicing.”

Operator C said he tries to get deiced by the FBO in the hangar when passengers arrive, “to bypass the shenanigans at the deicing bay.

“If we’re going to a remote location, we may take some deicing fluid along with us,” he continued. “But at the big airports, we’re at the bottom of the list. In Ottawa, we had to deice at the deicing bay. There was light freezing rain at the time. It cost us \$8,500 that morning to get deiced.”

B said his operation has also had difficulty getting access to deicing at some airports. “Sometimes we have to ask airlines for help.

“Maybe some thought needs to be given to deicing is every bit as important in ensuring safety as is fire and rescue. Perhaps resources need to be directed there,” he suggested.

D is encouraged by a request earlier this year from Transport Minister Marc Garneau, in which all aviation operators and airports were required to provide their deicing plan for the winter of 2019-2020. The request was made following a 2017 accident in which the Transportation Safety Board pointed to ice on the wings as contributing to the crash.

“To me, that’s kind of a big step,” he said. “We know as an operator that it is an important thing to do, but to send out a letter seems to indicate they realize they need to step in. I think it’s going in the right direction. Government needs to be held accountable to step up to help all operators have equal access to that service at airports. It’s an important bucket of safety that can’t be ignored.”



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**STEADY STAFFING – FOR NOW**

None of the business aviation operators we spoke to said they are having trouble finding staff. Most indicated they are fortunate to have experienced, long-term employees and enjoy a low turnover.

“One of the reasons I think we’re not challenged that way is that these are very good jobs,” said Operator C. “They are high paying, rewarding. It’s an element that is attractive to pilots. These corporate jobs

are few and far between, but they are the bestkept secret in aviation.”

But even though none of them are currently hiring, they’re still aware of the human resources challenges other operators are facing.

“I would put us all at the top of the food chain in our world,” said A. “I would fully expect that any of us could post a position and we’d choose from the best applicants. [But] I would hate to be a small jet operator starting out. Even the regional [airlines]

now, the choicest airline pilot role has been distilled down.”

D said his company has much to offer its flight department employees, including fair compensation, an attractive schedule, well maintained and equipped aircraft, and work/life balance. He believes education is key to attracting tomorrow’s top-notch employees.

“We operate in a sector that has real professional people that are high performers with good paying jobs,” said D. “Often, corporate aviation from an industry perspective is not viewed as a desirable place to be, but it’s becoming more sought after. Especially with the shortage of personnel, it’s important for the industry to educate talent coming into this world, so they know bizav is very much alive and well.”

**TOWARDS TOMORROW**

As the voice of business aviation in Canada, the CBAA is focused on celebrating its potential for not only revenue and profit growth, but also customer and employee satisfaction.

“CBAA is the purveyor of the facts,” said Norejko. “I see our job as celebrating those buckets about how an aircraft can be used.”

When it comes to changing the perception of business aviation, he said public opinion is diverse and hard to measure. On the other hand, collaborative partnerships with authorities and regulators can make definitive progress.

Despite its many challenges, every operator participating in the roundtable discussion loves the business and is optimistic about the future.

“I have the best job in the world,” said Operator A. “Despite all the frustrations, I still love our business. We’re the classic ops world. You don’t hear anything from anyone when it goes well. The passengers have no idea what we’ve gone through when we have a bad day, but we still pull it off for the customers.”

As long as there is a business case to be made for corporate aviation, these operators say they aren’t going anywhere.

“I’m optimistic because this sector has some of the best people in the business: hard working, experienced,” concluded B. “We understand the value; we’re not giving up. We’re just looking for a little more co-operation.”

“We won’t go down without a fight – we just wish we didn’t have to have our elbows out all the time.”

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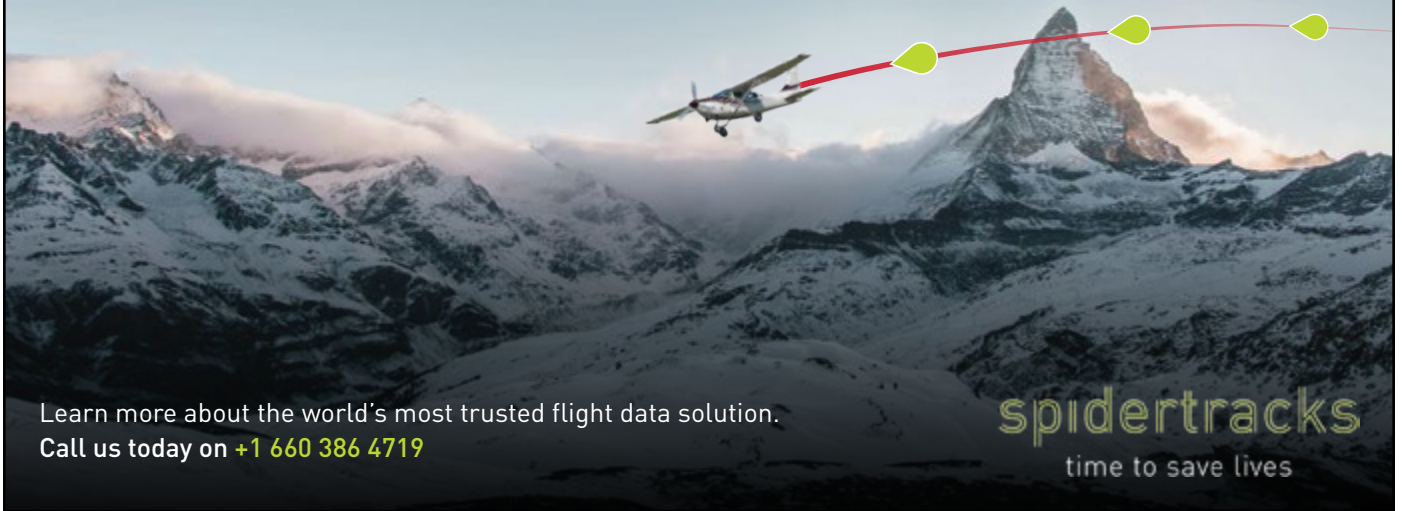
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DOWNLOAD THE WALLPAPER

The Pilatus PC-24 was introduced at the European Business Aviation Convention & Exhibition (EBACE) in Geneva, Switzerland, on May 21, 2013. The prototype rolled out from the plant in Stans on Aug. 1, 2014. **Pilatus Photo**

# THE SWISS UTILITY JET

Pilatus Aircraft's PC-24 "Super Versatile Jet" received its Canadian type certificate on June 27, 2019. With unique design features that differentiate the twinjet from its competitors – and a healthy order book to boot – the PC-24 seems poised for success in the light jet market.

BY FREDERICK K. LARKIN





Pilatus claims the PC-24 can operate out of some 7,500 airfields within North America, including unpaved strips. That translates to approximately 70 per cent more available destinations than its key competitors. **Pilatus Photo**



**O**ver the past 75 years, Pilatus Aircraft Ltd. of Stans, Switzerland has been designing and building specialized aircraft. Thirty years ago, the company identified an opportunity in the business aviation industry, when Beech King Airs ruled the corporate turboprop market. Pilatus' cabins were the ideal size for a variety of missions that extended beyond their original role, and they calculated there would be demand for a King Air competitor that could carry a similar payload, over a comparable distance, at a similar cruise speed.

The Swiss company figured that if such an aircraft could also operate out of shorter runways, doing so with a single engine at a lower cost, there would be keen interest from corporate operators. The new aircraft, the PC-12, first flew on May 31, 1991. Since then, more than 1,650 examples have been delivered around the world. Today, just over 100 operate within Canada.

More recently, Pilatus analyzed the light jet market and determined there would be interest in a new design that featured a larger cabin, enabled access to many more airfields – including unimproved landing strips – and had a competitive purchase price. The new model would be called the PC-24.

### THE TARGET MARKET

A “light” business jet has a maximum takeoff weight of less than 20,000 pounds (9,071 kilograms). Purchasers of new models in this category tend to be companies, government entities, fractional ownership programs and families. Given their lower valuations, previously-owned examples have proven to be popular with charter and air taxi operators.

### THE COMPETITION

Two models currently predominate the market niche that Pilatus is pursuing with the PC-24: the Embraer EMB-505 Phenom 300/300E and the Cessna 525C Citation CJ4.

The Phenom 300 first flew on April 29, 2008 and the 500<sup>th</sup> example, a Phenom 300E, was delivered on March 25, 2019. The Citation CJ4 flew for the first time on May 5, 2008, and the 300<sup>th</sup> unit was delivered on June 27, 2019.

### THE NEW PLAYER

Five years after the first flights of both the Phenom 300 and the Citation CJ4, the PC-24 was introduced at the European Business Aviation Convention & Exhibition (EBACE) in Geneva, Switzerland, on May 21, 2013. The prototype rolled out from the plant in Stans on Aug. 1, 2014, and flew for the

first time on May 11, 2015. EASA and FAA type certifications were received on Dec. 7, 2017.

Given the established presence of the Embraer and Cessna models, Pilatus had to offer an airplane that differentiated itself from the two incumbents if it was to be successful.

The specifications and key performance numbers of the three aircraft indicate that the PC-24's maximum cruise speed, maximum range and payload capability are all similar to its two primary competitors. What separates it from the competition, however, is its ability to operate out of 10 per cent shorter hard surface runways at maximum takeoff weight, and its larger cabin.

Sometimes, numbers don't tell the whole story. A closer look at the PC-24's design reveals some unique features in this market niche.

### THE CABIN

The 501 cubic foot (14.2 cubic metre) cabin volume is more than 50 per cent greater than its key competitors. Unlike the others, the PC-24's cabin floor is flat. The spacious interior permits a variety of executive layouts, including a typical six-seat arrangement, double-club seating for eight, or a 10-seat commuter arrangement. Regardless of the format, all seats can be removed quickly to create a mini jet freighter. Alternatively, the PC-24 can be



The PC-24's spacious cabin is more than 50 per cent larger than its key competitors and features a flat floor. **Pilatus Photo**

outfitted as a flying intensive care unit, with a dedicated configuration featuring three stretchers, seats for two medical personnel and the requisite medical equipment.

A unique feature of the PC-24's cabin is the large cargo door. Located just aft of the port wing and ahead of the engine, its generous size (51 x 49 inches / 1.30 x 1.25 metres) permits the loading of bulky items that are too large for the main door.

### THE ENGINES

The PC-24 is the first application for Williams International's Quiet Power Mode (QPM) feature, a variant of the FJ44-4A designed to idle at a slightly lower than normal RPM level. This enables a PC-24's starboard engine to run quietly, as the aircraft waits between flights, and it acts like an auxiliary power unit (APU) to provide power for the avionics and cabin climate controls. The elimination of an APU reduces weight, noise levels and associated expenses.

Williams' EXACT passive thrust vectoring nozzle technology is also unique to the PC-24. It deflects the exhaust upwards by three per cent, thereby contributing to a shorter takeoff run.

To prevent the engines from ingesting foreign object debris (FOD), Pilatus positioned them above the fuselage's centre line, and to further protect the engines from FOD, the sizeable double-slotted Fowler flaps extend down 37 degrees and act as shields.

### THE NACELLES

Unlike many corporate jets, the PC-24 is not equipped with thrust reversers. Instead, its sizeable ground spoilers deploy automatically upon touchdown. In addition, multifunction spoilers are available to provide additional lift-dump on landing. The lack of thrust reversers saves weight, reduces possible damage from deflected FOD on unimproved surfaces, and enables much quieter arrivals.

### THE LANDING GEAR

The PC-24's trailing-link main gear features oleo strut shock absorbers to make a rough landing feel smoother. This is appreciated when landing on surfaces such as grass, gravel, dirt, ice and even crushed coral. Also, the nose wheel is fitted with chines to deflect FOD, and the aircraft's four main gear tires are larger low pressure (72 psi) models. Pilatus claims that the PC-24 can operate out of some 7,500 airfields within North America – approximately 70 per cent more than the 4,400 that can be accessed by its key competitors.

### MARKET REACTION

At the EBACE gathering in Geneva in May 2014, Pilatus announced it would take orders for up to 84 units, priced at US\$8.9 million apiece. The PC-24 order book was filled within 36 hours.

Given that the prototype didn't fly until a



Certified for single pilot operations, the PC-24's Advanced Cockpit Environment is driven by Honeywell's Primus Epic 2.0 integrated avionics, featuring four 12-inch high-performance colour liquid crystal displays. **Pilatus Photo**







HB-VSA 



The 51 x 49 inch rear cargo door is a unique feature that enables the PC-24 to perform air medical missions for operators such as Australia's Royal Flying Doctor Service. **Pilatus Photo**

year later, this was an early indication of the market's enthusiasm. At the EBACE meeting in May 2019, another 80 aircraft were offered at US\$10.7 million apiece, and more than 40 were purchased during the first day.

Today, more than 40 PC-24s are based in 11 countries, including Australia, Canada, Chile, Denmark, Poland and South Africa. So far, the operators include corporate flight departments, fractional ownership programs, an air ambulance organization and individuals who fly their own aircraft.

When *Skies* asked if brand loyalty played a role in generating sales, Tom Aniello, Pilatus vice-president, Marketing, noted that most of the early PC-24 orders were from PC-12 operators.

"This percentage is skewed, as we offered the new jet to some of our best long-term customers first before going out to non-Pilatus operators," he said, adding that many prospective buyers had admired the PC-12, but required a twinjet.

### DEMAND VERSUS SUPPLY

Pilatus is currently building three PC-24s per month, and the rate is expected to increase to four per month throughout 2020. The plant at Stans can produce up to five PC-24s monthly.

"While demand is very high for the PC-24, we want to avoid saturating the market and will build at a rate slightly less than

market demand over a long period of time," explained Aniello.

This enlightened production philosophy results in enhanced residual values, and enables privately-held Pilatus to achieve a stable rate of growth over many years.

### OPERATIONAL EXPERIENCE

PlaneSense, Inc. of Portsmouth, N.H., became the PC-24 launch customer when it took delivery of serial number 101 on Feb. 8, 2018. That airplane has since accumulated approximately 1,230 hours with the fractional ownership operator.

When *Skies* asked George Antoniadis, the company's founder and CEO, about the type's entry into service, he said, "Operating the first of a completely clean sheet design jet, we expected that we might experience some reliability issues. We were surprised that there were very few with the PC-24. We were also extremely satisfied with the support we received from Pilatus during the run-up of our operations."

Today, PlaneSense flies each of its three PC-24s about 70 hours per month. Antoniadis noted that PC-24 owners appreciate the aircraft's ability to access 3,000-foot (915-metre) runways closer to their ultimate destinations. The model has also demonstrated its high elevation prowess, by accessing the 4,450-foot (1,356-metre) strip – 6,882 feet or 2,098 metres above sea level – at Steamboat Springs, Colo.

Depending on the type of mission, the cabin can be reconfigured quickly for maximum versatility. **Pilatus Photo**



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|   | LENGTH         | WINGSPAN          | HEIGHT          | CABIN LENGTH    | CABIN WIDTH     | CABIN HEIGHT    | CABIN VOLUME            | BAGGAGE SPACE         |
|---|----------------|-------------------|-----------------|-----------------|-----------------|-----------------|-------------------------|-----------------------|
| <br><b>Pilatus PC-24</b>               | 55'2"<br>16.80 | 55'9"<br>17.00 m  | 17'4"<br>5.30 m | 23'<br>7.01 m   | 5'7"<br>1.69 m  | 5'1"<br>1.55 m  | 501 cu ft<br>14.20 cu m | 90 cu ft<br>2.55 cu m |
| <br><b>Embraer EMB-505 Phenom 300E</b> | 51'4"<br>15.6  | 52'2"<br>15.9 m   | 16'9"<br>5.1 m  | 17'2"<br>5.23 m | 5'1"<br>1.55 m  | 4'11"<br>1.50 m | 324 cu ft<br>9.17 cu m  | 84 cu ft<br>2.38 cu m |
| <br><b>Cessna 525C Citation CJ4</b>    | 53'4"<br>16.26 | 50'10"<br>15.49 m | 15'5"<br>4.69 m | 17'4"<br>5.28 m | 4'10"<br>1.47 m | 4'9"<br>1.45 m  | 311 cu ft<br>8.81 cu m  | 77 cu ft<br>2.18 cu m |

## THE CANADIAN CONTEXT

The PC-24 received its Canadian type certificate on June 27, 2019, and the first Canadian registered example was delivered to a corporate operator in Montreal just days later.


Robert Arnone, president of Levaero Aviation, Pilatus' exclusive Canadian distributor, told *Skies*, "We continue to receive significant interest in the PC-24 from a variety of Canadian operators, and project this interest to continue for the foreseeable future."

To gain an appreciation for the PC-24's potential within Canada, it's helpful to examine how the country's 100-plus single-engine PC-12s are being utilized. According to the Canadian Civil Aircraft Register, approximately half of those aircraft are currently flown by six operators: the RCMP (16), Chrono Aviation (9), North Star Air (9), Ornge (8), Air Bravo (6) and Wasaya Airways (4). They are used for a wide range of missions related to law enforcement, medical emergencies, high priority cargo shipments, scheduled passenger services, and charters for corporate and recreational purposes.

Given the PC-24's ability to access remote airfields, its speed and its range capability, it should have a bright future across Canada for decades to come.

## FINAL WORDS

Pilatus refers to its PC-24 as the "Super Versatile Jet." Despite being in the light jet category, it provides a midsize jet cabin. Its versatility is confirmed by its range of quickly changeable interior layouts and by its ability to access almost 20,000 airfields around the world.

With the additional qualities of meticulous construction and proven operational reliability, the aircraft is a work of aeronautical art – one that is just as much at home on a remote wilderness strip as it is gracing the ramp at a busy cosmopolitan FBO. 



**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.



**“Pilatus is currently building three PC-24s per month, and the rate is expected to increase to four per month throughout 2020.”**

| MAX PASSENGERS | MAX. TAKEOFF          | MAX. PAYLOAD         | ENGINE MANUFACTURER    | ENGINE MODEL | ENGINE THRUST X 2    | MAX. CRUISE SPEED   | MAX. RANGE           | TAKEOFF LENGTH @ MTOW |
|----------------|-----------------------|----------------------|------------------------|--------------|----------------------|---------------------|----------------------|-----------------------|
| 11             | 18,300 lb<br>8,300 kg | 2,500 lb<br>1,134 kg | Williams International | FJ44-4A-QPM  | 3,420 lb<br>15.21 kN | 440 ktas<br>815 kmh | 2,000 nm<br>3,704 km | 2,930 ft<br>893 m     |
| 10             | 17,968 lb<br>8,150 kg | 2,637 lb<br>1,196 kg | Pratt & Whitney Canada | PW535E       | 3,360 lb<br>14.95 kN | 453 ktas<br>839 kmh | 1,971 nm<br>3,650 km | 3,254 ft<br>992 m     |
| 10             | 17,110 lb<br>7,761 kg | 2,220 lb<br>1,007 kg | Williams International | FJ44-4A      | 3,621 lb<br>16.11 kN | 451 ktas<br>835 kmh | 2,165 nm<br>4,010 km | 3,410 ft<br>1,039 m   |

Source: OEM websites



The PC-24 received its Canadian type certificate on June 27, 2019, and the first Canadian-registered aircraft was delivered to a corporate operator just days later. Levaero Aviation, Pilatus' exclusive Canadian distributor, is seeing "significant interest" in the new jet. **Pilatus Photo**




France's Alsim has been building flight simulators since 1994. Shown here is the company's AL172, an exact replica of the Cessna 172SP Skyhawk with Garmin G1000 NXi avionics suite. It is certified as a Level 5 flight training device in Canada. **Alsim Photo**



# SIMS

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Flight simulation technology has come a long way. Though there's little doubt that a sim can benefit students during flight training, it's important for schools to choose the manufacturer and model that meshes with their aircraft fleet and instructional philosophies.

► **BY HOWARD SLUTSKEN**





**A** session in a flight simulator can be invaluable for practising rarely-flown manoeuvres or complicated instrument procedures. With the increased realism of the newest flight training device at your local flight school or college, a sim session can also cause sweat to form on the palms of even the coolest pilot.

It wasn't always like that.

"There's a big difference between the simulators that were around 30 years

ago and what's available now," said Clark Duimel, executive director and chief flight instructor at the Pacific Flying Club (PFC).

"You'd work with somebody doing an instrument rating in the simulator and it was always about teaching them how to fly the simulator – it was so different from flying the aircraft."

Based at the Boundary Bay Airport (CZBB) in Delta, B.C., the PFC has a fleet of 30 single- and twin-engine aircraft, and

three flight simulators – an Alsim AL200 and a newer AL250, and a Redbird FMX.

"Our AL200 was our first new age simulator, which has an advanced control loading system. So, when you're flying it, it *is* like flying the airplane."

Alsim Flight Training Solutions is one of several companies – including Redbird Flight Simulations and Frasca International – that have Transport Canada-approved sims "flying" at schools across Canada.



Alsim has simulators operating in more than 50 countries. Its focus is on fixed-based sims with advanced visual display technologies. **Alsim Photo**

### THE FRENCH FLAVOUR OF ALSIM

Based in western France, Alsim has been manufacturing certified flight simulators since 1994. Its product lineup ranges from the entry-level AL250 to the soon-to-be-introduced “Airliner.”

The AL250 can be easily reconfigured to reproduce the panel and flying characteristics of a range of analog and glass cockpit, single- and twin-

“The capital investment that a flight school can make for a new simulator **can be significant.**”

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engine aircraft. Pricing for the AL250 starts at about US\$150,000, and can reach US\$200,000, depending on options.

The Airliner is a high-end, multipurpose hybrid simulator for both fly-by-wire and conventionally-controlled transport aircraft and is designed to provide a platform for training in multi-crew co-operation and line-oriented flight training, among other procedures.

“The big focus of our company has been on the immersion of being in a simulator – that feeling that you’re not actually in a sim, but you’re closer to being in an aircraft as much as possible,” said Scott Firsing of Alsim’s North America office.

With advancements in computing power, graphics cards and video projection systems, sims aren’t just applicable to traditional instrument training. They can be part of basic *ab initio* training, too.

“It is very much in the syllabus [at PFC],” said Duimel. “There is a lesson before [students] start flying in the circuit. We do a sim session on emergencies, bounced landings, wheelbarrowing and things like that, which you can simulate pretty well.

“When we first got the simulator, we didn’t really have a program for doing VFR (visual flight rules) work in the sim. But that changed after you start to realize how powerful it is and how nice it is to fly. The Alsim don’t have a motion base, but you really do get the feeling that the aircraft is moving.”

According to Firsing, many years ago Alsim debated whether to develop motion bases for its simulators. Instead, the decision was to build fixed-base sims and focus on control

loading and visual display technologies.

And the company has recently introduced a new way to increase the immersive experience that gives new meaning to “seat of the pants” flying.

“We have something called a ‘butt kicker,’” said Firsing. “It’s linked to our software, with a subwoofer under the seat for engine noise, turbulence, and hard landings.”

As it celebrates its 25th anniversary, Alsim will soon open a new facility in Florida which will build simulators destined for Canada and the U.S.

Firsing believes that Alsim’s strength is in its in-house engineering expertise: “We do as much as possible in-house. All our software is done by our own software engineers. Our hardware guys make every little switch in our factory in France. The versatility of doing it all in-house allows us to operate in over 50 countries. It also allows us to modernize and incorporate new technology,” he said.

### FRASCA – A FAMILY AFFAIR

It’s been more than 60 years since Rudy Frasca founded the company that still bears his name.

Today, with more than 2,700 simulators sold in 70-plus countries, Rudy’s son John is CEO of Frasca International, carrying on his father’s mission to improve aviation safety through better pilot training.

“It’s a privately-owned business that started as a grassroots industry, and it’s [born] from a love of aviation,” said Peggy Prichard, marketing manager, who also happens to be Rudy’s daughter.

Starting from the basic flight training

devices that Rudy built in his garage, Frasca grew and has become known for its sophisticated full flight simulators for both fixed-wing aircraft and helicopters.

Last year, the company leveraged that technology and engineering expertise and introduced the RTD – Reconfigurable Training Device – which Frasca positions as its entry-level advanced aviation training device (AATD).

“It’s robust, reliable, realistic and it’s reconfigurable, with aerodynamics that incorporate actual flight test data with actual Garmin avionics software. You can change it from analog to glass cockpit, from single to the twin, from the 172 to the Seminole, and we’re working on several different kits,” said Prichard.

“The RTD’s controls and structures are manufactured by Frasca and designed to withstand the rigours of heavy training schedules, with a modular design for easy maintenance.”

With a starting price of US\$50,000, the fixed-base RTD is targeted at smaller flight schools.

“Our specialty is the middle-level flight training device (FTD), and we realized a lot of customers can’t afford more than \$100,000 for a Level 5 FTD that some of the larger flight schools can afford,” she said.

A first glance at its hardware might imply the cost of the simulator is high, but there’s a good reason – flight test data is expensive.

“There’s a huge amount of cost that goes into getting the data, sometimes from the aircraft manufacturer, or else we have to engineer it ourselves,” explained Prichard.

“It really boils down to what you can afford to buy. You’ll be happiest if you can buy the best you can afford.”



With more than 2,700 simulators sold in 70-plus countries, Frasca International is well known for its training devices. Shown here is the RTD (Reconfigurable Training Device), an entry-level unit that incorporates actual flight test data with real Garmin avionics software. It can be changed from analog to glass cockpit and from single- to twin-engine. Frasca Photo



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Redbird has filled out its product line with a range of simulators, including the unique Xwind crosswind trainer. Shown here is the unit operated by Seneca College at its Peterborough, Ont., aviation campus. **Lisa Gordon Photo**

**REDBIRD’S CARDINAL**

In 2006, when Austin, Texas-based Redbird Flight Simulations was developing its first simulator, it repurposed a decaying Cessna 177 Cardinal RG to form the cab of its new sim.

Although it might have seemed like a good idea at the time, the Cardinal RG eventually ended up back in the boneyard – but not before it inspired the company’s name.

Redbird’s FMX was the first product, an enclosed simulator with multi-screen visuals and software that can mimic dozens of aircraft. In its current version, based on Lockheed Martin’s Prepar3D flight simulation software, the FMX can shift from one aircraft type to another in less than 10 minutes, including changing the sim’s panel template.

Pricing for the FMX starts at US\$64,800.

“One of the key design criteria for the FMX was that it had to fit in the normal classroom and run off of a normal wall outlet,” said Josh Harnagel, vice-president of Marketing for Redbird.

“We couldn’t demand specific facility requirements for it to be a viable product. You can break it down and it fits through a normal door and runs in a 16 by 16-foot space with an eight-foot ceiling.”

The FMX is certified by the U.S. Federal Aviation Administration (FAA) as an AATD. It includes a feature that might be unexpected

Redbird’s FMX is an enclosed simulator with multi-screen visuals and software that can mimic dozens of aircraft. It fits in a 16’x16’ space with an eight-foot ceiling, and plugs into a normal wall outlet. **Redbird Photo**



at the unit’s price – a three-axis motion base, driven by electric motors and belts.

“The motion platform is extremely robust. It uses programmable logic controller (PLC) technology, which is industrial automation,” said Harnagel.

After introducing the FMX, Redbird decided that the next opportunity was to create a more accessible unit at a lower price,

rather than moving into more sophisticated and costly simulators.

“We came out with the Redbird TD product line, which is a desktop sim. The FAA has certified the TD as a basic aviation training device (BATD), and the price point is around US\$6,000 to \$7,000 depending on your options. That’s been a big success,” said Harnagel.

Even with the TD’s popularity, Redbird




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# SIMULATION BY THE NUMBERS

How much training can you do in a flight simulator? Transport Canada provided these numbers:

## Aeroplane



**5/45** PRIVATE PILOT LICENCE  
5 of 45 hours of total training

**10/20** COMMERCIAL PILOT LICENCE  
10 of 20 hours of instrument training time

**20/40** INSTRUMENT RATING  
20 of 40 hours of instrument training time

**5/30** INSTRUCTOR RATING  
5 of 30 hours

## Helicopter



**5/45** PRIVATE PILOT LICENCE  
5 of 45 hours of total training

**5/10** COMMERCIAL PILOT LICENCE  
5 of 10 hours of instrument training time

**20/40** INSTRUMENT RATING  
20 of 40 hours of instrument training time

**5/30** INSTRUCTOR RATING  
5 of 30 hours

*Note: Transport Canada says it has amended Transport Publication (TP) 9685 Airplane and Rotorcraft Simulator Manual to better define the two basic non-type-specific flight training device configurations. With these amendments, a Level 1 flight training device category will be equivalent to the Federal Aviation Administration's basic aviation training device (BATD) classification. The revised manual will be published on the Transport Canada website by Dec. 1, 2019.*

Source: Transport Canada

has sold more units of the Jay, an uncertified desktop simulator that's popular with individual pilots for home practice.

With a starting price of US\$3,000, the Jay can be set up in as little as five minutes and comes preloaded with a wide selection of planes from a Cessna 172SP to a Lockheed Constellation.

Redbird has filled out its product line with a range of simulators, including the unique Xwind crosswind trainer and the high-end AMS, a cockpit-specific AATD for turbine aircraft.

The company's philosophy extends beyond the latest tech for hardware.

"Early on, we recognized that one of the key things that we could do to make our products more valuable was to add software tools. We thought we could get more training value out of adding a whole suite of software products to make the training more valuable for the instructor and the students, and for the businesses that operate our sims," said Harnagel.

One of the software tools that Redbird developed for private pilots is GIFT – Guided Independent Flight Training. There are 33 missions for pilots to fly, each up to seven minutes long. GIFT can run on any Redbird sim with a Cessna 172 panel. Since GIFT is licensed to the pilot, they can use it at home on a Jay.

"It sets them up in the right spot and in the right configuration. There's audio coaching in the mission that they fly and there's artifacts like gates and arrows that they fly through, and then they get a score based on the standards to pass the check ride," explained Harnagel.

Redbird has also recently released a version of GIFT for instrument training.

### MICROSOFT FS RETURNS

Sometime in 2020, Microsoft will release the newest version of its iconic Flight Simulator for its Xbox One gaming system and Windows 10 PCs.

Microsoft recently unveiled a video preview of Flight Simulator, showing richly detailed graphics and aircraft – a far cry from the crude display of the original FS that was released close to 40 years ago.

Perhaps the new game will inspire a new generation of enthusiasts who will be interested in aviation careers, hopefully addressing the global pilot shortage. But that may depend on the control interface that Microsoft designs into the new version.

"As the way you're controlling the aircraft gets better and better, the home computer system is going to become more and more important to the whole process. I think it's a really valuable tool for people," said PFC's Duimel.

"Sometimes we get people who've tried to teach themselves how to fly with a game. But they could've used a couple of lessons early on," he chuckled.



Flight simulators have come a long way. Today, they provide a realistic alternative for practising rarely-flown manoeuvres or complicated instrument procedures. **Mike Reyno Photo**

### INTERESTED IN A SIM?

The capital investment that a flight school can make for a new simulator can be significant. Although there's little doubt that a sim can benefit students working through a flight training program, it's important for schools to choose the manufacturer and model that meshes with their aircraft fleet and instructional philosophies.

"The most important thing they should consider is how they're going to integrate the simulator into their curriculum," said Redbird's Harnagel. "A big part of my job is teaching the industry, flight instructors and flight schools, how to best use the sim."

Having instructed for years, what is Duimel's advice to a school looking to purchase a new simulator?

"It really boils down to what you can afford to buy. You'll be happiest if you can buy the best you can afford. In other words, if you can afford to finance a half-million-dollar simulator, it's going pay back in the long run.

"I truly believe that as things progress, we're going to be doing more and more in the sim." 🇨🇦



**Howard Slutsken's** lifelong passion for aviation began when he was a kid, watching TCA Super Connies, Viscounts, and early jets at Montreal's Dorval Airport.

He's a pilot who loves to fly gliders and pretty much anything else with wings. Howard is based in Vancouver, B.C.

Photo: @\_byron\_

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# AGED TO PERFECTION

BY ROBERT ERDOS | PHOTOS BY HEATH MOFFATT



Much of British Columbia's rugged coast is serviced by venerable aircraft such as the single-engine de Havilland Canada Turbine Otter. Vancouver Island Air (VIA) of Campbell River, B.C., has found a new way to coax even more performance from this legendary bushplane.



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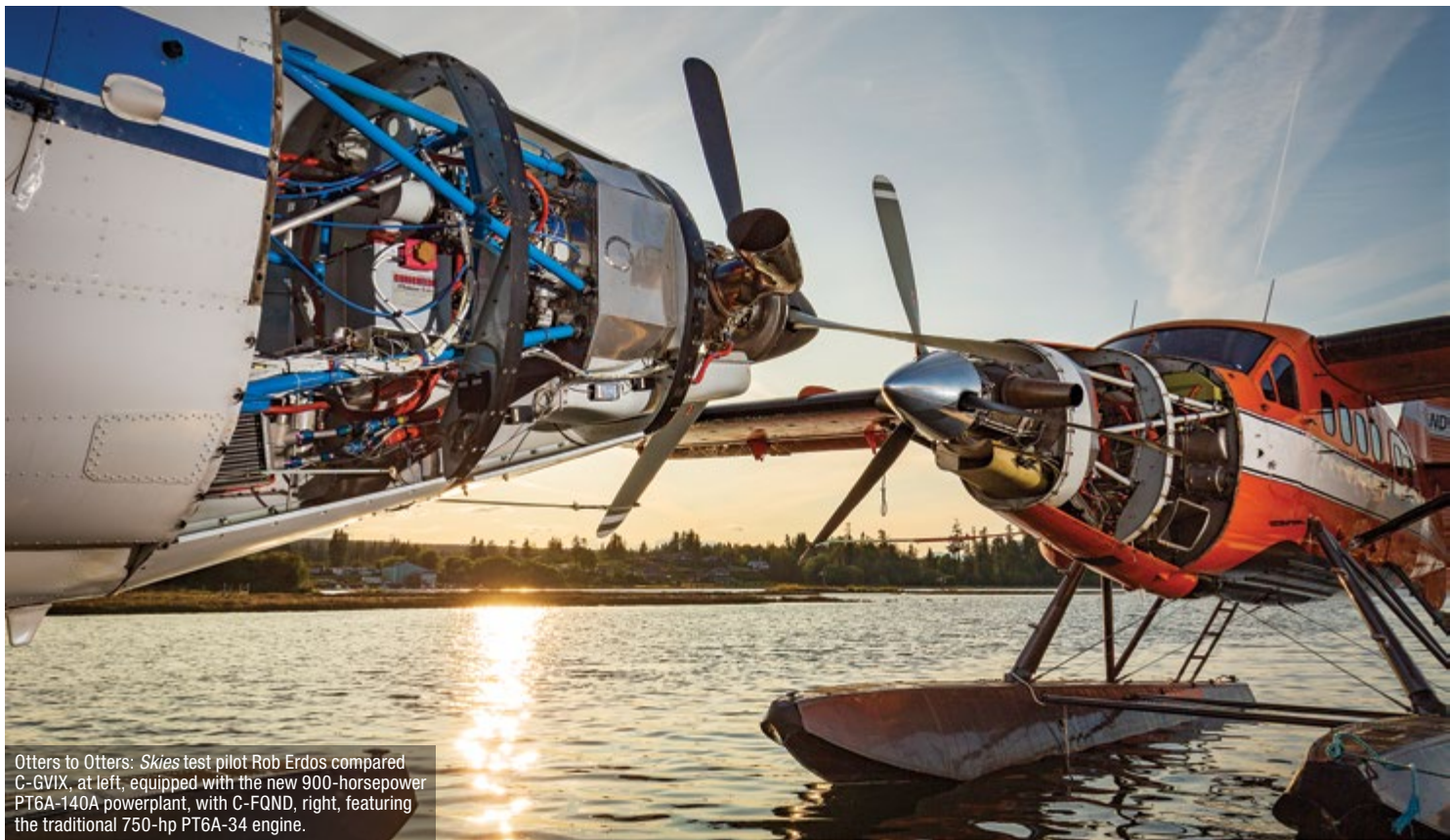
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When Vancouver Island Air's Turbine Otter needed an engine, the company embarked on the certification process for a more efficient PT6A-140A powerplant. The result? A homegrown solution that leaves other turbine-powered Otters playing catch-up.



Today, about 165 Otters are still flying, mostly in Canada and Alaska. When C-GVIX was due for an engine overhaul, VIA installed a 900-horsepower PT6A-140A engine that delivers increased performance and fuel efficiency compared to older PT-6 variants.



Otters to Otters: *Skies* test pilot Rob Erdos compared C-GVIX, at left, equipped with the new 900-horsepower PT6A-140A powerplant, with C-FQND, right, featuring the traditional 750-hp PT6A-34 engine.



**I**t's an airline, but not the kind you might imagine. The pilot wears shorts and a ball cap.

Passengers chat on the dock amidst pallets of cargo.

It's a common sight in British Columbia, where much of the rugged and breathtakingly scenic coast is accessible only by floatplane. From its base in Campbell River, Vancouver Island Air (VIA) is among the specialized air carriers that can take you wherever you need to go in coastal B.C.

Bobbing at the end of the company's dock is a Turbine Otter, manufactured in 1956. The vintage of the airplane may come as a surprise, but VIA finds the Turbine Otter to be the best choice for its operation. In fact, the installation of a new, more powerful and more efficient turboprop engine was just the recipe to update the venerable Otter.

*Skies* was invited to fly VIA's latest variant of the Turbine Otter, and found that despite its age it represents the state-of-the-art in bush flying.

Besides, the Turbine Otter is virtually VIA's only option.

### **SHELVES ARE BARE AT THE BUSHPLANE SHOWROOM**

Options weren't always so scarce in the bushplane market. There was a time when Cessna was cranking out tough little tail-draggers, Pilatus was building the Porter, and de Havilland Canada understood that Canadian airplanes were designed to operate in Canada, where lakes and rivers outnumber runways by a fair margin.

Beavers, Otters and later Twin Otters are a proud legacy of the Canadian need to negotiate some pretty tough terrain.

Today, about 165 Otters are still flying, mostly in Canada and Alaska. One might assume that 60 years after manufacture the inexorable march of technology would leave the Otter utterly obsolete, having been supplanted in service by ever more modern and capable bush-specific designs.

Actually, just the opposite is true. Aircraft manufacturers discovered that there is more profit in building high-speed mailing tubes for whisking corporate executives around the globe than building a robust means of lifting recently dispatched moose parts from a remote lake.

Consequently, the bushplanes currently in service are typically long-in-the-tooth machines. Nevertheless, they're essential. From my home in the British Columbia Gulf Islands, the friendly drone of a floatplane overhead is a nearly constant companion. Their average age is well over half a century.

### **NEED A BUSHPLANE? BUILD IT.**

De Havilland Canada's Downsview, Ont., factory built 466 Otters between 1951 and 1967; an accomplishment that amply demonstrated the merits of the original design. By



Author Rob Erdos, right, discusses the various flight characteristics of a DHC-3T Otter with Vancouver Island Air's chief pilot, Steve Crerar.







The Vancouver Island Air/Aerotech Industries Ltd. staff includes (L-R) Marlena Niforos, technical sales specialist; Richard Davey, AME/pilot; Steve Crerar, chief pilot; Larry Langford, owner/pilot; and Josi Billinghamurst, person responsible for maintenance and part owner.



AME apprentice Jonathan Bull works on restoring a DHC-3 Otter at VIA's Campbell River facility on Vancouver Island.



AeroTech Industries' "Otter Revitalization Program" is intended to "zero time" the airframe. The process requires the disassembly of the airframe, documentation of its conformance with the original type design, and installation of new metal where mandated.

2019, however, making a profit behind a radial engine is increasingly impractical, and avgas is often unavailable in the bush.

Fortunately, a cottage industry arose to service the needs of bushplane operators and their aging aircraft, providing spare parts and product improvements that have kept the Otter viable.

New from the factory, the Otter was powered by a good ol' Pratt & Whitney Canada

(P&WC) R-1340 radial piston engine.

The prospect of installing a turbine engine on the Otter is hardly revolutionary. Over the years, at least four companies have certified various turbine engines in the Otter; however, most vendors have left the market as the number of flying Otters has dwindled.

Typical Turbine Otter installations feature P&WC PT6A-34 or -135 engines; variants of a popular and well-proven design, widely

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renowned for its reliability. Other installations have featured the Garrett/Honeywell TPE331 or the Czech-designed Walter 601 turbine.

VIA took another path.

Josi Billinghamurst, VIA's director of maintenance, described the rationale that led the company to embark upon certification of a different engine. VIA operates two Turbine Otters, one of which was coming due for an engine overhaul. Available options would take months, and, he explained, an airline with a fleet of two aircraft could hardly afford to ground one indefinitely.

They called P&WC, shopping for an engine. "If you want a PT6, you'll want the -140A," they were apparently told, as the newer engine variant was more efficient. Of course, VIA would have to certify the installation; never a trivial process, but made somewhat easier by the similarity to existing Turbine Otter powerplants.

"So, you're telling me," I interrupted Billinghamurst, "that you have two Otters, both powered by PT6 engines, and one airplane is both faster and more fuel efficient than the other?"

He nodded. His statement wasn't impossible, but my skepticism alarm was ringing loudly.

Billinghamurst explained that the -140A engine is a newer variant, originally certified for the Cessna Grand Caravan EX, which includes a larger impeller and compressor, more efficient fuel nozzles and a different hot section, using improved power turbine blades. The result, according to Pratt & Whitney Canada, is an engine that can run hotter, with better fuel atomization, yielding improved fuel efficiency.

The fact that the -140A engine was also more powerful was icing on the cake. In addition, VIA contended that their -140A-powered Otter handled better, owing to a subtle realignment of the engine thrust line. Faster, more efficient and better handling? Clearly, some proof was warranted.

Suddenly, I better understood VIA's demonstration plan: I would test fly their "new" Otter fitted with the 900-horsepower PT6A-140A engine, registration C-GVIX, after which I would fly their other Otter, C-FQND, with the more common 750-horsepower PT6A-34 engine. Both airplanes would be ballasted to the same weight and balance, and flown under comparable conditions, providing a direct comparison.

**FLYING IS BELIEVING**

What could be better than taking a float-plane up to beautiful Desolation Sound on a sunny summer day? It was my privilege to fly with VIA's chief pilot, Steve Crerar, whose decades of float flying made him well qualified to be my adult supervision in the world of liquid runways.

Our flights in the Turbine Otter would occur at sea level – quite literally – with 23C temperatures and light winds. Both ships were at a light weight, having been ballasted to a gross weight of 7,158 pounds, with the centre of gravity 16.2 inches aft of the datum.

Once settled into the cockpit, Crerar gave me a quick tour, but the Turbine Otter's cockpit is so simple that he almost needn't have bothered. The power controls consisted of the traditional quadrant containing throttle, propeller and condition levers, plus a small additional lever for the emergency fuel control. The engine "gauges" consisted of a single Electronics International MVP-50T digital display, nicely configured to depict engine, fuel and electrical status at a glance.

Crerar had the Otter turning and taxiing within 45 seconds of selecting the master

**"As a belt-and-suspenders comparison, we precisely set 310 pounds per hour fuel flow. QND delivered 116 mph, while VIX rewarded us with 129 mph."**



At the controls of C-FQND, Erdos attempted to stay glued to C-GVIX's wing through several formation takeoffs and landings. Both airplanes were ballasted to the same weight and balance and flown under comparable conditions. The result? With its new -140A engine, VIX was indeed both faster and more fuel efficient than QND.

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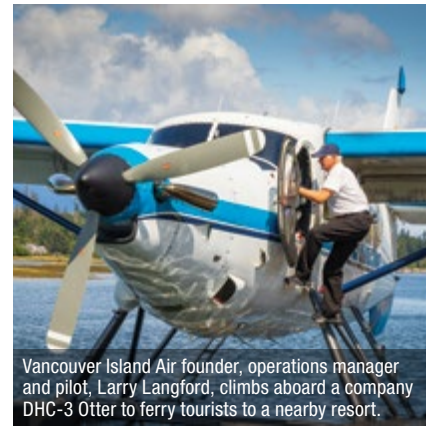








VIA's Otters work hard, flying diverse cargo into the various industrial camps and tourist resorts served by the company.



Vancouver Island Air founder, operations manager and pilot, Larry Langford, climbs aboard a company DHC-3 Otter to ferry tourists to a nearby resort.

switch; a good test of an airplane's bush utility. Pre-flight checks consisted only of a propeller governor test, performed on the first flight of the day.

Regulating taxi speed was easy; just a simple matter of finding the "sweet spot" on the throttle's BETA range. Taxiing was quieter in low idle (55% Ng), but the trade-off was a slower throttle response. High idle (72% Ng) provides the option of faster throttle response, but a higher taxi speed.

Crerar demonstrated the first takeoff from Campbell River's scenic floatplane aerodrome, the airplane configured with flaps set to half, trims set, water rudders retracted. As Crerar slowly advanced the

power, I started counting. We were airborne, and beginning to retract the flaps within 10 seconds. My only criticism, typical of most PT6 engine installations, was the sensitivity of the throttle, requiring one eye on the torque metre to avoid a brief surprise.

Our 110 mile per hour (mph) cruise-climb rewarded us with an observed 1,700 foot per minute rate of climb, albeit in a very light aircraft. We climbed to 2,500 feet in search of smooth air for our next, critical test.

I once had a teacher who would stomp his feet when he was discussing something that would appear on the exam. Here is my "foot stomper" from our flight: With the -140A engine, VIX was indeed both faster and

more fuel efficient than QND. In VIX, with the -140A engine, I carefully stabilized our speed at 120 mph. The resulting fuel flow indicated 290 pounds per hour.

Later repeated in QND under comparable conditions, fuel flow was 335 pounds per hour. Alternatively, as a belt-and-suspenders comparison, we precisely set 310 pounds per hour fuel flow. QND delivered 116 mph, while VIX rewarded us with 129 mph. Of course, air-speed and fuel flow calibrations may contribute to the difference, as would other factors, but VIA's claims were vindicated.

We descended to the water for some circuits. During one approach, Crerar demonstrated their Otter's steep approach capabil-



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**“The PT6A-140A engine is a newer variant, originally certified for the Cessna Grand Caravan EX, which includes a larger impeller and compressor, more efficient fuel nozzles and a different hot section, using improved power turbine blades.”**

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# CITATION TEAM CANADA



VIA chief pilot Steve Crerar had the Turbine Otter turning and taxiing within 45 seconds of selecting the master switch; a good test of an airplane's bush utility. Pre-flight checks consisted only of a propeller governor test, performed on the first flight of the day.



ities. With the throttle at idle, and full-flap selected, our stabilized rate of descent was about 1,900 feet per minute at 80 mph. Crerar pulled the engine condition lever to the low idle position, and the increase in propeller drag left us with a satisfyingly steep 2,600 foot-per-minute rate of descent; a very useful feature on a bush airplane. I hope this option remains available on the certified version.

Having survived a few circuits without event, it's timely to offer a few comments about the Otter's handling. If you're expecting terms like "responsive," "crisp," or "agile," there will be disappointment.

The Otter flies like a truck. Its controls are rather heavy and sluggish. The adverse yaw is eye-opening. In short, it's a superb bushplane, for the same reason that pick-up trucks make terrible race cars. Some designs are all about utility, and the Otter was designed as a no-frills working machine.

I almost forgot one more thing: 900 horsepower of performance! If you recall, I was

to have the opportunity to fly VIA's "other" Turbine Otter, and what could be a better back-to-back comparison than a photo formation flight?

I climbed aboard QND, again with Steve Crerar, and attempted to stay glued to VIX's wing through several formation takeoffs and landings. VIA president and resident Otter expert Larry Langford, flying VIX, had 900 HP at his disposal, while I was making do with more conventional Turbine Otter performance. The results were impressive. Larry was airborne two to three seconds before us in every case, and was typically retracting flaps by the time we were aloft. Point made.

Something else was evident during our formation flight in QND: I was busier!

Crerar had warned me that the alignment of the propeller thrust line – a propeller offset of -5.5 degrees having been originally certified in QND – would influence handling. Many aircraft benefit from a thrust line offset, but VIA believes that the Otter is not among them.

Going around the circuit, ostensibly glued to VIX's wing in echelon formation, QND left me labouring with a sudden need to trim whenever power, speed or configuration changed. VIX, with VIA's proprietary engine mount design, was indeed subtly more pleasant to fly. Point made. Again.

### **CERTIFIED - ALMOST**

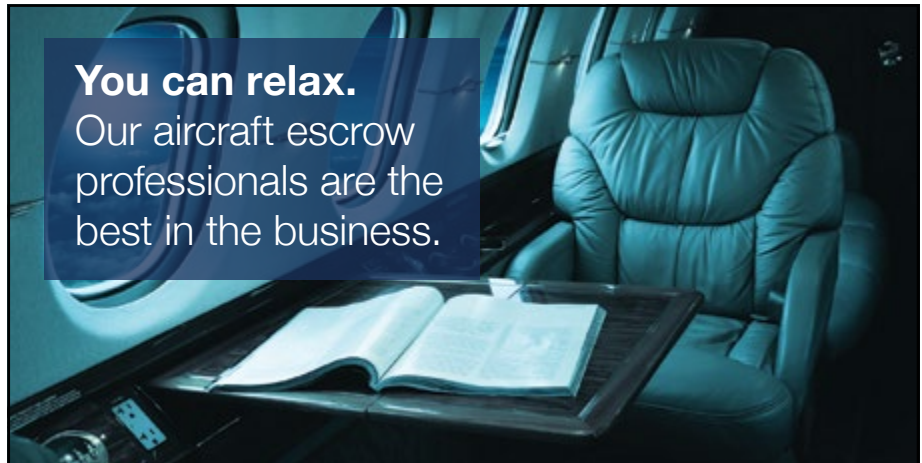
To address the critical shortage of Otter parts, VIA created a subsidiary, AeroTech Industries. It's an approved maintenance organization (AMO) that has certified a strategic selection of replacement parts intended to ensure the company's Otters stay airborne, while keeping the growing list of age-related Airworthiness Directives at bay.

It's 2019. Skeptics will contend that even with enhanced performance, better fuel efficiency and improved handling, the Otter is still an inherently elderly airframe.

VIA is working on a solution to that, too, in the form of Otter serial number 82, an ex-U.S. Army machine the company found



“Some designs are **all about utility,** and the Otter was designed as a no-frills working machine.”



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in Vietnam. It is being used as proof-of-concept for AeroTech Industries' "Otter Revitalization Program," which is intended to "zero time" the airframe.

If that sounds easy, understand that the process requires the disassembly of the airframe, documentation of its conformance with the original type design, and installation of new metal where mandated.

Vancouver Island Airways isn't shy of accepting a challenge, and has good reason to think that the best bushplane for their mission is an Otter, and that the best Otter is a brand new one. 🇨🇦



**Robert Erdos** is a contributing editor for Skies magazine. He is a graduate of the U.S. Naval Test Pilot School and a retired professional test pilot. Also an aviation enthusiast, his spare time activities include displaying vintage airplanes and flying his RV-6 kitplane.

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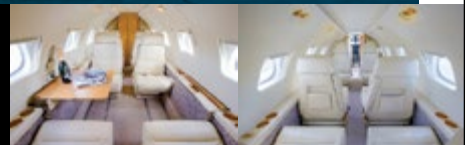
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# ERRRA FLIGHT



The issue of one versus two engines has never been a significant issue for Arctic operations except in Canada. Originally, two engines was one of the many discriminators used in choosing the F/A-18 (shown here) over the F-16 in 1979. **Galen Burrows Photo**



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# TTC PATH

Political interests and corporate marketing campaigns have muddied the waters surrounding the selection of Canada's next fighter jet fleet. Here, we illuminate some of the competition's main considerations.

BY ALAN STEPHENSON

**T**he path towards procuring a replacement fighter for the CF-188 Hornet has been one with many twists and turns due to political gamesmanship and strategic business marketing, causing much public misunderstanding.

This short article aims to put a few things into perspective as the competitors complete their analysis and response to the government's request for proposal (RFP) issued July 23, 2019, for the Future Fighter Capability Project (FFCP).

## ELIGIBLE SUPPLIERS

Of the original five qualifying suppliers, only the Boeing F/A-18 Super Hornet Block III, Lockheed Martin F-35A Lightning II, and Saab Gripen E fighters remain in the competition.

The Dassault Rafale and Airbus Eurofighter Typhoon were both pulled from consideration, with company officials citing "that NORAD [North American Aerospace Defense Command] security requirements continue to place too significant of a cost on platforms whose manufacture and repair chains sit outside the United States-Canada 2-EYES community."

Given that the Canadian government identified the first two principal roles of the Canadian Armed Forces as ensuring Canadian sovereignty and the defence of North America, the requirement to be fully functional and integral within NORAD is mandatory.

The reality today is that fighters are not simply weapons platforms, but flying computers that also function as airborne sensors that are designed to be integrated into command and control computer networks. Thus, the challenge for non-American manufacturers is to overcome both sensitive commercial and U.S. national security concerns when they are required to integrate and support U.S. information-sharing equipment in their platforms.

A second reason given for Airbus's departure was the eleventh-hour modification to the RFP that relaxed the expected industrial technological benefits (ITB) obligations. To attract more than three suppliers and ensure a competition, the government originally stuck to its standing ITB policy of "requiring the winning supplier to make investments in Canada equal to the value of the contract." However, this effectively eliminated the F-35 due to the Joint Strike Fighter (JSF) Program agreement – signed by Canada – that forbade such a demand. To provide latitude to all bidders, the final RFP was modified into a two-phased proposal to allow non-American companies to address 2/5-EYES challenges up front, while also applying rated criteria for economic offset potential of stated ITB requirements, to keep the F-35 within the bidding process.

Additionally, five per cent was shifted from cost to economic criteria to compensate for changes in the original draft ITB policy. The proposals will now be assessed on 60 per cent technical merit, 20 per cent cost and 20 per cent economic benefits.

## CURRENT BIDDERS

In recent years, the Saab Group expanded globally by offering industrial partnerships that combined local production and capital-heavy ventures with national customer partners.

Saab's approach with the Gripen E bid in Canada follows this successful formula of maximizing national economic benefits with an economical product; however, Saab also faces the challenges that Airbus determined to be too difficult to overcome. Additionally, the Gripen E is still in development; its first production flight occurred on Aug. 26, 2019, meaning issues of proven performance and systems maturation need to be factored in during bid evaluation. According to the firm, this first fighter will be used as a test aircraft in a joint Swedish/Brazilian test program, the only two customers for the Gripen E to date.

Given that the Eurofighter bid was sponsored by the U.K. government, a member of the 5-EYES community that decided it could not meet the information-sharing requirements, Saab will need to be innovative and cost-conscious in its proposal if it is to surmount this mission-critical criteria.

As for the Super Hornet, Boeing promised to invest \$18 billion in ITBs under the failed 2017 purchase agreement for 18 fighters, and it is anticipated that the company will follow its established approach to investing in Canada as per previous ITB commitments.

Concern over the so-called Boeing Clause, "to allow only companies that it deems 'trusted partners' to bid on major capital programs," has faded away and Boeing is confident that it can mount a competitive bid, particularly now that the U.S. Navy's (USN) commitment to future purchases will keep the production line open until 2033.

By incorporating leading-edge technology into the Block III to meet adversarial advances, Boeing has ensured the Super Hornet will meet Canadian requirements. Although still in development as well, a major question for government decision-makers has to do with sustainability. At present, only the USN and Kuwait will operate the Super Hornet Block III, while Australia has plans to upgrade their Block II version. As Australia expects to retire its fleet in the early 2040s and the USN in 2045, the challenge for Boeing will be in meeting the stated lifecycle expectancy of Canada's future fighter in a cost-effective manner.

Since 2015, the much-maligned F-35 has proven itself in combat and counts Australia, Belgium, Denmark, Israel, Italy, Japan, the Netherlands, Norway, Poland, South Korea, the United Kingdom, and the three U.S. services as customers. As the



As the only fifth generation fighter in the competition, Lockheed Martin's F-35 Lightning II contains technological advances that are designed into the aircraft and cannot be replicated in fourth generation platforms. The jet acts as a forward sensor that is integrated into the operational command and control system. **Eric Dumigan Photo**

only fifth generation fighter, it contains technological advances that are designed into the aircraft and cannot be replicated in fourth generation platforms.

The overall architectural concept regards the F-35 as more than just a weapons platform, but also as a forward sensor that is fully integrated into the developing multi-domain command and control system. Initial airframe costs have been significantly reduced and early sustainment issues are being resolved; however, the F-35 remains the most costly platform to own and operate at the moment.

With a projected lifetime production run of over 4,000 fighters, lifecycle support is guaranteed, and Canadian industry stands to gain substantially from Canada's early investment in the co-operative JSF Program. However, according to reports, manufacturers will lose points in the ITB element formula scoring system if they do not make a 100 per cent commitment to the contract value, which Lockheed-Martin is prohibited from doing by JSF contractual agreement.

### ARCTIC

Interestingly, all remaining competitors can lay claim to being Arctic platforms. Canada has already proven the F/A-18's credentials in the high North, the U.S. will base two combat F-35 squadrons in Alaska, and Sweden has developed the Gripen with Arctic operations in mind.


The issue of one versus two engines has never been a significant issue for Arctic operations except in Canada. Originally, two engines was one of the many discriminators used in choosing the F/A-18 over the F-16 in 1979. Recently, the Standing Committee on National Defence's shaping of the narrative in 2016 to promote the sole-source purchase of the Super Hornet reintroduced the idea that operations in the Arctic demanded two engines.

As with commercial aviation where transatlantic flight once required four-engine passenger planes, the advancements in engine technology have led to standard two-engine models today. Engine reliability is not a concern with any of the competing fighters. However, operations in Canada's Arctic are unique and risky in an inhospitable region that is 11 times the size of Sweden. Other discriminators, such as continuous communications and tracking, become equally or more important to survival.


### STEALTH

One of the unfortunate aspects of American F-35 global marketing efforts with respect to the FFCP is the issue of stealth technology. Although the idea of penetrating, first strike operations sells well in the U.S., stealth is a much maligned and misappropriated concept in Canada.

Stealth technology is all about maximizing self-protection and increasing survivability by disrupting the 'kill-chain' through low observability. This concept is no different



Saab's approach with the Gripen E bid in Canada will likely follow its previously successful formula of maximizing national economic benefits with an economical product. **Linus Svensson Photo**



**“If the fighter is to reach the government’s goal of flying until 2060, each competitor needs to be flexible and adaptative to evolving technology.”**

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By incorporating leading-edge technology into the Block III to meet adversarial advances, Boeing has ensured the Super Hornet will meet Canadian requirements. **Kevin Flynn Photo**

All remaining competitors can lay claim to being Arctic platforms. Canada has already proven the F/A-18's credentials in the high North, the U.S. will base two combat F-35 squadrons in Alaska, and Sweden has developed the Gripen with Arctic operations in mind. Boeing's Super Hornet Block III concept that is expected to be offered to Canada, is shown here. **Aaron Foster Image**



from the tactical advantages that I used while flying the CF-104 in Germany during the Cold War. The Starfighter had a one-square-metre cross-section nose-on, making the adversary's initial radar detection difficult and target acquisition and identification questionable, delaying force commitment to the target. This complicated the decision and order to attack the target, and finally upon weapons release, the low radar cross-section shrunk the available radar weapons envelope needed for destruction of the fighter. The CF-104's speed significantly exacerbated the adversary's kill-chain difficulties.

The CF-188 Hornet I flew later required a Defensive Electronic Countermeasures suite that masked the larger aircraft radar cross-section, and electronically intervened and complicated a more advanced kill-chain.

The advent of artificial intelligence (AI) will significantly decrease ambiguity and decision-making time in the near future. Whether built into the design or strapped on later, some form of self-protection is required to protect the pilot and the fighter asset that will either be defending Canadian territory or operate in foreign contested airspace when the government commits its fighter force.

The question is one of application and the cost effectiveness of self-protection measures used by each platform and how they are expressed in the bid proposal.

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The U.S. Air Force F-35A Lightning II demonstration team brought two jets to perform at the Aero Gatineau-Ottawa airshow, held Sept. 6 to 8. **Mike Luedey Photo**

**COSTS**

Costing is a nebulous exercise outside evaluation of the final bids due to the many variables. Although airframe costs are most often thrown around, the government must consider the airframe, operating, infrastructure, sustainment and other related costs as a package, balanced against the capability being purchased.

A good example of the intricacies involves the way the fighter fleet is bought. The Super Hornet must be purchased through the U.S. Foreign Military Sales (FMS) process, where the U.S. government acts as the broker. Generally, a 30 per cent mark-up is charged for research and development (R&D) and administrative fees.

In the case of the F-35, as a JSF partner, these costs are reduced for Canada through common funding. The costs for R&D have already been shared by the membership pool, and partners pay the same price for the weapons system as the U.S. services.

Future upgrades become additional FMS expenses for the Super Hornet, whereas upgrade developments are shared by JSF members.

Each of the competitors is being asked to provide 88 fighter aircraft within the \$19 billion funding envelope and the old adage of “you get what you pay for” is very applicable.

Each of these platforms brings a different level of current and future combat capability

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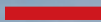
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“The reality today is that fighters are not simply weapons platforms, but **flying computers** that also function as airborne sensors.”



that needs to be judiciously weighed. If the fighter is to reach the government’s goal of flying until 2060, each needs to be flexible and adaptative to evolving technology. More significantly, 70 per cent of lifecycle costs are in sustainment and therefore the fighter chosen must be cost-effectively supported for the next 40 years.

**THE NEXT LEG**

In the lead-up to the RFP, it has been evident that national security factors have been competing with economic benefit interests. With the election this fall, the next government (whatever form this takes) will no doubt want to review the project and put its own stamp of approval on the process that it has inherited.

Hopefully this will not further delay the decision on the replacement of the CF-188 fleet and the Royal Canadian Air Force will finally be able to move ahead with the best fighter aircraft Canadians can provide to the women and men who are putting their lives in harm’s way. ■



**Alan Stephenson** (Col ret’d) holds a PhD from Carleton University and is a former CF-188 pilot with 3,600 hours flying fighters. He is currently an aviation consultant and a Fellow

at the Canadian Global Affairs Institute. This article is adapted from a paper for the CGAI: [https://www.cgai.ca/anatomy\\_of\\_a\\_buy\\_the\\_four\\_dimensions\\_of\\_procuring\\_a\\_future\\_fighter\\_for\\_canada](https://www.cgai.ca/anatomy_of_a_buy_the_four_dimensions_of_procuring_a_future_fighter_for_canada)

A two-ship formation of Saab Gripen E jets performs during flight testing. Saab will have to find a way to meet NORAD security requirements in order to mount a successful bid. **Linus Svensson Photo**

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# Diversity Matters

Canadian general aviation owners and pilots – and U.S. pilots who fly north of the border – could be faced with an upcoming challenge to equip with antenna diversity-type avionics. Now, stakeholders are pushing back on the possible Nav Canada performance mandate.

► **BY NORM MATHEIS**

**N**av Canada, Canada's air navigation service provider (ANSP), issued a Notice of Change at the beginning of this year, declaring that it will go ahead with a phased space-based Automatic Dependent Surveillance - Broadcast (ADS-B) Out performance requirements mandate.

The related aeronautical study that Nav Canada conducted through 2018 was submitted to Transport Canada, accepted, and amendments to the Designated Airspace Handbook (DAH) will be made.

If this rolls out as announced, equipping with 1090 MHz extended-squitter (1090ES) transponder-type equipment that supports antenna diversity – in other words, antennas on the top and bottom of the fuselage – will become necessary in certain cases.

The third phase, with an implementation date of Jan. 1, 2023, at the earliest, may have the greatest effect on Canada's general aviation (GA) community. Phase 3 may also require antenna diversity-type avionics to perform adequately for air traffic control surveillance *in Class C, D and E airspace*. I have written “-type” on purpose, as the new avionics hardware needed might not look like traditional

remote box or panel-mount transponders.

Canadian GA owners and pilots, and U.S. pilots who fly north of the 49<sup>th</sup>, could be faced with an upcoming challenge to equip. Nav Canada is now clearly focused only on the Aireon space-based ADS-B system for air traffic surveillance as its path forward. The ANSP is a founding partner of Aireon LLC, the American company that has deployed the only global air traffic surveillance system utilizing satellite-based receivers to monitor aircraft ADS-B Out transmissions.

Aireon *only* supports the 1090ES MHz ADS-B Out reply frequency format for avionics, the same frequency as traditional Mode A/C/S transponders.

The United States Federal Aviation Administration (FAA) mandate for ADS-B Out equipage continues to track for Jan. 1, 2020, for operations irrespective of registration, in all U.S. airspace where you need a transponder today.

While 1090ES equipment (diversity function *not* required, and just a bottom stub blade antenna) is acceptable and works for all U.S. airspace, less-complex 978 MHz universal access transceiver (UAT)-frequency equipment (read, cheaper) can be used outside Class A airspace below 18,000 feet.

Nav Canada says aircraft with only a bottom-mount antenna do not provide the reliable surveillance track required by the Aireon space-based ADS-B system. But general aviation proponents say equipping their smaller aircraft with both top- and bottom-mount antennas will be too costly. **Eric Dumigan Photo**



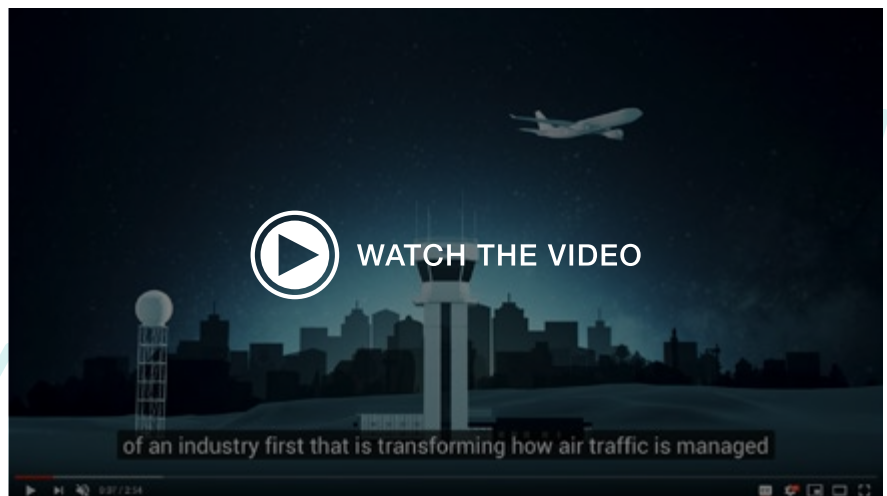
The 1090ES standard is the only truly global ADS-B Out fit, though; no other countries deploying ADS-B Out have gone down the UAT path to accommodate GA.

### MAKING TRACKS

Following the release of Nav Canada's Notice of Change earlier this year, interested groups and individuals started to make their concerns known in no uncertain terms.

U.S.-based Aircraft Owners and Pilots Association (AOPA), the American advocate for general aviation, wrote a letter to Nav Canada in March of this year. That letter stated in part, "We believe that the proposed antenna diversity requirement will have a significant negative impact on Nav Canada's most cost-sensitive users. As the representatives and advocates of large segments of the Canadian and U.S. aviation industries, we support ADS-B and the efficiency and safety benefits it will provide when it is adopted in a manner that supports general and business aviation on IFR and VFR flights. We do not believe that our concerns, which were voiced during the consultation phase, have been fully considered."

The letter, endorsed by eight additional supporting advocacy groups, along with a

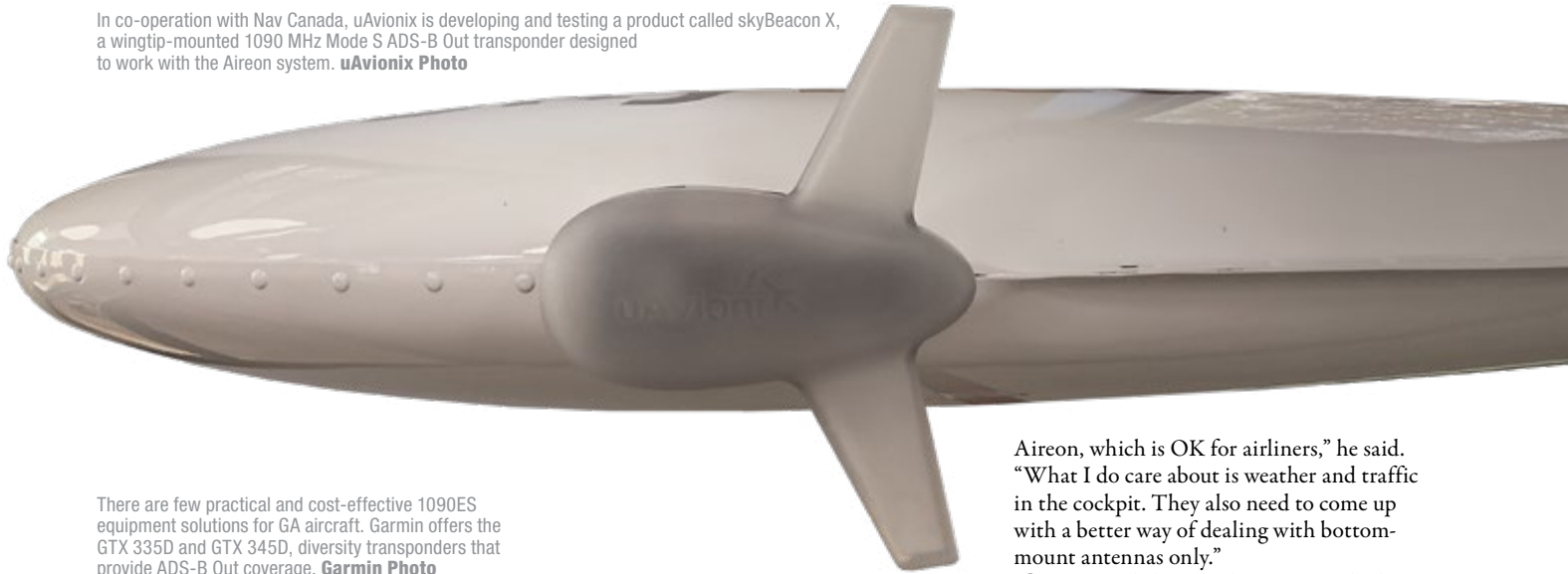


leading avionics manufacturer, also suggested an assumption was made that most of Canada's general aviation fleet is equipped with Traffic Alert and Collision Avoidance (TCAS II) systems that already require antenna diversity. That's not the case.

Nav Canada, responding to AOPA later in March and also directly on the issue of antenna diversity, noted, "To apply efficient ATC [air

traffic control] separation standards, operational surveillance systems must present a reliable track to the controller. When a track becomes unreliable, by not meeting the required detection rate, the track will "coast" and be removed from the controller's display. When tracks frequently coast, a non-surveillance separation standard must be applied, adversely affecting efficiency. Analysis conducted to date concludes that tracks

In co-operation with Nav Canada, uAvionix is developing and testing a product called skyBeacon X, a wingtip-mounted 1090 MHz Mode S ADS-B Out transponder designed to work with the Aireon system. **uAvionix Photo**



There are few practical and cost-effective 1090ES equipment solutions for GA aircraft. Garmin offers the GTX 335D and GTX 345D, diversity transponders that provide ADS-B Out coverage. **Garmin Photo**



**“Aireon only supports the 1090ES MHz ADS-B Out reply frequency format for avionics, the same frequency as traditional Mode A/C/S transponders.”**

associated with ADS-B equipped aircraft that only have a bottom-mounted antenna coast significantly more often than tracks associated with those that have antenna diversity. Data collected in the last few weeks, after all ADS-B equipped satellites were incorporated into the constellation, shows improvement; however, aircraft with only a bottom-mount antenna still do not provide the reliable track required to provide a surveillance service.”

Christine Gervais, Nav Canada manager, level of service, pointed out, “Nav Canada never made any assertion about TCAS II and GA. During consultation, TCAS II was mentioned as it relates to aircraft operating in the Reduced Vertical Separation Minima (RVSM) portion of Class A airspace (Phase 1). There are requirements for aircraft to be equipped with TCAS II depending on their operating environment and some aircraft operating in Class B airspace are also equipped with TCAS II. It was never suggested that GA aircraft are or would be equipped with TCAS II.”

Skies spoke with industry veteran Lee Coulman about concerns he’s expressed. Coulman has a 25-year background in air traffic control radar systems engineering at Raytheon Canada. He speaks from the perspective of a recreational pilot, and also from his experience working with a group testing an ADS-B ground station to monitor traffic and provide limited weather data at Stratford, Ont. “I’m upset with the direction Nav Canada is taking [all eggs in the Aireon basket], and specifically \$159 million injected into

Aireon, which is OK for airliners,” he said. “What I do care about is weather and traffic in the cockpit. They also need to come up with a better way of dealing with bottom-mount antennas only.”

[Nav Canada has no plans to provide the in-flight weather, data and enhanced traffic services available in the U.S. on 978 MHz UAT.]

There aren’t a lot of 1090ES equipment options today in a form that are practical, even apart from price, for smaller aircraft.

GA avionics industry leader Garmin did introduce the GTX 335D and GTX 345D in March of this year, two more of their diversity transponders that provide ADS-B Out coverage. The GTX 335D offers ADS-B Out, while the GTX 345D provides ADS-B Out as well as ADS-B In traffic and weather for display on compatible avionics and mobile devices. They need to be connected to a compatible Wide Area Augmentation System/Global Positioning System (WAAS GPS).

L3 has the Lynx NGT-9000 panel mount, which can support diversity.

Ryan McGinn, owner and person responsible for maintenance at Saskatoon Avionics, told *Skies* that the average cost to install a Garmin GTX 335D in a light single or twin would range anywhere between \$10,000 to \$12,000.

“The unknown with the diversity system is the mounting of the top antenna, depending on the type of interior, ease of access, etc.; the labour portion can fluctuate,” he said.

“In my opinion, the mandating of a diversity system which differs in any way from the system mandated in the States will have a negative impact on the Canadian aviation industry. This will not only affect general aviation cross-border traffic from the States, but certain business aircraft also.”

McGinn explained that turboprop aircraft such as the King Air 200, and older Cessna, Lear and Beechcraft jets under 12,500 pounds, did not typically have a diversity transponder as they were not mandated to have TCAS II or were flown in RVSM airspace.

“These operators, both Canadian and American, who have installed non-diversity equipment to meet the U.S. mandate would have to spend much more to meet the diversity mandate in Canada,” he said.



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The earliest that Canadian general aviation aircraft could require antenna diversity in Class C, D and E airspace is Jan. 1, 2023. **Eric Dumigan Photo**



## ANOTHER APPROACH

Relatively new to the avionics field, uAvionix has a different idea. The company announced in mid-July that it is developing and testing (in co-operation with Nav Canada) a product called skyBeacon X, a wingtip-mounted 1090 MHz Mode S ADS-B Out transponder designed to meet the update rate performance required when used in conjunction with Aireon.

Like the original (UAT) skyBeacon for the U.S. market, skyBeacon X is an LED position light replacement with an integrated 1090 MHz transponder, GPS position source, barometric altimeter, and LED position and anti-collision lights.

uAvionix president Christian Ramsey provided more detail on skyBeacon X.

“We have been building transponders for a number of years,” he said. “The testing we have been conducting with Aireon is not about the performance of the transponder – it’s all about performance with Aireon and what Nav Canada requires for a probability of an update rate.”

Ramsey ventured that uAvionix could have a non-certified version to market by early 2020. He confirmed that the need in Canada

is driving this product’s development. When asked to comment on a proposed cost, and concepts for installation – as it less intrusive to the aircraft than a traditional transponder installation – Christian was non-committal.


Pricing information is unavailable at this time, but as for installation, he said: “[In the U.S.] any FAA-licensed airframe and powerplant mechanic with authorization to do inspections (A&P IA), can sign off on the installation. In the U.S. we have recruited over 700 IAs as installers.”

Carter Mann, director of government affairs and communications at the Canadian Owners and Pilots Association (COPA), said, “There is a concern about the proposed mandate (the part about the Class C, D and E airspace) and just whether or not diversity will become a requirement in Phase 3. They (Nav Canada) haven’t demonstrated that diversity is required for smaller GA aircraft. We are still working with them on that. We talk to them regularly.”

Nav Canada’s Gervais did confirm that antenna diversity is required for Phase 1 and 2. “Phase 3 is still a question; however, diversity will likely be required to meet the performance requirements,” she said.

“There are some innovative systems now being tested that show promise, and we welcome the development of new affordable, reliable and certifiable aircraft avionics that can meet the performance requirements for the Aireon surveillance system. Fortunately, we still have more than three years until Phase 3 of the mandate is implemented, so there is potential.”

If Nav Canada does confirm that 1090ES diversity avionics will be a required piece of the puzzle for Phase 3, a change in focus for further lobbying may be indicated.

Aireon is a *fait accompli*; the investment has been made and there’s no turning back. It may be better time spent to look for a form of rebate or services discount within reasonable bounds, to offset equipment installation costs. It seems a case could be made for that. 



**Norbert (Norm) Matheis** is an avionics and special mission aircraft industry veteran. Advising clients on business development, marketing and proposal development, Norm holds an AME E licence and can be reached at [matheisn@gmail.com](mailto:matheisn@gmail.com).

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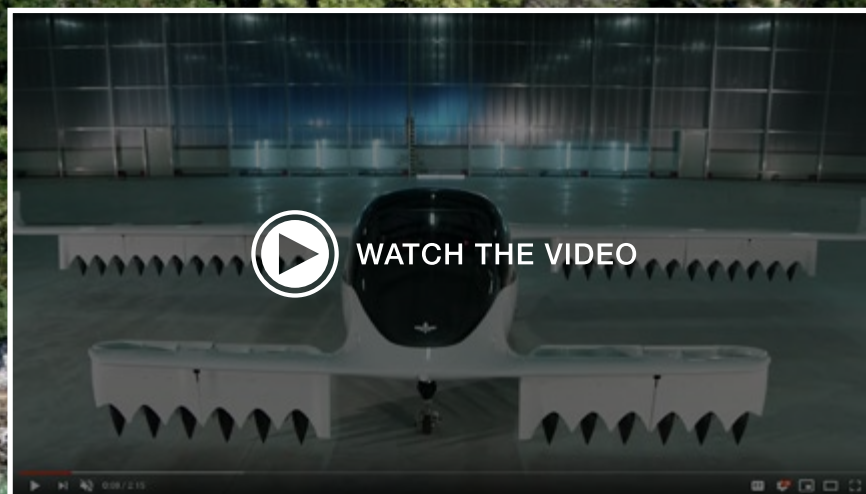




Like many companies in the emerging eVTOL space, Lilium wants to offer an air taxi service using vehicles that are cleaner, quieter, and more cost-effective than helicopters.



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# LILIUM

## BETS ON REGIONAL MOBILITY

We paid a visit to Lilium's headquarters in Munich, Germany, to learn why the eVTOL air taxi developer is looking well beyond inner-city missions.

**BY ELAN HEAD | IMAGES COURTESY OF LILIUM**

*Editor's note: This story originally appeared on eVTOL.com, a new online publication dedicated to the emergence of a new class of electric and hybrid electric VTOL aircraft. eVTOL.com is a sister publication to Skies and Vertical magazines, and is brought to you by MHM Publishing.*



Lilium's founders met each other while studying at the Technical University of Munich.



The Lilium Jet incorporates 36 ducted fans, spread across 12 independently articulating flaps.

**B**efore joining Lilium as head of flight test in 2017, Leandro Bigarella spent almost 16 years in the flight test department at Embraer, working on certification programs including the Phenom 300 business jet and the KC-390 military transport plane. That meant he had been involved with first flights before, but none of them quite as

momentous as the one that took place on May 4, 2019, when the full-scale prototype of the Lilium Jet spun up its 36 electric ducted fans and lifted vertically into the air.

"The first flight was a remarkable day," Bigarella recalled. Unlike a conventional airplane or helicopter — most new models of which are simply variations on well proven designs — the Lilium Jet was

something completely new: "new concepts, new flight test approaches, new tests, new technologies," he said. To see it actually flying was "really intense. . . . Everybody was super excited and very proud, too."

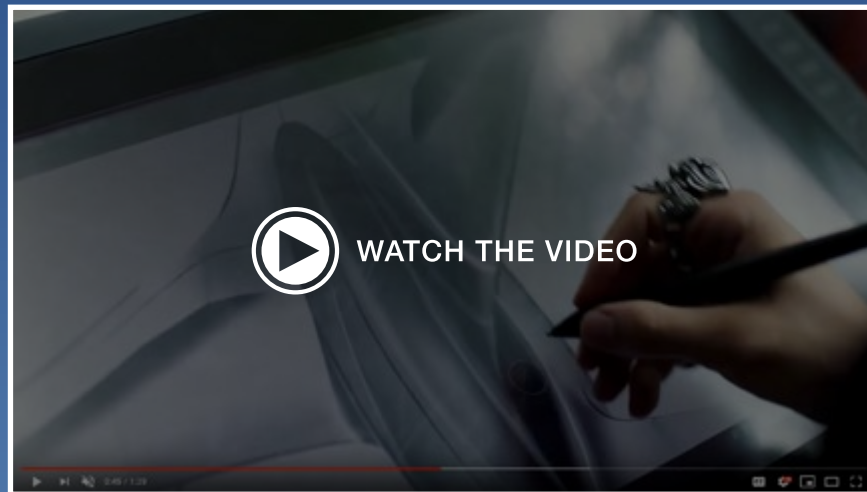
When that first flight was revealed to the world two weeks later, it marked the re-emergence of the German company, which had been relatively quiet since debuting an

early prototype of its electric vertical takeoff and landing (eVTOL) aircraft in 2017. The urban air mobility industry has grown by leaps and bounds since then, and behind the scenes, Lilium has, too. Buoyed by \$100 million in investment, the company now employs more than 300 people at its headquarters near Munich, with another 150 positions currently open. Although Lilium doesn't expect to continue growing quite as aggressively as it has in the past year — when its team nearly tripled in size — “we still have to grow a lot,” said CEO Daniel Wiegand.

Like many companies in the competitive and secretive eVTOL space, Lilium is still playing most of its cards close to the vest. Access to its aircraft and engineering facilities is tightly controlled, and the company has yet to publicly disclose its latest flight testing progress (suffice to say, the Lilium Jet can do more than a tentative vertical take-off and landing).

In late August, however, Lilium hosted eVTOL.com at its Munich headquarters to discuss its approach to engineering and flight test and its vision for the future of the company. In contrast to many other eVTOL players, Lilium isn't focused on intra-urban missions, skeptical that the time savings for a short hop across town will justify taking an air taxi. Instead, the company is placing its bets on regional air mobility, looking at using the Lilium Jet to create cost-effective transportation links between cities, or from cities to the countryside.

“Taking the car for a 300-kilometer trip in many cases takes four hours, in



some cases five or six hours if there's a mountain range in between — we can fly this in one hour,” Wiegand said. “And equally taking a commercial aircraft typically also takes three to four hours for the whole trip. So the sweet spot is really below the commercial aircraft, but above the typical inner-city trip.”

#### THE LILIUM JET FOR THE JOB

Achieving Lilium's ambitious performance targets for its five-seat, fully electric vehicle — a range of 300 kilometers (186 miles) at a speed of 300 km/h — is a tall order using today's battery technology. And the Lilium Jet's design has some

vocal critics, notably Uber director of aviation engineering Mark Moore, who earlier this year contended that the aircraft has impractically high disc loading in a hover. Yet Lilium has shrugged off this criticism, previously telling eVTOL.com, “We're confident that the progress we're making 'behind the scenes' will enable us to deliver our stated goals and we look forward to proving that in due course.”

The Lilium Jet is a fly-by-wire, vectored thrust aircraft that features 36 ducted fans distributed across its main wing and forward canard. (Lilium describes these ducted fans as “jet engines” because they move air much as does a conventional



Lilium's target 300-km range could connect urban centers like New York City with other metro areas and outlying towns.



jet engine, albeit using a different power source.) The ducted fans are divided evenly across 12 independently articulating flaps, with flight control achieved through software that varies the position of individual flaps and RPM of individual fans. The current prototype is remotely piloted only, but a future version, which will undergo certification, will have a human pilot on board, and autonomous capabilities are targeted for some point in the future.

For Bigarella, the idea of designing a flight test program for this wholly novel aircraft was what attracted him to Lilium. “I heard about this new VTOL market coming and I said, wow, this is pretty challenging because it’s something that no one has ever tested before from a flight test perspective,” he said. “Lilium came to my attention because of the design, and they were quite advanced in terms of flight testing.”

Bigarella said his biggest challenge “was to find the means of mixing both rotary-

wing and fixed-wing disciplines into one single project.” Not surprisingly, his flight test team — encompassing flight test and instrumentation engineers, test pilots, and maintenance technicians — reflects a mix of both fixed- and rotary-wing experience. One particular hurdle was finding test pilots who were proficient not only in airplanes and helicopters, but also with remote-controlled aircraft for the early testing phases. “This was something really different for us — planning flights with this kind of mindset,” he said.

Despite the novelty of the aircraft configuration, Bigarella said that Lilium has followed a fairly traditional, iterative approach to flight testing, starting with extensive flight simulation and systems testing on the ground prior to first flight. Now that the aircraft is flying, the flight test team is expanding the envelope gradually. “So it’s starting to add some maneuvers — some turns on spots, some lateral displacement, some forward and backwards

movement — and then start exploring until we are able to fly the whole envelope [out to] 300 kilometers per hour,” he said. While the focus of this testing phase is on aerodynamic and handling qualities, the team is also collecting data on battery discharge rates that will inform optimization activities at future stages of the program.

Bigarella remarked that he has been happily surprised by the stability of the aircraft, which has progressed well beyond its somewhat wobbly first flight.

“It’s amazing how stable the aircraft is,” he said. “[This is] something that caught our attention as flight test, because usually when you see this kind of new development [there are] some instabilities. . . . So the design is really something that is surprising us positively.”

According to Wiegand, Lilium is designing the aircraft systems to transport category levels of reliability: a 10-9 likelihood of catastrophic failure, consistent with the European Union Safety Agency’s recent Special Condition for Small-Category VTOL Aircraft. “It’s pretty clear that if you want thousands, maybe hundreds of thousands of eVTOLs flying around at some point, you need to achieve a similar safety track record like commercial aviation does today,” he said. “So we took the same approach which is standard in commercial aircraft, that you have no single point of failure on the whole plane. Be it on the flight controls and fly-by-wire, on the actuators, on the engines, on the battery, the power circuits — everything [has redundancy].”


Additionally, Lilium has made the decision to install a ballistic parachute on the aircraft, despite the associated weight penalty. At 10-9 levels of reliability, “classic aviation says you don’t need a parachute,” Wiegand said. “But at the same time we can see there are still things against which we can’t design . . . and for these cases, we want to have something on board that gives us a good night’s sleep.”

Another priority for Lilium’s design team is noise, which has been perhaps the greatest obstacle to the wider use of helicopters in urban environments. Through careful attention to ducting and fan speeds, the company is engineering the Lilium Jet to be at or below the noise targets identified by Uber in its Elevate white paper — roughly one-fourth as loud as small helicopters, and significantly less annoying.

“I love the sound of jet engines and helicopters and all these things when I’m excited about the tech, but when I’m on a Sunday afternoon lying in my garden, it’s different, right?” Wiegand said. “This is an area where Lilium is putting a lot of focus — to create something that is low noise enough so we can actually use this in a widespread way in communities, and bring this close to where we live.”

An aerial photograph showing a white Liliium Jet flying over a lush green forest. In the background, a large concrete dam curves across the landscape, with a body of water visible to the right. The aircraft is captured from a high angle, highlighting its sleek, manta-ray-inspired design.

For Liliium's eventual commercial operations, "the sweet spot is really below the commercial aircraft, but above the typical inner-city trip," said CEO Daniel Wiegand.

A side-profile photograph of a white Liliium Jet aircraft on a light-colored floor. The aircraft features a black canopy and a distinctive manta-ray-like wing shape. The name "LILIIUM" is visible on the side of the fuselage, and "L4" is marked near the landing gear.

The Liliium Jet's sleek styling was inspired by the manta ray. Liliium was recently awarded the prestigious Red Dot Luminary Award for the design of its aircraft.

## A TRANSPORTATION SYSTEM FOR EVERYONE

Wiegand has always been passionate about aviation. He began flying gliders when he was 14, “so long before I was allowed to drive a car,” he recalled. “And I was excited about everything that can fly. I had to have a parrot at home, took lots of slow motion movies from the bird to find out how it was staying in the air, how it was propelling forward, etc.”

Wiegand studied aerospace engineering at the Technical University of Munich (TUM), with an emphasis on flight propulsion. In 2013, he was living in a shared flat in Glasgow, Scotland, when he began sketching the first designs for the aircraft that would eventually become the Lilium Jet. As he recounts it, after seeing what he was up to, his flatmate told him, “If you think this

is technically feasible, you should found a company and do this” — and so he did, along with his TUM classmates Sebastian Born, Patrick Nathen, and Matthias Meiner. Today, \$100 million in investment later, the advice seems sound, but it was not an obviously wise idea at the time.

Since those early days, the design of the Lilium Jet has undergone remarkably few changes. “There was initially [around] 20 different concepts, but we evaluated [them] and converged quite early on the aircraft,” Wiegand said. However, Lilium’s concept of operations has evolved considerably. The original goal was to create an affordable two-seat vehicle for personal transportation, but the founders quickly realized that the limited market of private pilots wouldn’t sustain the volumes necessary to drive down manufacturing

costs. So instead, the company now plans to use the Lilium Jet as the basis for an air taxi service — one it will operate itself.

“I see the Lilium Jet very much in regional mobility, and by regional we are talking about things like inter-city, or city to countryside, or very large metropolitan areas with a diameter of maybe 100 kilometers or so,” Wiegand said. Although the company has yet to announce its launch markets, he said Lilium is seeing interest from local governments around the globe (such as Miami-Dade County, Florida, whose mayor, Carlos Giménez, has disclosed “preliminary talks” with the company).

Wiegand said that Lilium is advocating an open system of VTOL landing pads, similar to public roads or airports today. Under such a framework, any city could



build VTOL landing pads for immediate connectivity with all of the other landing pads within range. “They can be served by any service that is compatible [with] these landing pads, so it could be a Lilium service; it could be some other service,” he said. He believes this investment will be attractive to cities because it will connect them with neighboring municipalities “at a speed which is unique in history” — and at a fraction of the cost of ground infrastructure projects like highways and rail.

For similar reasons, Wiegand thinks the Lilium Jet could play a transformative role in emerging markets, too. In places like Africa, for example, there’s “a huge need for infrastructure and transportation in general. And with an eVTOL solution like the Lilium Jet, they can basically leapfrog billions in investment and 20 years of



Lilium head of flight test Leandro Bigarella came to the company from Embraer.



Lilium CEO Daniel Wiegand has always been passionate about flight.



Although this rendering shows what a dedicated Lilium skyport might look like, the company is also advocating an open system of VTOL landing pads, similar to public roads or airports today.



Lilium’s flight test team includes flight test and instrumentation engineers, test pilots, and maintenance technicians from both fixed- and rotary-wing backgrounds.

waiting time for a high-speed rail network or for a highway network.”

What will it take to persuade the rest of the world to embrace this vision? For Lilium, “our view on this is we should convince customers with facts,” Wiegand said. “Our idea is we offer a solution to the world that is safe, that is robust, that is reliable, and does what we promise.” He thinks that if the company delivers on those goals, early adopters will flock to the aircraft, followed eventually by more reluctant flyers.

Lilium’s rollout will be correspondingly gradual. The company is aiming to be operational in several locations by 2025, likely launching

with scheduled service along limited fixed routes. But Wiegand envisions a not-too-distant future in which “you can pick up your smartphone and say, OK, I need a flight from here to a city 200 kilometers away, and I’m getting that flight within three minutes or five minutes on the landing pad next door.” Who wouldn’t want to live in a world like that? 🚁



An award-winning journalist, **Elan Head** is also an FAA Gold Seal flight instructor with helicopter and instrument helicopter ratings, and has held commercial helicopter licenses in Canada and Australia as well as the U.S. She is on Twitter @elanhead and can be reached at elan@mhmpub.com.



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# In the Circuit

MONTRÉAL-MIRABEL INTERNATIONAL AIRPORT (CYMX) | BY ROBERT WILLIAMSON

## Success through diversification



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**L**ocated 35 kilometres northwest of the heart of downtown Montreal sits the International Aerocity of Mirabel (CYMX). Once envisioned as the Montreal area's primary gateway for international air travel, Mirabel Airport now serves an entirely different purpose.

"YMX is unique in the sense that it does not receive passenger flights, only cargo," said Anne-Sophie Hamel-Longtin, director of Corporate Affairs and Media Relations at Aéroports de Montréal (ADM), the local airport authority that took over the facility's operation in 1992.

"But processing cargo isn't the main activity of the site, as 90 per cent of the activity at YMX is centred around the manufacture and repair of aircraft."

Opened in 1975, the airport wasn't always focused on cargo movements, maintenance, repair and overhaul (MRO) operations and original equipment manufacturers (OEMs).

Envisioned as a replacement for Dorval Airport – now Montreal-Trudeau International – Mirabel was a product of the area's massive economic boom after Expo 67 earned Montreal international recognition.

At the time, Dorval was seen as a nuisance due to its close proximity to the downtown core of Montreal. Ironically, it would be Mirabel Airport's distance from the city centre that eventually contributed to the cessation of passenger operations.

A lack of adequate transportation options from downtown Montreal factored into its decline, but so did the development of longer-range aircraft that made a second Montreal airport redundant. Planes no longer needed to stop in the city for refuelling before transatlantic flights, and the airport never managed to surpass three million passengers per year.

Those issues, along with the fact that Dorval was continuously used for all domestic flights, paved the way for Mirabel to shut down passenger operations on Oct. 31, 2004.

Today, the facility is one of the few places in the world where aircraft assembly, component maintenance and manufacturing, aircraft maintenance, aerospace training, engine testing, R&D services and more can be found.

But regardless of all this activity, Mirabel has managed to keep busy with flight operations.

In 2018, the main runway received 24,036 flights and 107,660 tons of cargo – up 19.6 per cent and 11 per cent respectively from 2017. In total, 15 all-cargo carriers operate at CYMX – FedEx, UPS, Purolator and Cargojet are among them.

Not to be outdone by the cargo arm of the airport's operations, "Mirabel also represents a base for general aviation operations related to business. Hélibellule offers first class helicopter transportation services, while Nolinor Aviation is offering specialized commercial charter flights," said Hamel-Longtin.

Over the past decade, ADM has invested more than \$150 million into Mirabel, including \$60 million in 2016 towards upgrading

the main runway, which is the second-longest in Canada and "can accommodate the largest carriers."

"Since then . . . Mirabel has been growing," continued Hamel-Longtin. "There are more jobs in Mirabel today, and of higher quality, than at the time of international flights. In fact, 72 per cent of the approximately 5,000 direct jobs at CYMX are related to aerospace products and parts manufacturing. The total business activity of CYMX generated \$1.1 billion of nominal GDP [gross domestic product] in Quebec."

On July 1, 2018, Airbus officially assumed a controlling stake in Bombardier's C Series aircraft program – which has since been rebranded as the A220 – effectively making Canada Airbus's fifth home country. The OEM's arrival has already resulted in benefits for Mirabel, including the construction of new hangars for assembly work.

For ADM, the partnership was "a tremendously proud moment for all the employees working on the CYMX site and a powerful reflection of Quebec's know-how," said Hamel-Longtin.

"The arrival of Airbus has given the site a strong momentum, and ADM wants to take advantage of it in hopes to continue to implement the entire value chain at the International Aerocity of Mirabel," she explained. "At this moment, several potential projects are on the table and we hope they will take off."

Meanwhile, the Mirabel Airport campus been focused on environmental sustainability.

"Sustainable development is an integral part of ADM's mission, and several actions aimed at protecting the environment are carried out," said Hamel-Longtin. "Recent initiatives include the introduction of a harmonized collection of organic and recyclable materials for all tenant businesses at the Aerocity, in collaboration with the city of Mirabel."

In addition to those efforts, 96,000 trees were planted at the airport as part of a repurposing project with CO2 Environnement (now known as NatureLab) and about 300,000 bees have called the airport home since the installation of five hives.

More recently, ADM announced an investment of \$107 million, \$50 million of which will come from the federal government's National Trade Corridors Fund, for the development of an aero-logistics hub at Mirabel. The hub will consist of three components: increasing the cargo apron capacity by adding 13 aircraft parking spaces; developing additional storage space (215,278 square feet/20,000 square metres); and improving the road network.

"These enhancements will go a long way in responding to the growth of air cargo and supply chain activities, while improving the operational fluidity of all-cargo aircraft," said Hamel-Longtin.

Since the airport ceased passenger operations in 2004, ADM has worked to keep Mirabel operational. From cargo operations to OEM housing, the International Aerocity of Mirabel has diversified to a point that goes beyond your standard airport – and it's looking to maintain that course into the future. ■

COLUMN  
**Instrument IQ**  
 BY JOHN MONTGOMERY



# Sharpen your IFR skills

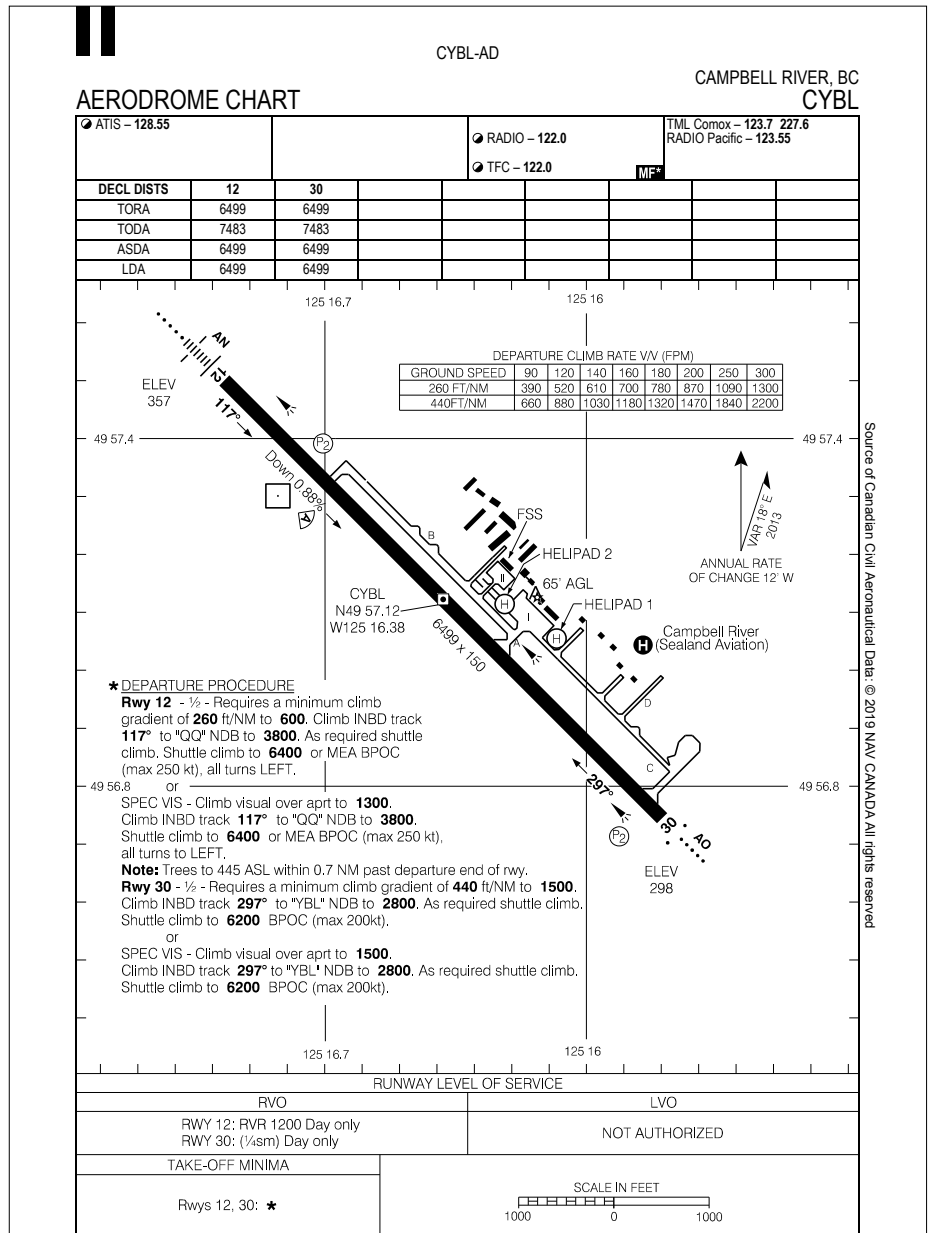
Test your instrument flight rules (IFR) proficiency and sharpen your piloting skills with this exclusive *Skies* feature!

Examine the following approach plate and take your best shot at the accompanying questions—answers can be found at [www.skiesmag.com/iq](http://www.skiesmag.com/iq).

## CAMPBELL RIVER, B.C. (CYBL) DEPARTURE PROCEDURES

1. You are planning to depart RWY 12 at CYBL at a time when the FSS is operating. How is takeoff minimum visibility determined?
2. Relative to the above, your initial climb groundspeed is expected to be 100 knots. What initial minimum rate of climb is needed to meet the obstacle clearance criteria?
3. Relative to the above, what becomes the required climb gradient upon passing through 600 feet ASL?
4. If your aircraft is unable to realize the above climb gradient, might you still be able to depart RWY 12? If so, by what means?
5. If planning to depart SPEC VIS with a climb speed of 100 KIAS, what minimum ceiling and visibility are required to legally depart?
6. Is a General Aviation Approach Ban a possibility if conducting an instrument approach to RWY 12?

**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](mailto:john@proifr.com).



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CYBL-AD

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Effective 0901Z 15 AUG 2019 to 0901Z 10 OCT 2019

**CHART NOT TO BE USED FOR NAVIGATION PURPOSES**

COLUMN

# Faces of Flight

BY MIKE LUEDEY

## Meet George Kirbyson: A legendary pilot with nothing but time



Craig "Rocco" Richard/ Top Aces Photo

**M**any of us have been inspired to chase a dream at a young age. For George Kirbyson, born October 1946 in Mayerthorpe, Alta., his dream began with a movie about legendary British fighter ace, Sir Douglas Bader.

As with many Canadian pilot stories, this one starts with the Air Cadets in Whitecourt, Alta., where Kirbyson earned his pilot's licence through the flying scholarship program, logging his first hours on the Fleet 80 Canuck, a popular Canadian-made taildragger.

After high school, he joined the Royal Canadian Air Force (RCAF). With 70 flight hours to his credit, Kirbyson bypassed the de Havilland Chipmunk trainer and strapped into the then-modern Canadair CT-114 Tutor jet trainer, a far cry from the little Fleet 80 he'd been flying in Edmonton. He earned his RCAF wings on the CT-133 Silver Star and after a few months at the School of Instructional Technique, became a CT-133 instructor at the age of 19.

He was later posted to Cold Lake, Alta., to fly the CF-104 Starfighter, which required transitional training on the iconic CF-86 Sabre in Chatham, N.B.

In 1969, Kirbyson went to Lahr, Germany with 441 Silver Fox Squadron, flying reconnaissance (training) missions between Southern France and Northern Denmark.

"Flying reconnaissance in the CF-104 was great," he told *Skies*. "Sometimes you'd go from the surface to 60,000 feet and not talk to anybody, and you always flew when the weather was good."

In the summer of 1970, 441 Squadron joined 439 Squadron at 4 Wing in Baden-Soellingen, Germany. Kirbyson's final year with

the RCAF was served back in Cold Lake as a CF-104 instructor.

Then 27 years old and living in the Vancouver area, Kirbyson joined Canadian Pacific Air Lines (CP Air) as a DC-8 second officer in 1973. His impressive airline career spanned 33 years on six different aircraft, including the Airbus A319, A320 and A321, and the Boeing 737 and 767.

Maintaining senior first officer status was crucial because it allowed Kirbyson time for the flying he loved most of all – in a Pitts Special S2-B as a member of the Canadian formation aerobatic team, the Ray-Ban Gold, which he joined as a show pilot in 1983.

Unfortunately, less than a year later, he experienced a serious cockpit fire as a result of a fuel leak while departing Langley Regional Airport, in formation with a teammate, Rod Ellis. He was forced to land in a nearby farmer's field.

Kirbyson suffered third-degree burns on his face, arms, hands and legs. His ears were protected by his headset; likewise, the palms of his hands from gripping the controls. He spent 33 days in hospital recovering with multiple skin grafts. Doctors told him he might never fly again.

They were wrong. Just three months later, Kirbyson set off to pick up a new plane. Another month to ready the plane in Langley; and by 1984, he was flying a show with the Ray-Ban Gold in Cleveland, Ohio!

Kirbyson has amassed over 2,000 hours on the Pitts, 1,500 of those on the one he bought in 1984. Though the team disbanded

in 1990, he still flies his plane in its original paint, the only one of the four still flying in those colours.

“The time flying in transit with the team was probably the most memorable,” said Kirbyson. “We got to see so much of North America from a perspective not many get to see it from. I took my son, Jordan, to a lot of shows; I think it gave him a chance to learn a bit about life in the Air Force and get a lot of exposure to aviation.”

It made a big impression. His son joined the RCAF and became a CF-188 Hornet pilot, something that makes Kirbyson incredibly proud.

Jordan Kirbyson had a chance to work with his dad in what will be the final professional chapter of the elder Kirbyson’s flying career. In 2004, after his final two years with Air Canada, and then 60 years old, Kirbyson began flying an IAI Westwind for Montreal-based defence contractor, Top Aces. Jordan had joined the company not long before and was flying the Dassault/Dornier Alpha Jet.

At Top Aces, Kirbyson flew a variety of training missions for all branches of the Canadian Forces, pulling targets, flying mock attacks and even impersonating hijacked airliners. While he and his son never had a chance to share the cockpit of the Hornet, they did get together in the Alpha Jet a few times, and flew alongside each other as well.

“George has maxed the course,” said James “Preston” Manning of Top Aces. “[He has had] an absolutely tremendous aviation career, accumulating more than 30,000 flight hours in 64 types. During his time at Top Aces . . . over the past 13-plus years, he has embodied all of Top Aces’ values. A true professional, and a highly respected member of our team, George has continued to serve at the tail end of an amazing career, providing important training to our Canadian Forces.”



By the time you read this, Kirbyson will be 73 years young, will have flown his last mission with Top Aces, and will be retired from professional flying. He’ll still be enjoying the skies around Langley in his Pitts with his son, and flying airshows with his friends at the Canadian Museum of Flight.

30,000 flight hours. That’s 1,250 days. It’s also 1.8 million minutes (if you’re counting). That’s a very large part of your life to spend doing something – but if you really love that something, then it’s probably been more of a blur. As I discovered, that incredible milestone doesn’t even have a footnote in his logbook.

We should all be so fortunate to do what we love so much for so long. Enjoy your retirement, George! 🇨🇦



Mike Luedey Photo





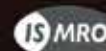
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