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On the Cover

The end of 2016 was an exciting time for the Royal Canadian Air Force, with the selection of the Airbus C295W for fixed-wing search and rescue and the news that Canada plans to buy 18 Boeing Super Hornet fighters. Here, the Super Hornet is shown in possible future Canadian livery. **MAIN: Jeff Wilson Photo, INSET: Airbus Photo**



Brian Losito Photo

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Jean-Philippe Richard Photo

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Mind the gap

BY MIKE REYNO

Finally! It took ‘only’ 14 years and three sitting governments to make the decision, but the federal government has finally chosen the Airbus C295W as Canada’s next generation fixed-wing search and rescue (SAR) aircraft, beating out the Leonardo C-27J Spartan, which many thought was favoured by the Royal Canadian Air Force (RCAF).

Sixteen C295Ws will replace the RCAF’s aging fleet of 50-year-old CC-115 Buffalos and CC-130H Hercules transports that are operated for SAR duties. Combined, these two aircraft perform more than 350 missions a year within Canada’s area of responsibility.

At 8 Wing Trenton, Ont., Defence Minister Harjit Sajjan, Public Services and Procurement Minister Judy Foote, and the commander of the RCAF, LGen Mike Hood, announced on Dec. 8 what will ultimately amount to a \$4.7 billion program for 16 C295Ws, a new training centre to be constructed at 19 Wing Comox, B.C., and ongoing maintenance and support services.

Winning the competition based on cost, the first C295W is expected to be

delivered in 2019 with the final aircraft arriving in 2022. Hood said that the C295W “will fundamentally change the SAR paradigm for us. I believe search and rescue is going to become a lot less about search and a lot more about rescue.”

The C295W is a win, too, for Canadian aerospace companies that have partnered with Airbus on the Spanish-manufactured aircraft: Pratt & Whitney Canada builds the PW127G turboprop engines and L-3 Wescam will provide the advanced electro-optical/infrared turret system. CAE will construct and deliver the simulator-equipped training centre while PAL Aerospace, under a joint venture with Airbus called AirPro, will provide the in-service support. Add to the list Heroux-Devtek for landing gear repair; Hope Aero for propeller repair; Precision Aero for repair of various other components; and Sonovision for technical publications.

The acquisition of the C295W is good news for the RCAF. It means the air force can finally retire its remaining old and tired transports, like the six remaining Buffalos that have been used for SAR for more than 40 years.

The announcement of Canada’s FWSAR aircraft was preceded by a ‘surprise’ announcement made by Sajjan on Nov. 22, that the government will immediately enter into negotiations with Boeing to acquire 18 F/A-18E/F Super Hornets to address what the government is calling a “capability gap.”

Capability gap? Say what?

Around the same time as the Super Hornet announcement, Hood stated before the House of Commons defence committee that the legacy CF-188 Hornet, which may need about a \$400 million upgrade, can fly until 2025. But the government now says that it needs the additional new fighters to address a shortage of jets required to meet Canada’s defence obligations until a new next generation fighter is chosen.

Critics question the need for 18 Super Hornets to fill a capability gap, which they say is politically driven by the

Liberals. The fact is the capability gap has not been created by the Liberals. Nor have the Liberals changed any policy. They have simply decided that this government will meet Canada’s defence obligations—obligations made by previous governments. In this case, those obligations entail being able to support NATO and NORAD missions simultaneously. This means the RCAF now finds itself short-handed with just 76 CF-188s (about half that number is available on any given day), down from the 138 CF-188s that were once in service.

In the short term, news of the Super Hornet buy is a blow to Lockheed Martin (and others vying to replace the CF-188), which wanted to sell Canada 65 F-35A Lightning II stealth fighters—a number that can now be deemed as too few to meet Canada’s ‘new’ obligations.

Regardless of the Super Hornet buy, Sajjan says Canada will remain committed to the F-35 program; to date, the country has contributed more than \$300 million to the jet’s development. The contributions keep Canada at the table as one of the nine partner countries involved in the project, and also allow for Canadian industry to have access to F-35 contracts—even though Canada has not yet committed to buy the fifth generation fighter.

Sajjan also said the government will launch an “open and transparent” competition to replace the CF-188—a process that could take up to five years! “The competition for a permanent fleet will be informed by the outcomes of the [upcoming] defence policy review,” he said.

In the long-term, a push to the right will ultimately put the F-35 in a better position to replace the CF-188. As time goes on, F-35 program costs continue to decrease and capabilities are on the rise as the program works to achieve full operational capability.

A push to the right for the actual selection of a new fighter aircraft will also mean that it will be the next government that will have to deal with this political hot potato, just like the previous government deferred any decision on selecting Canada’s next fighter until after the election that they lost in 2015.

The addition of the Super Hornet is welcome news for some. But at what cost? The government is in negotiations with Boeing now, so no one will comment. We do know it will mean that the RCAF will be operating a mixed fleet of fighters for the foreseeable future, which will put a strain on the air force in terms of the personnel that will fly and maintain the Super Hornet, and a strain on the budget that is allocated to the air force. What we don’t know is what increased capability the Super Hornet will ultimately bring to the RCAF—and will it be worth the cost? ■

“

The fact is the capability gap has not been created by the Liberals. Nor have the Liberals changed any policy.”

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New year, new look

BY LISA GORDON

Welcome to 2017! A new year brings with it the chance to step back and consider how we can improve our product for you, the reader.

Each January we tweak the *Skies* design in an effort to enhance imagery, improve readability or elevate our magazine to the next level.

We're never complacent about our mission: delivering the most insightful coverage of Canadian aviation and aerospace packaged with the very best photography, bar none.

This year, some of our changes are obvious and some will be more subtle.

For example, we've migrated all our timely news coverage to our website, www.skiesmag.com. Here, you'll find the as-it-happens coverage that is made possible through the immediacy of online publishing. Visit our new and improved website to read shorter original stories, press releases and relevant headlines we've collected from around the web.

The print magazine has been reserved for our lengthier, more in-depth stories

and custom content. The publication still features all our regular columns—including the popular Instrument IQ and Faces of Flight—as well as longer articles about issues that have a significant and lasting impact on industry.

Some other changes for 2017 include switching to a cleaner, easier-to-read font, adopting a more airy layout style, and the inclusion of custom info-graphics that add value to a feature by summarizing critical information from the story.

Although we're implementing several improvements this year, one thing will never change—our commitment to quality content and imagery. You can expect the same “coffee table” quality that *Skies* has consistently delivered since we launched in 2011.

We're proud to see copies of our magazine in offices, cockpits and hangars, even months after they have been printed. *Skies* is distributed at more than 20 tradeshow and industry events each year, with our research revealing that each print copy is read by about 3.1 people. Thanks for passing us on!

On another front, our *Skies News* e-newsletter has now gone to a daily format. We collect the biggest industry news each day, packaging it in a comprehensive format that allows you to quickly and easily scan for the items that affect you the most. If you're not yet a reader, subscribe to our free e-news at www.skiesmag.com/subscribe.

And speaking of news, 2016 was a very eventful year for Canadian aviation!

Bombardier, Canada's biggest aerospace OEM, secured a \$1 billion capital injection from the Quebec government, followed by an Air Canada purchase, certification of the CS300 and the successful entry into service of both the CS100 and the CS300.

Ultra low-cost airlines announced launch plans, the Bell 505 Jet Ranger X achieved Canadian certification, and we lost one of our brightest stars with the passing of legendary De Havilland Canada test pilot George Neal.

Porter Airlines celebrated a decade in operation and aircraft of all types fought “The Beast” as it ravaged Fort McMurray.

And who can forget the military stories of the year, with the Airbus C295W selected as Canada's next fixed-wing search and rescue platform and the government announcing plans to buy an interim fleet of 18 Super Hornets?

Last but not least, *Skies* test pilot Rob Erdos was a busy guy in 2016, flying the Canadian Coast Guard's Bell 429, the RCAF's CH-149 Cormorant, Textron's Citation Latitude and King Air 350i, and Bombardier's Learjet 75.

We can hardly wait to see what 2017 has in store for our industry!

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Grounded 2020? The ADS-B train approacheth

BY NORM MATHEIS

Perhaps it's time for some plain-speaking, folks.

If you're a Canadian business aircraft owner or his/her chief pilot, management firm or other in a key ops or maintenance role, consider this. It may be better than 50/50 at this point that, due to limited avionics shop capacity, you or your client won't be able to fly to the United States after midnight on Dec. 31, 2019.

If you are generally a forward-planner, perhaps you should be considering ground transportation or going back to the airlines. Sound ridiculous? It's not.

I'm talking to bizav turboprop, turbofan fixed-wing and helicopter owners and managers here. Canadian airlines generally have their Automatic Dependent Surveillance – Broadcast Out (ADS-B Out) avionics mod project in the works or a plan in place; new aircraft are coming equipped, and pilots flying Beech Barons don't have to fly to the U.S.

But, I bet *you* do. Do I have your attention now?

“

The ADS-B Out mandate has a hard date and zero sign of any appetite for extension.”

The U.S. ADS-B Out mandate means that if you want to keep using your Cessna Citation in U.S. airspace, including Alaska, you need a WAAS-capable navigator and you must replace your transponders with “extended-squitter” models.

Yes, there is a thing called a “squit” in our avionics world. This squit contains a bigger bagful of data to broadcast to ground-based infrastructure already in place, which is replacing radar as a means of tracking you on a U.S. air traffic controller's screen. Those are the big-ticket items, and in our business we call this “DO-260B equipage.”

Here's another zinger for you. If I were a manager at one of Canada's fine aircraft management companies I'd be considering asking my clients to sign a waiver, acknowledging that you warned them they will no longer be able to use their aircraft to go to Palm Springs or Dallas-Fort Worth after December 2019, unless equipped.

This is an airspace rule. All aircraft, irrespective of country of registration, must be in compliance in order to operate in U.S. airspace. And Europe will require the same gear six months later in June of 2020.

As of today, only a few of the roughly 1,900 business aircraft on the C-registry are equipped to meet the U.S. ADS-B mandate. Over 9,000 U.S. business jets still have to be equipped. I've personally concluded the reason for these low equipage numbers so far is a combination of human factors, including information overload and the hope that the Federal Aviation Administration (FAA) will blink on this one. Deferring spending and downtime figure in there too, somewhere.

And there's one other reason: Often, we hear owners say they might not have their aircraft for that long. Well, OK, but who is going to buy your non-ADS-B Out equipped aircraft in 2018, when they could choose one that is equipped?

The ADS-B Out mandate has a hard date and zero sign of any appetite for extension. Aviation has had extraordinarily-advanced notice. FAA leadership has taken what looks to be an irreversible position on this issue. Secondary surveillance radars (and VORs, for that matter) are staged for decommissioning.

Are there alternatives to the equipage (and associated costs) mentioned here? Yes. But tread carefully.

ADS-B Out is only the first stage of the FAA's NextGen reinvention of the U.S. air traffic management (ATM) system. Simply put, ATM forward-planning in the United States and Canada assumes you are integrated WAAS navigation/LPV- and datalink-capable. If not, to use our national sport analogy, expect to be spending more and more time sitting in the penalty box. Cheap and cheerful “stand-alone, bolt-on” ADS-B boxes might only be short-term relief.

So, why did I say earlier on in this piece that you may already be in a pickle? One word. Capacity.

There simply aren't enough avionics shops, technicians and aero-engineering firms to do all the work needed, even if all the remaining owners-in-need showed up at a shop with a purchase order tomorrow. There are maybe 100 shops in the U.S. that can install ADS-B Out on a business aircraft. There are possibly 25 in Canada. We hear of shops taking deposits now for future ADS-B Out install slots, like taking a number at the deli counter. By the time this issue of *Skies* hits the street, there will be only about 720 working days left until the mandated deadline.

The closest we've seen to anything like this in years past was the reduced vertical separation minimums, or RVSM, mandate. But here's the thing. That affected fewer aircraft. And if you ran out the clock, you just burned more gas for a couple of months at a bad altitude until you could find a shop that would take you. That isn't an option with ADS-B Out, which will be required in all U.S. airspace where a transponder is required today.

Is there any good news here? Yes. Avionics manufacturers currently provide incentives to early adopters through their dealer networks. There are good avionics shops that do have capacity, right now, if you are in a position to move.

Equipping prior to the mandate will also allow you to benefit now from more direct routings, including clearances direct to airports and fixes, saving time and fuel, since controllers will have more precise data from ADS-B Out-equipped aircraft.

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Norm Matheis is the Canadian regional sales manager for Universal Avionics Systems Corporation.



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Airports: Another Great Divide

BY KEN POLE

For a country that considers itself a bastion of free enterprise, competition and capitalism, our southern neighbour is seriously delusional. Drill down into many industries and you'll find layers of federal, state and even municipal incentives and tax breaks as well as outright subsidies.

Books could be written about this but given space constraints here, let's consider U.S. airports. Most notably, I am referring to those close to the Canadian border and, in particular, New York State's Ogdensburg International Airport (OGS), an hour's drive south of Ottawa (YOW).

OGS is seducing more Canadians with lower fares. OGS-Boston with deep-discount Cape Air, albeit connecting through Albany,

N.Y., can be seriously cheaper than the lowest YOW-BOS round-trip.

Flying mostly Cessna 402Cs, Cape Air has had a monopoly at OGS but Allegiant Air, with a mixed Airbus, Boeing and McDonnell Douglas fleet, is breaking in and could drive down no-frills fares even further. Mind you, some Allegiant aircraft are decades old and there are documented safety issues.

Nevertheless, OGS appeals to Eastern Ontario residents. Its expanded facilities are designed to draw more Canadians, and other U.S. airports are watching.

"An independent study estimates that between 110,000 and 210,000 Canadians from the Ottawa market could be served,"

OGS said in its latest annual report. "The authority's plan to bring a low-cost carrier to the airport is directed at increasing revenues for the airport, as well as increasing bridge traffic and toll revenues, thereby helping to stimulate the local economy."

Its optimism is buoyed by \$25 million in subsidies, mostly from the U.S. Department of Transportation, which considers OGS an "essential air service," one of dozens which stood to lose scheduled service when Congress deregulated airlines in 1978. Those subsidies nationwide have topped \$300 million annually.

Washington's 2015-2016 budget called for spending of \$3.876 trillion, only partly offset by tax revenues of \$3.276 trillion. The \$600-billion shortfall pushes the cumulative U.S. federal debt over \$20 trillion, nearly \$61,000 for every American. Canada's equivalent at the end of 2015 was a record \$612 billion or \$16,817 *per capita*. The overall debt picture in each country is really worse in that those numbers don't include provincial, state or municipal borrowing.

Now there's Donald Trump, about to be sworn in as the 45th President, talking about massive new infrastructure spending, including on airport facilities. And tax cuts, too! The needed funds would come from "infrastructure bonds," another source of subsidies which would exacerbate the debt problem.

"There's definitely disparity in the way our respective governments treat airports; we can't count on subsidies," Krista Kealey, vice-president of communications and public affairs at YOW, told me. "Our model is very much a user-pay model . . . and we also earn through non-aeronautical revenues (parking, retail leases, etc.) to help keep our costs low."

Other costs borne by airports in the National Airports System, which still pay Transport Canada significant rent for their land, include runway improvements, policing and, ironically, fees for facilities required by government entities such as the Canada Border Service Agency.

"Costs are increasingly being downloaded to us," said Kealey. "And every time they download a cost, it makes us a little less competitive."

Canada's unsubsidized airports continue their dialogue with the government. What that might yield is uncertain, but there is an array of government priorities, not the least of which is revenue generation, standing in the way of a level playing field.

Meanwhile, a couple of afterthoughts: Are Americans aware of how the U.S. is effectively subsidizing Canadian travellers with their tax dollars?

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Lessons learned (or lost) from tragedy

BY TONY KERN

One of the unspoken rules of thumb for aviation professionals is not to speculate on the cause of an accident until after the facts are known and the report is in. I've never liked this rule and here's why.

Before we know what the facts are, our minds are free to roam into the land of what might have been. In doing so, we are building thought processes and searching our own experience for relevant information from our past and from our present.

On Nov. 28, 2016, an Avro RJ85 traveling from Santa Cruz, Bolivia, to Medellin, Colombia, crashed shortly before landing. The flight was being operated by LaMia, a small charter airline with a single plane, captained by one of the company's owners, with a first officer who was on her first-ever commercial flight.

The plane was carrying a Brazilian soccer team, which was heading to the South American Cup Finals. Many rumours floated around during the subsequent investigation, including that the flight plan, which was leaked online, showed that the flight duration and the fuel on board were exactly the same; four hours and 22 minutes. The aircraft crashed four hours and 37 minutes after takeoff, killing 71 of the 77 people on board.

The aircraft overflew two airports where it could have stopped to refuel, but instead the crew decided to press on to their destination.

After investigating the accident, Colombia's Civil Aeronautics Agency laid blame on both LaMia and Bolivian authorities for allowing the plane to depart without enough fuel to make its destination.

There were significant human factors associated with this tragedy. They have bitten others in the past, and will do so in the future if we lose the lessons.

First, this was a unique event, a special mission to fly a Cinderella team from a small town to a big game. Unique events have a way of hijacking normally sound judgment.

Lesson 1: *When you find yourself operating outside your normal mission profiles, stay inside the lines of compliance and build in an extra margin of safety.*

Secondly, according to some reports, the team may have been pressed for time to get to its destination. Time pressure is known to dramatically escalate both errors and noncompliance, due to the perceived need to take shortcuts to make deadlines.

Lesson 2: *If you find yourself in a time pressure situation stay inside your normal, compliant, habit patterns. If you find yourself outside these parameters, share the workload and your concerns with others on your crew.*

That leads us to the third human factors issue.

Crew resource management (CRM) is the ability of an aircrew to bring all available resources to the challenge of conducting a safe and effective flight. In this particular case, we know that the captain was an owner of the company and the first officer was on her first flight. This incredibly steep authority gradient likely stifled any valuable input from the FO to the captain during this highly stressful situation.

Lesson 3: *It is the duty of the captain to ensure the active involvement of all crewmembers, and it is the duty of all crewmembers to be assertive enough to ensure the safety of flight.*

In the face of this tragedy, don't lose sight of the human factors involved and the associated lessons. It's an opportunity for all of us to do a little "what if-ing" to refine our own judgment. 

“

There were significant human factors associated with the LaMia tragedy. They have bitten others in the past, and will do so in the future if we lose the lessons.”

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Galen Burrows photographed Chartright's Bombardier Global 5000 at Toronto, taking off in the setting sun to destinations unknown.



How low can you go? **Stuart Sanders** was at the end of the runway in Comox, B.C., to catch Nav Canada conducting runway calibration tests with its Bombardier CRJ-200ER.



You guys done yet? A Porter Airlines Q400 is de-iced at Ottawa's Macdonald-Cartier International Airport.
Jan Jasinski Photo

C295W

FOR CANADA

AIRBUS WILL SUPPLY CANADA'S NEXT FIXED-WING SEARCH AND RESCUE PLATFORM

BY CHRIS THATCHER

Forgive Fernando Alonso for looking a little shell-shocked on Dec. 8, 2016. Just 48 hours earlier, the head of military aircraft for Airbus Defence and Space had been informed at his office in Spain that the company's C295W had won Canada's fixed-wing search and rescue (FWSAR) competition.

Standing in the hangar of 424 Transport and Rescue Squadron at 8 Wing Trenton, Ont., on that cool winter morning amidst government ministers, senior officials, search and rescue technicians and other military personnel, reality began to set in. "Until this morning, I was saying it's not really true," said Alonso. "Now I am starting to believe it is true."

Though an early December announcement about the FWSAR competition had been expected for several months, the winner remained a closely guarded secret up until two days before the formal press conference. Air force public affairs officers and executives with Airbus admitted it was a scramble to coordinate an event.

"I only found out yesterday that Airbus won this competition," acknowledged LGen Mike Hood, commander of the Royal Canadian Air Force (RCAF), while standing in the hangar at Trenton.

"People don't believe how good [the government] was at keeping it quiet," said

Simon Jacques, head of Airbus Defence and Space in Canada.

The announcement of a dedicated search and rescue aircraft to replace the RCAF's fleet of CC-115 Buffalos and the CC-130H Hercules assigned to SAR duty concluded a procurement competition that has sputtered hot and cold over the past 14 years, since it was first declared a government priority in 2003.

The \$2.4 billion contract will be rolled out in two phases. The first includes delivery of 16 aircraft, beginning in 2019 and concluding by 2022, as well as construction of a new training centre in Comox, B.C. The second will cover five years of maintenance and support.

The agreement includes options to provide maintenance and support services for an additional 15 years, bringing the total value to \$4.7 billion.

The advanced capabilities of the C295W, in particular its integrated radar and sensor suite and communications and data management systems, represent a new paradigm for search and rescue, according to Hood.

RCAF FWSAR crews respond to over 350 missions each year across an 18 million square-kilometre area of responsibility (AOR) that extends from the Pacific Ocean to the North Pole and well out into the eastern Atlantic. The increased endurance



Watch the video [here!](#)



With the announcement that Airbus' C295W will be Canada's next fixed-wing search and rescue platform, the Canadian government concluded a torturous procurement decision that has dragged out over the past 14 years. **Airbus Image**





ABOVE: Representatives from the RCAF, the Canadian government and Airbus Defence and Space gather behind a model of the Airbus C295W at CFB Trenton on Dec. 8, 2016. **Warren Liebmann Photo**

RIGHT: RCAF Commander LGen Mike Hood told press conference attendees that with the C295W, “search and rescue is going to become a lot less about search and a lot more about rescue.” **Andy Cline Photo**

OPPOSITE: Using computer modelling, the C295W was assessed against more than 7,000 search and rescue incidents to which the RCAF has responded in the past five years. The new aircraft and the RCAF’s other SAR assets, including the reliable CH-149 Cormorant helicopter (shown here), will cover Canada’s 18 million square-kilometre area of responsibility. **Mike Reyno/Airbus Photo**



of the C295W, as well as its ability to identify and track up to 200 search objects simultaneously, in low light and poor weather conditions, and share that data in real time with other military and civilian partners in the air, on the ground or at sea, “will fundamentally change the SAR paradigm for us,” said Hood. “I believe search and rescue is going to become a lot less about search and a lot more about rescue.”

“This aircraft is a game-changer for search and rescue in Canada,” said Defence Minister Harjit Sajjan. “It represents a great technological improvement of our [SAR] capabilities for the future.”

Alonso, who earlier in his career conducted cold weather testing of various Airbus planes in Iqaluit, N.W.T., said the C295W was well prepared for Canada’s

harsh winter climate. “Your country is very kind to offer the most horrible operation conditions that people can experience,” he said.

In a twist on the usual bidding process, companies were asked to suggest basing solutions to most effectively cover the AOR. Airbus’ proposal maintained the air force’s current operating bases in Greenwood, N.S.; Trenton; Winnipeg, Man.; and Comox. The exact distribution of the new aircraft, however, would be “defined more accurately in the days to come,” said Hood.

The C295W features two Pratt & Whitney Canada PW127G turboprop engines, an Airbus integrated tactical system, and an L-3 Wescam advanced electro-optical/infrared turret system.

CAE will construct and deliver the simulator-equipped training centre while PAL Aerospace, under a joint venture with Airbus called AirPro, will provide the in-service support.

Other partners to date include Heroux-Devtek for landing gear repair, Hope Aero for propeller repair, Precision Aero for repair of various other components, and Sonovision for technical publications.

Under the government's Industrial and Technological Benefits policy, Airbus will be expected to make investments in Canadian companies equal to the value of the contract. Since C295W assembly and systems integration are already performed in Spain, most of that will come in the form of indirect benefits as Airbus seeks more Canadian content for its global supply chain.

Pablo Molina, head of Airbus Military Aircraft Canada, said Airbus is still seeking some components for the C295W, but emphasized in its bid that the plane was fully assembled and certified as a means to minimize risk. Jacques added that the aircraft already contains about 20 per cent Canadian components.

Airbus has now sold over 170 C295 aircraft to almost 25 customers, including a dedicated SAR platform to Portugal, with a large Atlantic Ocean area of responsibility, and Finland, with Arctic search requirements. An earlier variant, the CN235, is operated by the U.S. Coast Guard as HC-144A Ocean Sentry for maritime patrol, transport, ISR and disaster relief.

"END-TO-END SOLUTION"

The FWSAR project has suffered a tortured history. Though both Liberal and Conservative governments deemed it a priority, a request for proposals (RFP) to replace the six remaining CC-115 Buffalos, which first entered service in 1967 as tactical transport aircraft, was repeatedly delayed. The statement of requirements (SOR) was changed multiple times and on several occasions media leaks suggested the government was considering a sole-source deal for the Alenia C-27J Spartan.

In 2009, the National Research Council of Canada (NRC) was asked to review the SOR. Its final report, released in March 2010, concluded that the requirements were "over-constrained" and limited the number of potential bidders.

By that point, however, a half dozen potential bidders were offering suggestions for the FWSAR project, including Bombardier and its Dash-8, Viking Air with a new build of the DHC-5NG Buffalo, Lockheed Martin and the C-130J Hercules, and Bell-Boeing with the V-22 Osprey.

In the wake of the NRC report, the government also weighed the merits

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of a two-fleet solution and considered “alternative service delivery” models that would have allowed industry to assume more of the SAR role.

When the 200-page RFP was finally released in March 2015, the field had slimmed to three: Airbus, Leonardo (Alenia), and Embraer Defence, a late entrant with its KC-390 that is still under development in Brazil.

Among the evaluation measures, each aircraft was assessed against more than 7,000 SAR incidents to which the RCAF has responded in the past five years, using a computer model to measure response time to reach the search area, time on station and recovery time.

The RFP also took a different approach. Rather than seek a like-for-like replacement of the aircraft, Public Services and Procurement invited industry to submit proposals for “detailing an end-to-end solution,” including basing requirements, number and type of aircraft, and training and maintenance program, what Minister Judy Foote called a “complete search and rescue service.”

“If you ask industry, this was the first time they have ever been so engaged,” she told *Skies*, noting that Canadian companies have expertise that can help solve these sorts of challenges, including the longer-term in-service support (ISS) that often exceeds the initial acquisition costs.

“Our overall objective is to establish a long-term collaborative relationship with industry to sustain our equipment and fleets,” Foote told an aerospace industry audience in November. “[We want] to find ways to encourage contractors to be more efficient and innovative and build flexibility into contracts to adapt to changing needs over time.”

“This is a change in how procurements have been done all across the world,” said Molina. “Now you will see more capability-based requirements instead of very technical and directed requirements. A combination of best products, services and partners is what makes capability... and having the best partners in the country has helped us.”

The announcement was a blow for Leonardo, which had been considered by many as the leading contender almost since the FWSAR project was first launched in 2003. The C-27J Spartan has greater speed and endurance, and could better “put first responders on station” to do their work, retired LGen Steve Lucas, a spokesperson for Team Spartan, told *Skies* at a briefing in November.

The team, which included General Dynamics Mission Systems–Canada, DRS Technologies, KF Aerospace, and IMP Aerospace, planned to assemble the C-27J, including its flight management and mission systems, at IMP’s facilities in Halifax,

N.S. Leonardo and General Dynamics were proposing a joint venture called Spartan Aviation Services to serve as the ISS integrator.

At the time of contract announcement, Team Spartan said it had no comment on the decision pending a government debrief.

Foote said both the C295W and C-27J were deemed compliant. After a fair and transparent competition, “it came down to the cost,” she said, which was worth 25 of 100 points in the evaluation process.

Winning the long-running FWSAR competition is undoubtedly a coup for Airbus. But it might be just the first Canadian footprint for the C295W. Earlier this year, the manufacturer toured the North with a Mexican Air Force plane to highlight its endurance, cargo capacity and self-sufficiency to commercial airline operators looking to replace aging fleets with more robust alternatives. Airbus will be hoping one success story feeds the other. ✚



Chris Thatcher is an aerospace, defence and technology writer and a regular contributor to *Skies*.



Serving alongside the CH-149 Cormorant, the new fleet of Airbus C295Ws will be based in Greenwood, N.S.; Trenton, Ont.; Winnipeg, Man.; and Comox, B.C.
Mike Reyno/Airbus Photo

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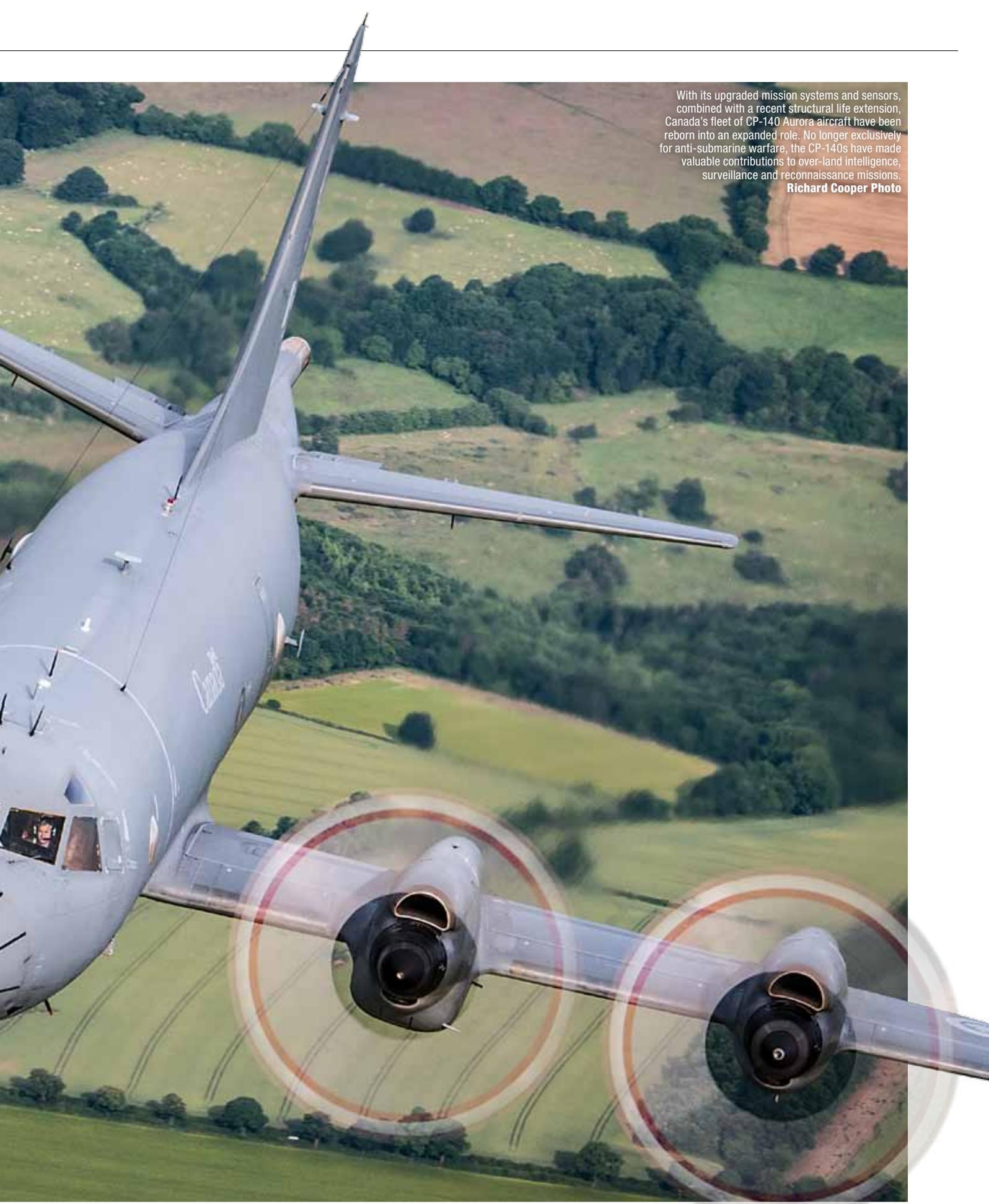
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An aerial photograph of a military aircraft, likely a transport plane, flying over a lush green landscape with fields and forests. The aircraft's wings and engines are prominent. Two large, semi-transparent, circular sensor cones or radar beams are overlaid on the image, centered on the engines and extending outwards. The cockpit area is visible on the right side of the aircraft.

OPERATION INNOVATION

SKIES DISCUSSES THE ROYAL CANADIAN AIR FORCE'S PURSUIT OF TRANSFORMATIVE CHANGE WITH COMMANDER MIKE HOOD.

BY CHRIS THATCHER



With its upgraded mission systems and sensors, combined with a recent structural life extension, Canada's fleet of CP-140 Aurora aircraft have been reborn into an expanded role. No longer exclusively for anti-submarine warfare, the CP-140s have made valuable contributions to over-land intelligence, surveillance and reconnaissance missions.

Richard Cooper Photo

Simulation plays a vital role in the modern RCAF. In addition to saving wear and tear on the aircraft fleet, simulator time helps crews hone world-class skills when faced with scenarios that would be very difficult to replicate in the real world. **Mike Reyno Photo**



RCAF Commander LGen Mike Hood is focused on promoting innovation within the air force. **DND Photo**



The RCAF currently needs CF-188 pilots and technicians. Hood said those positions must be filled in preparation for the coming Super Hornet fleet. **Jeff Wilson Photo**



When Ashton Carter was sworn in as U.S. Secretary of Defense, he urged the Pentagon to “think outside this five-sided box” and set about, as one of his top priorities, “stoking its innovative culture.”

Along with renewed investment in research and development, Carter stood up the Defense Innovation Unit-Experimental, or DIUx, an initiative to accelerate the growth of new capabilities for the warfighter by connecting the Pentagon with technology hubs in Silicon Valley, Boston and Austin, Texas.

“We cannot afford to be bureaucratic, too slow to act or risk-averse, nor to discourage thinking differently,” he wrote recently to explain his approach to encourage more innovation.

LGen Mike Hood may not have had Carter in mind when he assumed command of the Royal Canadian Air Force (RCAF), but he has followed a similar path in pursuit of instilling an innovation culture.

Like Carter, Hood can recall a not-too-distant past when the RCAF was a leading institution for innovation, breaking new ground with the Avro CF-105 Arrow, the G-suit, and space technology.

“We have kind of lost our innovative edge as we downsized through the years and focused on our core operational piece,” he said in a recent interview with *Skies*. “I believe to be successful in the future, we have to become a lot more innovative.”

Not surprisingly, then, his top priority isn’t a complex deployment or a hot-button procurement project. While those are

certainly a constant on his radar, he has faith in the people around him to manage the issues of the moment. Instead, Hood’s focus is squarely on the air force of 2030.

“My watch is about making sure the institution is capable of managing future challenges,” he said.

And as the RCAF transitions to new fleets of fighter jets, strategic airlift, ISR (intelligence, surveillance, reconnaissance) platforms, aerial refuelling, search and rescue, tactical aviation and even unmanned systems, all of which herald massive leaps forward in technology and capacity, Hood believes there is an opportunity to reconnect with that innovative past.

Providing, of course, he has the right culture to achieve that goal.



The C295W’s enhanced sensors and radar will “fundamentally change the search and rescue enterprise,” according to Hood. **Airbus Image**



Canada's CH-148 Cyclone maritime helicopters are now well into test and evaluation. Crews are reportedly impressed with their anti-submarine and above-water warfare suites. **MCpl Jennifer Kusche Photo**



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TECH HUB

The first signs of a cultural shift are already taking shape. As part of a broader effort to “flatten” the organization and encourage the flow of innovative ideas from all ranks, Hood introduced a Vector Check that draws inspiration from the popular TV show, *Dragon's Den*. About once a month, senior leadership gather via videoconference to hear 10-minute pitches about ongoing projects and new initiatives. It is an opportunity to ensure a project is on the right track and has leadership investment. But it's also a means for new or better ways of doing something to surface, with ideas coming from headquarters to the flight lines.

More recently, Hood kick-started work to establish an air force innovation hub in the heart of the Region of Waterloo's technology triangle, acquiring space in Communitech, an ecosystem of start-ups, global companies, academia, government, and tech incubators and accelerators.

The goal isn't necessarily to solve the air force's technology challenges, though all solutions will be welcomed, but rather to immerse up to eight non-commissioned and junior officers at a time for a three-month period in an entrepreneurial environment where they can learn best practices and develop "an innovation mindset."

"The ecosystem is incredible," said Hood. "It is probably in the top three places in the world for start-ups and innovative approaches. And I want to tap into that."

"Maybe we will give them some vexing problems to tackle, but it is more about creating the culture that these people are then going to bring back to their organizations."

As an example, he pointed to communications in the Arctic. At present, signals intelligence gathered at Canadian Forces Base Alert is microwaved 500 kilometres south before it can be linked with a satellite and transmitted to Ottawa, and even then the satellite dish is pointed at 90 degrees.

"Imagine operating UAVs [unmanned aerial vehicles] and prosecuting warfare in the North and the information challenges around that," he said. "I don't know how we are going to solve that yet, but I am trying to build the culture where we can be ready if that need arose."

He has also negotiated fellowship programs at two Canadian universities and secondments at several technology companies, including Open Text, a company with which he once spent a semester, to give mid-career officers and non-commissioned members educational and work experiences that could return more creative thinking to the air force.

Hood is fully cognizant that much of this is counterintuitive to a chain of command that thrives on hierarchy. But after a tour of Communtech and facilities at the University of Waterloo, the conversation among his general officers convinced him the approach could work.

"I'm prepared to invest some energy and if we fail, it's fail fast and on to the next good idea," he said. "But I can tell you that all of the general officers in the air force are encouraged and supportive. To have the culture I want, I believe [this technology hub] is going to be an important facet of preparing the air force for 2030."

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The focus on innovation comes as the RCAF “rebalances” some of the functions of its three core pillars: 1 Canadian Air Division, which, in addition to being the Joint Force Air Component Commander for operational deployments and the commander of the Canadian North American Air Defense Region, is also responsible for the force

generation of equipment; 2 Canadian Air Division, responsible for training and education; and the Canadian Forces Aerospace Warfare Centre (CFAWC), its doctrine, concept development and experimentation centre.

The arrival of new fleets of aircraft with more advanced sensor suites and the torrent of data they are generating

will cut across all three pillars, affecting warfighting capabilities, training, and future operating concepts. The RCAF has long held that every platform is a sensor and every sensor is a node on its network, putting a premium on data collection, analysis and dissemination, as well as the strength of the network architecture that supports those

functions, even as quantum computing threatens to shatter the ability to protect that data. But optimizing an air force for the digital age means rethinking traditional roles and responsibilities.

“I talk about the RCAF as the guarantor of Canadian sovereignty. Today that is a physical presence,” Hood said. “In 2030, it may be that data sovereignty is more important than actual sovereignty. And ensuring the movement and integrity of all that information is a challenge that I don’t think many of us fully comprehend.”

As a result, the air force is examining the amalgamation of trades such as signals, communications and electronics, navigation, electronic warfare, air weapons control and unmanned systems into a more “fulsome warfighting trade.”

“I can conceive that they may be the most important warfighters in the air force in 2030, not the fighter pilot,” he said. “Although all of those trades will have bespoke things that they will do, the warfighting domain that RCAF air power is operating in is much broader and everyone needs to have an understanding of that.”

That digital imperative is also driving changes to the RCAF’s Future Aircrew Training (FaCT) Project, which will bring the training of pilots, air combat systems officers and airborne electronic sensor operators under one cohesive umbrella—whether or not Canada eventually acquires the Lockheed Martin F-35A Joint Strike Fighter as its next-generation fighter jet.

“We are beginning to imagine how all of those pieces are going to fit together,” he said. “Fifth generation is a huge forcing function on many air forces around the world. The Australians have tackled this with their Plan Jericho, which outlines how they are going to operate and fight in a fifth-generation environment. As an interoperable air force, I need to be able to do the same thing irrespective of where we are with fifth generation as a potential.”

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Hood's focus is squarely on the air force of 2030.”

RENEWAL AND ACQUISITION

As one might expect, Hood has been primarily focused on the people side of the innovation equation. In part, that's out of necessity. Changes to culture and internal policies will be critical if the RCAF is to meet the expectations of the millennial generation it must recruit. And with so many aircraft fleets in some stage of transition, including the delivery of new fleets, the training system will require further investment.

For Hood, the influx of new aircraft and young, digitally inclined people means

the air force is growing, a vastly different position from his recent predecessors who have managed declining budgets and personnel. It's also an opportunity to assess the technology requirements of new and future platforms to push the innovation agenda further.

As 2016 came to a close, the federal government announced a three-pronged approach to the replacement of its 35-year-old fleet of CF-188 Hornets: a program to extend the structural and operational life of the current fleet of 76 fighter jets for 10 to 15 more years; an open competition to select the

Hornets' eventual replacement; and the start of negotiations with the U.S. government and Boeing Defense and Space on the possible acquisition of an interim fleet of 18 F/A-18 Super Hornets.

The need for an interim fleet is based upon the Liberal government's interpretation of existing policy—namely, that Canada must be able to meet its NORAD and NATO obligations simultaneously.

That means that whatever fighter eventually replaces the Hornet, the total requirement would exceed 65 aircraft. (The previous Conservative government had proposed acquiring 65 F-35As.)

Before the RCAF takes on an interim fighter fleet, however, Hood first has to bring the extant fleet and its aircrews and maintainers up to 100 per cent.

“We are short some technicians and some pilots,” he said. “I would then use that crew force as the engine to force-generate additional capability [for the Super Hornet]. With the information I have now, I would stand up a separate squadron unique to the new platform, and protect my extant crew force.”

The new squadron would likely be based at 4 Wing Cold Lake, Alta., he added.

The CF-188 Hornets are but one of several aircraft fleets the RCAF is either preparing to replace or upgrade. In December, the government signed a contract with Airbus Defence and Space for delivery of 16 C295W search and rescue aircraft, a new training centre and up to 20 years of in-service support to replace the CC-115 Buffaloes and CC-130H Hercules. As with new fighters, enhanced sensors and radar will “fundamentally change the search and rescue enterprise,” said Hood.

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AIRBUS

Hood also has to consider the possibility of midlife upgrades for the CH-149 Cormorant (shown here) and CH-146 Griffon. **Mike Reyno Photo**



history by former Defence Minister Peter MacKay, the CH-148 Cyclone maritime helicopters are now well into test and evaluation, and impressing crews with their anti-submarine and above-water warfare suites.

JUSTAS, the joint unmanned surveillance and target acquisition system, is again a growing priority as shipping and other activity increases in the Arctic. The tentative date for a contract award is 2021, but Hood would be “keen” to accelerate the program if possible. Public Services and

expanded from 14 to 21 by converting seven VH-71 airframes, airworthy variants of the AW 101, that were acquired from the U.S. government in 2011 for spare parts.

Hood is a proponent of the idea, but said it wouldn’t happen unless the manufacturer is able to bring down the repair and maintenance costs of the extant fleet. “I believe once we get there, the conditions will be set for me to drive forward with a Cormorant midlife update and I want to see the VH-71s included in that,” he said. “But until such time as they can deliver on

of the Aurora Incremental Modernization Project, which will deliver beyond line-of-sight satellite communications and Link 16 tactical data exchange, Hood is already looking to what comes next when the platform retires around 2030. He has challenged his team “to imagine how we continue to develop the world-leading ASW capability and put that into a Canadian platform” such as a Bombardier C Series or Q400.

“Why do I need to go anywhere else? We have it right here,” he said. “The technology needs to continue to develop



A CH-146 Griffon helicopter flies over an Iraqi village during Operation Impact in Northern Iraq on Nov. 23, 2016. **DND Photo**

Procurement Canada sought new costing information from industry in January 2016, and Hood said the soon-to-be-released Defence Policy Review (DPR) might provide an indication of how the government would like to proceed, including whether to acquire separate domestic and expeditionary UAVs or compromise on a single system.

Hood also has to consider the options of midlife upgrades for the CH-149 Cormorant and CH-146 Griffon. Under a proposal from manufacturer Leonardo (formerly AgustaWestland), the search and rescue Cormorant fleet could be

what the department has asked in the way of reducing cost, I’m a little stuck.”

The Griffon presents a different opportunity that could be informed by the outcome of the Defence Policy Review. Though a limited life extension project to upgrade avionics and some communications systems is planned, the RCAF is also considering whether it might be wiser to invest in another platform to support other investments in tactical aviation.

His most intriguing program, however, might be a future ISR platform. As the CP-140 enters the fourth, and final, block

and it will. I should be starting to do some experimentation now.”

Adopting a Canadian-built aircraft into the RCAF’s next ISR platform is but another example of his broader innovation agenda.

“I want to be at the leading edge of that,” he explained. “I want to be working with Canadian industry, favouring Canadian industry, and I want to create that innovation culture to maybe get the RCAF back to where it was at one point in time where it drove a lot of the innovation. That is a laudable goal but I’m under no illusions about how hard it will be to get there.”

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BY LISA GORDON



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With 76 aging CF-188s operating at a serviceability rate of roughly 50 per cent, Canada's current ability to meet its NATO and NORAD obligations simultaneously is severely limited. Enter the interim fleet of 18 Boeing F/A-18 Super Hornets. **Jeff Wilson Photo**

On Nov. 22, 2016, the Canadian public was informed of an urgent “capability gap” within the fighter jet force structure of the Royal Canadian Air Force (RCAF).

After analyzing the situation, Defence Minister Harjit Sajjan and other senior government and military members held a press conference that day to announce a three-part plan designed to guide the replacement process for Canada's greying fleet of CF-188 Hornets.

“We will launch a wide open and transparent competition to replace the CF-18 fleet,” Sajjan told the press. “The first step will begin in the months ahead. In addition, we will enter into discussions immediately with Boeing for a fleet of 18 Super Hornets to address the capability gap. Third, the Canadian Armed Forces will implement a range of new measures to extend the life of the current CF-18 fleet.”

Canada's CF-188 Hornets—which first entered service in 1982—have had their airframes and missions systems upgraded periodically to keep them safe and operationally relevant, but it's been clear for years that a replacement must be found.

What hasn't been as clear is why, according to the Canadian government, the situation is now so urgent as to prompt immediate negotiations with Boeing Defense for the purchase of an interim fleet of 18 Super Hornet fighter jets.

Why could Canada not launch an open competition now and make do with the existing Hornets until a successor was named?

After all, even RCAF Commander LGen Mike Hood testified to the Senate Committee on National Security and Defence on Nov. 28, 2016—nearly a week after the press conference—that all 76 Hornets are able to safely fly until 2025 or later, having been upgraded to stay “active and relevant” until a final replacement could be found through an open competition process.

So why the urgency? According to government sources, it's all a matter of policy interpretation. They say that currently, Canada cannot simultaneously meet its commitments to the North Atlantic Treaty Organization (NATO) and the North American Aerospace Defense Command (NORAD) while maintaining its own sovereignty. The word “simultaneously” is the key here. In other words, if those three priorities came knocking at the same time, Canada would be unable to respond effectively.

With 76 aging CF-188s operating at a serviceability rate of roughly 50 per cent, Canada's current ability to meet its obligations in a meaningful way would be severely limited.

“We should never have allowed this to happen in the first place,” said one source. “We enjoy the protections of NATO [and NORAD] and it would be irresponsible if we could not provide capability because we are stretched too thin.”

And, according to Sajjan, that's a reality the current government is not prepared to

“risk manage”—as previous governments are accused of doing—in the hope that the worst case scenario will never unfold.

“We have an obligation to have a certain number of fighters ready for NORAD and NATO. However, the number of mission-ready planes we have today is less than the obligations to NORAD and NATO taken together,” he said. “The objective of our government is to fix that gap as soon and as effectively as possible.”

And so, without further ado, the Canadian government launched discussions with Boeing—negotiations that were underway at the time of writing in mid-January 2017.

TAKING HEAT

The decision to purchase an interim fleet of Boeing Super Hornets has been criticized by the press and former military officials alike.

They cite many reasons why the plan doesn't fly—not the least of which is that the Liberals were elected on the basis of a platform which promised “an open and transparent competition” to replace the CF-188 Hornets. Instead, the government's decree that it will sole-source the purchase of an interim fleet seems like anything but open and transparent.

Not to mention that cost projections for 18 Super Hornets have remained murky so far—in response to reporters' questions, Public Services and Procurement Minister Judy Foote only said, “The cost must be acceptable to Canada. We must sit down with Boeing and see what they can provide—we want the best service and [the best] capability. If a fair price is negotiated, that price will be made public.”

Indeed, Parliamentary Budget Officer Jean-Denis Fréchette has given the Department of National Defence until Jan. 31 to comply with a request to provide cost estimates for the interim Super Hornet acquisition.

Critics also believe a Super Hornet purchase now stacks the deck in favour of the Boeing jet during the future competition to replace the entire fleet, which is expected to take up to five years from the release of the government's Defence Policy Review, expected this spring. Prime Minister Justin Trudeau has gone on record several times with his doubts about the F-35, an aircraft he said while campaigning that Canada would not buy if the Liberals were elected.

Capability-wise, there are accusations that the government is wasting Canadian taxpayer money on the Super Hornet, a so-called fourth-generation “dinosaur” that pales in comparison to the promised abilities of Lockheed Martin's stealthy, fifth generation F-35 Lightning II.

Finally, if Canada did buy the F-35 following the competition process, then that leaves us with the question of what to do with the Super Hornets? They will still be young jets—certainly by CF-188 Hornet standards—but operating a mixed fleet will be costly and inefficient for an air force as small as Canada's, critics say.





THE RIGHT CHOICE FOR RIGHT NOW

Generally speaking, the selection of any aircraft is driven by a country's mission profile.

"Your needs are determined by your missions," said another source who also requested anonymity. "The public needs to understand how these 18 new aircraft will be able to address the need to meet our NATO and NORAD missions concurrently and why we therefore need more aircraft."

"There's been no change in policy. Our ability to respond to those commitments concurrently with adequate numbers of aircraft and people has become increasingly difficult over time due to such things as

the Forces Reduction Program, the CF-188 modernization program, and the age of the CF-188 resulting in decreased serviceability."

The addition of 18 new Super Hornets to the existing fleet of 76 CF-188s will give the air force greater latitude to meet both discretionary and non-discretionary missions.

As one source said, "The RCAF must manage these commitments, but it's up to the government to ensure they can do so. The Super Hornet is at the FOC (final operating capability) stage versus IOC (initial operating capability), like the F-35."

To those who claim the Super Hornet program is winding down, Boeing says otherwise. Roberto Valla, the company's vice president of global sales, told *Skies* that the U.S. Navy will be flying the Super

Hornet [alongside the F-35] through 2040. "We are working with the Navy on a robust service life extension plan and continually inserting new capabilities to keep the aircraft relevant for decades to come," he said.

And in the U.S. Marine Corps, the F-35 is set to replace the legacy F/A-18 Hornets and the AV-8B Harrier.

An interim fighter purchase will boost the Canadian fighter fleet by some 19 per cent. It will also increase capability significantly, with the Super Hornet presenting some unique benefits.

"That aircraft works best with our current infrastructure and is the quickest way to get capability," emphasized one source. "The Super Hornet comes with known capital and sustainability costs and is ready



FAR LEFT: The Super Hornet is compatible with Canada's existing air tankers and can also function as a tanker on its own to refuel other fighters. **USN Photo**

MIDDLE LEFT: (L-R) Gen Jonathan Vance and Ministers Harjit Sajjan and Judy Foote announce plans to explore a Super Hornet purchase. **Cpl Mark Schombs Photo**

BOTTOM LEFT: The Growler would bring a new capability to the RCAF. But this would mean an increase in acquisition costs and manpower. **Boeing Photo**

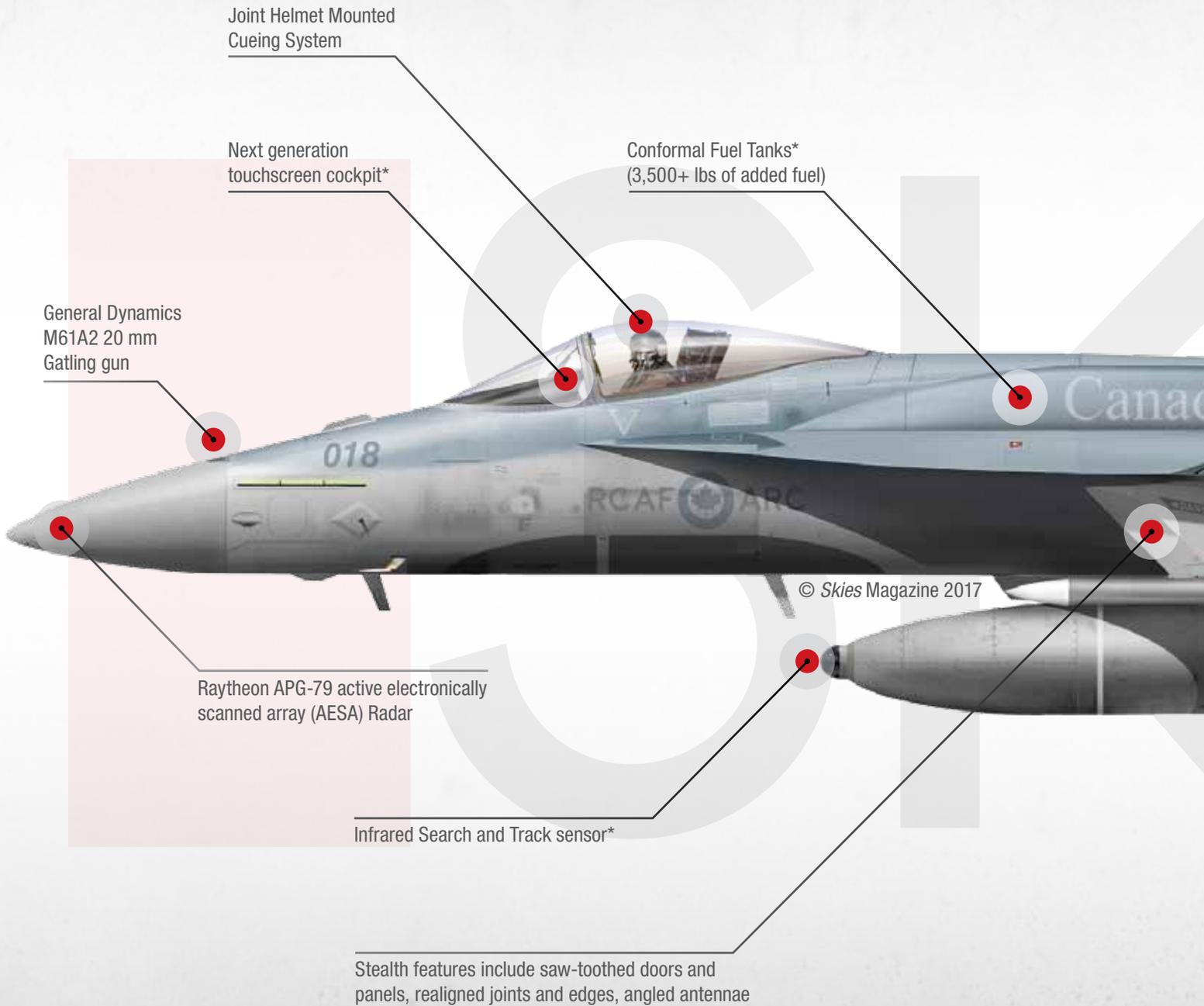
LEFT: Boeing has proposed many enhancements that are found on the Advanced Super Hornet. **Boeing Photo**

BELOW: The optional Super Hornet advanced capability cockpit includes a large 11 x 19-inch moving map display. Pilots can view six different screens at the touch of a finger. **Boeing Photo**



BOEING CF-188E SUPER HORNET

Ugo Crisponi Illustration



*Part of the Super Hornet's optional advanced capability package

Length:
60 ft 1¼ in (18.31 m)

Wingspan:
44 ft 8½ in (13.62 m)

Height:
16 ft (4.88 m)

Wing area:
500 ft² (46.5 m²)

Empty weight:
32,081 lb (14,552 kg)

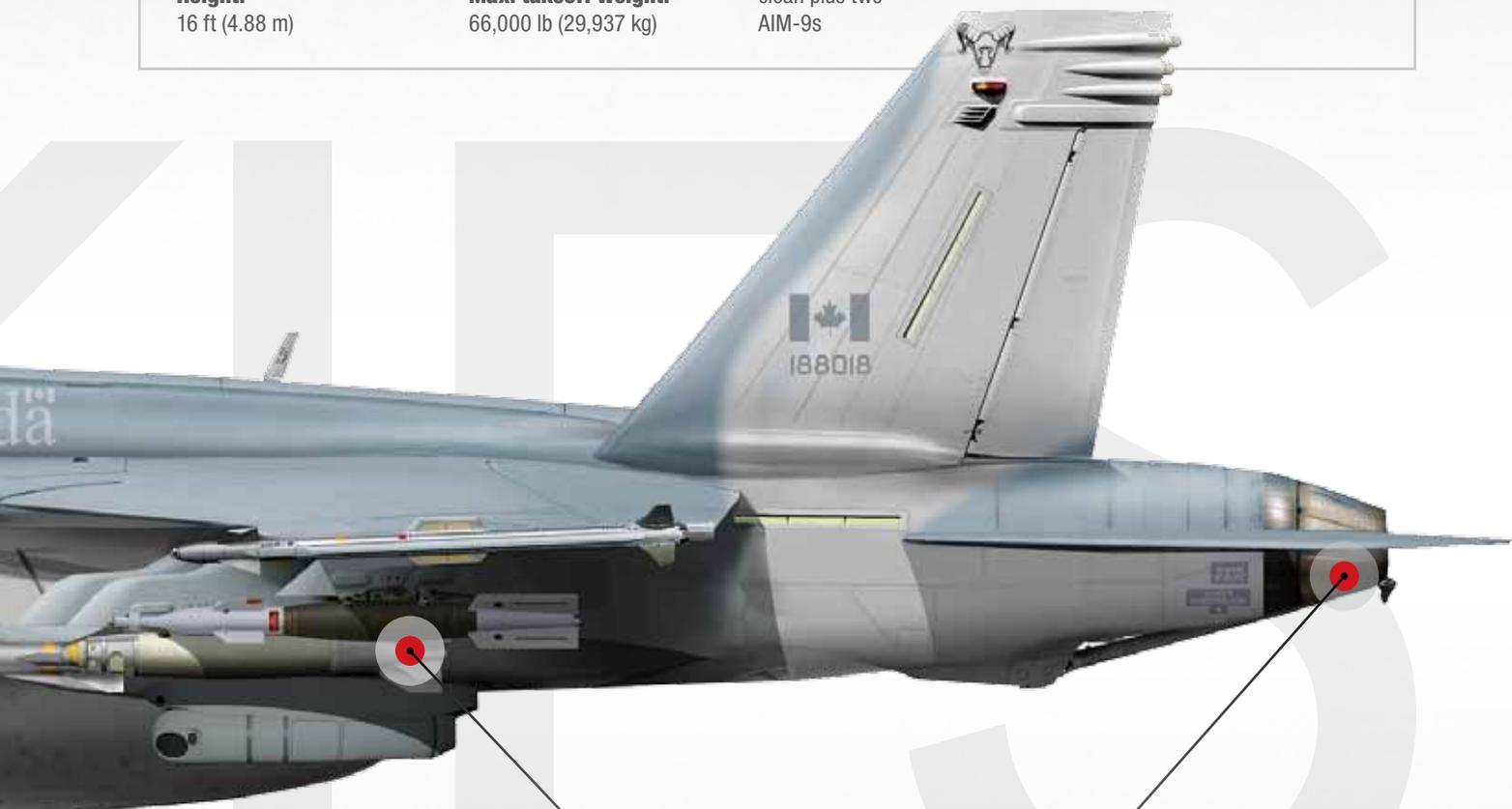
Max. takeoff weight:
66,000 lb (29,937 kg)

Max. speed:
Mach 1.7+ (1,260 mph, 2,030 km/h)
at 40,000 ft (12,190 m)

Range:
1,275 nmi (2,346 km)
clean plus two
AIM-9s

Ferry range:
1660 nm (3,054 km)

Service ceiling:
50,000+ ft (15,000+ m)



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F414-400 Turbofan engines

Hard points: 11 total: 2x wingtips, 6x under
wing, and 3x under fuselage with a capacity
of 17,750 lbs of fuel and weapons.





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to go now while the F-35 is in the system design and development (SDD) phase.”

A memo dated Aug. 9, 2016, and prepared by J. Michael Gilmore, director of the Operational Test and Evaluation Directorate of the U.S. Department of Defense, indicated that although the U.S. Air Force declared IOC with the Block 3i configuration of the F-35A, the fighter would not hold up against the criteria of initial operational test and evaluation (IOT&E).

“If used in combat, the F-35 in the Block 3i configuration, which is equivalent in capabilities to Block 2B, will need support to locate and avoid modern threats, acquire targets, and engage formations of enemy fighter aircraft due to outstanding performance deficiencies and limited weapons carriage available...,” wrote Gilmore.

In other words, if deployed this past summer, the F-35 would have necessarily been accompanied on a combat mission by fourth generation fighters.

Gilmore also pronounced the program “on a path toward failing to deliver the full Block 3F capabilities for which the Department is paying almost \$400 billion by the scheduled end of System Development and Demonstration (SDD) in 2018.”

But while doubts have clearly been expressed about the F-35, sources who spoke to *Skies* said the program is trending well, with costs coming down and capabilities coming up. However, “we understand the capabilities of the Super Hornet today; the F-35 brings its IOC and what it can do today.”

In other words, they believe it’s not a question of which fighter is ultimately the best fit for the Canadian mission profile—it’s a question of which interim jet is the right choice for the country *right now*, in the face of what the federal government deems an unacceptable capability gap.

PERFORMANCE IN THE FIELD

The F-35’s claim to fame has always been its stealth capability, the argument being that if the enemy can’t see you they can’t hurt you.

But while a stealthy airframe is undoubtedly an advantage, “an element of stealth with a healthy electronic warfare capability is perhaps a more balanced approach,” said one source.

And, while Lockheed Martin works diligently to perfect the F-35, countries like Russia and China (as well as the U.S. and its allies) are also working hard to improve existing low-frequency radars for early-warning purposes and to get a general idea of where stealth aircraft are operating. While these radars may not be able to pinpoint stealthy aircraft with enough accuracy to fire upon them, they are reportedly able to pick out their general location.

In the meantime, the Super Hornet’s upgraded AESA (active electronically



scanned array) radar represents an “exponential leap in technology needed for current and future missions,” said Boeing’s Valla.

That AESA radar has been called a “force multiplier” by some sources, who say that just one Super Hornet will be able to see and share valuable data with the classic CF-188 fleet through a datalink capability.

Another knowledgeable source told *Skies* that the Super Hornets’ AN/APG-79 AESA radar hardware is essentially equivalent to the AN/APG-81 on the F-35. “Radars are the same,” he said. “They use different algorithms to produce information for the pilot. Other onboard sensors such as FLIR (forward-looking infrared) andIRST (infrared search and track) complement the radar.”

He added that the U.S. Navy’s Super Hornets and EA-18G Growlers (an electronic warfare variant of the Super Hornet) are all tied into the Navy’s digital network, which feeds each aircraft a steady stream of data from a variety of sources, including satellites and unmanned platforms, for a complete and comprehensive picture of the operating environment.

“This is the ultimate sensor fusion,” said the source. “The F-35’s sensor fusion will come through the Navy’s digital network as well. But the Growler underpins the current U.S. Navy capability.”

OPPOSITE: The Super Hornet will bring a new capability to the RCAF. But will the air force be able to meet the manpower requirement to fly and maintain two fighter fleets? **Capt Andrew Jakubaitis Photo**

ABOVE: The Super Hornet will be operated by the fourth largest air force in the world, the U.S. Navy, well into the 2040s, alongside the Lockheed Martin F-35C Lightning II. The F-35C was never intended to replace the Navy’s Super Hornets. **US Navy Photo**

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CANADIAN SUPER HORNETS

With negotiations currently underway, Canada will be looking to get the best deal possible in terms of equipment and support.

So what might the ideal Canadian Super Hornet look like?

“At a minimum, I think our Super Hornets should have conformal fuel tanks and the same updated cockpit as the U.S. Navy [with AESA radar],” said one source, who is also in favour of painting the traditional Canadian false canopy on the bellies of the new jets.

In an ideal situation, CF-188s belonging to one of the four existing fighter squadrons would see their aircraft redistributed elsewhere; subsequently, that unit would transform into a Super Hornet squadron.

Such an arrangement would utilize existing personnel to maximum effect.

Our sources say Cold Lake is the preferred location for Canada’s new jets, with a squadron hopefully achieving FOC within two years of Super Hornet delivery, which could be as early as 18 to 24 months from contract signing.

“I’m assuming 12 [jets] operational on the line at any given time, 24 pilots, and 200 to 250 technicians. Cold Lake is the ideal spot with the training range and AETE [the RCAF’s Aerospace Engineering Test Establishment] on site,” said one.

When asked about his recommendation for Canada’s future fighter, post-competition, he said a mixed fleet would be a

“luxury” because no one aircraft can do everything well.

“I’m a dreamer, but I think if we had a mixed fleet of Super Hornets and F-35s that would be ideal.”

For its part, the Super Hornet works with Canada’s existing infrastructure (including short runways in the far North), is compatible with our existing air tanker fleet, and in fact brings a built-in tanking capability of its own. Plus, with close to 60 per cent commonality with the legacy CF-188 Hornet, the transition for both pilots and maintainers should be smooth.

As it stands today, the F-35 shows promise but it would need upgrades to operate from the RCAF’s established forward operating locations and currently could not be refuelled by Canadian air tankers.

In addition, an important factor is the deployability of the aircraft, said one source. “The F-35 is designated top secret so that calls for extraordinary operating locations. It’s not a problem for a country like the U.S., but how would a smaller country like Norway deploy the F-35 on an operational mission? They’d have to go to a designated U.S.-approved area. It is a consideration.”

Of course, a mixed fleet approach could cost Canada more money, and therein lies the stumbling block in this “blue sky” scenario.

In any case, an open competition that pits Canada’s identified mission profile and priorities against demonstrated aircraft performance and well understood capital and acquisition costs is undoubtedly the best way to select the country’s future fighter fleet.

And, with that competition expected to take five years, the final decision will fall into the hands of the next government—Liberal or otherwise.

One other thing is a certainty, too. Canada will need a lot more than 65 new jets—the number of F-35s originally proposed by the Harper Conservative government—to address its now-urgent fighter jet capability gap. ■



Lisa Gordon is editor-in-chief of Skies magazine. Prior to joining MHM Publishing in 2011, Lisa worked in association publishing for more than a decade, overseeing the production of custom-crafted trade magazines. Lisa is a graduate of the Ryerson University Journalism program.

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BY LISA GORDON

When it was announced in 1980, no one could possibly have realized the far reaching ripple effects of Canada's CF-188 procurement. Now, 37 years after the purchase, it's clear that the associated industrial offsets and intellectual property rights have hugely impacted the development of the Canadian aviation and aerospace industry. **Cpl Manuela Berger Photo**



When Canada was selecting a new fighter jet back in 1980, government officials demanded a proven “off the shelf” design and a procurement agreement that included substantial industrial regional benefits (IRBs) for Canadian industry.

After a three-year selection process associated with the so-called New Fighter Program, Ottawa selected the F/A-18 in April of 1980 based on its performance as well as an attractive package of associated IRBs. The latter were aimed at offsetting the final acquisition cost of the jets, which was estimated at US\$2.8 billion (in 1989 dollars).

Offsets related to the Canadian jet purchase were to be provided by manufacturer McDonnell Douglas (MD) and its major subcontractors, according to a 1990 report entitled, “F/A-18 Sales to Canada, Australia and Spain: A Case Study of Offsets,” produced by the U.S. Office of Management and Budget. They were designed to achieve a number of Canadian government objectives, among them advancing Canada’s industrial capability (especially for in-country life cycle support of the jets), stimulating technological advancement, improving the country’s competitiveness on a global scale, encouraging exports, and creating high-paying skilled jobs across the country.

The New Fighter Program was a highly

competitive procurement, which led to the submission of very attractive industrial offset bid packages. In fact, MD’s winning proposal was valued by the government of the day at about 110 per cent of contract value, and was expected to create 24,000 related jobs.

As the first export customer for the Hornet, Canada elected to purchase its CF-188s through the Direct Commercial Military Sales (DCMS) channel, meaning it bought the aircraft—including rights to the associated intellectual property (IP)—directly from McDonnell Douglas without going through the U.S. government’s Foreign Military Sales (FMS) process.

At the time, no one could possibly have realized the far reaching ripple effects of Canada’s CF-188 procurement. But now, 37 years after the purchase, it’s clear that those very same industrial offsets and IP rights have hugely impacted the development of the Canadian aviation and aerospace industry.

In fact, at the November 2016 Canadian Aerospace Summit in Ottawa, Public Services and Procurement Minister Judy Foote told aerospace industry representatives that an internationally recognized centre of excellence for Hornet support has developed at L3 MAS in Mirabel, Que.

“A contract to buy and build military equipment typically gets far more attention

than in-service support and maintenance of those fleets,” she pointed out. “[Yet] the cost to support and maintain the equipment over its lifetime exceeds what we spend to buy it. Those maintenance, repair and overhaul services are worth more than \$2 billion per year for the defence industry....”

“A good example is L3 MAS, which is repairing and maintaining the CF-18 Hornet fleet at its facility in Mirabel. These same skills and experience have been used to obtain work from the United States to maintain its Hornet fleet. Today, L3 MAS is an industry leader with over 700 employees at seven operating locations throughout Canada.”

Foote said the government’s long-term objective is to establish a “collaborative relationship with industry to sustain our equipment and fleets.”

Jacques Comtois is vice president and general manager at L3 MAS. He told *Skies* that Foote’s comments were welcome.

“To me, it was a clear indication that finally, after many months of representation, they [government ministers] recognize the fact that the centre of excellence that exists at L3 MAS today is a result of the decision made by the government of Canada in 1980 to acquire the IP [intellectual property] of the CF-188 Hornet,” he said.



L3 MAS in Mirabel, Que., recently celebrated 30 years of providing integrated technical support for Canada's CF-188 Hornet fleet. The facility has earned a reputation as a centre of excellence for the legacy fighter aircraft. **L3 MAS Photo**

LEARNING FROM THE PAST

On Nov. 22, 2016, Foote was joined by Defence Minister Harjit Sajjan; Innovation, Science and Economic Development Minister Navdeep Bains; and the Chief of the Defence Staff, Gen Jonathan Vance, at a press conference to announce a three-pronged plan designed to address the pressing need to acquire a new Canadian fighter.

“We will launch a wide open and transparent competition to replace the CF-18 fleet,” explained Sajjan. “The first step will begin in the months ahead. In addition, we will enter into discussions immediately with Boeing for a fleet of 18 Super Hornets to address the capability gap. Third, the Canadian Armed Forces will implement a range of new measures to extend the life of the current CF-18 fleet.”

A few days after that press conference, Boeing and L3 MAS announced they would collaborate on the production and support of the F/A-18 Super Hornet if the Government of Canada moves forward with the acquisition.

L3 MAS is one of more than 560 Boeing suppliers across Canada that support the OEM's commercial and defence platforms. The Mirabel company recently celebrated

30 years of providing integrated technical support for the CF-188 Hornet, a platform that was assumed by Boeing following its merger with McDonnell Douglas in 1996.

Comtois of L3 MAS said it might not be possible for Canada to acquire the IP associated with the Super Hornet, but at the very minimum Canada should ensure the necessary access to it under licence.

“For sovereignty reasons, operational performance, costs... we need access to the IP,” stressed Comtois, who said that L3 MAS will then have the chance to replicate the success it has had with supporting the legacy Hornet. “We’re very passionate about this issue because it’s the reason why we exist.”

He said having the original OEM data makes it easier to have repairs certified by airworthiness authorities and greatly improves the turn-around time when routine maintenance is required at operating bases.

“In our vault here, we have the original drawings of the [CF-188] aircraft Canada acquired,” he said. “So it’s easy for us to go back and understand why things were designed a certain way, and then devise repairs based on that data. It’s easy to show the traceability of your repairs to the airworthiness authority—we used original

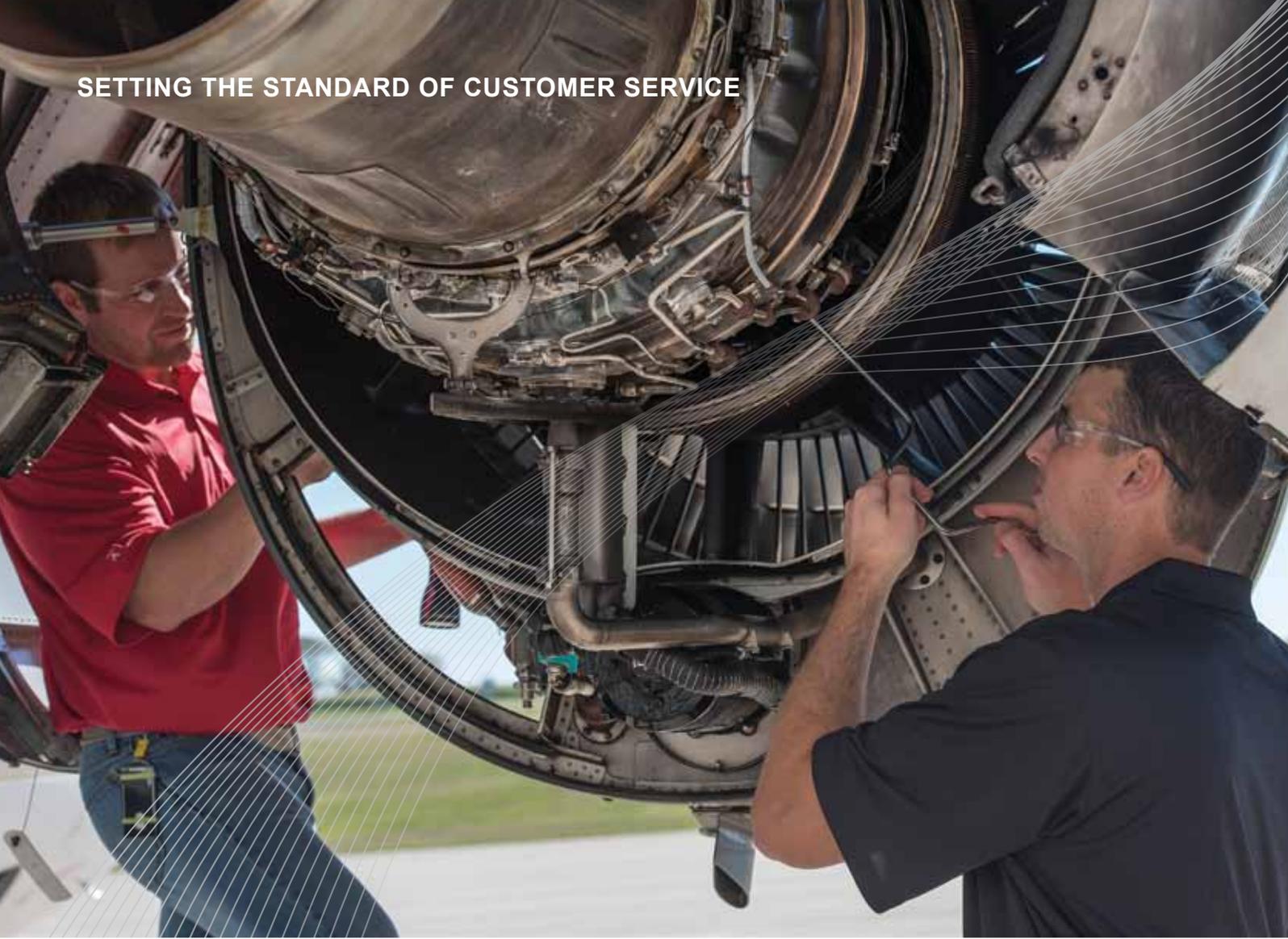
OEM data and built from there.”

The life of the Canadian fleet has been carefully extended through a planned series of structural and mission system upgrades, with much of that work being carried out at L3 MAS. In fact, the Royal Canadian Air Force (RCAF) operates some of the oldest and highest usage-time F/A-18 Hornets, along with the U.S. Navy, with many tail numbers having already surpassed the jet’s original design service life of 6,000 flight hours.

Due to in-country efforts on the CF-188, including additional fatigue testing, L3 MAS has in fact demonstrated an increased service life of the airframe and its components to 9,000 flight hours, significantly above the original design life. As a result, the 76 remaining CF-188s are now expected to fly through 2025, wrote RCAF Commander LGen Mike Hood, in documents filed with the House of Commons defence committee in late November 2016.

Comtois said the decades of expertise accumulated during L3 MAS’ work on the CF-188 fleet has led to interest from foreign Hornet operators as well. As Minister Foote mentioned in her AIAC speech, in March 2016 the U.S. Navy selected L3 MAS to provide depot-level maintenance on its fleet of F/A-18 A/B/C/D fighter jets.

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Over the 30 years it has been supporting the CF-188 fleet, L3 MAS has generated approximately \$3 billion in revenues and created about 1,000 related jobs.”

“The reason the U.S. Navy is here now is the original life expectancy of those aircraft was 6,000 hours,” said Comtois. “They didn’t plan to fly beyond that, but now the F-35 program has been delayed and they need to keep those F-18s flying well beyond 2025. As a result, structural inspections and modifications are being performed by L3 MAS on U.S. Navy jets. In addition to work on the USN fleet, over the years we’ve also generated revenue from Australia, Finland and Switzerland.”

Over the last two years, L3 MAS has pioneered even more specialized robotic repairs through Canadian and U.S. Navy contracts.

“We’re talking about technology, innovation, all the things government right now is saying we need to differentiate ourselves in the global economy.”

All told, Comtois said that over the 30 years it has been supporting the CF-188 fleet, L3 MAS has generated approximately \$3 billion in revenues and created about 1,000 jobs in direct relation to the program.

EXTENDING FOR THE FUTURE

Keeping Canada’s fleet of legacy CF-188s serviceable has required a systematic program of structural and operational (mission system) upgrades over the years.

Comtois said L3 MAS works on about 10 Hornets a year, with the fleet cur-

rently undergoing what is called Control Point 3 (CP3) of the CF-188 Structural Upgrade Program.

“In CP3, we look at specific components on the aircraft which are prone to fatigue, damage or wear and depending on the result, we implement corrective measures.”

Depending on the results of the open competition that aims to replace the entire fleet of fighters—and the resulting timeframe to obtain the new jets—Comtois said the service life of the legacy Hornet fleet would very likely be extended beyond 2025. A mitigation plan has been jointly developed by L3 MAS and the RCAF to support such an outcome if it were to materialize. One example of this is additional component tests which are currently ongoing for the flight control surfaces to demonstrate capability for an extended service life.

“The further we fly, the flight controls—flaps, ailerons, etc.—become a more critical area of the aircraft,” continued Comtois. “These components have specific lives and due to their composition, it is difficult to inspect or repair them. But now we’re approaching the end of their life and time is becoming critical. Most countries have opted for large scale procurement of these flight control surfaces (FCS) but this is a very expensive option. “As such, L3 MAS has developed a

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very cost-effective solution to re-certify the FCSs for the extended period that is required at a fraction of the cost of the procurement option. In this regard, L3 MAS is certifying these structures further than anyone has before and this has in fact attracted a lot of attention from other countries who are now considering this same avenue, perhaps via L3 MAS. This is the type of benefit that occurs when an ‘in-country’ capability exists.”

On the mission system side, the last thing done to Canada’s legacy Hornet fleet was the installation of a new radar warning receiver system in 2014. Currently, the jets are undergoing a small GPS upgrade and mission computer software is upgraded annually, adding functionality based on pilot feedback.

PREPARING FOR THE SUPER HORNET

It won’t take L3 MAS long to ramp up support for the new Super Hornets, said Comtois, though he also noted that the RCAF’s operation and maintenance model for the interim Super Hornet fleet will be different than the legacy jets, with L3 MAS’s involvement yet to be defined.

Although the company has no prior experience with the new jet, he explained that the Super Hornet shares the same “philoso-



phy of design” as the legacy platform. “It’s a bigger aircraft, more powerful, with more capabilities; however, it originates from the same OEM and as such the technical and maintenance manuals and documentation will be in a format and specifications with which we are already quite familiar. We’re confident our highly qualified people can easily make the transition from the legacy to the Super Hornet.”

Comtois said Canada must complete the negotiations with Boeing for the planned fleet of 18 Super Hornets, and this will clarify exactly what aspects will be covered within the acquisition and what sustainment model will be employed.

TOP: The RCAF and the U.S. Navy operate some of the oldest and highest usage-time legacy F/A-18 Hornets, with many tail numbers having already surpassed the jet’s original design service life of 6,000 flight hours. **DND Photo**

ABOVE: The more the legacy Hornets fly the more the flight controls, such as flaps and ailerons, become a critical area of concern. **DND Photo**

“We have to be realistic. With only 18 aircraft, significant investment in sustainment in Canada could be a challenge. Fortunately, Canada has already made a significant investment in a Hornet sustainment capability and this can be leveraged to maximize the work in Canada,” noted Comtois.

Providing Canada secures access to the IP for the Super Hornet, he said L3 MAS will collaborate with Boeing to train the necessary personnel.

Since Canada’s fleet of interim Super Hornets will be small, the number of new personnel required could be limited. However, beyond just job creation, it’s technology transfer and maintaining existing high quality jobs in Canada that is important, according to Comtois. “Our aim is to maintain our centre of excellence.”

The current facilities at the Mirabel plant are sufficient to accommodate the Super Hornets for whatever depot level maintenance they require.

For its part, Boeing said it supports the development of a comprehensive Canadian in-service support program and is committed to a 100 per cent offset obligation in Canadian content value.

“Acquisition of the Super Hornet brings

with it an in-country in-service support plan that minimizes reliance on non-Canadian sources, thereby providing the RCAF new levels of sovereign control in their lifecycle sustainment while also providing significant opportunities for Canadian industry,” wrote Robert Valla, Boeing vice president of global sales, in response to questions posed by *Skies*.

While Valla did not speculate on how soon Canada’s first Super Hornet might be delivered, he said the U.S. Navy will be flying the platform through 2040.

He agreed with Comtois that existing Canadian knowledge of CF-188 physical infrastructure and intellectual know-how will assist with a “no-risk transition to operation of Canada’s newest fighter.”

As previously mentioned, L3 MAS is one of about 560 Boeing suppliers of all sizes located in nine Canadian provinces, resulting in more than US\$1.3 billion contributed to the Canadian economy.

“In all of our IRB, and now ITB programs, we work to leverage the breadth and depth of the Boeing enterprise to offer partnership and work placement opportunities across the company’s commercial and defense

businesses—ensuring long-term sustainable growth for companies across Canada,” concluded Valla.

With the Nov. 22 announcement of its plans to pursue an interim Super Hornet purchase, as well as the Dec. 8 news that Airbus’ C295W has been chosen as Canada’s next fixed-wing search and rescue platform, the Canadian government has made two major commitments to Canadian air power.

“We need to be able to capitalize on these investments to create value for Canada,” said Comtois. “These programs offer a key opportunity to expand on an already impressive capability with further technology transfer, high-knowledge job creation and export potential. That is clearly where our future must be as a country.”

He is optimistic about that future, although he said it’s not taken for granted.

“People have worked hard here for 30 years. But it’s exciting to be part of the next generation of Hornets and to look forward to what the future has in store for L3 MAS and Canadian industry.” 

—with files from Chris Thatcher and Ken Pole



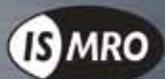
L3 MAS is well positioned to provide in-service support for Canada’s new 18-strong Super Hornet fleet. **Jeff Wilson Photo**



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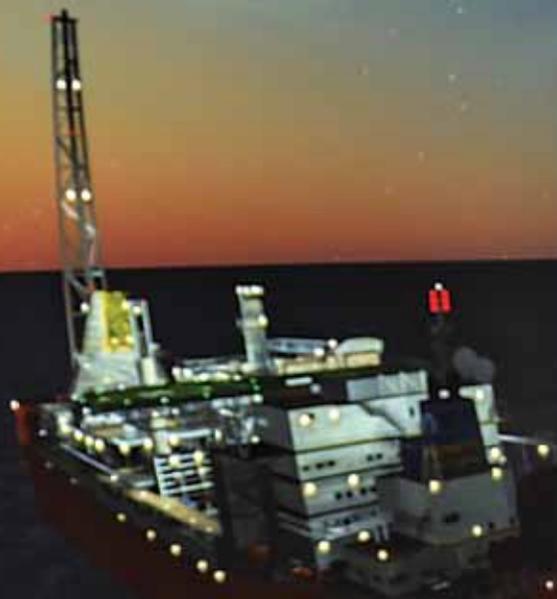


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An Immersive EXPERIENCE

A \$16-MILLION HELICOPTER TRAINING AND R&D FACILITY NEAR ST. JOHN'S, N.L., IS BRINGING A NEW LEVEL OF FIDELITY TO COUGAR HELICOPTERS' SIMULATOR TRAINING.

STORY BY OLIVER JOHNSON | PHOTOS BY HEATH MOFFATT

Roughly 350 kilometres southeast of St. John's, N.L., deep under the tempestuous waters of the North Atlantic, lies the Hebron oil field. The Hebron project—to recover the estimated 700 million barrels of resources contained within the field—is one of the key offshore projects in the region, utilizing a 680,000-tonne platform.

Sitting in the back of the Cougar Helicopters Sikorsky S-92 just a few hundred metres from the structure, the sheer scale of the construction, standing seemingly immovable above the crashing waves, was impressive. The platform's blinking

lights reflected off the sea as the skies began to darken. But something wasn't quite right. And not least the fact that the Hebron platform doesn't quite exist yet.

"Can we make it about 15 minutes later?" asked *Skies* photographer Heath Moffatt, who was leaning out the side of the cabin. The technician to my right tapped a few buttons and the skies instantly darkened.

"Oh, great! But maybe another five minutes?"

A few more increments took us to 4:36 p.m., which, it turned out, provides just about the perfect ambient light for a photograph of the inside of a simulator. Yes,



The helicopter training and R&D centre, located in Mount Pearl, N.L., was built and is run by Montreal, Que.-based CAE. It contains a Sikorsky S-92 simulator that is the first Level D simulator in Canada to be compatible with night vision goggles.

despite our view, we were on dry land, and just a few minutes' drive from Cougar's headquarters in St. John's at a new helicopter training and research and development (R&D) centre in nearby Mount Pearl.

Fully funded by the Hibernia Management and Development Company and the Research & Development Corporation, and operated by Montreal-based CAE, it contains the first Level D full flight simulator (FFS) with night vision goggle (NVG) compatibility in Canada, as well as two classrooms, a virtual simulator, and an instrument procedures trainer. The virtual simulator is

a computer program that allows students to explore a fully-functional S-92 cockpit, while the instrument procedures trainer is a fixed simulator with a number of screens around two pilot seats that display the S-92's controls.

The simulator was certified in March 2016, and recurrent courses for Cougar—the centre's major customer—began the following week. Cougar uses the facility for its initial training on the type, as well as its recurrent, night proficiency, and search-and-rescue (SAR) training. Prior to the centre opening, Cougar's pilots had been travelling to FlightSafety

International's facility in Lafayette, La.; and then to Oslo, Norway, to perform their simulator training. Having such a facility so close provides obvious financial and logistical benefits.

The simulator replicates the cockpit of Cougar's search-and-rescue S-92 to exact detail, down to that aircraft's registration number—C-GIKN—appearing on the name plate on the simulator's dash.

Paul Carter, Cougar's chief pilot, said the operator worked closely with CAE to develop the simulator.

"It's almost a custom sim," he told *Skies*. "They built and replicated our auxiliary fuel

tank system, which is a VIH design and modification . . . they have our quick position alert button, the Blue Sky tracking system built in on the overhead, and they have all our offshore routes, all the installations we fly to in the right positions. And they now have the Hebron platform—which is to set sail in spring—in the actual latitude and longitude that it’s going to end up in, in June. We’re already landing on it and it’s not even operational.”

THE SECRET TO SUCCESS

CAE is a major presence in the international flight training market, providing its services to 120,000 pilots across its various fixed- and rotary-wing training facilities. It now has five S-92 Level D FFSSs in operation around the world—and their distribution is truly global. In addition to Mount Pearl, there are S-92 FFSSs in Sao Paolo, Brazil; Oslo, Norway; Zhuhai, China; and Brunei in Southeast Asia. However, the simulator in Mount Pearl is the first to be compatible with night vision goggles (NVGs).

But what goes into creating such a realistic product—one that incorporates and seamlessly blends advanced mechanical and software engineering? In terms of numbers, about 250 people will work on a simulator before delivery, said Peter Cobb, CAE’s business development leader for helicopter training, but more fundamentally, it requires a deep understanding of how the helicopter operates.

“Certainly a lot of data gathering is required, so we flight tested several S-92s in order to gather the necessary data that we needed to simulate the systems and the performance of the aircraft,” said Cobb. “Then of course we’ve got a strong baseline capability—we delivered the first Level D simulator to the Australians over 20 years ago now—so we’ve got a broad level of capability around helicopter simulation, which is quite specific.”

Cobb said the introduction of CAE’s 3000 Series, about five years ago, ushered in a new era of immersive mission training in helicopter simulators. “One of the things we did . . . was move to direct projection domes as opposed to the columnated visuals that you see in fixed-wing simulators. And those direct projection domes allow you to give a bigger field of view, which is particularly important for helicopter pilots, because they’re looking down much more than they’re looking straight ahead. It provides very accurate feedback in terms of where you are with regards to the ground or the water.”

According to CAE, its simulators can replicate up to 400 malfunctions in an aircraft—and the ability to introduce these during training is a huge benefit to pilots. But for Cougar, it’s the ability to fly not just in the



They’ve modelled turbulence through the [oil rig] structure, which is a big thing for us.”

CLOCKWISE FROM TOP:

Cougar Helicopters is the centre’s major customer. The cockpit of the simulator is an almost exact replication of Cougar’s search and rescue Sikorsky S-92—down to the registration C-GIKN appearing on the name plate on the simulator’s dash.

CAE said its Series 3000 simulators can replicate up to 400 malfunctions. Cougar uses it for initial, recurrent, night proficiency, and search and rescue training.

Cougar chief pilot Paul Carter (left) and chief training pilot Barry Steeves (right) stand alongside the simulator in Mount Pearl. Cougar expects to fly over 1,000 hours each year in the device, which is just a short drive from its headquarters in St. John’s.







TOP:

The team can even have Cougar's dispatch centre create a flight plan to and from an offshore vessel—and then fly that mission with the weather and conditions exactly as they are outside.

RIGHT:

Cougar's crews operate off the coast of Newfoundland in some of the most challenging conditions found anywhere in the world. The ability to train in a simulator that allows them to not only perform complex operations such as hoisting to and from a vessel, but to do so in the inclement conditions they encounter in the North Atlantic, is a huge benefit.



North Atlantic environment, but the exact geography off the coast of Newfoundland—with the oil rigs and platforms in their exact location—that’s a unique draw.

“The more realistic simulator training is, the more value the training is going to have . . . so we’re pleased as punch with this,” said Barry Steeves, chief training pilot at Cougar. “They’ve modelled turbulence through the [oil rig] structure, which is a big thing for us, and the vessels move with sea states, so when we train, it allows us to train in a really contextual environment.”

The team can even call up Cougar’s dispatch centre and have them create a flight plan to and from an offshore vessel—and they will then fly that mission with the weather and conditions exactly as they are outside.

Of course, a huge benefit of training in a simulator as opposed to a real aircraft is in practicing emergency operations.

“We can do things in this simulator that we could never hope to do in the aircraft, as far as training goes,” said Steeves. “Everything from the classic engine failures, to practicing autorotations to the sea, to doing ditchings, to landing on moving platforms. So the fidelity is the key with this simulator that puts it a little step ahead.”

MORE THAN A SIMULATOR

CAE has four full-time staff running the centre. While Cougar is clearly the major customer, projected to fly over 1,000 hours a year in the simulator, HNZ and CHC have also made use of it. CAE hopes the simulator will ultimately deliver 1,500 training hours annually.

But the centre’s purpose is to provide more than just a home for simulator training. There are five ongoing research projects at the facility, each exploring various aspects of pilot performance in the offshore flight environment. The trials are supported by Cougar (which supplies the majority of the pilots for the tests) and in partnership with local firm M2M Consulting.

They include an investigation into the various factors that might influence pilot performance, such as fatigue, temperature, or alcohol consumption—whether recent or in the near past. One of the tools the team is able to utilize at the centre is a climate chamber. This allows pilots to be exposed to high or low temperatures and then taken to the simulator to fly, to monitor the impact on their responses and ability. The overall aim of the project is to develop an offshore helicopter aircrew health monitoring guide.

Another project is looking at helmet fatigue—a particularly relevant issue

for Cougar’s SAR pilots who fly with NVGs on their helmets—to explore what the parameters are in which pilots become fatigued and develop strategies to alleviate it.

Other projects are exploring ways to optimize crew resource management and taking a more empirical look at the first office induction process.

The establishment of such a world-class facility in Canada has been no mean feat, and Cobb said he’s particularly proud that two great Canadian companies have been able to partner together to make it happen.

“We’ve been talking to Cougar for a long time about getting a Canadian

training capability for them, so it was certainly very satisfying personally and I think also satisfying from a Canadian professional perspective.”



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

Follow him on Twitter @orjohnson_

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CUSTOMERS, EMPLOYEES AND BEAN COUNTERS GIVE THE BOEING 787 DREAMLINER TWO THUMBS UP, SAYS AIR CANADA OFFICIAL

STORY BY BRENT JANG | PHOTOS BY BRIAN LOSITO

After a shaky start to Boeing's 787 Dreamliner program, the planes have turned out to be key contributors to Air Canada's return to financial stability.

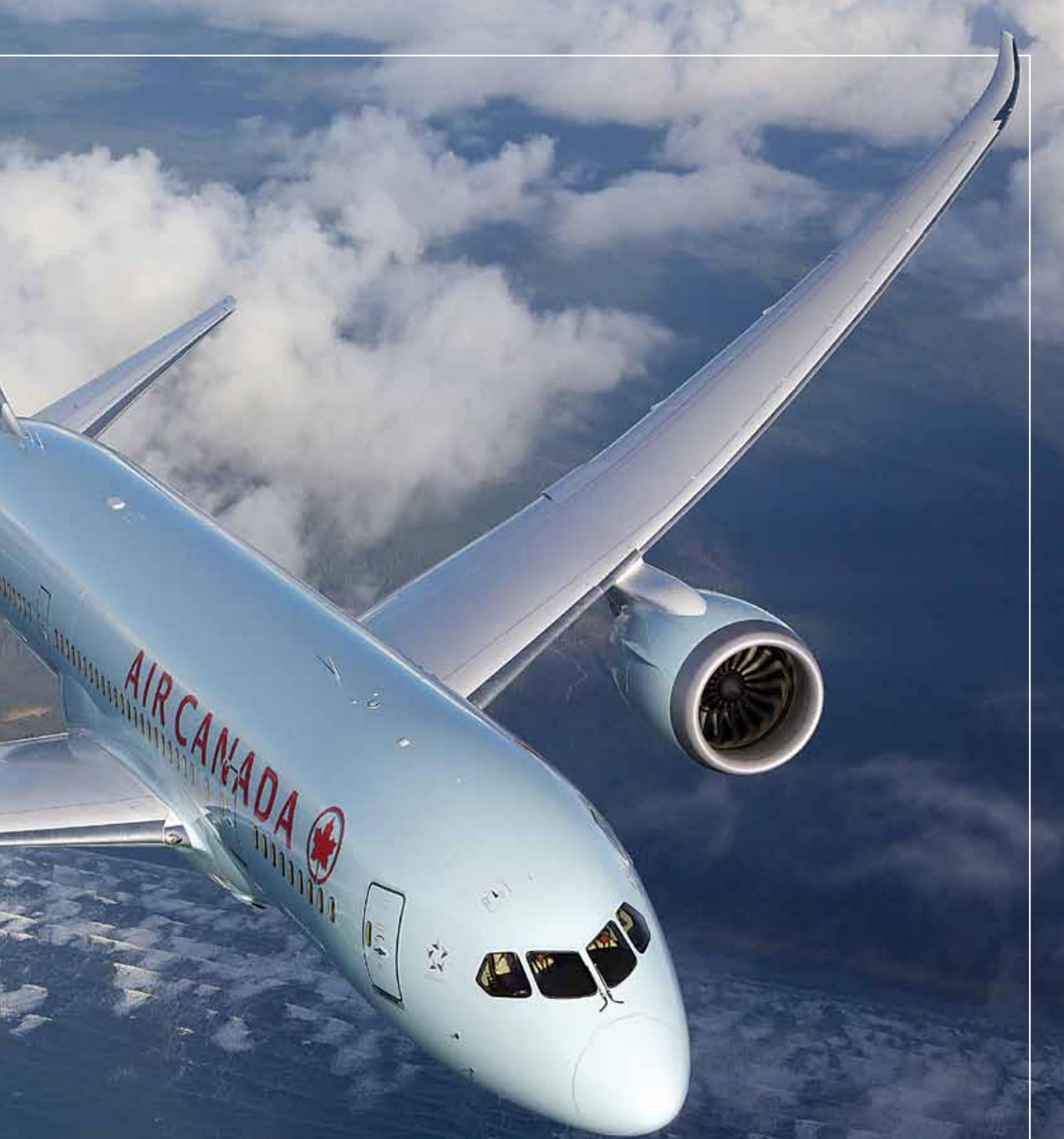
The country's largest airline, which emerged from bankruptcy protection in 2004, first ordered 787s in 2005 and waited until 2014 to receive its first Dreamliner.

With the list price exceeding \$200 million for a Dreamliner, each plane represents a large capital investment for Air Canada.

Ben Smith, Air Canada's president of passenger airlines, noted the twin-engine 787-900 model has 298 seats in three cabins, including 247 in economy, 21 in premium economy and 30 in international business class.

Air Canada said it has found the three-cabin design to be financially rewarding because of consumer price points that appeal to a range of business and leisure travellers.

"This plane has been a dream. Customers, employees and our finance people love it. It's rare to have that combination all together," said Smith in an interview as he stood in the aisle in



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With the list price exceeding \$200 million, each Dreamliner represents a large capital investment for Air Canada.

The 251-seat 787-800 has a range of roughly 14,500 kilometres, while the 298-seat 787-900 has a range of about 15,370 kilometres. Both models ordered by Air Canada have General Electric engines.





TOP: Pilots are impressed with the Dreamliner, which cruises at 13,106 metres (42,998 feet), putting it above most of the weather faced by other aircraft.

MIDDLE: The international business cabin includes executive pods that can be adjusted to an 80-inch, fully lie-flat bed.

ABOVE: The economy cabin features slimline seats in a 3-3-3 configuration. Each seat has a nine-inch intuitive touchscreen with a USB outlet and universal power ports.

international business class, surrounded by individual pods.

“Every single seat here has access to the aisle,” he said, referring to a configuration that is a vast improvement over older designs in other planes where a business class passenger next to the window has to climb over a fellow passenger to get to the aisle.

Smith said Air Canada has the highest 787 utilization of any airline in the world, aided by the pit crew concept. Air Canada uses five to eight employees to prepare for each arriving 787 or 777.

“We have the highest dispatch reliability, so the way that we’re maintaining our planes allows us to have the highest level of performance,” he said.

The 787’s avionics are similar to the 777s, meaning that it is an easy transition for pilots already trained on the 777 to convert to the 787 if they so choose as opportunities arise.

Smith acknowledged that it has been a sometimes rocky journey for the 787. “This was a very new design, so there were a lot of challenges and hurdles to overcome to get it to where it is. Normally, with new technology, there are things you have to work out,” he said. “Safety is obviously No. 1. The airplane had a lengthy delay in the actual launch, but now we’re really happy with it.”

Boeing’s launch customer in 2011 was All Nippon Airways. Since then, the Dreamliner program has overcome its share of problems, notably from Boeing resolving lithium-ion battery overheating issues that had resulted in fires in early 2013.

After grounding the Dreamliner for three months that year, the U.S. Federal Aviation Administration declared it safe to fly.

Air Canada has ordered 37 Dreamliners, of which 21 had been delivered as of late 2016. Another nine planes are slated

The 787 Dreamliner cockpit features new technology while maintaining commonality with other Boeing airliners, particularly the 777. Five multi-function displays give pilots more information and significant flexibility to customize the information they need.



to arrive in 2017, bringing the total to 30. The remaining seven are set to be delivered by the end of 2019.

All eight Boeing 787-800s that were ordered by Air Canada are already in service, while 13 of the 29 larger 787-900 versions are now flying. Canada's largest airline took delivery of its first 787-800 in May 2014, while the carrier's first 787-900 arrived in July 2015.

"We have 13 options, so the total could be boosted all the way to 50," said Smith.

As Air Canada edges closer to completing its firm order of 37 Dreamliners in 2019, it will also be gearing up to take narrow-body deliveries of Boeing 737 MAX jets in 2018 and the Bombardier C Series in late 2019.

To facilitate line maintenance in Toronto,

Air Canada broke ground in September 2016 on its \$90-million Hangar 5 project. The new 127,000-square-foot facility will have a 77-foot ceiling and the capacity to handle three wide-body and two narrow-body aircraft simultaneously. The structure will be optimized for the Dreamliner fleet.

Leveraging the 787 platform

In some cases, the 787 has allowed Air Canada to introduce new routes and in other instances, the new jet has replaced the aging 767s on existing routes.

"Air Canada will have one of the most fuel-efficient and youngest fleets in North America," said RBC Dominion Securities Inc. analyst Walter Spracklin.

The Dreamliners are 20 per cent more fuel efficient than the 767s, which are

being transferred to Air Canada's Rouge arm. Rouge had 19 Boeing 767s in its fleet near the end of 2016.

The 251-seat 787-800 has a range of roughly 14,500 kilometres, while the 298-seat 787-900 has a range of about 15,370 kilometres. Both models ordered by Air Canada have General Electric engines.

In the flight deck, Capt Ken Smith spoke to *Skies* while he sat in the captain's seat, before he piloted the inaugural Vancouver-Delhi flight in October 2016.

"I've been at Air Canada for 38 years. I waited for this aircraft and I'm glad that I did. There were delays in the deliveries," said the 61-year-old pilot. "This is what I wanted to do at the end of my career. I am thrilled. This aircraft has technology, speed and distance."



Air Canada promotes high Dreamliner utilization, aided by "pit crews" who meet each arriving 787.



The Dreamliners are 20 per cent more fuel efficient than the 767s, which have been transferred to Air Canada's Rouge arm.



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From Vancouver, Air Canada's Dreamliners fly to Delhi, Brisbane, Seoul and Tokyo's Narita Airport. From Toronto, the 787 flies to places such as Frankfurt, Seoul, Paris and Tel Aviv.

The veteran pilot, who formerly flew the Boeing 767, said he is impressed with the fuel-efficient Dreamliner, which cruises at 13,106 metres. "We get to fly higher, above most of the weather that other airplanes have to deal with."

Air Canada stopped flying the Toronto-

Delhi non-stop route in 2005. The airline found economic limitations with the 284-seat Airbus A340 due to that plane being less fuel-efficient with four engines, said Capt Perry Shindruk, who served as the check pilot on the inaugural Vancouver-Delhi flight in 2016.

And the 211-seat Boeing 767 didn't have the longer range required on many international routes and was also deemed too small. That lower number of seats poses problems when airlines are seeking extra revenue, especially from selling seats at the front of the cabin.

Air Canada reinstated non-stop service between Toronto and Delhi in November 2015, utilizing the 787-900.

Air Canada flight attendant Bavleen Saini said passengers are comfortable aboard the 787. In part, that is due to an air circulation system called gaseous filtration that is designed to help passengers feel less jet lagged.

"One of my favourite things is the interior lighting," she added. "To wake up to a sky blue, we're able to do that on this aircraft."

The 787 windows, which are 30 per cent larger than on comparable jets, have electrochromatic instead of manual shades.

"We have individual dimmable windows instead of shades. There is a lot more space in the overhead bins, and there is ease of opening and closing them," said Saini.

Rajiv Chander, the Consul General of India based in Vancouver, said he is pleased to see the 787 fly non-stop between Vancouver and Delhi, starting with seasonal service.

"The flight takes between 14 and 15 hours. You could go through Tokyo, Hong Kong or Frankfurt, but the total travel time would be at 20 or even 24

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hours,” said Chander. “Now, you get more rest and you’re not spending as much time in transit.”

The B.C. government welcomed the opening of the new Vancouver-Delhi route during the launch ceremony in October at Vancouver International Airport, also referred to locally by its airport code, YVR.

B.C. Finance Minister Mike de Jong thanked Kevin Howlett, Air Canada’s senior vice-president of regional markets and government relations, for helping make the 787 non-stop route possible.

“You have been on behalf of Air Canada forthright, candid but also passionate about recognizing the potential of this route,” said de Jong during the ceremony with Howlett, YVR president Craig Richmond and other dignitaries.

“You’re flying on one of the most advanced aircraft on the planet—the 787-900, the Dreamliner,” said Richmond. “We’re big proponents of technology and I’m sure that Air Canada will agree that the Dreamliner is really something else. It is opening up routes like this that just were not possible a few years ago.”

Connecting passengers are another

reason that aviation officials are optimistic about the wide-body 787. Where it might have been difficult to make a route work in the past due to limited regional traffic, attracting passengers from outside Canada to connect through major hubs such as Vancouver and Toronto has provided an extra lift for Air Canada.

Building connecting traffic is being aided by “levering the 787 platform,” said AltaCorp Capital Inc. analyst Chris Murray.

Ben Smith said Air Canada has been making major commitments with the 787 on routes such as Vancouver-Delhi, which is beginning with service three times a week with a view to eventually go daily.

“This is not an easy route to start. Those of you involved in the planning stages know that we were waiting for the right aircraft to become available. The 787 is what’s making this possible. This is the most technologically advanced, long-haul carrier available,” he said during the route launch ceremony.

Other destinations served by the Dreamliner from YVR include Brisbane, Seoul and Tokyo’s Narita Airport. From Toronto, the 787 flies to places such as Frankfurt, Seoul, Paris and Tel Aviv.

Air Canada officials say the airline’s training for pilots, mechanics and flight attendants has been getting more advanced over the years.

Howlett touted efficiencies on the maintenance side. “There are minimum turn times on the ground from the maintenance support point of view. You’ve got commonality with the 787 and the 777,” he said in an interview during a tour of the Dreamliner.

Consumer demand will dictate whether routes such as the one between YVR and Delhi remain economically viable, he concluded. ■



Brent Jang, a business reporter at The Globe and Mail, is the winner of two National Newspaper Awards and has been a National Magazine Award nominee. He boarded test flights for the Airbus A380 in 2007 and Boeing 787 Dreamliner in 2012.



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New Jet ON THE RAMP

HONDA AIRCRAFT'S FIRST FORAY INTO THE AVIATION WORLD HAS PRODUCED A LIGHT JET THAT IS INNOVATIVE, ATTRACTIVE AND COMPETITIVE, WRITES *SKIES* TEST PILOT ROB ERDOS.

STORY BY ROBERT ERDOS | PHOTOS COURTESY OF HONDA AIRCRAFT COMPANY

There's definitely something different about the HondaJet. Its novel configuration elicits comments, curiosity and speculation. It's certainly innovative, but aviation history is littered with "revolutionary" but ultimately unsuccessful designs, and it can be hard to tell "curb appeal" from genuine technology.

Expectations are high when it's the manufacturer's first design, and especially when that manufacturer is Honda.

Skies was invited to Honda Aircraft Company headquarters in Greensboro, N.C., to fly the HA-420 HondaJet, which proved to be a pleasant, well-engineered airplane; an assembly of clever and practical innovations, each contributing to a very impressive capability.

Michimasa Fujino, Honda Aircraft's visionary founding president and the HondaJet's chief designer, first sketched the airplane on the back of a calendar in the 1990s. It has been a long road to receipt of the HA-420's FAA type certificate in December 2015, with the protracted gestation of the HondaJet into a certified airplane foreshadowing Honda's intentions in aviation.

Honda Aircraft was founded in 2006; at the same time, Greensboro was chosen as the location of its worldwide headquarters. Having spent a day at their 680,000-square-foot, 133-acre, 1,700-person strong facility, there is no doubt of Honda's commitment to aviation. The gleaming factory, the hangars, and the offices are all clearly far larger than those required for production of a single light jet design.

Honda Aircraft prefers to focus more on its accomplishments than its plans, and when I enquired of my host about possible future direction, I was told, with an expansive wave of her arms, that, "our guests are invited to draw their own conclusions." I did. Honda is in aviation to stay.

Further evidence of Honda's commitment is the development of the HF120 engine. In a highly ambitious venture, Honda collaborated with GE in designing a brand new engine for its brand new airplane. How many manufacturers have done that?

The HF120 is a highly efficient twin-spool, medium bypass turbofan engine with 2,050 pounds thrust flat-rated to 25C. It incorporates full-authority digital engine control (FADEC) with a 5,000 hour time-between-overhaul (TBO).

Designing a new airplane is expensive. So is designing a new engine. Have I mentioned that Honda is in aviation to stay? My Greensboro tour started at Flight



FROM TOP-DOWN:

The author climbing aboard the HondaJet with test pilot Stefan Johansson.

The interior inspection tried to discover how an airplane can be small on the outside and big on the inside.

The pre-flight inspection revealed an airplane with spectacular fit and finish. Systems were simple and accessible.

FlightSafety International's Level D flight simulator awaits new HondaJet pilots in Greensboro, N.C.

FlightSafety International's state-of-the-art facilities include a fixed-base avionics trainer, computer-equipped classrooms and extensive training aids.

OPPOSITE:

The HondaJet displays its innovative "OTWEM" configuration: over-the-wing engine mounts.



Safety International's (FSI) impressive training facility adjacent to Honda's factory. It consists of one Level D certified flight simulator (and space for a second), a fixed-base avionics trainer, plus classrooms and extensive training aids. I was fortunate to get a brief spell in the simulator with FSI instructor Erin Brady for cockpit familiarization between busy scheduled training. There was just enough time to simulate a "V1 cut" engine failure on takeoff.

Despite my complete unfamiliarity with the type, single-engine handling was completely conventional; indeed, more conventional than the innovative HondaJet would seem to be. I couldn't wait to actually go flying.

WHAT'S AN OTWEM?

So, what's so innovative about the HondaJet? Lots, as I discovered during a pre-flight inspection with test pilot Stefan Johansson, senior manager flight operations, who has been intimately involved with the entire development and certification process.

No doubt one first notices the engines, which are mounted on pylons standing on the wings. Honda calls it the over-the-wing engine mount, or OTWEM, a patented design feature it credits with several mystical aerodynamic benefits, such as increasing the drag divergence Mach number.

Additionally, situating the heavy engines' load path on the wing spar, and directly above the undercarriage loads, evidently helps make a lighter, more efficient structure. Honda also credits OTWEM for cabin noise reduction, greater fuel efficiency and increased cabin volume — the latter a consequence of moving the aft cabin bulkhead back. No doubt there are also benefits in terms of systems simplicity, since fuel can be routed up to the engines without passing through the cabin pressure vessel.

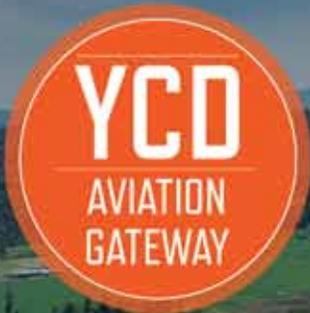
The forward fuselage has a subtle but distinctively bulbous shape in order to promote natural laminar flow to reduce drag. The choice of composite materials for the fuselage facilitates manufacturing of the requisite compound curves and yields a very smooth skin to maintain

The Garmin G3000 avionics suite is a good fit for the HondaJet's tidy and functional cockpit.





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TOP LEFT: The HondaJet production line currently produces two to three aircraft per month, but the facilities evidently have far greater capacity.

TOP RIGHT: The first aircraft was delivered on Dec. 23, 2015 at Honda Aircraft's world headquarters in Greensboro, N.C.

ABOVE: Honda's pristine 680,000-square-foot facility in Greensboro, N.C., demonstrates Honda's commitment to aviation.

laminar flow and retain structural lightness. Construction quality was as close to perfect as I could discern. Johansson described Fujino's penchant for conducting quality control inspections from a distance of three inches using a magnifying glass.

Fuelling is accomplished through a single-point gravity feed system, with the filler cap located six feet high on the aft fuselage. "Fuel trucks carry a ladder," offered Johansson in response to quizzical looks. A remote gauge is optional.

My opportunity to fly the HondaJet occurred later that day. Our well-equipped demonstrator aircraft,

registration N420EA, was brand new HondaJet serial number 16. Its basic empty weight was 7,364 pounds. Adding two 185-pound hominids and 2,000 pounds of fuel (out of a maximum capacity of 2,854 pounds) brought our ramp weight to 9,729 pounds. That is, with a 10,680-pound maximum takeoff weight, our basic crew of two and roughly two-thirds fuel, we had room for four passengers and a bit of luggage. Alternatively, had we filled the tanks, our crew of two would have been within a fat suitcase of the maximum gross weight, affording a published maximum range of 1,223 nautical miles.

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TAKING A HONDA OUT FOR A SPIN

I found cockpit ingress easy, and the seats and pedals comfortable and adequately adjustable. The HondaJet cockpit is simply excellent, although the cockpit field of view seemed slightly confining. Circuit breakers are stored under a folding cover, contributing to a tidy, utilitarian workspace. I found the instrument panel simple and logical. Cockpit controls were predominantly pushbutton switch-lights (white is good) and rotary knobs (forward is normal). Cockpit setup could be

accomplished at a glance.

The acclaimed and highly functional Garmin G300 integrated avionics suite is a natural fit for the HondaJet. Its graphical interface is an easy transition for a single pilot; however, the system is no slouch for capability with all of the state-of-the-art avionics acronyms integrated into the new light jet.

Once we were strapped in, Johansson pointed at the instrument panel and helpfully announced, “The battery switch is over there.” Little further explanation was required. Once the avionics booted



HONDAJET

GE-Honda designed HF-120-H1A FADEC-controlled turbofan engines

Tail-mounted speed brake leaves upper wing surface clean

Patented Over-the-Wing Engine Mounts (OTWEM)

up, I was presented with the normal operating checklist on the left half of the left display. Using a neat multi-function scroll wheel in the yoke, the electronic checklist easily guided me through start-up and systems checks.

Garmin determined that our prescribed takeoff speeds would be decision speed (V1) 109 knots indicated airspeed (KIAS), rotation speed (Vr) 115 knots, and single-engine safety speed 120 KIAS. Takeoff demanded that I simply shove the throttles into the Takeoff detent, and I noted strong acceleration and

precise steering to our rotation speed of 115 knots. A roughly 10-pound pull predictably pitched us into the command bars, and we were off. Flap retraction, coupled with strong acceleration, necessitated a bit of forward trim—but overall, takeoff was a breeze.

The published climb profile is 210 knots indicated airspeed until 0.57 Mach, realizing an impressive 3,990 feet per minute at sea level under standard conditions. A climb straight to the certified ceiling of FL430 should be achievable at any weight almost any day, taking 24.1 minutes and 444 pounds of fuel, according to the flight manual.

We levelled off at 40,000 feet (FL400), ISA-3C, having burned 1,500 pounds of fuel since start-up. Our current weight was 9,229 pounds and we established economy cruise conditions, realizing 356 knots true airspeed (0.624 Mach) and burning 290 pounds per hour per engine. The HondaJet was demonstrating impressively efficient performance that was slightly better than the flight manual's numbers.

At altitudes in the “mid-30s,” and high speed cruise power settings, performance can be pushed to a very respectable 422 KTAS (0.720 M) under standard conditions, expecting a total fuel flow just under 1,100 pounds per hour.

The manual flight controls were just right; harmonized, light and responsive enough to satisfy the owner-pilot. The optional speed brakes consist of two clamshell sections on the tail cone. Another Honda innovation, this is a two-position system, designed such that the speed brakes float against dynamic pressure in flight, providing a fixed increment of drag. Mounting them on the tail keeps the upper wing surface clean in the interest of drag reduction; however, they have negligible effect upon landing performance.

CORNER OFFICE ALOFT

A cockpit curtain provides privacy for the passengers. I pulled it shut behind me as I stepped aft to sample how the other half lives. The cabin interior wasn't the most opulent among bizjets, but I found it bright, thoughtfully designed and functional, with club seating for four, plus an optional side-facing seat opposite the entry door.

The 86-inch seat pitch is very impressive for a light jet; an advantage of moving the aft fuselage bulkhead into space that would otherwise be occupied by engine structure. Consequently, the folding desk on the right side benefits from actual knee room.

“

Expectations are high when it's the manufacturer's first design, and especially when that manufacturer is Honda.”

AT A GLANCE



Natural laminar flow forward fuselage and wing for drag reduction

Garmin G3000 integrated avionics suite for single-pilot operations



“ The manual flight controls were just right; harmonized, light and responsive enough to satisfy the owner-pilot.”

The cabin sound level wouldn't have disturbed quiet conversation. Honda claims that is a further benefit of the OTWEM configuration, which distances the engines from the fuselage.

The externally-serviced lavatory hides behind a convenient pocket door, and incorporates a cool skylight, which provides light without compromising privacy.

THE BIG NEWS

The story thus far has been about the “jet” part of the word “HondaJet,” but let's pause to reflect upon the fact that Honda is building airplanes; a development in the aviation industry akin to dropping a shark into an aquarium.

It's the same Honda, or a subsidiary rather, of the gigantic Honda Motor Company, which reportedly sold about 4.7 million automobiles in its 2016 fiscal year, in addition to its other ventures. What other company in aviation has the resources to build a factory, sustain the workforce payroll and bankroll development of a new airplane for over a decade before they even have a single marketable product? It's a game changer.

Now, the question is, will the investment pay off?

As of Dec. 20, 2016, Honda Aircraft had delivered 23 aircraft, with an initial production rate of two to three units per month. FAA approval for flight into known icing (FIKI) was granted on Nov. 23, 2016, with Canadian type certification targeted for early 2017.

Honda's first aeronautical product has proven to be innovative, attractive and eminently competitive in the light jet market. Their offering shows that Honda Aircraft has a willingness to innovate, sound aeronautical engineering skills, a sensitivity for their target market, and a flair for attractive design.

Start thinking of Honda as an airplane company.



Robert Erdos is a contributing editor for Skies magazine. He is a graduate of the U.S. Naval Test Pilot School and a 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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HOPE FOR TOMORROW

TORONTO-BASED HOPE AERO IS STAYING TRUE TO ITS ROOTS DURING AN EXCITING EXPANSION INTO WESTERN CANADA.

**STORY BY BEN FORREST
PHOTOS BY ANDY CLINE**

On a bulletin board next to the conference room at Hope Aero's maintenance and overhaul facility in Mississauga, Ont., is a list of six principles known as the Hope Aero Way.

They're short and simple statements, bits of wisdom that make good business sense and articulations of ideas founder Harry Hope always had but never wrote down.

The first principle is: jobs get done properly the first time. The second is: Hope Aero treats a customer's aircraft like its own.

The third principle: Hope Aero employees know the business and understand their customers. The fourth: "We tell it like it is," when it comes to time, cost and whether the company can handle the job.

The fifth has to do with efficiency: Hope Aero organizes its facility into specialized units that turn work around faster. The sixth: "We constantly reinvest in better ways of doing things."

Those ideas are bred in the bone of Hope Aero, a leading aircraft component maintenance specialist focused on propeller overhaul, wheel and brake maintenance, dynamic balancing and non-destructive testing.

They reflect the company's values, define its approach and guide how it works together as a team and with its clients.

They may also help explain why the company has gathered a list of 200 regular customers that includes some of the biggest names in Canada's aviation

Hope Aero is a family-owned company guided in part by founder Harry Hope, left, chief financial officer Cathy Dunn, and CEO Terry Hope.





community: Air Canada, Air Georgian, Cargojet Airways, First Air, Air Labrador and Air Inuit, along with government agencies like Transport Canada, the Royal Canadian Mounted Police and Canada's Department of Defence.

But there's more to it than that, according to Terry Hope, 58, a son of Harry's and the company CEO. That's only a starting point.

Success also comes from Hope Aero's practice of consulting with its employees, as was the case in a recent series of strategy sessions with all of its supervisors.

"[We went] through and hammered down through what everyone feels—where the company should go, how the company's doing. And that's where we came up with 'world-class.'"

Being a world-class, preferred supplier of products and services is central to Hope Aero's plan for future growth, something its broad, globally-recognized clientele already expects.

But the company knows achieving and maintaining world-class status rests on its 90-person workforce, many members of which have been employed at Hope Aero for decades.

"Our people is our strength," said Terry, who joined the family business full-time 39 years ago. "We realize that each and every day they know how to do their jobs, they do them well and they care."

A HISTORY OF SUCCESS

Hope Aero has its roots in Harry Hope's career at Western Propeller in Edmonton, Alta., where he began working as an apprentice in 1951 straightening propellers.

Born in the small Saskatchewan town of Lashburn, he obtained his pilot's licence in British Columbia and wanted to get a job flying. That dream never materialized, but fixing propellers was a way to stay involved in aviation.

Harry received his letter of authority to certify aircraft propellers as airworthy in September 1956; two years later, he opened a branch of Western Propeller in Winnipeg.

In 1964 he bought a 50 per cent stake in Western Propeller (Winnipeg) Ltd. and moved east in 1969, where he opened an overhaul shop in Malton, Ont., about two kilometres from the company's current facility near Toronto Pearson International Airport.

In 1982, the company added wheel and brake maintenance to its offerings, and in 2000 it started selling Chadwick-Helmuth (now Zing Honeywell) dynamic balancing equipment.

The Hope family became sole owners of the company in 1993 and changed the company name to Hope Aero Propeller and Components Inc.

Harry witnessed exponential growth before he retired in 2001, seeing business double and re-double many times. The company had 250 work orders in its first year but had nearly 3,000 in 1997. Now,



The company works on about 1,200 propellers in a given year.



“

Our people is our strength. We realize that each and every day they know how to do their jobs, they do them well and they care.”

CLOCKWISE FROM TOP LEFT:

Hope Aero has grown exponentially since its founding and now completes work on about 10,000 wheels and brakes in a given year.

Propeller work is an intensive process tackled one product at a time.

The company is especially busy in summer, when warm temperatures cause tires to wear out more quickly.

the company averages more than 12,000 work orders per year.

“Two main things,” said Harry when asked what explains that growth. “Look after our customers with quality work, and you can’t do that without great employees. Employees are what makes us tick.”

ONE EMPLOYEE’S STORY

Bruce Kentner started working for what is now known as Hope Aero in 1981, when he was 17 years old.

He began as a parts cleaner and floor sweeper and eventually became facilities manager with a reputation for being able to fix anything that’s broken.

“I just enjoyed it,” said Kentner, 52. “Enjoyed the variety of things to do, and it’s more or less what I wanted to do ... it was mechanical—work with my hands.”

He’s stayed so long in part because he has been treated well and paid well, he said.

“I guess you feel like family,” he added. “You feel like part of the organization. You feel like what you do matters ... If you need something, they’re willing to listen to what you need. If you have an opinion, they listen to it. You’re just treated fairly.”

Many of Hope Aero’s employees are actual relatives of Harry and Terry Hope, including chief financial officer Cathy Dunn—Terry’s sister. But the company strives to treat all its workers as family.

“We try to treat our customers right and to treat our employees right,” said Dunn.

Kentner hopes to spend the rest of his career at Hope Aero, he said. At this point could he imagine working somewhere else?

“No,” he said, growing serious in an interview interspersed with jokes. “I couldn’t.”

HIVE OF ACTIVITY

When *Skies* visited Hope Aero, the shop floor at the Mississauga facility was buzzing with activity.

Dozens of workers worked calmly but quickly on a variety of tasks, as Terry Hope stood on a balcony nearby, answering questions above ambient thumps and clanging metal.

“This is busy,” he said. “We are very busy.”

Tires wear out quicker on hot runways, so summer is busier than winter at Hope Aero. After about 10C, the wheel-related work volume increases.

Hope Aero completes work on about 10,000 wheels and brakes in a given year, including all of Air Canada’s wheels and brakes, Terry said.

The company also works on about 1,200 propellers in a given year—work that’s much more intensive. Wheels and brakes are done on a production line, while propellers are done one at a time.

“You look at the task analysis of a [wheel] component, it’s 30 tasks,” said Terry.

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“When you look at the task analysis of a propeller, it’s 170 tasks.”

This is a glimpse of the company’s current capacity, but bigger things may be in store. Hope Aero aims to begin production in May 2017 as part of a Western Canada Centre of Excellence for aircraft maintenance activities in Manitoba.

Air Canada announced via press release on July 21, 2016, that it had signed agreements with three of its business partners that would help support the creation of the centre of excellence.

Along with Hope Aero, the partners included Airbase Services Inc., an Air Canada supplier that specializes in aircraft interior equipment repair and maintenance; and Cargojet Airways, an Air Canada cargo partner that will establish its own repair and maintenance activities, according to the press release.

“The intent is wheels and brakes—to service the Western Canada wheel and brake market,” said Terry, referring to Hope Aero’s plans for the facility.

“It diversifies our offering, in that we’ll have two centres to be able to get maintenance done, and can lean on each

other as required.”

Hope Aero plans to hire an initial staff of four in Manitoba, with the goal of eventually employing 20 people in the province.

“It certainly won’t be instantaneous, but it might be a few years down the road to get that sort of number,” said Dunn.

Meanwhile, Dowty Propellers has announced a sub-contract agreement with Hope Aero to provide repair services for Dowty’s Canadian customers who operate Bombardier Dash 8 Q400 airplanes.

“We’re very excited that we’re being set up to do that,” said Dunn.

Along with that growth, Hope Aero continues to support humanitarian and charity work. Its employees are raising money to create a deep well in Africa, and the company is a proponent of the Canadian Warplane Heritage Museum in Hamilton, Ont.

“We have a special place for all the men and women in uniform—a special place in our hearts,” said Terry. “Warplane Heritage keeps that message alive, so we never forget.”

WHAT LIES AHEAD

Hope Aero is moving forward with an eye on its past, pledging never to lose

focus on the family principles that built the company.

In other words, the Hope Aero Way has a place in the company’s future as well as its impressive history.

“It’s off to the next generation,” said Terry when asked for his vision for the future of the company. “I was walking around here this spring and just realizing that the future is very bright, and these people are coming along.

“I’ve got a couple of the staff where they’re saying they’d like their children to work here when they come of age, and it’s really good to see.

“So it’s to pass on Hope Aero to the next generation, whoever that might be.”



Ben Forrest is assistant editor of Skies magazine. Before joining Skies in 2015, he spent the better part of 10 years in the newspaper industry, where he worked as an editor, sports editor and general assignment reporter.



Hope Aero is known for its skilled, knowledgeable and dedicated employees. “Employees are what makes us tick,” said founder Harry Hope.

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GOING ON THE RECORD

KELOWNA CRASH REFOCUSSES ATTENTION ON CANADA'S FLIGHT RECORDER REGS

BY KEN POLE

The October 2016 crash of a 1974 Cessna Citation eight minutes after takeoff from Kelowna, B.C., which killed the pilot and his three passengers, is focusing fresh attention on Canada's regulations governing cockpit voice recorders (CVRs) and flight data recorders (FDRs).

Currently, only Canadian multi-engine, turbine-powered commercial aircraft flown by two pilots and carrying six or more passengers are required to carry a CVR.

Like all aircraft its size, the Citation wasn't required to have a recorder of either type on board. That prompted Transport

Minister Marc Garneau to say "it's a good time for us to look at the issue" even though his department has been considering it for "quite a while."

In fact, there's grim irony in that an International Civil Aviation Organization (ICAO) standard adopted by most other regulators long ago originated with our own Transportation Safety Board (TSB) in February 1991—yet Canada has so far failed to follow suit.

The TSB's recommendations flowed from a review of 14 major "occurrences" in 1988-1989. Five aircraft had recorders from which useful data were retrieved. The other nine were not equipped, hindering the investigations.

Current Canadian recorder regulations date to 1969, and changes since then have been editorial or administrative. ICAO issued new standards and recommended practices in 1985; and while Canadian legislation met those standards, it fell short of ICAO's recommended practices.

So Transport Canada formed a review group in 1986 and the Canadian Aviation Safety Board (CASB) published a Statement of Requirement for improved regulations. Transport eventually responded by promising new legislation to match updates announced by U.S. Federal Aviation Administration (FAA) in 1988. But the process evidently stalled into a bureaucratic tailspin, prompting the TSB (which absorbed the CASB in 1990), to urge Transport to "expedite" updated recorder requirements in smaller aircraft.

Transport Minister Marc Garneau has asked officials to examine expanded requirements for flight data and cockpit voice recorders in smaller aircraft.





Five days after the Kelowna crash, Garneau, a navy commander who learned to fly as part of his astronaut training, said “there was very little choice” among “extremely expensive” units in the early 1990s. New recorders are “cheaper” so it is time for another look at regulatory requirements, he indicated.

Two weeks later, in a Watchlist of outstanding issues, the TSB pointed out its 1991 recommendation. “This latest accident is another reminder of how important these recorders are,” TSB Chair Kathy Fox told reporters at a news conference.

She conceded the department has some “tough” regulatory challenges which can take time to resolve. “But a decade? Two decades? There is no reasonable excuse.”

Norm Matheis, regional marketing manager for Canada for Universal Avionics Systems Corporation, questioned the “cheaper” concept, pointing out that despite similar base pricing, CVRs and FDRs are quite distinct.

“Depending on what yardstick you use, cockpit voice recorders are already pretty cheap. A Universal Avionics CVR or FDR lists for \$16,500, but installation drives up the overall cost. Putting a CVR in a Citation, for example, could be \$50,000.

“A flight data recorder is a totally different matter,” continued Matheis. “In some thing like a regional turboprop, there’s a lot of stuff to record. That’s very intrusive to the aircraft.”

Installations depend on how many input parameters regulators require—anywhere from 50 to 250—and the more advanced the aircraft, the costlier it becomes.

What about the general aviation (GA) community? Retrofitting even a CVR would be a major expense for pilots who can’t write it off for business purposes.

“We may never see the industry, the rulemakers, reach down into that extreme lower end of GA,” Matheis replied. “But I’m kind of scratching my head as to why, in Canada, again using that Citation accident as an example, why that aircraft’s not required to carry a CVR. Not having anything for the investigators to look at other than the crash site—that’s tough.”

At Maxcraft Avionics Ltd., based at Pitt

“

I’m kind of scratching my head as to why, in Canada, again using that Citation accident as an example, why that aircraft’s not required to carry a CVR.”

— Norm Matheis, Universal Avionics Systems Corporation



ABOVE: A high-profile October 2016 crash involving a 1974 Cessna Citation near Kelowna, B.C., has renewed the call for cockpit voice and flight data recorders in smaller aircraft, including business jets. **TSB Photo**

RIGHT: **Universal Avionics Photo**



Meadows Airport in B.C. and recognized by Transport Canada, the FAA and the European Aviation Safety Administration, president Daryl MacIntosh agreed that the cost of even a basic CVR can be daunting.

“We just quoted a new installation for an old business jet,” he told *Skies*. “It was over \$50,000 just to replace it—and that’s keeping the existing wiring!”

When *Skies* asked for an update at the end of November 2016, Transport Canada replied that regulatory amendments bringing Canada into line with U.S. and other international requirements would be “brought forward in the coming months.”

The regulator reported it is working with “a number of stakeholders and partners” to identify the best way to mandate not only CVRs but also video recorders, “while ensuring that they can be used

within the parameters of privacy legislation and policies.”

A week later, Garneau seemingly telegraphed his own preference. He told reporters after a cabinet meeting that since “Canada and the United States work very well together” in all transport modes, it is “critically important . . . for us to have harmonized regulations.”

MacIntosh recollected how quickly ICAO, the FAA and EASA had responded to the TSB recommendations years ago.

“We made all the recommendations and said ‘yes we should make it better’ but we haven’t done it,” he lamented. ✘



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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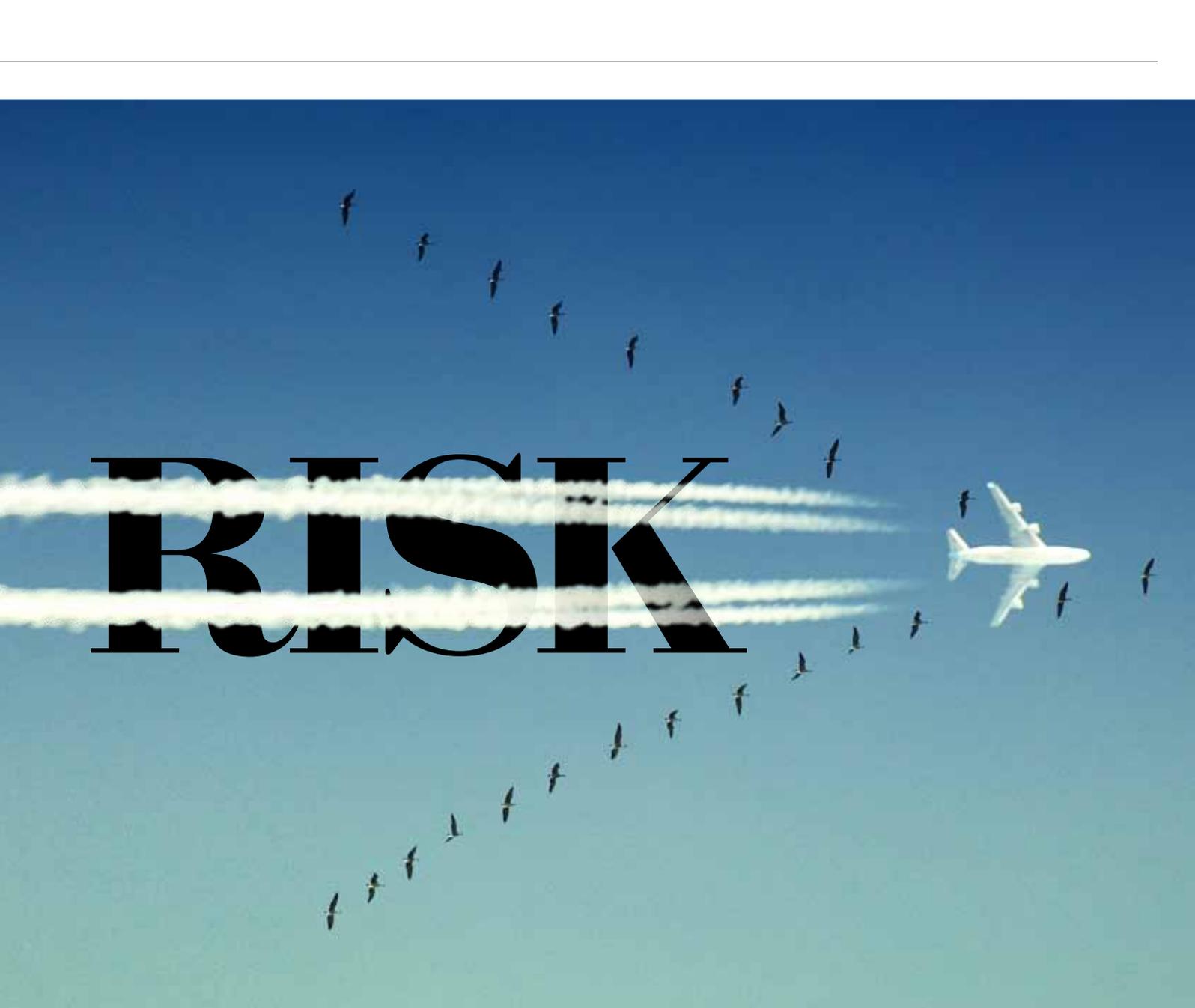
BY MARIO PIEROBON



One of the main responsibilities of any airport authority is controlling pesky birds that like to hang around the airfield. As the populations of most North American large bird species rise, so does the corresponding risk to aviation safety.

Traditionally, airport wildlife management has revolved around very practical techniques, including the use of deterrents such as other predatory animals or birds, pyrotechnics and soundwave dispersal techniques.

Over the years, however, bird hazard management has evolved to incorporate scientific principles and is increasingly performed according to a risk-based model. Gary Searing, executive director of Bird Strike Committee Canada, told *Skies* that airports are most often subjected to



RISK

large numbers of birds during migration or post-nesting season.

“The abundance of birds is often not affected by the areas near airports, but by breeding habitats many miles away,” explained Searing. “For example, in the Pacific Flyway, Snow Geese arrive in Vancouver all the way from Wrangell Island in Russia and many shorebirds who land there breed in Alaska.”

Traditionally, predatory birds, such as falcons, have been used for deterring other bird species. At some airports, dogs chase away unwelcome avian visitors, having an advantage over falconry in that they can be trained to move according to the handler’s instructions and to hold short of pavement to prevent runway incursions.

“However, dogs cannot access wetland

areas as effectively as falconry birds, nor are they as useful in controlling flocks of shorebirds,” said Searing. “While far faster than humans, they also are much slower than falcons and thus do not cover as much ground in the same amount of time.”

Lately, remote-controlled artificial predators have been introduced, including ornithopters (bird-like remote-controlled aircraft with flapping wings) and rotary-winged drones.

“These will likely never have the same effect as a real live predator, but they require far less maintenance and upkeep and are entirely controlled by the handler,” said Searing. However, he pointed out that remotely-controlled aircraft require a stack of permits before they can be used on or near an airport.

OPPOSITE: Wires strung across a ditch at Vancouver International Airport act as a deterrent to birds who may otherwise take up residence on the airfield.

Gary Searing Photo



TOP LEFT: While man-made remote-controlled drones and other vehicles are sometimes used for airport wildlife management, “these will likely never have the same effect as a real live predator,” according to expert Gary Searing.
Gary Searing Photo

TOP RIGHT: Trained predatory birds are often used to chase away other feathered visitors.
Gary Searing Photo

OPPOSITE: A common approach to bird hazard management involves identifying specific risks, ranking them in order of importance, and developing a plan to mitigate them as much as possible.
Gary Searing Photo



RISK-BASED APPROACH

Broadly defined, risk-based wildlife hazard management is based on identifying wildlife risks at an airport, ranking those risks, developing an approach or plan to mitigate each of them, and implementing the plan by focussing on the current highest-ranked hazards at the airport.

When a risk-based approach to management (including bird hazard management) is introduced, it almost always leads to the implementation of some type of software solution.

“The best software application for bird hazard management comes with a major piece of hardware, the avian radar,” reported Searing. “Accipiter Radar Technologies, an Ontario-based company, has developed an application using radar to detect flying birds up to 13 kilometres away from an airport and to alert the airport when hazards reach a specified level in each sector. This allows wildlife controllers to identify hazardous situations as they develop and focus their activities in these areas rather than driving all around the airport searching for avian hazards.”

On a smaller scale, Falcon Environmental Services, a company based in Quebec and Ontario, has developed an app to assess risk.

“In my opinion, these types of apps should be built into data collection apps which many airports are currently using,” said Searing. “As the data are entered, they should be analyzed and a risk level determined based on the information entered over the previous hour or two.

I am not aware of anything like this at the present time, but it would not be difficult to produce. I should also say that there are many approaches to assessing risk. Individual apps should be clear as to which approach they are using and how risk is calculated.”

Under the Canadian Aviation Regulations (CARs), there is a qualifying process to become an airport bird hazard manager. Bird Strike Committee Canada has been actively working to improve this process.

“Currently, Transport Canada has no accreditation process for airport wildlife managers,” noted Searing. “The regulations require individuals conducting wildlife control to be trained in a list of topics once every five years. However, the depth of training is not specified and there is no requirement for any field-level training. More importantly, there is no auditing requirement for individuals. Transport Canada may audit the wildlife management plan, but the wildlife controllers, once they receive their training, are considered to be qualified.”

He added that there are no set qualifications for the trainers, either. That means that a person who has never set foot on an airport could potentially deliver wildlife management training that would be accepted by Transport Canada.

“Many airports do not fully understand the importance or the process of airport wildlife management,” said Searing. “Therefore, education and training is critically important to improving the process and making Canada’s airports as safe as possible for the flying public.”



Mario Pierobon is a safety management consultant and content producer. He is currently working on a research project investigating aircraft ground handling safety.



“

The abundance of birds is often not affected by the areas near airports, but by breeding habitats many miles away.”



Pilot training changes require enhanced instructor capabilities

BY RANDALL BROOKS

A student training for a commercial pilot's licence inadvertently reacts too aggressively while manoeuvring. The plane shudders, stalls, and quickly rolls to 90 degrees of bank with one wing pointing directly at the ground. What happens next is in the hands of the flight instructor on board, and their training to correctly react to this unanticipated departure from controlled flight.

The International Civil Aviation Organization has called for the introduction of upset prevention and recovery training (UPRT) into the commercial pilot instructional syllabus. This new, more robust training is intended to reduce the threat of loss of control in-flight, currently the leading cause of fatalities in all sectors of aviation. It involves manoeuvring in all attitudes and throughout a broader spectrum of the flight envelope in appropriate training aircraft for this mission. The goal is to teach pilots how to prevent and recover from a wider variety of situations than they have been prepared to deal with in the past.

As national aviation authorities such as Transport Canada, the Federal Aviation Administration and the European Aviation Safety Administration begin to consider the introduction of this new type of training, they must identify how to appropriately qualify instructors who will provide this training. Manoeuvring at all attitudes in an aerobically-capable aircraft is well beyond the scope of current flight instructors' responsibilities. How do we ensure that this training is introduced safely?

One way to answer this question would be to borrow from the approach taken in the realm of instrument flying. To receive

an instrument flight rules (IFR) rating, pilots must demonstrate their proficiency not on a *single* type of instrument approach, but on a wide variety of different kinds of approaches using many types of ground-based or global positioning system (GPS) navigational aids.

This is because while on an instrument flight plan, weather conditions or other factors might force pilots to accept a type of instrument approach different from what was originally planned. Although in most cases pilots do not need to execute instrument approaches to minimums or execute go-arounds from a missed approach, they are tested to the worst case—the lowest allowable altitudes for the approach—so they can demonstrate they possess the proficiency to safely operate in the full IFR domain.

In the case of UPRT, the competent instructor is responsible for the safety of flight despite any anomalies or unexpected student inputs, and must demonstrate that they can safely recover from *all* conditions they may encounter while delivering training, even though most training flights will go exactly as planned without unanticipated departures from controlled flight.

The difference from the comparison to instrument approach proficiency is that the requirement for an alternate instrument approach generally allows time and alternatives not available to the UPRT flight instructor. A student-induced spin (a spiralling or auto-rotating flight condition involving rapid altitude loss) will require the UPRT flight instructor to promptly and effectively address any time-critical, potentially life threatening situation that confronts them.

Only demonstrated proficiency in the full spectrum of spin recovery can ensure safety in the delivery of UPRT. Without going into details, there are many spin variations that an instructor might have to correct: normal spins, flat spins, accelerated spins, transition spins, and cross-over spins. All of these spin conditions can occur both upright or inverted.

Proficiency in recovering from this full range of potential spin conditions may seem onerous or unnecessary for those unfamiliar with the circumstances which arise in the actual delivery of UPRT, but they are as normal for safe operation in the all-attitude domain as instrument approach capability is for those who operate in instrument meteorological conditions.

They are no more technically difficult to master, but can certainly be more intimidating physically. While the described spin recovery skills may seem unusual or excessive, that is only the case from the perspective of normal flight operations and not from the viewpoint of regular operations in the upset domain.

Clearly, the outcome of the scenario introduced at the beginning of this article is dependent upon the training and qualifications of the flight instructor to appropriately respond to the situation.

Some tend to overestimate the risks associated with the delivery of UPRT. This is often the result of assessing risk based on the all-attitude/all-envelope flight operations of the past, which did not practice risk mitigation through today's comprehensive safety management system approach. By applying the same principles of risk mitigation we regularly apply to normal flight operations through the use of aircraft with the appropriate margin of safety for intended operations, flown by flight instructors appropriately trained and qualified for delivery of instruction in the all-attitude/all-envelope domain, the risks of delivering UPRT are minimized.

If spin recovery and other necessary proficiency standards are identified and required by UPRT flight instructor certification standards, qualified flight instructors will be well equipped to safely and effectively handle any potential flight conditions they may encounter.

Randall Brooks is the vice-president of training and business development for Aviation Performance Solutions (APS) and a former corporate pilot, production test pilot, and formation aerobatic airshow pilot. Expanded versions of Skies articles by APS are available at apstraining.com/skies. APS specializes in reducing the risk of loss of control in-flight globally through integrated upset prevention and recovery training (UPRT) solutions.

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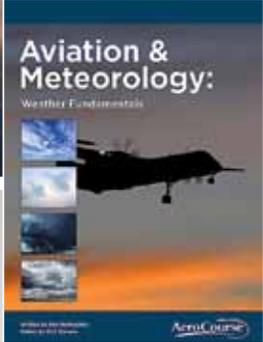


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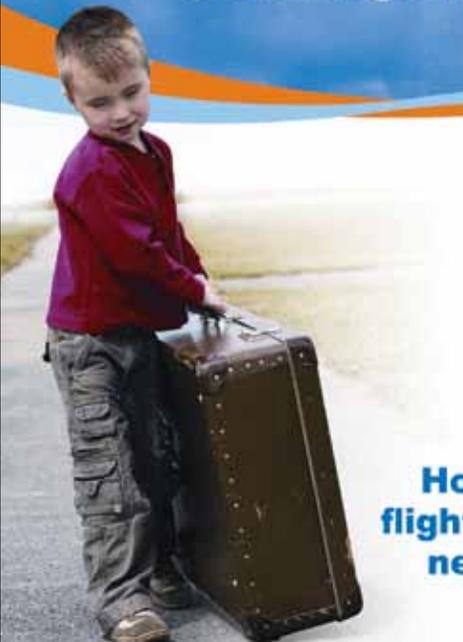


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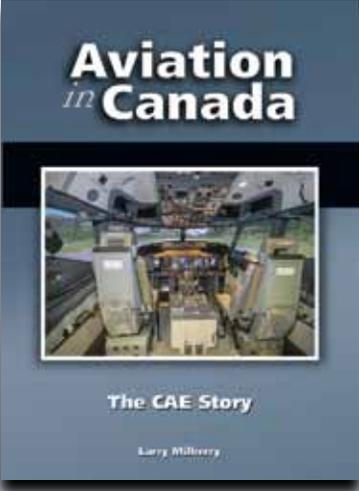
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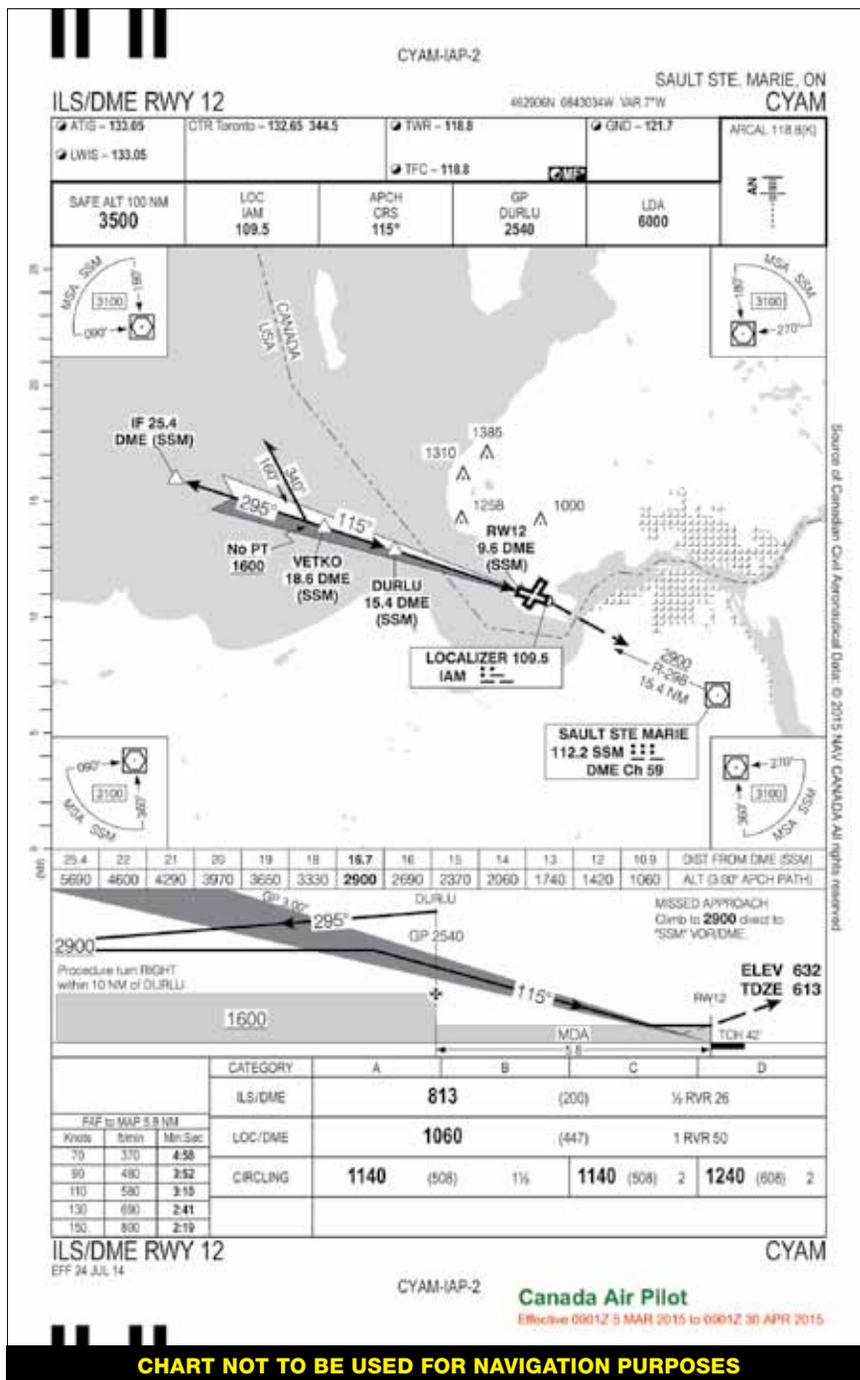


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Sharpen your IFR skills

BY JOHN MONTGOMERY



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5. If doing the LOC/DME approach, what is the minimum allowable step-down altitude between DURLU and NUKAV?
6. What should be your course of action in the event of a missed approach and arrival over the clearance limit?

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.

CHART NOT TO BE USED FOR NAVIGATION PURPOSES



Meet Luke Penner, aerobatic champion

BY LISA GORDON

Now that aerobatic season is over, Luke Penner has the time to reflect on the amazing year that was 2016.

The 33-year-old chief flying instructor with family-owned Harv's Air in Manitoba has been a pilot for 14 years—but while flying runs deep in his blood, it's aerobatics that really captures his imagination.

"My flying background is broad: I've been instructing for more than 10 years; a DFTE [designated flight test examiner]; air taxi flying up north," said Penner, who has logged about 8,000 hours. "The thing I like about aerobatics is the creative aspect. The rest of the flying I do, especially IFR flying, is very structured and regimented. Aerobatics allow you to express yourself in a creative way."

Penner's creativity paid off big time in 2016, when he made the decision to pursue his dream of competitive aerobatic flying.

"For the last year and a half I've been learning as much as I can about the competition world," he told *Skies*. "I was lucky to find mentors who could guide me."

To prepare for his first competition—the Midwest Aerobatic Championships—Penner tapped into the expertise of some big industry names. Canadian Red Bull Air Race pilot

Pete McLeod and U.S. aerobatic champion Patty Wagstaff were both influential in the development of his aerobatic sequences.

"[McLeod] was instrumental in teaching me how to think about a sequence and how to draw a line in the sky, and how to make it look really good to a judge," said Penner.

In January 2016, he flew with Wagstaff at her flight school in Florida. "Patty has been a tremendous resource for me," he continued. "She helped me develop a freestyle sequence."

Come the end of June, Penner hopped into his 1983 Pitts Special S-2B—coincidentally manufactured the same year he was born—and headed to hot, humid Nebraska for his first competition.

When he arrived, he met veteran aerobatics competitor Tom Adams, who watched Penner during a practice and offered him some well-placed pointers before his first competitive flight.

With temperatures reaching as high as 33C that day, routines had to be modified due to decreased aircraft performance. Finally, Penner was called to the aerial performance box.

"The adrenaline starts flowing when you're called up. You just try to execute your

plan. When you're in the box it's only about three minutes—it's short but very intense."

When he was done, Penner rocked his wings three times to signify the end of his sequence. That's when his hands started shaking.

"In terms of how I did, I really had no idea. I was pretty confident I had no penalties."

In fact, when the score sheet was posted on the hangar wall, Penner came out on top in the field of 16 competitors. "I nearly fainted," he laughed, remembering the moment. "Then I had to rein myself back in—it could be beginner's luck!"

But the next day Penner repeated the performance, winning his very first aerobatics competition. On the heels of his success, he decided to enter the 2016 U.S. National Aerobatic Championships in Denison, Texas, in late September.

The Pitts isn't known for its cross-country abilities. Nevertheless, Penner enthusiastically set off on the long journey to Texas—covering about 1,000 nautical miles in six hops.

This time, the Sportsman category included 18 competitors. Each flew a known sequence (published in advance by contest officials) with Penner also choosing to perform an optional freestyle sequence.

"Knowing that I am going to fly Intermediate next year, where there is no choice but to fly freestyle, I wanted to get an early start on that."

The national competition was dramatic right to the end. "I was in first after the first and second flights. Then came the last flight and I felt the most pressure to perform well," said Penner.

The Manitoba pilot was on pins and needles while the scores were tallied. Then came the euphoria of learning he had finished in the number one spot—followed shortly by the disappointment of learning that since he is Canadian, he cannot be the U.S. national champion.

"I put my nationality down when I registered," said Penner. "But [later] I was told the rules said I couldn't actually be the national champion."

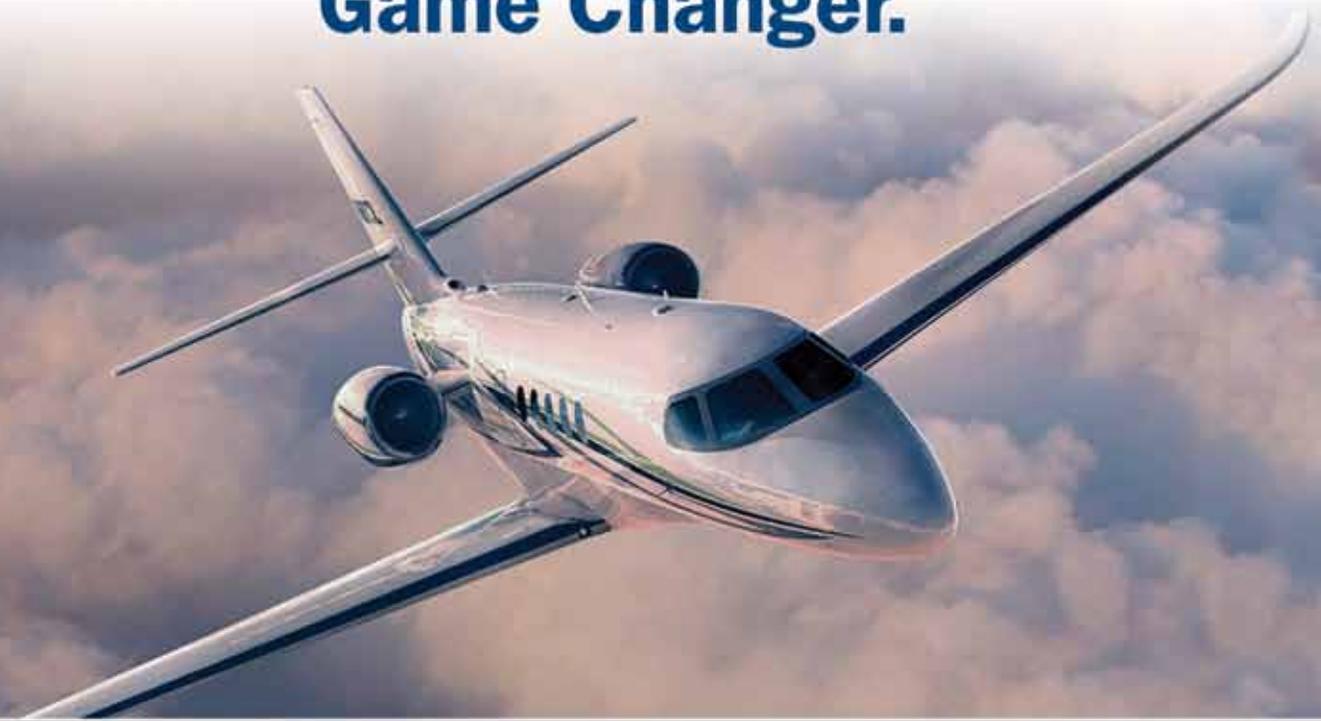
Nevertheless, Penner doesn't take it personally. He plans to return to the U.S. nationals next year in the Intermediate category and will spend the winter sketching out a new freestyle sequence.

Just how far will he go?

"That depends on how I do. My plan is to do a couple years of Intermediate. If that goes well, I'll have to make a decision. If I want to move up to Advanced, I'll need a new airplane."

In the meantime, the challenge of the Intermediate category beckons. Fortunately, said Penner, the long Manitoba winter will give him lots of time to study before the Pitts takes to the skies again in March. ■

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