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The Magazine for Aircraft Maintenance Professionals

UPDATE



Transport Canada Approved for R/T

A large, detailed photograph of a Boeing 727 jet engine, showing the fan blades and the engine casing. The engine is the central focus of the cover.

Boeing 727: final flight of the prototype

Pathways: Connecting Canada's transportation system to the world

A smaller, semi-transparent inset photograph showing a close-up of engine components, possibly a compressor or turbine section.

Publication Mail Agreement No. 0041039024
and Return Undeliverable Canadian Addresses to
Alpha Publishing Group (2004) Inc.
Unit 7, 11771 Horseshoe Way, Richmond, BC, V7A 4V4
email: amumagazine@outlook.com

April - May 2016
Volume 14/Issue 6

\$7.95

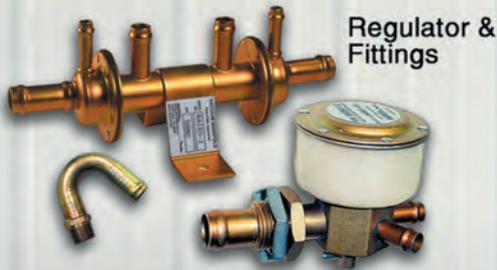
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Air Canada wants level playing field

Air Canada said that it welcomed the greater flexibility contained in the bill tabled March 24th by the Government of Canada to amend and modernize the Air Canada Public Participation Act with respect to its aircraft maintenance obligations.

“It is indeed time that the Air Canada Public Participation Act, dating from the company’s privatization nearly 30 years ago, be modernized to recognize the reality that Air Canada is a private sector company, owned by private sector interests, which operates in a highly competitive global industry that has undergone dramatic transformation over the past three decades,” said Calin Rovinescu, President and Chief Executive Officer, Air Canada. “No other airline in Canada is subject to restrictions such as those imposed on Air Canada. To succeed and thrive in the global marketplace and to create high-skill job opportunities in Canada beyond those held by our 26,000 employees, we need a level playing field and the same ability to manage our business and affairs as our competitors. Our airline industry today is very different from what it was in the 1980s, with greater domestic competition, more foreign carriers and maintenance dynamics that have dramatically changed on a global basis.”

Subject to concluding final arrangements, the Government of Quebec has agreed to discontinue the litigation related to Air Canada’s obligations regarding the maintenance of an overhaul and operational centre following Air Canada’s agreement to collaborate with the province to establish a Centre of Excellence for C Series airframe heavy maintenance work in Quebec. The Government of Manitoba has also agreed to discontinue litigation following Air Canada’s agreement with that province to further support Manitoba’s aviation sector by bringing three of its suppliers and partners to Manitoba and helping to develop a Western Canada Center of Excellence.

Air Canada is studying the proposed amendments and will make submissions to the Minister of Transport after completing its review.

(With Air Canada files.)

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AirMaintenance Update

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Richmond BC V7A 4V4 Canada
phone: (604) 214-9824 • **fax:** (604) 214-9825

Published by Alpha Publishing Group (2004) Inc.

Publication Mail Agreement Number 0041039024 and Return Undeliverable Canadian Addresses to:
Alpha Publishing Group (2004) Inc.
Unit 7, 11771 Horseshoe Way
Richmond BC V7A 4V4 Canada

amumagazine@outlook.com or amumag2015@gmail.com **website:** www.amumagazine.com

editor: John Campbell
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publisher: Bill Carter
sales manager: Bill Carter
Advertising inquiries: (604) 214-9824

Subscription Rates: 1 Year: \$40 2 Years: \$60
AirMaintenance Update is published 6X annually. AirMaintenance Update may not be reproduced in whole or in part in any form without the express written permission of Alpha Publishing Group (2004) Inc. Copyright 2016 Printed in Canada

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Publications Mail Registration No. 0007198278

ISSN 1703-2318

Upcoming Events

Cyclone Details Need Sorting



The Canadian Press reports that one of Canada's new CH-148 Cyclone helicopters had to be winched off a ship after a small piece tore off while it was being parked — an unexpected problem that sent engineers back to the drawing board. Access to information documents say a metal ring on the helicopter's nose snapped as crews tried to get it lined up for a tow into a hangar originally designed to hold the vintage Sea King helicopters that are being phased out. The incident — which wasn't noted in any news release — occurred during testing last year before the former Conservative government announced on June 19 it had accepted ownership of the choppers.

The 28 Cyclones have faced repeated development delays since being ordered in 2004 and are not expected to be fully operational on both the East and West Coasts until 2021. The deck incident on March 12 was among numerous issues noted in the access to information docu-

ments leading up to the former Conservative government's acceptance of the helicopter. Documents prepared at the end of 2014 also say the first generation of the helicopters, known as Block 1 versions, would have 64 restrictions on their initial capabilities, ranging from prohibitions on flying over rough seas to altitude restrictions on automated flying systems. It also said the helicopters would have a lifespan of 200 hours before some parts had to be changed out.

CANADA

CHC Quality and Safety Summit

April 4 – 6, 2016

Vancouver, British Columbia
www.chcsafetyqualitysummit.com

Careers in Aviation Expo

April 9, 2016

Toronto, Ontario
www.careersinaviation.ca

Careers in Aviation Expo

May 14, 2016

Calgary, Alberta
www.careersinaviation.ca

Great Lakes International Air Show

June 18 – 19, 2016

St. Thomas, Ontario
www.greatlakesinternationalairshow.ca

Northern Skies Air Show

July 16 – 17, 2016

Peace River, Alberta
www.peaceregionalairshow.com

Abbotsford International Air Show

August 12-14, 2016

Abbotsford, British Columbia
www.abbotsfordairshow.com

UNITED STATES

Brazing Symposium

April 4 – 5, 2016

Dallas, Texas
www.brazing.aviationweek.com

MRO Americas

April 5 – 7, 2016

Dallas, Texas
www.mroamericas.aviationweek.com

2016 MCAS Cherry Point Air Show

April 30 – May 1, 2016

Cherry Point, North Carolina
www.cherrypointairshow.com

National BiPlane Fly-In

June 3 – 4, 2016

Junction City, Kansas
www.nationalbiplane-flyin.com

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STCs & new products

Trailblazer constant speed prop now on Scout patrol

Hartzell Propeller Inc. has received STC approval for installation of the company's new Trailblazer constant speed propellers on American Champion Scout aircraft. Included in the STC are 8GCBC Scout and Denali Scout aircraft. The Hartzell 80-inch, swept two-blade, advanced structural composite Trailblazer prop replaces either the two-blade aluminum Hartzell, or the two-blade wood core propeller, available on Scouts from the factory. The new unlimited life Trailblazer is said to provide an increase in climb performance compared to factory-installed propellers. **For more information visit** www.hartzellprop.com



Clean up that mess with bonded pads

New Oil Eater Sonic bonded pads and rolls are intended to provide solutions for providing a safer and cleaner workplace by absorbing spills including oils, solvents, water and acids. The pads and rolls tear along their perforated seam to fit almost any space. They are constructed from a single layer of polypropylene fibres that have been bonded together using a high-loft process. The material is said to provide strength and reduced linting.

For information visit www.oileater.com



Fall protection available from Alpine while working on Bells

Alpine Aerotech has introduced a fall protection system to improve safety for those working at heights on the Bell 205 / 212 / 412 / CH146 aircraft. This fall protection system is collapsible and compact for easy stowage, making it an ideal kit for both hangar and field applications. When installed properly, the system is said to actually eliminate the fall hazard.



For information visit www.alpineaerotech.com

AVS-SYS introduces flexible ducting in low-pressure situations

AVS-SYS Ltd. has introduced a new range of flexible ducting specifically designed to suit the on-board environments found in aircraft of all types, while removing weight to provide long term operational savings. The primary use of the ducting will be in the low-pressure air distribution system on board aircraft. The flexible ducting comes in a range of lengths and diameters with various cuff ends to provide options across a spectrum of aircraft types.



For more information visit www.avs-sys.com

New kit from Spectroline pinpoints leaks

Spectroline's MLK-35A Maxima leak detection kit is said to pinpoint the exact source of leaks in hydraulic, engine oil, and aircraft fuel systems. The kit features an ultraviolet lamp and a 237-ml bottle of Aero-Brite universal fluorescent dye, which locates all leaks in petroleum- and synthetic-based aviation fluid systems. The Maxima lamp reportedly delivers up to 10 times the UVA output of conventional high intensity discharge (HID) lamps, and can be used in direct sunlight.

For more information visit www.spectroline.com



Take the scream out of tire deflation

Kestrel Engineering Ltd. is now offering a device that is said to reduce noise levels by more than 20 decibels when deflating aircraft wheels. The Saf-Deflat-Aer screw-on version contains an integral silencer and a connector, which is firmly screwed onto the external threads of the Schrader wheel valve. A knob is then used to locate the end of the integral spindle on the valve core. It is then rotated to raise the core off its seat, which results in the compressed nitrogen escaping through the integral silencer. **For more information visit** www.kestrelengineering.com



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BELL COMPLETES COAST GUARD CONTRACT



After being awarded a contract in May 2014, Bell Helicopter Textron Canada has now completed the delivery of 15 light-lift helicopters to the Canadian Coast Guard, with the final unit delivered March 16, to the Shearwater station in Nova Scotia. The new helicopters are said to be faster, able to fly farther and carry greater payload than the aircraft they are replacing. In addition, they provide a range of safety enhancements over the existing aircraft. The Canadian Coast Guard's helicopter fleet supports several programs that contribute to the safety, national security and sovereignty of Canada. Helicopter missions include everything from flying to remote sites in Canada to supporting construction and maintenance of CCG communication sites, oil pollution response, ice monitoring and support to DFO Science programs.

AIR CANADA TO PURCHASE FLEET OF C SERIES JETS



Air Canada announced in mid-February that it has entered into a Letter of Intent with Bombardier Inc. for the acquisition of up to 75 Bombardier CS300 aircraft

powered by Pratt & Whitney PurePower PW1500G engines as part of its narrow-body fleet renewal plan. The LOI contemplates 45 firm orders plus options to purchase up to an additional 30 aircraft and includes substitution rights to CS100 aircraft in certain circumstances. Deliveries are scheduled to begin in late 2019 and extend to 2022. The first 25 aircraft on delivery will replace Air Canada's existing mainline fleet of Embraer E190 aircraft.

"The entry of the C Series into our fleet is expected to yield significant cost savings," said Calin Rovinescu, president and CEO of Air Canada. "We have estimated that the projected fuel burn and maintenance cost savings (on a per seat basis) of greater than 15 percent should generate an estimated CASM reduction of approximately 10 percent, when compared to the aircraft it will replace."

The acquisition of the C Series aircraft complements the acquisition of 61 Boeing 737 MAX aircraft announced in December 2013 to replace the larger end of the airline's narrow-body fleet.

ALPINE AEROTECH LAUNCHES NEW PRODUCT WEBSITE



Kelowna, BC-based Alpine Aerotech has launched a new website designed to provide visitors with simple search functions for established product lines, as well as newly approved products. Individual product pages at www.aalproduct.com provide photos and key information such as weight, installation time, approval details and price.

"Responding to the needs of our customers results in newly approved kits and this new website allows us to feature these products as soon as they become

available," says Jeff Denomme, president of Alpine Aerotech.

SKYE AVIONICS TACKLES BIG REWIRING PROJECT



Skye Avionics is quite proud of a recently completed tip-to-tail Bell 206B wiring refurbishment project and in March the Campbell River, BC-based company contacted AMU to share the details, which included new engine and transmission harnesses, the installation of a new avionics package, Aero Led lighting and other modifications to meet the operator's requirements. The helicopter was an early serial number and had been cared for, however the wiring and terminals were showing signs of wear and numerous splices could be found throughout the harness. A number of issues were detected when the harness was removed. As a result the Skye Avionics team refurbished and treated all of the grounding points throughout the entire airframe, refurbished the circuit breaker panel and rectified all found defects. Along with the new wiring, Skye Avionics provided a documentation package that includes schematics of the entire avionics system. The total time of this completed project was a five weeks.



BELL 505 JET RANGER X PROGRAM IN HIGH GEAR

Launched at HELI-EXPO 2014, Bell Helicopter's 505 Jet Ranger X program has moved from mockup to prototype in less than two years. Flight-testing is now underway and the company says it is making "significant" progress toward type certification.



"The Bell 505 program is proceeding with velocity," said Matt Hasik, Bell Helicopter's executive vice president of commercial business. Three flight test vehicles have amassed more than 575 flight hours and work has begun to prepare for low-rate initial production at the Louisiana Assembly Centre, which opened last year in Lafayette, Louisiana. Additionally, engine partner Turbomecca received EASA type certification for the Arrius 2 R engine which will power the Bell 505.

HNZ INVESTS IN NORTHERN CANADA



Helicopter support services provider HNZ Group says it has enhanced its presence north of the 60th parallel through the recent creation of Acasta HeliFlight Inc., which will be based in Yellowknife, NWT and provide specialized northern Canadian VFR helicopter transportation services across all sectors of the regional economy. Acasta will be

primarily under the leadership of president Adam Bembridge, a local aviation executive.

"I'm extremely proud to not only be a part of this investment in the north personally, I'm thrilled to have a such a dynamic partner like HNZ Group making this significant investment in the future of my home community of Yellowknife," said Bembridge. "Together we see this as a strategic investment that will create stable, long-term northern employment. I personally look at Acasta HeliFlight as an opportunity, in otherwise challenging times, to demonstrate our commitment to our fellow northerners and do our part to contribute to the overall stability of our economy."

UP & AWAY AVIATION: MAKING CRITTERS LESS COMFORTABLE



Farnborough, UK-based aviation-detailing company Up & Away Aviation says it has a new aviation approved pesticide that is effective in killing virtually all insects. It's a treatment designed to leave a residual film that lasts for up to eight weeks ensuring ready-to-fly status for treated aircraft. This will appeal to customers travelling to an increasing number of countries where "disinsection" is now a legal requirement. This service is said to provide "complete peace of mind" to those concerned about the recent threat from the Zika Virus with its capacity to kill mosquitoes that are proven to carry the virus. The service involves treating the aircraft cabin and cargo while passengers and crew are on the ground. It's a process that is said to take about an hour depending on aircraft size.

"Passengers can relax and enjoy their flight knowing that their aircraft has been completely fumigated and a safe environment has been created," said Ste-

fan Murphy, managing director of Up & Away Aviation. "It is also a great advantage to be able to land anywhere in the world without the inconvenience and delay caused by having to be disinfected by the authorities on the ground."

VIH AEROSPACE EARNS BELL 407 CERTIFICATE OF AIRWORTHINESS



VIH Aerospace of Victoria, British Columbia has received a Transport Canada - Certificate of Airworthiness for its Bell 407 Helicopter; aircraft serial number 53001.

In obtaining the Certificate, VIH Aerospace now adds the availability of a serviceable Bell 407 helicopter for lease options to compliment its Bell 407 Overhaul, Rental and Exchange program, that provides operators with low to zero hour lease and exchanges for their Bell 407 components while the operator's components are overhauled by VIHA's component repair and overhaul specialists. As a Bell-approved Customer Service Facility, VIH Aerospace offers a suite of services including component overhaul, structural repair, avionics and electrical modifications/upgrades/installations. ■

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Boeing 727: **Final flight of**

On March 2, the Museum of Flight's recently restored Boeing 727 prototype made its first flight in 25 years; the flight also marked the airplane's last flight ever. The Future of Flight at Paine Field in Everett, Washington held a pre-flight ceremony while hundreds of enthusiastic fans and former 727 flight crew members awaited the plane's flight and arrival at The Museum of Flight. The plane received a heartfelt welcome at the museum when it taxied through the Museum's Boeing Field gate at 11 a.m.



Above left: Fire trucks greet the Boeing 727 at Seattle's Museum of Flight.
Above right: The Boeing 727-100, N7001U was rolled out in 1962.

the Prototype

The final flight from Paine Field to Boeing Field lasted less than 15 minutes. Upon landing it taxied directly into the museum's parking area — through a celebratory arch of water created by water cannons on Boeing and King County fire trucks — where the engines were shut down for the last time. After the ceremonies, the plane was opened to the public, where they were able to tour for the remainder of the day as part of their admission.

The 727's brief trip from Everett to Seattle was flown under a special flight permit, with only essential flight crew on-board: pilot Tim Powell, co-pilot Mike Scott, flight engineer Ralph Pascale, and safety officer Bob Bogash. Powell, Scott

and Pascale fly 727s on a regular basis; airline and corporate pilot Powell has over 10,000 hours at the controls of various 727s. Bogash is the museum's 727 project manager.

History of the Boeing 727 Prototype

The museum's three-engine, Boeing 727-100, N7001U, first flew on February 9, 1963. Until the 777 in the 1990s, it was the only type of Boeing commercial jet with no dedicated prototype—the first airplane was not kept as a flight test airplane, but was delivered to the “kickoff customer” airline and went into regular service. It was the first of 1,832 Boeing 727 Trijets



Above: Detailed view of the first Boeing 727 built.

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built at Boeing's Renton plant. The airplane was delivered to United Air Lines on Oct. 6, 1964, and remained with the company for its entire service life. During its 27-year career the Trijet accumulated 64,495 hours, made 48,060 landings, and flew an estimated three million passengers. United paid \$4.4 million for the airplane, which in-turn generated revenues of more than \$300 million.

In 1984, the Museum of Flight's Chairman of the Aircraft Acquisition Committee, Bob Bogash, approached then-United top managers Ed Carlson and Dick Ferris, and asked for the 727 upon its retirement. United agreed. On Jan 23, 1988 the airplane was present during an official museum ceremony a few years before it was retired. On Jan. 13, 1991, the airplane—repainted in its original United colours—flew revenue trip 838 SFO - SEA, and was then ferried to Boeing Field for a final acceptance ceremony at the museum. It made one last flight to the Museum's Paine Field Restoration Center. Bogash, a Boeing Company veteran of 30 years, became the 727's restoration project manager.



Above: Boeing 727 N7001U: the first 727.

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Top photo: 727 stab removal. Bottom photo: The main display area of the Museum of Flight, located at Boeing Field, Seattle.



Because United removed many of the major parts on the airplane to use as spares for its remaining fleet of 727s, the museum was left with a significant challenge with its goal to restore the airplane to airworthy condition. After a few idle years the restoration began in earnest, and grew significantly with the donation of two more 727s for parts. On March 6, 2004, Federal Express donated a 727-100 airplane to the museum, and in September 2005, Clay Lacey donated a 727-200. Over the past 25 years, dozens of enthusiastic volunteers have helped bring the plane back to life. FedEx has been a long-time partner on the project, and recently donated the engines that will power the plane on its final flight. The expertise and equipment for the huge project has been international and from all walks of life. Preservation of this historic airplane has entailed four phases.

Phase I involved prevention of any deterioration of the aircraft. To accomplish this task, heated, dehumidified air was supplied to the cabin during the wet winter months. Periodic washing and polishing had also been accomplished.



Above: United 727 and 247.

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Annual Workshop/Symposium

Our annual Symposium and Workshops are to be held Wednesday and Thursday, September 28th and 29th. The exhibitors will set up Tuesday evening. This is a change from previous years when our workshop was held Thursday and Friday. The workshop committee expects that by moving the operations forward by one day it will be more convenient for exhibitors, speakers and attendees. Again this year we will be having two days filled with educational sessions as well as a full house of displays from industries supporting aircraft maintenance. Check our website at www.ame-ont.com for all the details.

Licence Renewal

A reminder that you should renew your AME licence prior to the expiry date. The renewal fee is \$40, however if you miss the deadline it

will cost you \$115 to renew. A licence being renewed one year after the deadline will still cost you \$155, but you will also have to write and pass the CARs exam and pay the appropriate fee for its administration and correction. It can get expensive.

So next time you renew your driver's licence or car plates, check your AME Licence expiry. It's easy to renew. Just \$40 cheque or credit/debit card (they do not take cash any more), fill in form 24-0083 and supply a photo which you can take with your own digital camera. Details can be found on the web at: www.tc.gc.ca/eng/civilaviation/standards/maintenance-aarpb-general-renewal-2543.htm

I filled in the form and brought it to my regional office earlier this week. I was served by friendly staff who took my photo, gave me a receipt for the credit card payment and I was out within 10 minutes. I expect to have my new licence in the mail by the end of next week.

*Submitted by Stephen Farnworth
 For the Board of Directors*

Western AME Association



About our Association

The Western AME Association is run by a volunteer group of AMEs who are elected by the member AMEs to the Board of Directors. The membership is comprised of AMEs, non-licensed personnel working in the industry, students and apprentices as well as corporate members. A separate committee runs an annual symposium/workshop. This workshop is a two-day event that features speakers on a variety of topics, as well as an industry tradeshow with over 50 booths from various companies, suppliers, manufacturers and other organizations. Attendance at this and other smaller workshops may be counted towards the recurrent training requirements required by Transport Canada.

NATA'S 40th Anniversary Celebration

Celebrating 40 Years of Northern and Remote Aviation in Canada
 For 40 years now, the Northern Air Transport Association has been supporting and promoting Northern and remote aviation in Canada. This April 25-27, we will be in Whitehorse, Yukon Territory for our 40th Annual General Meeting, Conference, & Tradeshow. NATA 40 promises to be our biggest and best ever gathering of the aviation industry and government. The theme of this event is the past, present, and future of Northern and remote aviation—we will be honouring our past, celebrating the present, and looking toward the future of what is a critical industry for Canada and, especially Canada's North.

We've reached out to our contacts as well as past and present leaders in the industry to collect materials and information for displays and presentations at the event. On exhibit will be uniforms, pins, aircraft, photos and any other equipment or materials we collect or

acquire leading up to next April. Have something to contribute, give us a call or email! We will arrange for copies to be made or items to be shipped as needed and make sure all your originals are returned to you in same condition after the event. These displays will be available for viewing and discussion during the various conference functions we'll be hosting at venues across Whitehorse. We'll be making use of some of Whitehorse's most iconic locations including the Air North hangars, Kwanlin Dun Cultural Centre, the MacBride Museum, and the Westmark Hotel.

NATA conferences are known industry-wide for providing great opportunities to network and access decision-makers. This year will feature even more receptions and social functions featuring the very best in food, drink, and hospitality that the Yukon has to offer. We'll be pulling out all the stops to make this our most memorable conference ever, for both the delegates and their companions. In addition to the various special events and social functions we will, of course, be holding our usual interactive discussions with industry and government, as well as providing critical updates and information sessions. Our tradeshow promises to be the biggest ever and we'll be providing more details in the coming weeks on how your organization can showcase itself at this fantastic opportunity for networking and sales.

We encourage media and other partners and interested parties to contact us regarding opportunities for partnership, collaboration on content, or promotion related to this event. Please feel free to contact us with any questions or information.

*Colin Dempsey, NATA
admin@nata-yzf.ca*



President's Notes

By Uli Huber

The AME Associations from across Canada met in Vancouver on October 4-5, 2015 for the annual AGM of the CFAMEA (Canadian Federation of AME Associations). The meeting was called to order by the president Ole Nielsen with representatives Steve Farnworth, Ontario AME association filled in as proxy for the President Sam Longo; Rod Fisher Western AME Association, Bob Rorison Pacific AME Association. The Central AME Association with President Mike McCartan was not present at this meeting for unspecified reasons.

AME Conferences

The Airlines in the regions of Pacific, Western and Ontario have started to set up workshops and symposiums and it was suggested to possibly collaborate with these committees and work towards a joint Symposium as displays are very much attracted to those conferences from a sales point of view. A further motion was put forward to have one AME (CFAMEA) conference in Canada and alternate between East and West. Something I objected to as it sounds good at first, but would profoundly change our current Atlantic AME Association structure. We are all volunteers and putting this conference together would be a big task and the revenue sharing also becomes an issue. Should CFAMEA become a 'wealthier' organization with paid positions, this proposal could be reviewed. However, the only source of revenue for CFAMEA is the membership contributions and that would mean substantially higher membership cost to each region. I think it is safe to say that things will remain unchanged.

CFAMEA Bylaws

A minor change to the CFAMEA bylaws was added to the effect that a board member can participate at a meeting via an electronic media. Paragraph 8.03 was also amended to spell out the requirement to have 'no less than four Directors or present by proxy to be present to form a Quorum. Some changes and rearrangement for the CFAMEA website were also on the list, together with some repeated brainstorming about a name change of the CFAMEA to a more descriptive and meaningful name. However, the name would also have to be flowing well off the tongue in French!

Membership

A problem that all associations are faced with is, how to attract new members and how to keep existing ones. Ideas like, airline dis-

counts, Aerospace Museum discounts, Legal defense fund, Insurance discounts, Rental car discounts are some of the possibilities.

UAS

The UAS (Unmanned Aircraft System) movement will be continuously monitored by Ole Nielsen and he will attend any meetings that TC will bring to the table for discussion.

Hall of Fame

A long-time member of the Pacific AME Association, Gordon Dupont, was inducted into the Canadian AME hall of fame with a display at the Canadian National Aviation Museum in Ottawa. Congratulations Gordon.

AME Licence

TC is no longer printing the AME licenses; this is done by Operational Support Services. The new form of the licence will no longer require a photograph and the address will no longer be on it. New security features on the licence should make fraud more difficult. A new expiry date of 10 years and a magnetic strip are also new. My personal hope is that the magnetic strip feature works better than the Hotel keys I have been using lately!! Keep the new AME licence away from cell phones. The new licence should start printing in April 2016. TC also indicated that the feedback and working relationship with the AME associations and CFAMEA is important and the plan is to have head office (Ottawa) representation on all regional symposiums.

Future CFAMEA Meetings

The next CFAMEA meeting will take place in Ottawa sometime in the fall 2016. All Board members also agreed that the AGM should be held at TC Head office in Ottawa rather than moving it across Canada. We would have easier access and representation from Transport Canada staff members as it takes very little time out of their busy schedules to just walk across the street. Jeff also suggested that TC would most likely make meeting space available within their office, pending approval by their internal security group. It's all about keeping the bad guys at bay! Hope to see you all in Moncton's ARAMC on April 6-8. Keep those aircraft flying safely!

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Central AME Association



The Central Aircraft Maintenance Engineer Association is an organization dedicated to maintaining and enhancing the standards, rights and privileges of all AME members in the central region of Canada. The objectives of our Association are:

1. To promote and protect the profession of the Aircraft Maintenance Engineer
2. Develop, maintain and improve representation and consultation with regulatory bodies that affect the profession of the Aircraft Maintenance Engineer

3. To represent the views and objectives of the membership of the association
4. Promote and develop the knowledge, skill and proficiency of AMEs through education, publications and research.
5. Cooperate and associate with groups, associations and organization on matters of mutual interest.
6. To promote honorable practices among the membership and between persons in the aviation industry

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PAMA SoCal Chapter



November 2015 Meeting Wrap

Thanks to Mike Morgan, Avionics Installations Sales Representative, and Lee Bowes, formerly the Southwest Regional Manager and most recently named as the Central US Regional Manager, and all at Duncan Aviation for hosting the November 2015 Chapter dinner meeting and excellent technical presentation on "Cabin Management Systems – Familiarization and Support" at the 94th Aero Squadron Restaurant in Van Nuys, CA. Mike can be reached at Mike.Morgan@DuncanAviation.com and by phone (269) 967-1271-0670; and to reach Lee, email Lee.Bowes@DuncanAviation.com or call 402-730-3786.

A&P Student Scholarship

The A&P/IA Continuing Education Scholarship deadline is May 8, 2016. The Awards Presentation will take place June 14, 2016. This scholarship is open to all southern California residents currently enrolled in good standing in an accredited A&P or IA Training School/Program.

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January 12th Meeting topic: CMH Airspace Review

The FAA Safety Team provided Mr. David R Neef, Operations Manager of the Columbus Air Traffic Control Tower to give a presentation on CMH Airspace to CFI's, Pilots and Student Pilots at our January meeting. The Lane media room was full, even though the morning's weather brought most local traffic to a crawl. Mr. Neef gave an overview of CMH ATC, their airspace operations and procedures. Beside Ground, Tower, Arrival and Departure operations at CMH, Port Columbus ATC is responsible for traffic below 11,000/10,000 to the ground in their eastern and western areas that span from beyond Zanesville in the east to just across the Indiana border in the west.

David discussed the local airports, special operations with air traffic at Dayton and Wilmington airports and the process of becoming an air traffic controller. His question and answer period at the end

of the program gave lots of information on how to smooth in-flight operations in National Air Space for all those in attendance. We wish to thank him for his presentation and taking the time to be with us at the meeting.

February Meeting Topic: "UAVs"

The February meeting was well attended on Tuesday the 9th with members of the pilot, maintenance and remote control modeling groups filling the room. Around 60 people came to hear FAA Inspector John Welsh give a presentation on UAVs and the recent FAA regulations concerning them. COPAMA President Joe Lippert started with a PowerPoint that showed upcoming meeting topics, a note about our loss of past treasurer Donna Bricker and information about next

month's Ohio Aviation Maintenance Symposium at Columbus State's main campus. Joe then introduced this year's COPAMA Scholarship recipients with photos taken of those in attendance. This year's Scholarship Awardees are Pablo Cortes, Matthew Thomas, Jacob Galliher, James Andersen, Gregory Churchill, Megan Kimbler, Wilfredo Ortiz, Stephen McGirr and Byron Bruno. Unable to attend were Nathan Fellrath and Sean Peters. We congratulate them and wish them well as they finish their studies and start their careers in aviation.

After dinner, Inspector Welch started his interactive presentation on what has become a hot and dynamic topic. The following is a condensed outline of items discussed and a group of hyperlinks for those who are looking for more information about Unmanned Aircraft Systems (UAS).

UAS aircraft are categorized by a few different ways that the new FAA regulations address them. Government and Civil (flights for profit) are tighter controlled than the Hobby or Recreational (Model Aircraft) flyers. The latter group will continue on with little FAA interaction unless they are involved in some reported rule infraction.

The new CFR 14 Part 48 specifies the registration and identification requirements for all unmanned aircraft based on weight and operation of the UAS, the nationality (US citizen) and age (13 or older) of the operator and the location and airspace they are allowed to operate in.

Aircraft less than .55 pounds (8.8 ounces) are not required to be registered. Aircraft above .55 pounds to 55 pounds that are model aircraft flown outside must be registered by Feb 19th, depending on if they were operated by the current owner prior to December 21, 2015. For all other small, unmanned aircraft, compliance with this part is required prior to operation of the small, unmanned aircraft.

Beginning March 31, 2016, small, unmanned aircraft operated as other than Model Aircraft may complete aircraft registration in accordance with FAR Part 48. UAS aircraft over 55.0 pounds will need to be registered under FAR Part 47 like manned aircraft.

Since this is new technology with expanding interest in the way these vehicles may be used, the FAA has created a website resource www.faa.gov/uas where the full rules and guidance material may be viewed. There you may find the links for UAS registration (\$5.00 for three years regardless of category). You may also download the B4UFLY app that provides a checklist of your proximity to Restricted Areas, Airports, Upcoming Restrictions, National Parks and other Guidance Materials.

The operator must be within line of sight of the UAS with current guidelines of below 400 feet and less than 100 miles per hour. Those parameters are expected to change to match the start of National Air Space (NAS) of 500 feet AGL and clear of groups of people such as stadium. Operation within five miles of an airport requires a notification of the Airport Director or Control Tower of time and location of your proposed flight.

UAS aircraft have the lowest priority in the air and must avoid all other aircraft in flight. There is a reporting requirement of any incident or accident that causes damage and offending aircraft can be reported to local police, the FAA or through one of the ways listed on the website above. Since they are registered aircraft, anyone destroying them may be in violation of the FAA regulations and subject to legal action.

We wish to thank Inspector Welsh for his informative presentation and discussion of this current topic. We'd also like to thank Lane Aviation for the use of their facility and Media room.

Next month will be the Maintenance Symposium at Columbus States downtown campus and we hope you'll visit the link below for directions and registration information.

We're also looking for judges to help with the District 7 Science Day on Saturday, March 19th. Just send us an email and show up around 9:00 to select this year's winners of the G.E. COPAMA Awards. No previous judging experience necessary! Hope to see you at the Symposium and the Science Day events!

www.copama.org



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

amu.editor@gmail.com

Canada Transportation Act Review REPORT



Transport Canada says this country's air transport system is in great shape, but could use a tweak here and there. In a recent review report, TC offered suggestions.

On February 25, Minister of Transport Marc Garneau tabled the Canada Transportation Act (CTA) Review Report in Parliament. The review undertook a broad examination of the national transportation system and identified potential actions to enhance the system's ability to support Canada's international competitiveness, trade, and prosperity.

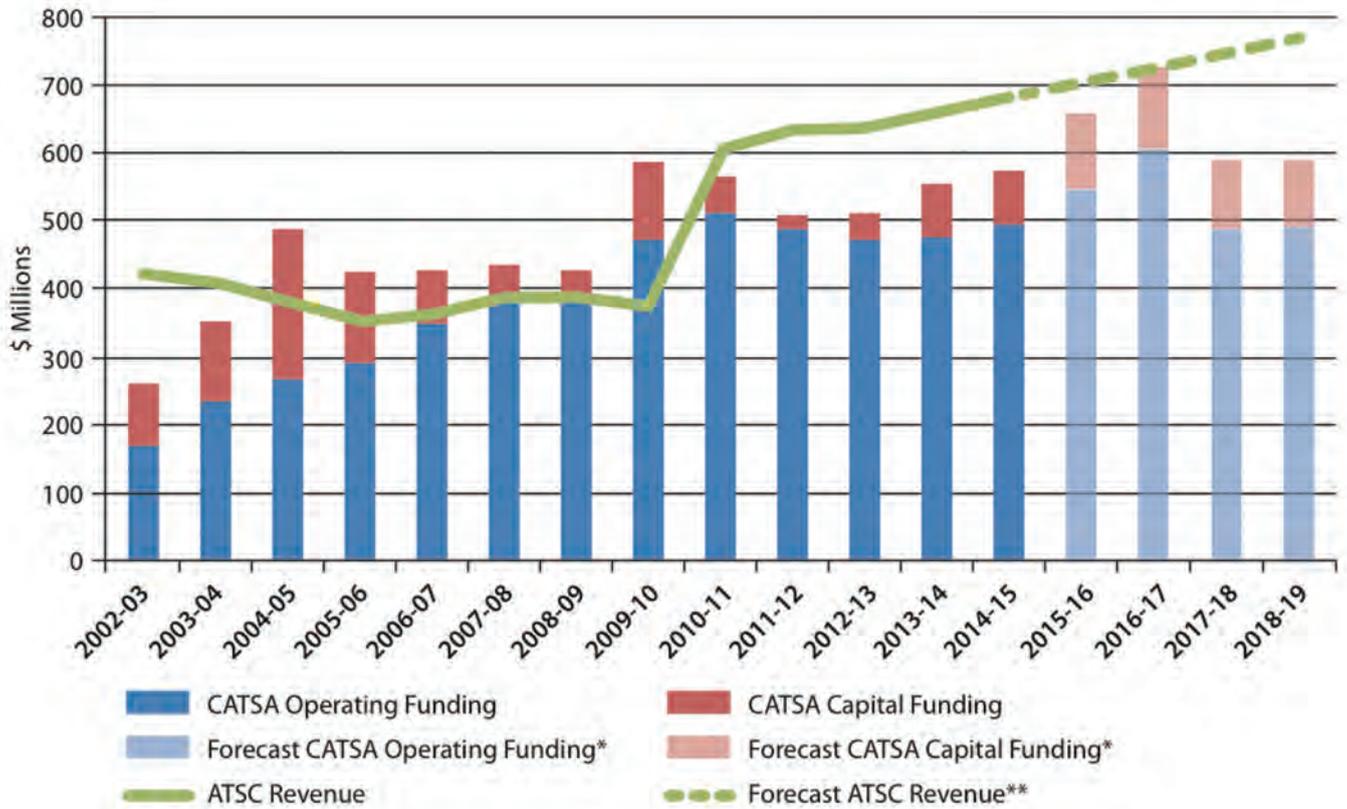
The report, entitled *Pathways: Connecting Canada's Transportation System to the World*, represents 18 months of analysis including: over 340 stakeholder consultations across Canada and international travel to research and analyze models and best practices; over 200 stakeholder submissions; and over 30 Review Secretariat commissioned studies. Following are excerpts from the report.

Where we are today: flying high?

Presently, Canada's air transport system may be in the best shape that it has ever been.

The largest airlines boast renewed fleets, record profits and aggressive growth strategies; the quality of our airport and air navigation infrastructure is among the best in the world; and traffic continues to grow faster than the economy. But low fuel prices may be masking a number of underlying issues, and emerging challenges on the horizon threaten the sustainability of the Canadian air sector's current success.

Canadian cities such as Vancouver, Calgary, Toronto, and Montréal are well placed geographically to serve passengers, connect them to emerging markets, and provide a gateway for North America.



In 2011, the nine largest U.S. airports received US\$423 million in capital contributions, grants and land transfers from federal and state governments in the same year.

International traffic is forecast to continue to grow fastest between emerging economy countries. Other countries, including the Persian Gulf states, Turkey, and China, are competing for transit traffic, and their large public infrastructure investments are being rewarded with major increases in market share.

Despite the importance of air travel to Canada, it is increasingly difficult for our air transport system to remain globally competitive, due to geography, population density, and federal policies that inhibit growth. Not much can be done about the first two, but policies that, in today's context, no longer serve national interests should be revisited.

For example, Canada has emphasized governmental cost recovery more than many other countries. Cumbersome immigration and border controls may act as a disincentive for some travellers to visit Canada. Traffic volumes in northern and remote regions are insufficient to support needed infrastructure improvements and a competitive carrier market based on commercial and user-pay principles alone.

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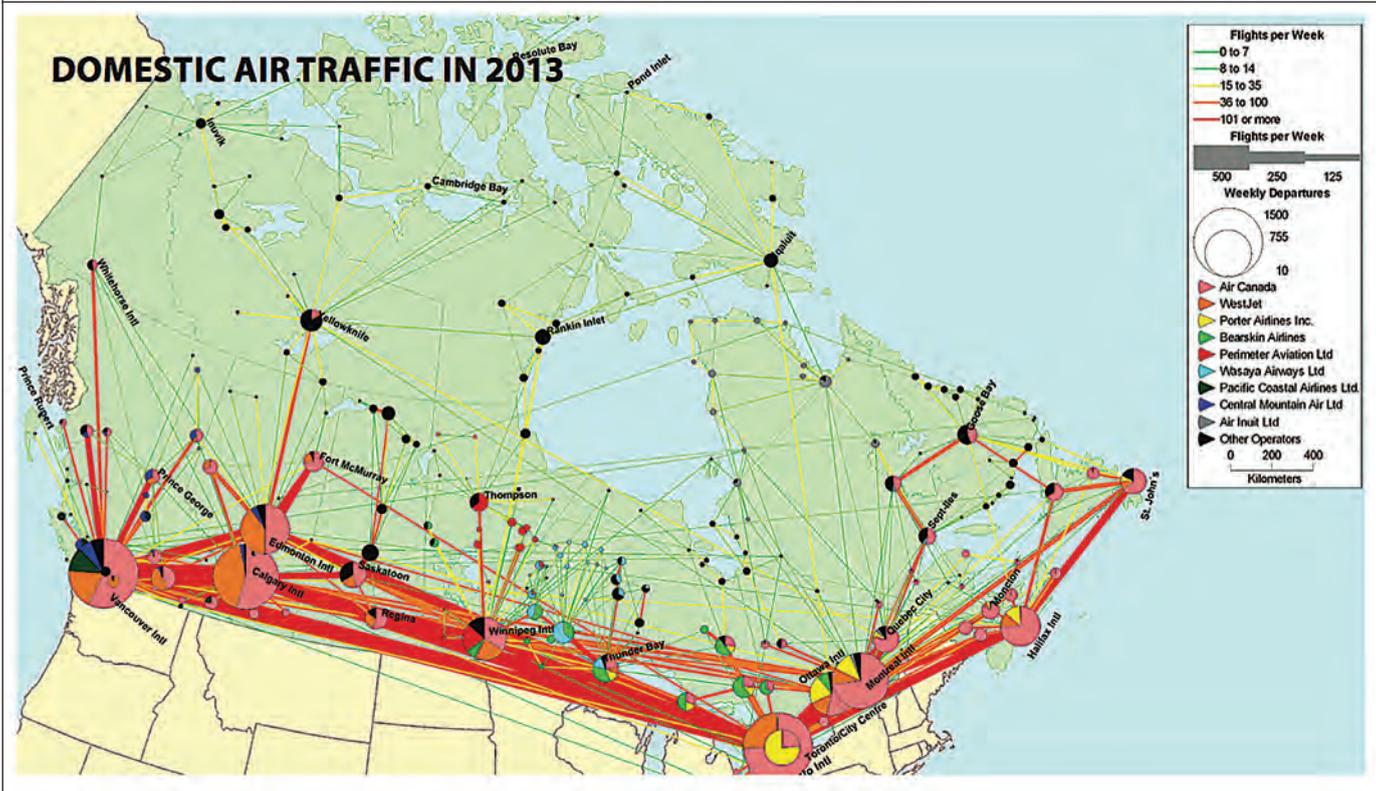
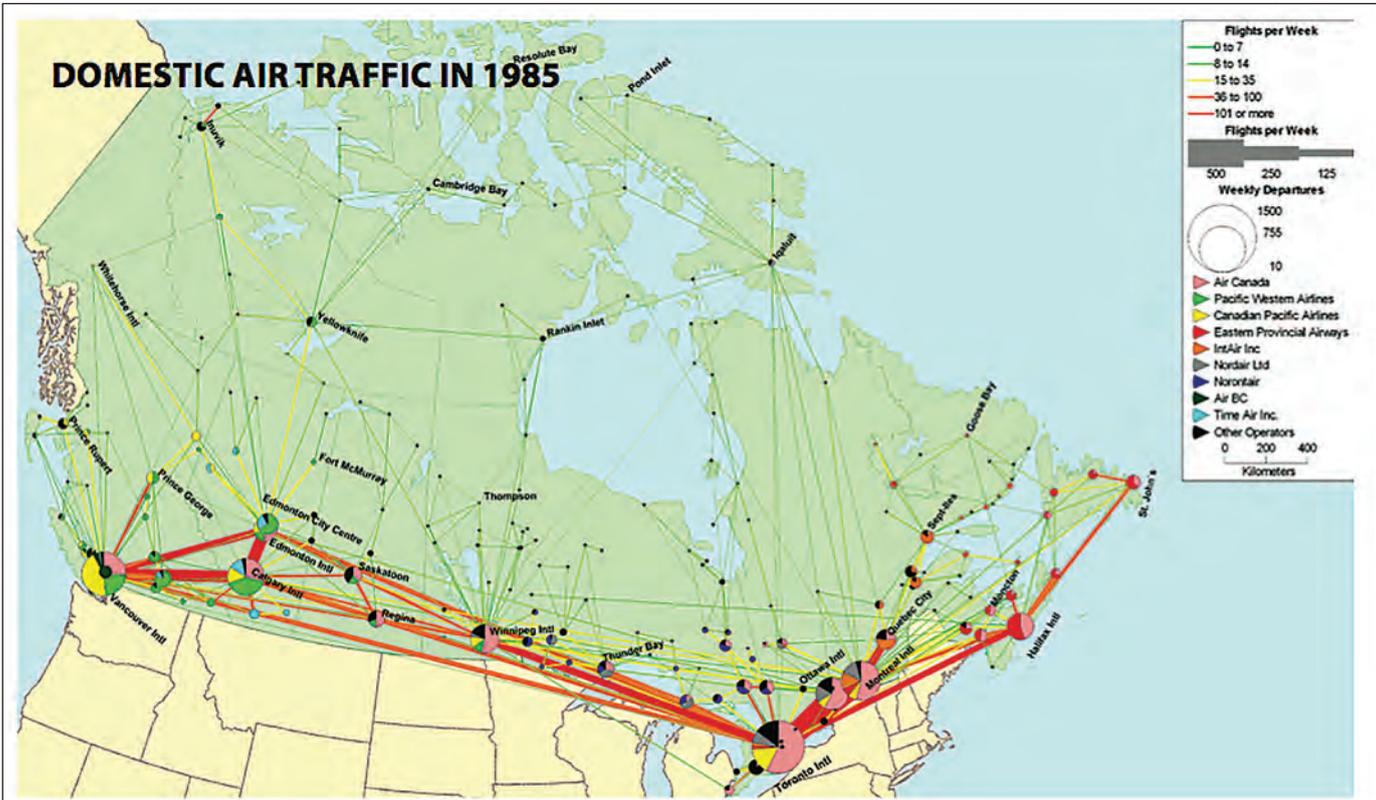
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Demand for air travel is known to be extremely price-elastic, so small price changes can have pronounced impacts on travel decisions. Low traffic volumes limit economies of scale (larger aircraft can realize lower operating and fuel costs per passenger) and dissuade new entry into the market; this ensures high airfares that depress travel and so perpetuate the problem.

Where we need to be in 20 to 30 years

Countries around the world have recognized the importance of aviation to their national interest as a vehicle for trade and investment, and also as a means of projecting political influence by exposing incoming visitors to their values and cul-



ture. The vast distances from Canada's priority overseas markets only increase this strategic importance, and so the quality of our air transport system ought to be of concern. Fortunately, we have met the test in many respects: our major airport and air navigation infrastructure is excellent, and our airlines are profitable and internationally recognized for customer satisfaction.

However, the world is changing and moving inevitably towards a liberal open market for air services. It is time to reconsider policies that may have served us well when the Canadian airline industry needed protection to flourish, but that now impair competitiveness. Of course, such protectionism comes at a cost that is largely borne by Canadian consumers, who pay relatively high airfares, and by the Canadian travel and tourism sector that, also due to higher costs, has been losing market share for over a decade.

The Review recommends a package of measures that address the three major components of competitiveness: cost, access, and user experience. The aim is to reduce the cost burden on the sector and ensure that these savings are passed on to users. Proposals are also included to reform governance structures to allow more competition in domestic and international markets, to strengthen market-based oversight of airports, and to facilitate increased international travel to and through Canada by visitors, investors, and in-transit travellers. Finally, the proposed measures enhance consumer protections to align with those in the U.S. and the European Union, and to ensure greater consistency and transparency across the system. We believe these measures will create the conditions for Canada to assume a position of leadership in respect of air safety, security, and efficiency.

The flight plan: what we need to do to get there

A system based on competition, market forces, and the user-pay principle is the best means to deliver a robust air transport sector in most cases. However, it remains important for government to support the safety, security, and efficiency of air transport essential for access to

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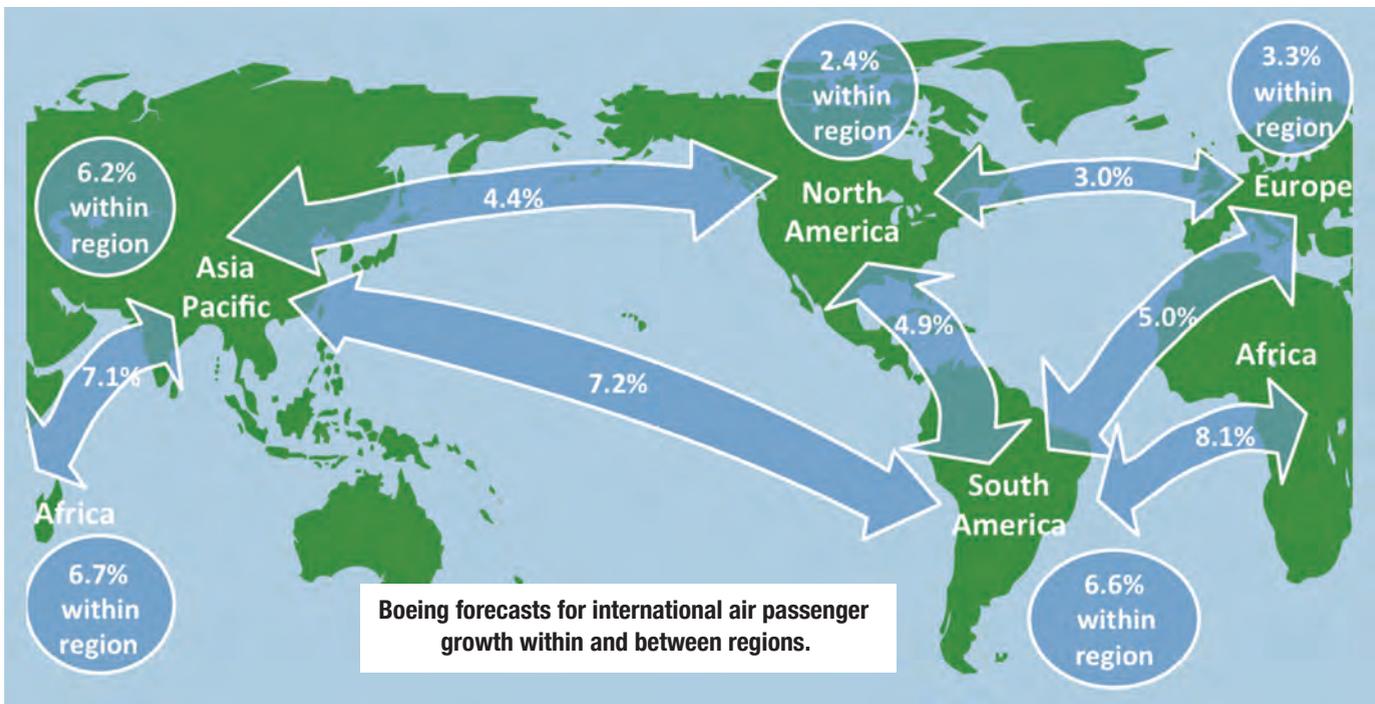
remote and northern communities that do not have the volume of traffic to do so on their own. The recommendations below have been crafted to advance the interests of consumers, increase competition, and support the health of the air transport sector.

User Pay Policy and the Cost of Air Transport

Air transport is critical economic and social infrastructure, providing access to trade and investment; connecting people to jobs, friends, and family; and delivering vital goods and services in remote areas. Geography, population size, and environmental conditions increase the operating costs of air transport in Canada compared to other jurisdictions. A user-pay approach to financing air infrastructure and services is effective and sustainable, but it further increases costs for the sector and for users (shippers and travellers). Other countries see the increasing importance of air transport for global competitiveness. Some, such as the U.S., Singapore, and the Persian

Gulf states, actively subsidize their air sectors; others with user-pay models that promote self-sufficiency, such as countries in the European Union, still support their air sectors in other ways and minimize further tax burdens on the sector. Canada is unique among its competitors in charging onerous rents and taxes that undermine competitiveness. Airport rents, for example, can represent up to 30 percent of airport operating budgets, far more than would be expected in dividends and income tax from a private, for-profit airport, such as those in Europe.

Security charges of up to \$25 per passenger have exceeded the cost of security screening by an average of 18 percent every year since 2010-2011 and fail to recognize the national interest in a secure system. In other modes, and in the U.S. and European Union, security costs are shared and, unlike their competitors across the border, airport authorities in the National Airports System bear the additional burden of having to make payments to their municipalities in lieu of municipal taxes. These payments can



be substantial—as much as \$30 to \$40 million per year in the cases of Toronto and Montréal—and there is no requirement that they be aligned with property taxes levied against comparable industrial sites in those jurisdictions.

Canada has collected approximately \$5 billion in airport rent since 1992, already well in excess of the value of the assets originally transferred, and is estimated to collect at least \$12 billion more over the next 40 years. The C. D. Howe

Institute, the Conference Board of Canada, the Senate Standing Committee, and industry and business groups have consistently called for airport rent and the Air Travellers Security Charge to be significantly reduced and restructured, or eliminated altogether, to help improve cost competitiveness for the air sector, and ultimately, for travellers and shippers.

Canada cannot become a world-leader in terms of the cost competitiveness of air transport without heavy public subsidization of the sector, not only to match the subsidies offered by some competitors, but also to overcome the naturally high-cost operating conditions and lack of economies of scale.

Such subsidized models are unsustainable and not recommended. Nevertheless, the gap must be narrowed, such that air infrastructure and services are cost-competitive with those jurisdictions in which infrastructure and services are generally self-sufficient, such as Australia, the United Kingdom, and others in Europe.

1. The Review recommends that the Government of Canada act for the benefit of consumers to reform the user-pay policy for air transport and improve its cost competitiveness in relation to comparable jurisdictions,

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while ensuring continued and sustainable financing for infrastructure and operations by:

- a. Linking fees predictably and transparently to the actual provision of services and infrastructure.
- b. Drawing on general government revenues, in addition to user fees, to support objectives that advance the national interest in a secure, accessible system that serves northern and remote regions.
- c. Phasing out airport rent and increasing capital funding available to smaller airports.
- d. Reducing the Air Travellers Security Charge as one of the airport security screening reforms.

2. The Review recommends that the Government of Canada work with the provinces to further improve cost competitiveness by:

- a. Committing to re-invest fuel tax revenues in safety, security, and reliability improvements at smaller regional, remote, and northern airports.
- b. Reducing or eliminating aviation fuel taxes on international traffic (where these still exist).
- c. Allowing all passengers arriving from international destinations to purchase duty free merchandise, as is increasingly the case around the world.
- d. Ensuring that payments in lieu of municipal taxes required of individual airport authorities in the National Airports System are no greater than for comparable job-creating industries.

National Airports Policy: Ownership and Governance

Airports play a significant role in the competitiveness of the air transport sector as a whole. Airport authorities must work and invest in the long-term interests of their communities and users, including competing air carriers. To do so, they must be internationally competitive, as well as transparent and accountable.

With the introduction of the National Airports Policy, Canada achieved its objective of reducing the administrative and financial burden on government of managing, operating, and developing airports. A network of efficiently run airports spans the country and, since divestiture, the airport authorities have invested over \$19 billion in new, upgraded, and badly needed infrastructure. However, the model put in place to accomplish this transformation is one that now puts the airports' cost competitiveness at risk. The World Economic Forum ranks Canadian airports among the best in the world for infrastructure quality (16th overall), but 135th for cost. Air carriers note that in addition to government imposed fees and taxes, the continued and rapid escalation in airport infrastructure costs significantly affects their ability to offer customers competitive fares, to grow their services and to compete internationally.

The requirement to turn over National Airports System airports in good condition, free of debt, and the 30- to 40-year depreciation that applies to most airport-related investment will all become serious constraints on airport management

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The Canada Transportation Act Review Report recommends moving within three years to a share capital structure for larger airports.

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Canada Transportation Act Review Report recommends significantly increasing funding for the Airports Capital Assistance Program to support safer, more efficient, reliable services at regional and local airports.

as the end-of-lease dates approach. Also, while most airport authorities have developed certain good governance and consultation practices that may be codified in the leases or bylaws, these vary from case to case, and the authorities do not operate under a specific piece of governing legislation as do the Canada Port Authorities, under the Canada Marine Act, or Nav Canada, under the Civil Air Navigation Services Commercialization Act. The Review heard concerns that airports and carriers may potentially abuse a dominant market position, absent common rules and appeal mechanisms applicable to all airports, on such issues as fee charging, competing in the same business as their tenants, and disadvantaging rival carriers in relation to landing rights, slots, and gate access. This gap should be closed.

Canada was a leader in commercializing airport operations, but airport ownership models have changed worldwide in the past 25 years. For-profit corporations with share capital predominate, making the antiquated Canadian model somewhat unique and international comparisons, along with benchmarking, very difficult.

The Review heard from many of the original authors of the Canadian model, who considered it to be a first step towards fully private, for-profit airports; independent analysis and international examples show the benefit of increased private sector discipline in the management of large airports. Meanwhile, smaller, federally owned airports are operating at a significant disadvantage, as they cannot access federal infrastructure funding like the larger locally owned airports

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outside the National Airports System, and they are subject to taxes. They should be treated on a level playing field with all other regional airports in Canada.

Our goal in addressing these issues is to restore Canada to its place as a world leader in the governance of airports and in the use of competition and market forces to determine optimum investment and service levels and costs. Our recommendations follow:

3. The Review recommends that the Government of Canada strengthen the viability, accountability, and competitiveness of the National Airports System by:

a. Divesting the federal government of smaller federally owned airports in consultation with provinces, municipalities and First Nations, and provide one-time payments for needed safety investments, where appropriate.

b. Moving within three years to a share-capital structure for the larger airports, with equity-based financing from large institutional investors, accompanied by legislation to enshrine the economic development mandate of airports and to protect commercial and national interests (including provisions that are currently spelled out in the airports' leases) by:

(i) Establishing investment thresholds, foreign ownership limits, and tests of public interest and national security to be administered by Industry Canada and the Competition Bureau, under the Investment Canada Act and the Competition Act.

(ii) Maintaining protections against insolvency (currently contained in the airport leases), so that, in the event it should occur, all assets belonging to the insolvent airport authority would revert to the Crown without liability.

(iii) Enacting so-called light-touch regulations covering fees

and charges to protect users and confer oversight on the Canadian Transportation Agency.

c. To resolve issues applicable to airports regardless of the ownership/governance model, enacting legislation to implement the following provisions for all Canadian airports with scheduled services:

(i) Establishing a set of principles to guide all airports in Canada when determining fees and requiring airport operators to grant reasonable access to any licensed airline who requests it; providing the Canadian Transportation Agency oversight and enforcement in both instances.

(ii) Tying airport improvement fees to specific projects with explicit sunset provisions.

(iii) Requiring airline expertise on the boards of directors of airport operators (current airline employees would not be eligible).

(iv) Ensuring meaningful and timely user consultation for major capital projects.

(v) Strengthening performance reporting and benchmarking.

(vi) Providing appropriate directive powers to the Minister in the event of extraordinary circumstances (legislation is currently silent on this, unlike for other modes).

d. Significantly increasing funding for the Airports Capital Assistance Program to support safer, more efficient, reliable services at regional and local airports. This would require expanding the eligible investments to include lengthening and surfacing runways for modern jet service in northern and remote airports, and investing in more advanced navigation, weather, and landing systems.

(The report in its entirety is now available on Transport Canada's website www.tc.gc.ca/ctareview2014.) ■

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Helicopter Industry Outlook:

Cautious purchases amid increased usage



In the face of a slower global economic growth environment and increased volatility in oil and gas-related markets, the helicopter industry is reacting with a cautious outlook for near-term new purchases. In its 18th annual Turbine-Powered Civil Helicopter Purchase Outlook, Honeywell forecasts 4,300 to 4,800 civilian-use helicopters will be delivered from 2016 to 2020, roughly 400 helicopters lower than the 2015 five-year forecast.

“The current global economic situation is causing fleet managers to evaluate new helicopter purchases closely,” said Carey Smith, president, Defense and Space at Honeywell Aerospace. “And that’s why

we’re seeing a more cautious five-year demand projection compared with previous years. “Even in a slower growth environment, Honeywell is well-positioned to help operators keep current fleets lasting longer with aftermarket upgrades and repairs.”

Key global findings in the outlook include:

The survey showed new purchase-plan rates were stable, but operators cited fewer new model purchases over the five-year period, leading to a more cautious near-term outlook. When considering a new purchase, operators’ results mirrored those from last year,

with make and model choices for their new aircraft most strongly influenced by range, cabin size, performance, technology upgrades and brand experience. Helicopter fleet utilization generally declined compared with last year. Over the next 12 months, usage rates are expected to improve but at a reduced rate.

Helicopter use expected to increase

Helicopter fleet utilization reported in the survey generally declined compared with last year. Over the next 12 months, usage rates are expected to increase but at a reduced rate, as the gap between operators planning increases and those planning decreases has narrowed in every region.

Regional Overview

Latin America: The 2016 results show strong fleet replacement and growth expectations, well above the world average, rising eight percentage points over the prior year. Latin America led all global regions in the rate of new aircraft purchase plans despite an economic slowdown in Brazil. In terms of projected regional demand for new helicopters, Latin America is now contributing the second highest demand among the regions tracked, trailing only North America. Latin American respondents currently favour light single-engine models for just under half their planned acquisitions, followed by light twin-engine models at about 35 percent and

a balance of intermediate and medium twin-engine platforms for the remaining purchases.

Middle East and Africa: This region has the second-highest new purchase rate among the regions, with up to 30 percent of respondent fleets slated for turnover with a new helicopter replacement or addition. More than 60 percent of planned new helicopter purchases are intermediate and medium twin-engine models. Heavy multi-engine models are underrepresented due to the absence of input from the large oil and gas operators in the region.

North America: Purchase expectations fell two percentage points in this year's survey but still provide a strong base of demand for light single-engine and intermediate or medium twin-engine platforms. More than 60 percent of planned North America purchases were identified as light single-engine models, while just under a quarter of new purchases were slated as intermediate or medium twin-engine models. North American purchase plans are a significant component of the overall 2016 survey demand and help support global industry demand projections by virtue of the large fleet active in the region.

Europe: Purchase plans decreased slightly with continued weakness in reported Russian buying plans. The sample of Russian operators responding in 2016 remains small, which continues to add uncertainty to the overall European results.

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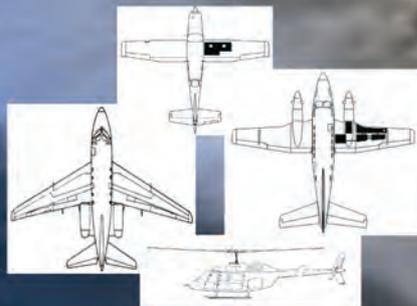
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European purchase intentions currently tend to favour light twin-engine and light single-engine models in nearly equal shares this year.

BRIC countries (Brazil, Russia, India and China): Demand continues to ebb and flow with stronger results recorded for India and Brazil in the 2016 survey. In India and Brazil, new helicopter purchase-plan rates exceed the world average by a wide margin. Planned Chinese purchase rates slipped, reflecting near-term slower economic growth prospects. Notably, no Chinese-built models received specific purchase interest mentions in the survey; however, civil deliveries are occurring and are reflected in the Honeywell outlook.

Methodology

The 2016 outlook presents a snapshot of the helicopter business at a point in time and reflects the current business and political environment. This year's survey queried more than 1,000 chief pilots and flight department managers of companies operating 3,070 turbine and 360 piston helicopters worldwide. The survey excluded large fleet or "mega" operators, which were addressed separately. Input received from large oil and gas support and emergency medical service fleet operators is factored into the overall outlook in addition to the individual flight department responses. The survey detailed the types of aircraft operated and assessed specific plans to replace or add to the fleet with new aircraft. ■

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New business for Bell

Bell Helicopter has announced it secured commitments from two customers for a total of three Bell 407GXPs in corporate/VIP configuration while at the Helicopter Association International Heli-Expo 2016 in Louisville, Kentucky. Among the signings, Bell Helicopter signed with a private customer based in Newfoundland, Canada, for a Bell 407GXP that will be used for personal and corporate transport. While there are more than 100 Bell 407 platforms operating in Canada alone, this is the second Bell 407GXP to be signed for by an eastern Canadian-based operator. "The Bell 407GXP is a truly versatile aircraft that will provide unprecedented speed, reliability and safety when operating throughout Canada, and we look forward to taking delivery in the coming months," said the new (unidentified) owner.

Also at the show, Bell Helicopter signed with New York-based Gotham Air Private Charters for two additional Bell 407GXPs. The company already operates a Bell 427 and a fleet of Bell 407s. "We are pleased to see the continued interest in our modern commercial product line from our corporate and VIP customers," said Anthony Moreland. "The proven capabilities of the Bell 407GXP will continue to attract operators in this market segment, and we are delighted to support all of these customers and their operations."

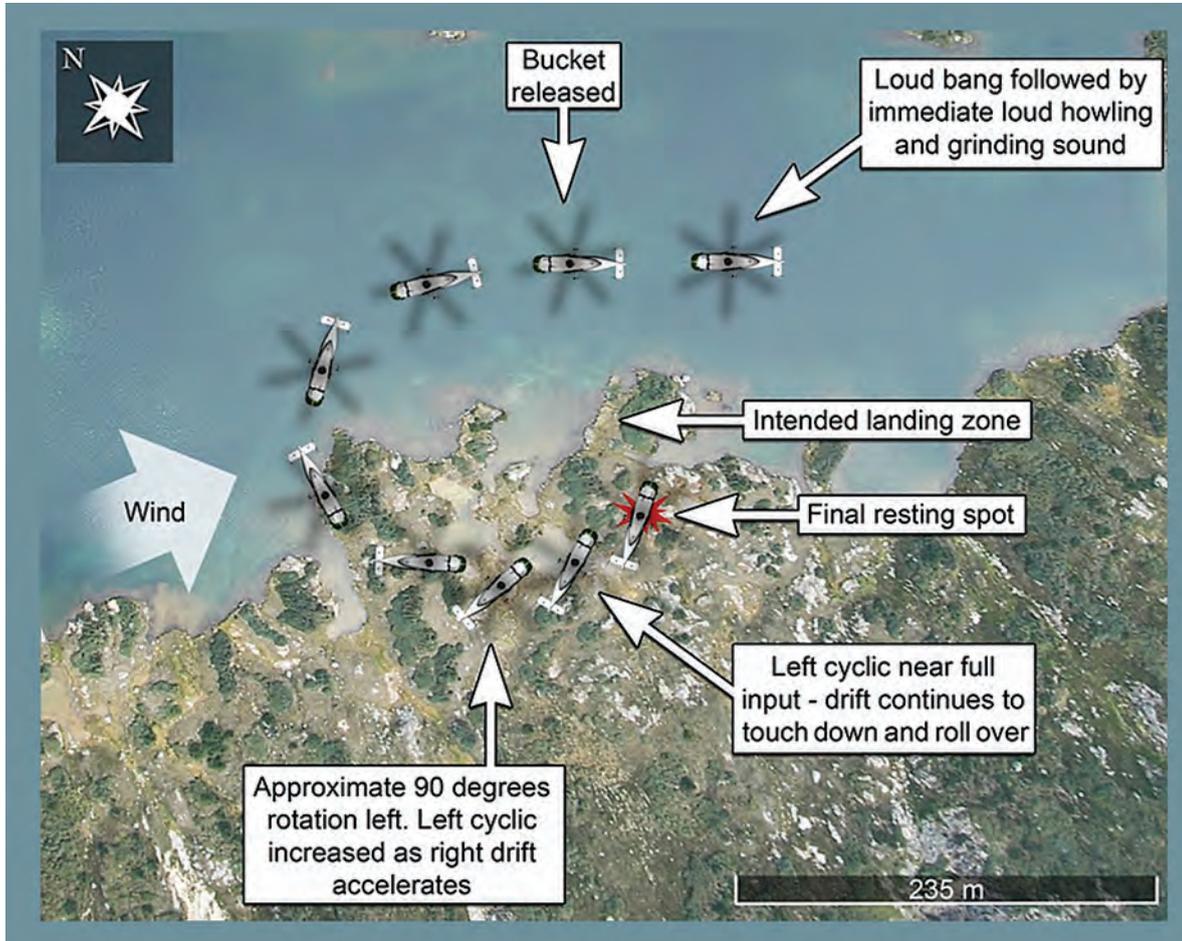
Big deal with Norway going smoothly

Finmeccanica has announced the first of 16 AgustaWestland AW101 helicopters for the Norwegian Ministry of Justice and Public Security (MoJ) successfully performed its maiden flight at its helicopter division's Yeovil factory in the United Kingdom on March 21. The successful on-schedule maiden flight marks a major milestone and the start of the flight test program that will lead to initial aircraft deliveries to the MoJ, for operation by the Royal Norwegian Air Force in 2017. Aircraft deliveries will continue through to 2020.

In December 2013, the Norwegian Ministry of Justice and Public Security signed a contract for 16 AW101 helicopters plus support and training, to meet the Norwegian all-weather SAR helicopter (NAWSARH) requirement based on a new generation aircraft. Each aircraft is provided with an advanced SAR equipment package including a multi-panel active electronically scanned array surveillance radar system from Finmeccanica airborne and space systems division, built at the company's Edinburgh centre, providing 360-degrees of coverage. Finmeccanica's Helicopter Division will provide initial support and training services, including spares at each of the aircraft operating bases and aircrew training. It will then provide performance based logistic support to deliver approximately 90,000 flying hours across the fleet of 16 helicopters over the initial 15-year period of operation.



Shake, Rattle and Roll



On August 4, 2013, VIH Helicopters Ltd. Kamov Ka-32A11BC, (C-GKHL) was carrying out fire suppression operations east of Bella Coola, British Columbia using a water bucket on a long line connected to the helicopter's external load belly hook. At about 1830 Pacific Daylight Time, just after the helicopter lifted a load of water out of a high altitude mountain lake, there was a loud bang followed by howling and grinding noise, and the helicopter began to shake severely. The pilot not flying released the external load (line and water bucket) and the pilot flying flew towards land for an emergency landing.

The crew had difficulty keeping the helicopter pointed in the direction they were tracking, and the shaking was such that they could not see the instrument displays. The helicopter touched down while

drifting sideways to the right with near-full left cyclic control input. The helicopter bounced and rolled onto its right side, and the main rotor blades contacted the ground and broke. The rotors were turning at normal speed — about 270 revolutions per minute (rpm) — when the blades collided with the ground and broke. The energy in the broken blade pieces caused some of them to travel several meters from the main wreckage.

The crew was able to shut down the engines and exit the aircraft with minor injuries. There was no fire. The 406 MHz emergency locator transmitter activated upon touchdown. An examination of the damaged helicopter by one of the company's aircraft maintenance engineers revealed damage to the left side engine (No. 1 engine) that was consistent with turbine failure before the helicopter's hard landing.

Flight data recorders

The helicopter was equipped with a flight data recorder (FDR), but not a cockpit voice recorder (CVR). Neither is required by regulations when carrying out aerial work operations. The FDR was removed from the helicopter and TSB investigators reviewed the data, with help from the operator's technicians and the Russian based Air Accident Investigation Commission, Interstate Aviation Committee (MAK). FDR data revealed a sudden loss of power from the No. 1

engine, followed by a loss of main rotor rpm. Both alternating current (AC) generators dropped off-line during the time the rotors were below normal operating rpm. Low rotor rpm was only brief, and the AC generators came back on-line when the rpm returned to normal after the load was jettisoned. However, the AC powered autopilot system shut off and, as designed, did not come on when AC power was restored. The FDR data also show that after the power loss, the No. 1 engine continued to operate at low rpm until it was shut down.

The engines' turbine operating temperatures (TOT) were not recorded on the FDR because the input had been disconnected during unrelated maintenance troubleshooting.

Weather and Pilots

The weather in the area was suitable for visual flight rules (VFR) flight, with clear unlimited visibility. There were two pilots operating the helicopter; both were qualified to act as captain. Records indicate that the flight crew was certified and qualified for the flight in accordance with existing regulations. The Pilot Flying (PF) had about 14,800 hours total flying experience in helicopters, of which about 4,200 hours were acquired flying the Kamov Ka-32 type. The PF had completed the required recurrent ground and flight training on the Ka-32, including engine failure emergency procedures. The Pilot Not Flying (PNF) had about 19,200 hours total flying experience in helicopters, of which about 4,300 hours were acquired flying the Kamov Ka-32 type. The PNF had completed the required recurrent ground and flight training, including engine failure emergency procedures. Both pilots were within the flight and duty time limits prescribed by regulation, and fatigue was not considered a factor. Neither pilot had previously encountered vibrations or noise similar to those encountered during the accident sequence.

Flight control systems

The Kamov Ka-32A11BC has counter-rotating rotors (two main rotors, stacked on top of one another, turning in opposite directions). There is no tail rotor; the torque from the upper rotor offsets the torque from the lower rotor. To induce yaw, torque to one rotor is increased while torque to the other rotor is decreased; lift remains the same but the aircraft will yaw in the direction opposite to the rotor with the higher torque.

The Ka-32 is equipped with a control augmentation system referred to as the autopilot. This system operates on AC power generated from the rotor transmission. The AC generators operate in a narrow rpm range (normal rotor

The advertisement features a collection of power tools including air drills, angle attachments, and drill bits, arranged on a blue background with a faint pattern of tools. The tools are labeled with their model numbers: 13-1127-25 Air Drill, 13-1227A-2 45° Angle Drill, 02-AWD Composite Drill Bit, 20-127-4 Angle Attachment, 13-1629 'Pancake' Offset Drill, 53-127-4C Angle Attachment With Chuck, 02-241 Countersink, and 13-1529 'Pancake' Air Drill. Below the tools is a logo for USATCO U.S. Air Tool Co. featuring a globe and the letters NY and CA. The text reads: "Serving the aerospace & metal working industries since 1951!". At the bottom, there are four small images showing hands using the tools on metal parts. Contact information is provided: Toll Free US & Canada: 800-645-8180, www.USATCO.com, and USATCO U.S. Air Tool Company, Inc. with addresses and phone/fax numbers for Ronkonkoma, NY and Rancho Dominguez, CA.

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rpm) and are tripped off when the rpm drops below 83 percent. Without AC power, the autopilot drops off-line and larger control movements are required to change the helicopter's attitude. It should be noted that although the AC generators will automatically come back online when the rotor rpm returns to normal, the autopilot must be re-engaged by the pilots.

Weight and performance

The helicopter was being operated within its weight and balance limitations at the time of the accident. The gross weight of the helicopter was 11,639 kg with the water bucket full, and 7,784 kg once the water bucket was released. With one engine inoperative (OEI) at the operating weight of 11,639 kg, a density altitude of 6,800 feet, and hovering with the water bucket a few feet over the lake, the helicopter could not attain a safe fly-away speed and would descend until the weight of the water bucket was removed, either by it landing in the water or being released. Once the weight of the water bucket was removed, the helicopter should have been able to climb at 275 feet per minute, using the 2.5-minute OEI power limit and 32 knots indicated airspeed.

No. 1 engine maintenance

In August 2011, when it had accumulated 4,283.5 hours of total time since new (TTSN), the engine was inspected and repaired by Motor Sich (Ukraine) because metal particles were found in the oil.

In April 2013, at TTSN 4,936.9 hours and 923 hours time since overhaul (TSO), in accordance with a Transport Canada Foreign Airworthiness Directive, the compressor turbine was replaced with another compressor turbine (different part number) with 956 hours TTSN and zero hours TSO. The fuel manifold was also replaced with another (different part number), which had 956 hours TTSN and zero hours TSO. Also at that time, seven new T-102 thermocouples were installed.

The engine was installed in C-GKHL on May 16, 2013. On May 18, 2013, the

engine's maximum power caution light started activating inconsistently. The caution light sometimes activated before the engine reached maximum power, and sometimes failed to activate when the engine reached maximum power. The electronic engine governor (EEG-3) was replaced; however the problem was not resolved. On May 19, 2013, the fuel control unit (FCU) was replaced, and the problem was resolved. During that time and until the engine failure, several power checks demonstrated that the engine's automatic limitation system was functioning correctly and that no engine limits were exceeded.

Examination of failed engine

The helicopter was recovered from the accident site and transported to a facility where it was examined, and the No. 1 engine was removed for disassembly and detailed examination. Before the engine was removed, standard tests were carried out by an avionics technician to determine the functionality of the engine turbine temperature indicating system. The results of the tests showed that the electrical resistance in the system circuits was within the required range for proper temperature indications. This also confirmed that the disconnect of TOT input to the FDR had no effect on the functioning of the gas temperature limitation system.

Fuel and oil filters were examined; there were no extraordinary findings.

The power turbine (PT) section was separated from the rest of the engine, and examinations revealed damage consistent with damage from objects upstream.

Further disassembly exposed the compressor turbine (CT) section. Examination of the CT section revealed that all the CT blades were broken off, and that several of those were broken close to the blade roots. Very few of the turbine blades' broken pieces were recovered; the turbine exhaust showed damage consistent with turbine blade debris exiting with the exhaust gasses before the engine stopped.

The CT blades were removed from the section turbine hubs and examined under optical microscopes and scan-

ning electron microscopes (SEM) to determine fracture surface structures that demonstrate failure modes. All of the available fracture surfaces were consistent with overload failures; therefore, those fracture surfaces were not the origin of the initial failure. It was also apparent that the ring that retained the first stage guide vanes for the CT section had failed on its outer edge and cracked on the inner section of one of the guide vane slots. The fracture surface features were consistent with a fatigue break. The CT blade parts, the CT section guide vanes, the guide vane retention rings, the CT wheel hubs and the thermo couplings for the engine temperature indication system were sent to the TSB Engineering Laboratory.

It was determined that the CT blade fracture surfaces were caused by overload. However, it was noted that some of the remaining parts were short enough that some of the blades could have broken more than once (e.g., a blade may have broken at two thirds of its length and then been hit by debris and broken again at one third of its length).

The advertisement is a vertical rectangular graphic with a blue background. At the top left, it says "New" in a white box. To the right of "New" is "One Piece" in white. Further right is the phone number "800-746-8273" in white. Below this is the word "DOORS" in large, bold, red letters with a white outline. Underneath "DOORS" is an illustration of a white airplane inside a hangar with a large open door. To the right of the hangar, there is a list of applications: "AVIATION", "AG DOORS", "SHOP DOORS", and "BARN DOORS", each preceded by a small red square. Below the hangar illustration, the word "HYDRAULIC" is written in large, bold, black letters, followed by "One-Piece™ DOOR" in smaller yellow letters. Below that, the word "OR" is written in white. Then, the word "BIFOLD" is written in large, bold, black letters, followed by "STRAP LIFT and auto latch" in smaller yellow letters. Below the bifold door illustration, there is a yellow banner with the text "Say YES... to Strap-Lift Doors" in black. Below the banner, it says "Say NO to Cable Lift" in white. At the bottom, the website "SCHWEISSDOORS.com" is written in white with a red star icon to the left. On the right side of the advertisement, there is a vertical text "Lift Straps" and a small "006" at the bottom right corner.

The guide vane retention ring, which has slots the guide vanes fit into, showed anomalies in the size and shape of the slots. Microscopic examinations revealed that the slots had been machined to different shapes during manufacture, rather than worn into these different shapes.

TSB Laboratory reports: Examination of engine components

FDR data showed that the No. 1 engine lost power during flight. Examinations determined that one or more first stage compressor turbine (CT) blade(s) broke and subsequently collided with the remaining blades, causing them to break. All of the blades in the CT section broke, and all of the blades downstream in the power turbine (PT) section were either broken or damaged. As a result, gas flow was reduced and power was lost. The turbines continued to rotate at reduced revolutions per minute (rpm), causing vibrations because of unequal blade damage. The low rpm of those turbines caused the vibration signatures to be inconsistent with normal engine vibrations.

Detailed examinations of the CT section components revealed manufacturing anomalies. While the lack of information from the manufacturer limited the TSB's ability to compare the accident engine blades to a standard, large differences in material structure can be caused by treatment variations during manufacture, such as heat treatment or coating regimes. Such variations are not likely to have been within a design standard. Poor quality control during manufacture can allow components like these to be installed in an engine.

The material structure anomalies that were found are consistent with variations in the heat treatment during manufacture, and reduce resistance to failure. Additionally, the anomalies in the first stage guide vane retention ring would have allowed the guide vanes to move and warp, thereby causing unanticipated gas flow patterns within the compressor turbine. This likely caused the fatigue cracking and breaking of the retention ring. This, combined with the anomalies in the material structure of the CT blades, likely caused one or more of the CT blades to fail. Furthermore, the hole on the low-pressure side of one of the guide vanes may have added to the gas flow pattern changes.

Emergency landing

The helicopter was hovering at a high gross weight when one engine lost power. This is a critical phase of flight as high power is required. In this occurrence, the majority of the load being carried was hanging externally on a 150-foot long line below the helicopter. When the engine lost power, the helicopter descended and the load landed in the lake and was released, thereby removing about 3,855 kg of the load. Because the helicopter was still 150 feet over the lake and the power required to maintain flight was substantially reduced, the remaining engine provided sufficient power to restore rotor rpm and allow the helicopter to be flown away from the lake. However, because of the following factors, the crew did not identify the problem as an engine failure and did not shut down the failed

engine: the presence of severe vibration, which was greater than either pilot had ever experienced, the lack of visual clues caused by the pilots' inability to read the instruments, and the poor control responses. The severe nature of the vibration could have been indicative of an imbalance in a major and critical rotating component, such as the rotor system or transmission. For these reasons, the crew executed an emergency landing on the closest land surface.

During the emergency landing, the crew had difficulty controlling the helicopter, particularly its heading. The landing surface was uneven, and the helicopter was still moving over the ground partially sideways upon touch down. This caused the helicopter to roll onto its side enough to allow the rotor blades to strike the ground.

Quality control

The manufacturing anomalies in the guide vane retention ring slots were clearly visible to the naked eye. These anomalies, which show up as gaps, were even more evident when the guide vanes were installed. The guide vanes should fit in the slots tightly; there should be no visible gaps. The fact that obvious anomalies like these were missed during the manufacturing and assembly of the engine components may indicate a problem with quality control. The anomalies in the structure (alloy treatment) of the CT blades were also likely due to poor quality control during the manufacture of these blades. This too puts personnel involved at risk, as these anomalies on their own could cause blade failures.

Safety action taken

The regulator (Russian Authority) that holds the engine type certificate issued Revision 1 to Airworthiness Directive (AD) RU-2012-53-05R1Footnote 4 on November 11, 2013. It requires Klimov TV3-117BMA engines installed in Kamov Ka-32 helicopters used for external load operations to make the following changes:

All engine cycles will be multiplied by a factor of 1.2 (this means that the engine life limits that are measured in cycles would be reached 20 percent sooner); and

Upon engines reaching 750 hours since overhaul, the parts installed at this mid-life "hot section" inspection will now be new. This also now applies to these parts at engine overhaul. The AD did state that the investigation of the failure in Canada was still in progress and that the changes would not be final until the results of the investigation were finalized.

VIH Helicopters Ltd. has increased the "Load Release" training and added it to the yearly recurrent training requirements. The company is field-testing an improved electrical release guard that allows easier access to the external load release button in the Ka-32s they operate.

(This report concludes the Transportation Safety Board's investigation into this occurrence. The Board authorized the release of this report on December 17, 2014. It was officially released on January 5, 2015.) ■

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Boeing Benchmark

Through the test of time, the 737 continues to dazzle.

As I settled into my window seat, just above the port engine, I smiled. Glancing at the info card in the seat pouch was the familiar Boeing 737 moniker: destination, warm and welcoming Cuba. Ironically, my very first flight in a 737 some 40 years ago was diametrically opposed to my current travel plans. As a 22-year-old apprentice aircraft mechanic, with Nordair, I was flying north, specifically from Montreal to Frobisher Bay (Iqaluit) on Baffin Island. Clearly, there was nothing neither warm nor welcoming about that particular flight.

Few modern airliners can boast the longevity and versatility of the 737. First flown in April 1967, the 100 Series entered commercial service in February 1968, with the slightly longer 200 Series following close behind in April of the same year. Powered by two tried and true Pratt & Whitney JT8D engines, the 200 Series aircraft soldiered on until the early 1980s when the 300-400-500 Series evolved using the new CFM 56 high bypass turbines. These new quieter engines along with a revised wing design yielded a 25 to 30 percent increase in fuel economy, positioning the aircraft for many additional sales for future decades to come.

Interestingly, the low under wing design presented some real challenges when it came to retrofitting the new technology CFM56s. To make it all work, the engine was moved further forward and up in front of the wings' leading edge on modified pylons. The fan diameter was reduced slightly, decreasing efficiency, and the accessory gearbox was rotated slightly from the 6 o'clock position to the 4 o'clock location (intake view) to increase ground clearance. It gives the engine an oval shaped "Hamster Pouch" look that makes the aircraft instantly recognizable from a frontal view.

Other, more subtle, modifications were common in the earlier years to allow the aircraft to operate more efficiently for airline use, especially under extreme conditions. Boeing produced a 737QC (Quick Change) configuration, incorporating a cargo door with palletized cargo capabilities, along with palletized seating. While I was with Nordair in the mid-1970s, these versatile QC versions flew round the clock, often flying cargo to the north, then rapidly reconfigured in Montreal to fly a charter flight of passengers to Florida, all within a 24-hour span.

The other popular option on all of Nordair's 737s was the "Gravel Kit." This was an absolute must for operating the aircraft on the Arctic's remote, gravel runways. The low engine

design was particularly susceptible to ingesting FOD (foreign object damage). The kit is readily apparent, with long leading edge probes extending from the lower engine nacelles. High pressure engine bleed air is pushed through probe nozzles to clear the area directly in front of the intake. The other give-away to this mod is the large gravel deflector plate trailing back from the nose landing gear.

Despite the disadvantage of the low engines from potential FOD damage, their accessibility was a delight for mechanics. Walk-around and oil level checks were a breeze without the need for a ladder. This was particularly appreciated with many quick 737 service checks in Frobisher, with howling winds and temps pushing minus 60! As mentioned earlier, these memories are neither warm nor welcoming.

Despite these extremely harsh conditions, these rugged little Boeings performed admirably. From cold soaking in the frigid arctic to roasting in the southern sunshine, these timeless classics continue to ply the sky. It is not surprising to me that they have stood the test of time and are still currently in production, rolling off the assembly line at a rate of 42 per month. Since 1967 8,800 737s have been delivered, with outstanding orders for 4,417 more as of January 2016.

Since its creation, this benchmark Boeing boasts a comprehensive track record. Remarkably, as of 2006, there are 1,250 B737s airborne at any given time around the globe, with two departing or landing every five seconds! Boeing's sound design has paid solid dividends. Despite the demise of its other iconic aircraft now long out of production such as the 707 and the 727, the 737 seems to have just the right DNA combination to continue its legend for many years to come.

As for me, that 40-year span since my first frigid introduction to this aircraft seems to have flown by (pun intended). As I look out my window at the CFM56 quietly churning away, I count my blessings. The beauty of machinery is that it can transcend time, and the Boeing 737's legacy will continue until long after I am gone. That being said, I am happy to report that the immediate future looks bright for both of us.

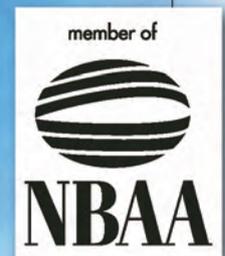
There is no doubt our paths will cross again for further flights together. The beauty for me, and the source of my ongoing smile, is the knowledge that all future destinations will be in a southerly direction. I'm pretty sure Baffin Island will get along just fine without me. *For more published writing by Sam Longo, please visit www.samlongo.com* ■



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