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# AirMaintenance

The Magazine for Aircraft Maintenance Professionals

# UPDATE

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**Going South:**  
the expanding rotorcraft  
market in Latin America

**Hypoxia:**  
the silent killer

The Regs: a look at  
**CAR 604**

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# Failure to Communicate

Are iPads in tech schools the key to luring young blood to train as AMEs? That would be too easy of course but, “We definitely have to change the way we teach,” says Anatolij Legenzov, the CEO of Helisota, which is a rotorcraft MRO in 25 countries, and an authorized Mil Helicopters and Robinson R44 service centre. “This generation learns very differently and we have to adapt in order to maintain the magnetism of the industry.”

Legenzov is speaking to the latest Global Helicopter Mechanic Shortage Survey that shows more than a third of the currently employed helicopter technicians are over 50 years of age and little is being done to attract new talent. More than 5,000 machines are expected to supplement the global fleet by 2019. Unfortunately, the existing technical manpower capable of maintaining these helicopters is getting old and shrinking fast. In the United States (and likely Canada too) the average age of maintenance technicians is 53, while in Australia it extends to 58.

“In early 2012, the CEO of Bell Helicopter expressed his frustration about the fact that the profession of an aviation technician was no longer popular and such tech giants as Apple and Google were gobbling up the best talent,” says Legenzov. “Unfortunately, we can now see that his fears were completely justified. Almost 60 percent of all workers state that the profession is not properly promoted, making the industry’s chances to compete with innovative and brand-conscious Silicon Valley companies pitiful. However, things can be changed if we turn our focus to the correct target group: Generation Y.”

Generation Y or the so-called millennials are taking the place of Baby Boomers. And although at present only 14 percent of rotorcraft maintenance personnel belong to this tech-savvy age group, the number is expected to skyrocket, and will account for 75 percent of the global workforce by 2025.

“The only way to address the accumulating workforce deficiency is to completely reorient so that we could keep up with the technological innovations,” says Legenzov. “Otherwise we will fail to attract and train a future generation of aviation experts.”

— John Campbell  
Editor

## Departments

- 4 Upcoming Events
- 6 STCs & New Products
- 8 Industry Forum
- 20 AME Association and PAMA News
- 39 Classifieds
- 42 AMU Chronicles  
By Sam Longo



## Features

- Going South:** **10**  
The expanding rotorcraft market in Latin America
- The World Before and After CAR 604** **14**  
By Norm Chalmers
- Life Status Update:** **24**  
**Hypoxia – the silent killer**  
By Gordon Walker
- Flight of the Catbird:** **30**  
The Lindbergh of model planes
- Communication Breakdown:** **36**  
Raising the Bar: Beech 1900D (C-GWGA)

### AirMaintenance Update

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editor: John Campbell

art director: Gregory Kero

publisher: Bill Carter

sales manager: Bill Carter

Advertising inquiries: (604) 214-9824

production manager: Chrissie Auclair

circulation: Anne Gervin

contributors: Mike Broderick,

Norm Chalmers, Sam Longo, Brian McNair,

Gordon Walker, Sue Yost

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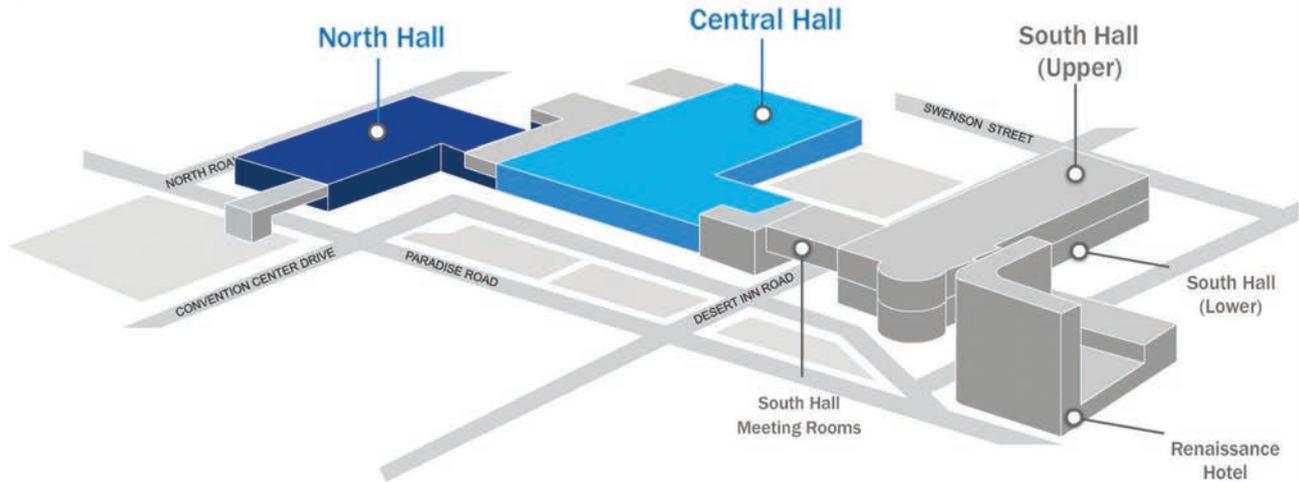
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# Upcoming Events



Las Vegas Convention Center



## CANADA

**ATAC National Aviation Conference and Tradeshow**  
November 2 – 4, 2015  
Montreal, Quebec, [www.atac.ca](http://www.atac.ca)

**HAC Annual Conference and Trade Show**  
November 13 – 15, 2015  
Vancouver, BC. [www.h-a-c.ca](http://www.h-a-c.ca)

**Canadian Aerospace Summit**  
November 17 – 18, 2015  
Ottawa, Ontario  
[www.aerospacesummit.ca](http://www.aerospacesummit.ca)

## UNITED STATES

**Brazing Symposium**  
April 4 – 5, 2016  
Dallas, Texas  
[www.brazing.aviationweek.com](http://www.brazing.aviationweek.com)

**MRO Americas**  
April 5 – 7, 2016  
Dallas, Texas  
[www.mroamericas.aviationweek.com](http://www.mroamericas.aviationweek.com)

**NBAA 2015**  
November 17 – 19, 2015  
Las Vegas, Nevada; [www.nbaa.org](http://www.nbaa.org)

**U.S. Sport Aviation Expo**  
January 20 – 23, 2016  
Sebring, Florida  
[www.sportaviationexpo.com](http://www.sportaviationexpo.com)

**Aviators Sun and Fun Cruise**  
January 30 – February 4, 2016  
Ft. Lauderdale, Florida  
[www.meetings-at-sea.com](http://www.meetings-at-sea.com)

**Minnesota Aviation Maintenance Technician Conference**  
March 21 – 22, 2016  
St. Paul, Minnesota  
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# Advertisers Index

|                                      |    |   |    |                                   |    |
|--------------------------------------|----|---|----|-----------------------------------|----|
| APS Brakes / Aero Incorporated ..... | 26 | Concorde Battery .....                  | 16 | Progressive Air .....             | 31 |
| Aeroneuf Instruments Ltd .....       | 17 | Eagle Fuel Cells Inc .....              | 28 | Propworks Propeller Systems ..... | 27 |
| BKD Aerospace .....                  | 7  | Gregoarsh Aviation .....                | 44 | Rapco Inc .....                   | 2  |
| Canadian Aero Accessories Ltd .....  | 43 | Hartwig Aircraft Fuel Cell Repair ..... | 12 | Schweiss Bi-fold Doors .....      | 18 |
| Canadian Propeller Ltd .....         | 25 | MARSS .....                             | 18 | Superior Oil Coolers .....        | 33 |
| Casp Aerospace Inc .....             | 19 | NAASCO .....                            | 11 | U.S. Air Tool Company .....       | 15 |
|                                      |    | ProAero Engines Inc. ....               | 31 |                                   |    |

# NBAA 2015



What happens in Vegas stays in Vegas? Don't count on it. But for those who haven't already marked their calendars, November 17 to 19 in Las Vegas are the dates and the place to be as NBAA's Business Aviation Convention & Exhibition (NBAA2015) once again opens its doors. As the fifth-largest trade show in the United States, the NBAA Business Aviation Convention & Exhibition is always a must-attend event, and this year is no different. This year the event will feature more than 1,100 exhibits displayed across one million square feet of floor space and two static displays of aircraft. The show's 26,000 attendees are also invited to attend dozens of education sessions covering topics of interest to all industry professionals.

Among the hundreds of items on a packed itinerary, the convention brings together the world's most cutting-edge business aircraft in one venue. NBAA2015 will feature more than 100 aircraft at the Las Vegas Convention Center and Henderson Executive Airport (HND). "The overwhelming demand for aircraft display space — both indoor and outdoor — underscores the strength of the business aviation industry," said Chris Strong, NBAA senior vice president, conventions and membership.

The big show will also offer a glimpse of the future when John Petersen of the Lindbergh Foundation presents his lecture, "The Future of Planes and Flying." Petersen will discuss how exponential technological and rapid social changes are conspiring to dramatically change the world of aviation in 10-20 years. Radical new materials, electric propulsion, extraordinary battery advances, 3D printing, big data and web



breakthroughs, artificial intelligence and parallel breakthroughs in many other areas, will fundamentally change aviation as we know it. Get the big picture of big change in aviation from a professional futurist.

On the service side, NBAA2015 offers terrific opportunities for aircraft operators, maintainers and support personnel to learn about the industry's latest service guidelines and repair procedures, and obtain valuable technical information firsthand from OEMs in one convenient location.

Don't miss it! [www.nbaa.org](http://www.nbaa.org)

# STCs & new products

## Enhanced Vision System for home-builds

Astronics Corporation's new Max-Viz X1 Enhanced Vision System is made specifically for experimental and homebuilt aircraft, which often operate from unimproved airstrips with wildlife and other obstacles. Designed for turbine and piston, fixed and rotary wing aircraft, the system uses infrared sensors, signal processing, and advanced cockpit displays to show terrain, runways, taxiways, aircraft and obstacles in poor visibility conditions. Max-Viz X1 has a 320x240 pixel resolution and is compliant with RTCA/DO160G environmental qualification test standards.

For more information visit [www.astronics.com](http://www.astronics.com)



## Blind rivet nut installation tool offers easy adjustments

Stanley's ProSert XTN20 offers setting adjustments that are easily made in a production environment. With the patented, quick-installation mandrel exchange system and the tool-free stroke and force setting features, changeovers are easy and installations are consistent and reliable. Weighing just 1.59 kg including the (M6) nosepiece assembly, it is much lighter than most comparable tools. It is designed with a low-force, single-action trigger and comfortable weight balanced ergonomic handle. The blind rivet nut installation tool has an M3 to M10 thread size capacity.

For information visit [www.StanleyEngineeredFastening.com](http://www.StanleyEngineeredFastening.com)



## Heavy-duty parts washer from Inland Technology

Inland Technology offers the IT-80 heavy-duty agitating parts washer. The hands-free auto lid opens and closes for easy loading and unloading and features an adjustable flow auxiliary pump with flow-through parts brush for thorough final cleaning. Other features are a large, 80-gallon solvent capacity, 250-pound load capacity, variable speed agitation platform, and air or electric operation. The cylinder cover protects users from moving parts and pinch points. Comes complete with EDGE TEK Micro Filtration System for prolonged solvent life.

For information visit [www.inlandtech.com](http://www.inlandtech.com)



## Tronair offers full line of tripod and axle jacks

Tronair manufactures a full line of OEM-approved tripod and axle jacks. The threaded rams of all five- through 30-ton tripod jacks are equipped with hand wheel safety nuts. Air pumps are available on jacks where they are not standard. For more information visit [www.tronair.com](http://www.tronair.com)



## All weather mobile tool chest doubles as seat

Snap-on Industrial's All Weather mobile tool chest has a lid that doubles as a seat when the case is open. It can be pulled by hand with a wide-wheel base and a telescoping trolley-style handle. It also comes with sliding drawers that can accommodate foam cutouts for tool control and accountability. The mobile tool chest comes in four colors and two configurations: two 2-inch drawers plus six 1-inch drawers, or three 2-inch drawers plus four 1-inch drawers. Features include a 22-inch wheelbase for improved stability during transportation and solid rubber wheels that absorb the shock of rough surfaces. For more information visit [www.snapon.com](http://www.snapon.com)



## Ultrasonic software provides simplified instrument operation

Olympus has introduced the new Corrosion Module software, now available with the portable EPOCH 600 Ultrasonic Flaw Detector. The Corrosion Module is designed for the growing number of inspectors who require both flaw detection and corrosion measurement solutions as standard offerings. This optional software provides simplified instrument operation for basic corrosion applications, requiring less set up time and more efficient data collection. The EPOCH 600 determines metals wall loss due to corrosion or erosion. For more information visit [www.olympus-ims.com](http://www.olympus-ims.com)



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Unit 7 — 11771 Horseshoe Way  
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## ABLE AND ROTORLINK ENTER AGREEMENT



A new agreement between Able Aerospace and Vancouver-based RotorLink has established “in country” availability of Able’s PMA offerings and full line of rotor wing components. Under the agreement, RotorLink will serve as Able’s distributor and logistics coordinator in Canada.

“This partnership places one of the world’s largest PMA and Bell components inventory with a single Canadian company, so that local customers can access Able solutions in the fastest, most cost-effective way,” said Anthony Saenz, President of Able Aerospace, Inc. RotorLink is an independent helicopter support company providing technical services and logistics support for 20 different aircraft types, operated by customers around the world. The Able-RotorLink agreement strengthens Able’s position in the Canadian market, where it already serves a broad base of fixed-wing and rotor-wing clients.

## VECTOR AND DND INK MRO CONTRACT



Vector Aerospace has signed a contract with Canada’s Department of National

Defence (DND) to perform all MRO services for their T-58 engines, effective July 30. The company has been a registered overhaul facility for CT-58 and T-58 engines since 1976. Between 1996 and 2003, Vector helped develop and implement an upgrade program for 109 DND T-58 engine conversions from the -8F to -100 configurations. Vector also repairs the T700-T6A1 engines for the AW CH-149 Cormorant (AW101) and is currently conducting Assemble Inspection and Test (AIT) for the CT7-8A7 engines for the new Sikorsky CH-148 (H92) Cyclone helicopters in Canada.

## CENTRE OF EXPERTISE IN AIRPORT SECURITY



The Sherbrooke and Haut-Saint-François regional county municipalities of Quebec along with a host of other collaborators have announced the creation of a centre of expertise in airport security at the Sherbrooke airport. The centre, named Airpole, will provide integration, training and innovation services to key players in the airport industry to promote the emergence of new technologies and more efficient protocol measures. An agreement has been reached with the International Air Transport Association (IATA) for aviation safety professionals to offer a training program in English and in French. IATA represents some 260 airlines that make up more than 80 percent of global air traffic.

The Airpole centre will organize its activities around three business units: CENFOR for hands-on education and training; TIC, a technology and equipment integration and testing centre and finally, the TS, a technology showcase. These three sites will allow first respond-

ers, law enforcement officials, airport managers and staff along with the rest of the aviation industry access to optimal infrastructure that will allow for specialized training and research. “Our vision is to establish a centre of expertise that will help the aviation industry meet the evolving challenges surrounding airport security,” says Bernard Ricard, President of the Airpole Board of Directors.

The centre of expertise’s establishment will require major investments of nearly \$22 million, according to a study prepared by Raymond Chabot Grant Thornton, but the economic benefits that construction activities will bring are estimated to total \$14.6 million, including \$10 million in direct economic impact. According to the same study, construction activities would create or maintain 187 jobs across Quebec while the centre’s utilization would create or maintain 986 jobs over 10 years, including 840 jobs in the region.

## HARTZELL OPENS SERVICE AND SUPPORT IN CHINA



Hartzell Propeller Inc. has named Shenyang Avias Aviation Maintenance Engineering Co. Ltd. as the company’s first service and support centre in the People’s Republic of China. Shenyang Avias is located near Shenyang Taoxian Airport in Shenyang, the provincial capital and largest city of Liaoning Province in Northeast China. Shenyang Avias was established in 1998 and has a professional maintenance staff of 40 people who perform maintenance, repair and overhaul of aircraft engines and components.

“This latest initiative demonstrates that Hartzell Propeller is committed to Chinese owners, operators and mechanics,” said Weiqing (Max) Wang, Hartzell Propeller Managing Director for

China, based in Shanghai City. “While Shenyang Avias is our first service and support centre in China, Hartzell will continue the long-term expansion of the service and support network to meet future growth of General Aviation in China.”

Hartzell recently completed translations of propeller owner manuals into Mandarin for the most popular turbo-prop and piston-powered aircraft flying in China.

## NEW RESTRICTIONS ON DRONES NEAR WILDFIRES SOUGHT BY BC



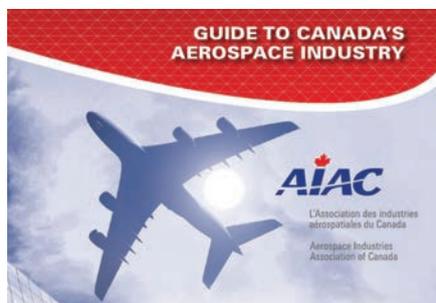
The CBC has reported that the province of British Columbia plans to toughen up the laws prohibiting the operation of drones near wildfires, after the unmanned aircraft grounded air tankers and helicopters that should have been fighting two forest fires earlier this summer. Legislative amendments to the Wildfire Act will be introduced next spring. Mike Morris, the Parliamentary Secretary to the Minister of Forests, Lands and Natural Resource Operations, announced in early September.

“Our message is simple. If your drone is in the sky above an active wildfire, you are grounding firefighting aircraft, putting lives at risk and may cause the fire to spread,” said Morris. “This is completely unacceptable behaviour and there will be legal consequences for anyone who gets caught.”

The provincial government is also calling on the federal government to tighten the rules affecting drones under the Canadian Aviation Regulations, including changes to protect personal privacy, registration of drones and certification of operators. Currently, operating a drone that weighs under 35 kilograms

recreationally requires neither a licence nor a special permit, though operators must follow a list of Transport Canada safety guidelines, which include keeping away from forest fires and anywhere the small aircraft might interfere with first responders. The current maximum fine for an infraction is \$25,000 and violators could spend up to 18 months in jail. All wildfires are considered to be “flight restricted,” according to the federal Canadian Aviation Regulations. The restricted area is within a radius of five nautical miles around the fire and to an altitude of 3,000 feet (about 915 metres) above ground level.

## AEROSPACE RESEARCH IN BC RECEIVES MAJOR BOOST



British Columbia’s aerospace industry is receiving a big boost in research and marketing according to industry and government leaders that participated in the Aerospace, Defence & Security Expo (ADSE) in Abbotsford, BC this summer. “BC’s aerospace industry shows strong potential to continue growing as a driver of our economy,” said Jay Teichroeb, Vice President, AIAC Pacific. A new study shows that the industry employs 8,300 British Columbians and generates \$2.4 billion annually. The study also identifies the province’s capabilities so that they can be better marketed. It was also announced that \$7.3 million is being invested in five BC aerospace research projects. Three projects will focus on green aviation technology: Waterfall Group, Nebula UAV Systems, and NORAM Engineering and Constructors will lead them. The other two research projects involve aircraft design and measuring pilot fatigue. Asco Aerospace, Avcorp Industries, Conair Group and Convergent Manufacturing Technologies will conduct the research with

Camosun College and the University of British Columbia.

## NBAA: RECORD NUMBER OF “INDOOR” AIRCRAFT



Organizers say that the NBAA’s 2015 Business Aviation Convention & Exhibition (NBAA2015) will host a record number of aircraft on the show’s indoor static display, while still offering the wide-ranging number of aircraft at the convention’s traditional outdoor display. The convention brings together the world’s most cutting-edge business aircraft in one venue, and NBAA2015 will feature more than 100 aircraft between the two displays at the Las Vegas Convention Center and Henderson Executive Airport (HND), both of which are sold out.

“NBAA’s Business Aviation Convention & Exhibition is the world’s premier industry event,” said Chris Strong, NBAA senior vice president, conventions and membership. “This year’s static displays provide an unprecedented opportunity for those interested in comparing the latest technology, newest aircraft and also previously owned aircraft, side-by-side.”

The convention centre, home to an exhibit hall containing more than 1,100 exhibitors and dozens of education sessions, will host 15 aircraft and two aircraft mock-ups on indoor display. HND will host about 80 new and previously owned aircraft on static display.

“The overwhelming demand for aircraft display space—both indoor and outdoor—underscores the strength of the show, and the industry,” said Strong. “This is the earliest we have ever sold out our static display. ■

# Going South?



**Is that the sound of opportunity knocking for Canadian and American AMEs as the rotorcraft market expands in Latin America and the MRO industry there struggles to catch up?**

Latin America has long been a rather generous market for helicopter manufacturers and sellers. Moreover, in the upcoming several years the already healthy demand is expected to increase even further. However, while helicopter manufacturers from all over the world are doing their best to secure their slice of the rising pie, MRO providers are faced with the pressing need to find fast solutions in terms of maintaining the thriving regional rotorcraft fleet.

Recently, the Export-Import Bank of the United States announced its approval of a \$22.4 million loan for the export of AgustaWestland-produced helicopters to Colombia, which is a clear signal that the US-

based producers are set to take maximum advantage of the upcoming market growth. However, it is highly unlikely that the competing Russian Helicopters will give away their current six percent annual business growth in the region easily.

While industry experts are getting ready to place their bets on the upcoming race between the American and Russian manufacturers, MRO providers must get busy preparing to meet the upcoming demand for the maintenance of rapidly growing rotorcraft fleets in the region.

Even though the relationship between the US and its neighbours to the south is getting warmer fast, Russian rotorcraft manufacturers have historically held

the dominant position in the region. According to the Russian Helicopters' data, at the start of 2014 there were more than 400 Russian-built machines operating in Latin America. The Russian-produced helicopters run the show in the segment of commercial helicopters with the maximum takeoff weight of 10-20 tons as well, accounting for 77 percent of the regional fleet. They also account for 42 percent of all military helicopters across Latin America. Moreover, contracts are already signed for 41 additional helicopters to be delivered by 2016.

The main reasons for the ever-growing popularity of the Russian choppers as opposed to the American-made machines include their relatively low price and better suited capabilities for the Latin American terrain. The Mil family's abilities, for example, are very advantageous, taking into account the natural topographic features of the region. As a result, it boasts a number of advantages when operating over flat to rolling terrain in the mountains and at high amplitude of temperatures. Unsurprisingly, such features have been praised by the



**"It seems like MRO centres in Latin America, at least for the time being, will not be able to cope on their own, possibly requiring a helping hand from outside," says Anatolij Legenzov, CEO of Helisota.**

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partners in such countries as Argentina, Peru and Brazil—countries dominating the order book of Russian Helicopters

“The current ties with the Soviet-built and modern Russian rotorcraft technology have been historically solid in the region, and they are sure to continue being close in the near future,” says Anatolij Legenzov, the CEO of Helisota, which is a rotorcraft MRO in 25 countries, and an authorized Mil Helicopters and Robinson R44 service centre. “As a result, MRO providers in the region already possess some experience of working with the Russian-built machines. This certainly will enable them to minimize the cost of services and training of new technical specialists that will be needed for further fleet expansion.

“Nonetheless, as almost 50 percent of the region’s operators are planning to increase their fleets and the demand for helicopters in the region is expected to register an astonishing compound annual growth rate of 14.99 percent between now and 2023, it seems like MRO centres in Latin America, at least for the time being, will not be able to cope on their own, possibly requiring a helping hand from outside.”

Trying to keep up with the demand, American manufacturers as well as Russian Helicopters are busy establishing support centres across Latin America. The latter had already previously operated bases in Mexico and other countries in the region, and last year the company decided to add an extra one in Brazil. Regardless, one of the main issues to overcome for all manufacturers if the expansion is due to continue is the potential lack of qualified maintenance personnel.

As the region is expected to require an increasing number of technical personnel to accompany the expansion, over a third of the existing labour force in the field is aged 50 years or more, according to Helicopter Maintenance magazine. With that in mind, the future of local MROs is looking grim, to say the least.

The appetite of Latin America, on the other hand, seems to remain a single unstoppable force. The most recent Honeywell forecast has exposed that the region is to experience a further 34 percent sales spike in helicopter purchases over the next half a decade and it will account for almost one third of the global helicopter purchase plans in 2015. As a result, rotorcraft maintenance providers must get ready to deal with the increasing pressure, no matter the origin of helicopters to soon reach the region in great numbers.

“As Latin America seems to be showing no signs of a cease in rotorcraft market expansion, the investment in MRO procedures and professional engineer training will certainly remain the issue under the industry’s microscope,” says Legenzov. “In order to properly maintain the growing number of helicopters and ensure maximum air safety, the region will definitely require all the possible support they can get. Even though manufacturers are trying to provide additional assistance, it seems like the rest is left up to the experienced and certified independent third party MRO providers, which can deal with the additional pressure of added MRO procedures as well as help to supply, train and develop qualified technical personnel to meet the increasing regional demand.” ■



Pictured above and below: Robinson R44.



# The world before and after CAR 604



Back in the good old days there was no regulation of business aviation. This was just viewed as private aviation.

Given the recent changes to an unwelcome regulation, it might best to double-check your current state of compliance.



BY NORM CHALMERS  
Pacific Airworthiness Consulting

**For those of you new to the aviation industry,** or new to AMU Magazine, I use many aviation abbreviations including the following in this issue:

**AD:** Airworthiness Directive  
**CAIRS:** Civil Aviation Issues Reporting System  
**CAR:** Canadian Aviation Regulation, which is a law of Canada

**FAA:** Federal Aviation Administration  
**SAIB:** FAA Special Airworthiness Information Bulletins  
**SB:** Service Bulletin  
**STC:** Supplemental Type Certificate  
**TCCA:** Transport Canada Civil Aviation (or TC)  
**TSBC:** Transportation Safety Board of Canada

Below you will note that the Italics denotes a quotation. I do this in some cases because of the large amount of material that I quote. Please be aware of this as you read on.

My first topic is CAR 604, regarding private business aviation. Back in the good old days there was no regulation of business aviation. This was just viewed as private aviation. That is still the reality in every advance

and civilized democracy in the world. With this absence of TC meddling, this private corporate aviation was the safest aviation sector. Corporate jets were flying business people around with no public tax money being spent regulating them. Then a coterie of commercial operators complained that these private aircraft were taking business away from them. The management at TC saw this as an opportunity to build their bureaucratic empire so invented CAR 604.

Some years later, our federal government reduced TC's budget. That budget cut pushed TC to delegate some of the regulatory oversight jobs. TC downloaded corporate flight operations oversight responsibility to the CBAA making CBAA membership mandatory. Years later a business jet slid off the end of a slippery runway. Some politician got hysterical and TC got involved again writing the new CAR 604.

This time last year, and then again in our 2015 February/March edition, I wrote about the new CAR 604 which is now law. Most, if not all, 604 private operators will now be in violation of some part of that regulation. TC's process, as in the past, is to issue numerous exemptions. The TC Ottawa exemption mandates continued compliance with requirements in place during the CBAA oversight era. My friends in that business aviation part of the aviation industry have told me that TC has made little or no effort to inform them of these changes. As with the implementation of SMS, we will probably see further exemptions that will extend this phase-in period of CAR 604. Whether or not TC spends any more money implementing CAR 604 in this useless exercise remains to be seen.

On a different topic, a fairly new TC document is AC-600-003, Regulations for Terrain Awareness Warning Systems. Section 5.0 of this AC reads:

**5.0 IMPLEMENTATION DATES**

- 1) The TAWS regulations came into force on July 4, 2012, when they were published in the Canada Gazette II, Volume 146, No. 14.
- 2) The TAWS regulations became effective for all affected aeroplanes on July 4, 2014.
- 3) All aeroplanes required to have TAWS

will have to be in compliance with the TAWS EAA requirements by July 4, 2017.

4) CARs 605.37 GPWS ceased to apply on July 04, 2014.

5) Appendix A of this AC summarizes the above information on TAWS including the applicable CAN-TSO references.

Note that implementation date of July 4, 2017. Base on the history of similar implementations, there will be a late rush to beat that date. I recommend that you get in line to buy your TAWS hardware and to have it installed.

In that AC I also note another political statement injected to please those TC non-aviation political overlords:

**6.0 FUTURE DISPOSITION**

1) TCCA is committed to maintaining a viable civil aviation transportation system, while not compromising safety. This AC will remain in effect for information purposes until further notice.

The minister has been convinced to no longer use the word "safety". It has been replaced by the term "risk management".

The advertisement for USATCO U.S. Air Tool Co. features a collection of air tools against a blue background with a faint pattern of tools. The tools are labeled as follows:

- 13-1127-25 Air Drill
- 13-1227A-2 45° Angle Drill
- 53-127-4C Angle Attachment With Chuck
- 02-AWD Composite Drill Bit
- 02-241 Countersink
- 20-127-4 Angle Attachment
- 13-1629 'Pancake' Offset Drill
- 13-1529 'Pancake' Air Drill

The logo for USATCO U.S. Air Tool Co. is centered, featuring a globe with an airplane silhouette. Below the logo, the text reads "Serving the aerospace & metal working industries since 1951!". At the bottom, there are four small images showing hands using various tools on workpieces.

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When a coterie of commercial operators complained that private aircraft were taking business away from them, management at TC saw it as an opportunity to build their bureaucratic empire and so invented CAR 604.

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I have contacted the CBC and CTV about the changes at TC but have had no replies.

Moving right along, the FAA continues to publish their advisory information. They recently published three SAI Bs regarding defective parts. Here are some examples that may be of interest to you:

SAIB NE-15-19 relates to PW 4000 series engines. It states: *This ... alerts you ... to potential low-pressure turbine (LPT) 4th stage vane crack due to a non-conforming fillet radius in a high stress area. We have received reports of LPT 4th stage vane liberations, which have resulted in multiple engine failures and one low-energy case uncontainment on PW4000 series engines.*

This is the first time I have read words like “liberation” and “uncontainment” used to describe unrestrained engine failures. These events are, in other words, engine explosions. Regardless of one’s views regarding these sorts of engine failures, there will be no AD.

SAIB SW-15-20 relates to the installation of an STC and to “poor” wire

crimps leading to wire burning. Over the years many of us have used the old type wiring terminal crimpers like those used for cars. The proper aviation crimper is an expensive tool but not as expensive as a burned up aircraft or even a lost revenue trip. You ought to get the experts to do your wire crimping.

SAIB NE-15-21 is related to PMA parts in PT-6 engines. The topic of PMAs has always provided material for discussion. Some PMA parts are as good as, or better than, the original factory parts but events like this are not good advertising.

One more rant about TC. Back in the year 2009 I submitted a CAIRS regarding strange wording used in several standards. Here is that strange wording:

721 Foreign Air Operations, **721.22** Transport of Passengers in Single-Engined Aircraft in IFR Flight or in Night VFR Flight, **(1) General (a)** only factory built, turbine-powered aeroplanes are permitted;

722 Aerial Work, **722.18** Night, VFR OTT and IFR Operations, **(11)** Single-engine (SE) aircraft operation VFR at night or in IFR is subject to the following standards:, 722.18(11)(c)(i)(A) only factory built, turbine-powered aeroplanes are permitted;

723 Air Taxi, **723.22** Transport of Passengers in Single-Engined Aeroplanes, The standard for transport of passengers in a single-engined aeroplane under IFR or VFR at night is: **(1) General, (a)** only factory built, turbine-powered aeroplanes are permitted;

I ask the minister, what do the words “factory built” indicate? I advised the minister to change the wording. I assume that the minister didn’t understand my message because I didn’t receive an answer. A literal translation of that means the aircraft can be built by Ford or Meccano factories. My valued readers, do you think that am I being too critical?

Changing government departments, the TSBC recently published an accident report related to an aircraft with multiple modifications. Each modification improved low speed aerodynamic performance. The report states:

**Aviation Investigation Report - Aerodynamic stall – Collision with terrain:**

*while manoeuvring for landing on water, the aircraft departed from controlled flight and collided with terrain at an elevation of 27 feet above sea level .... There was no fire. The aircraft was destroyed and the 3 occupants were fatally injured.*

Following the analysis details, it goes on to state:

**Safety action taken**

**Transportation Safety Board of Canada:**

On 18 November 2014, the Transportation Safety Board of Canada (TSB) issued Safety Advisory letter A13P0278-D3-A1 to Transport Canada explaining the value of angle-of-attack indicators in small aircraft.

Individual STCs are approved by regulators after testing on an otherwise unmodified aircraft. Consequently, most Transport Canada-issued STCs include a compatibility statement which states, in part: Conditions: Prior to incorporating this modification, the installer shall establish that the interrelationship between this change and any other modification(s) incorporated



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will not adversely affect the airworthiness of the modified product.

In addition to this statement, Transport Canada (TC) has issued Airworthiness Notices B045 - Compatibility of Multiple Modifications. The regulator requires the installer to ensure the modification(s) will not affect the airworthiness of the modified product and, if necessary, a new flight manual supplement may be required with the installation to prescribe the operating envelope.

The installer's evaluation of compatibility of modifications made to the aircraft had not included stall testing, and despite the aforementioned conditions, there was no requirement by the regulator for evidence that this had been accomplished.

This following paragraph sums up the message of this report:

The combined aerodynamic effects of installing multiple STCs onto a single aircraft are not typically tested by the STC holder and were not known. Accordingly, there was no performance data or procedural guidance for the owner or pilots of

(the aircraft) for the combination of modifications on the aircraft.

The findings of the report that are critical to this message are:

### Findings as to causes and contributing factors

1. The aircraft had several approved modifications that resulted in undocumented performance and handling characteristics.
2. The pilot's expectation of the aircraft's performance capabilities likely assumed a reduced stall speed that was based on unverified performance.
3. The aircraft experienced an accelerated aerodynamic stall while being flown at an altitude from which recovery was not possible before it collided with terrain.

### Findings as to risk

1. If multiple supplemental type certificates are installed without adequate guidance on how to evaluate and document the effects on aircraft handling and performance, there is an increased risk of accidents due to unknown aircraft performance.

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2. If advanced stall warning systems, such as angle-of-attack indicators, are not incorporated on aircraft, there is an increased risk of stall accidents.

Many years ago I was involved in the development of a new type aircraft. The assessment of an aircraft performance at low speed and during stalls is a highly technical process involving knowledgeable people in all areas of aircraft development including certified test pilots. The aerodynamic assessment of modified aircraft is very time consuming and expensive. It is not normally within the capabilities of aircraft operators. The test pilot we worked with had specialized test pilot training and much test pilot experience. Years later he was in the process of testing an aircraft for aerodynamic stall performance and died in the resulting crash.

Until next time be good and be careful and use your intelligence and ability to make good judgments and decisions.

Please be aware that I am not a lawyer or legal expert. What I write in my column is not legal advice nor legal opinion.

If you face a legal issue, you must get specific legal advice from a lawyer and preferably one with experience in the aviation matters in your own country/state.

NORM CHALMERS worked with Transport Canada as an Airworthiness Inspector for 25 years. Before this, from 1967 to 1983, he worked in the aircraft maintenance industry in and around Western Canada and in the Arctic. His industry experience includes the operational maintenance of normal and commuter category aircraft and smaller transport category aircraft in the corporate sector as well as several years working in major repairs in the helicopter sector. As an Airworthiness Inspector, he has been responsible for most duties related to the position, including the approval of all aspects of maintenance, manufacturing, training, and responsibilities related to distribution organizations. Norm now operates Pacific Airworthiness Consulting; [www.pacific-airworthiness.ca](http://www.pacific-airworthiness.ca). ■

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# Western AME Association



## 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, 2016 we will be in Whitehorse, Yukon Territory for our 40th Annual General Meeting, Conference, and 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; 867 446-6282; admin@nata-yzf.ca



## AME Association of Ontario

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## AME Association of Ontario

### Board Information

At this time of year our Aircraft Maintenance students are firmly entrenched in their studies; our AME Association of Ontario has had its annual meeting and symposium and the CFAMEA Annual General Meeting has taken place. We will report to you about these events in our next Ontario news through AMU Magazine.

Meanwhile, our association's directors continue to meet regularly and work to improve the association. Plans are well underway to update the web page to remove some of the glitches, make it easier to navigate and improve the membership renewal and course registration and payments section.

The Board of Directors meets monthly. Usually these meetings are scheduled on Monday evenings. These meetings are open to all members. Should you wish to attend a meeting, please contact one of the board members so we can advise you of the location, agenda and many last minute changes or updates.

## AME Association Promo Video Project

By Bart Debowski

Over the past few months, the AME Association of Ontario has been taking part in a promotional video project that I initiated to promote new membership and growth. The goal of the video is to showcase the role the Association plays in the industry, within Ontario. Topics covered include the annual AME symposium, interviews with board directors, member benefits and more. Having been assigned to produce media for the AME Association of Ontario, I began researching ways that would be able to boost membership. I've been involved in freelance aviation photography/video for many years now, so I decided to combine the research alongside my passion for filming aircraft to produce this video.

One of the key topics discussed is networking for AMEs, apprentices and technicians. The networking opportunities found within the association open up new doors for students looking for employment, new opportunities within the industry and much more. The support from the board of directors for this video project has been outstanding and I am excited to see the results once the project is complete.

— Submitted by Stephen Farnworth  
For the Board of Directors



## Atlantic AME Association

### About Us

The Atlantic AME Association is one of five similar associations across Canada; the others being the Western, Ontario, Central and Pacific associations.

These associations represent regional interests, as well as, concerns of national importance. The Canadian Federation of Aircraft Maintenance Engineers Associations (CFAMEA) is a national body, which is supported and financed by all the regional associations and which represents the associations at the national level.

The purpose of the association is to maintain and enhance the standards of professionalism of the AME and the aircraft maintenance industry as a whole and to protect the rights and privileges of the AME. The association works with and is consulted by Transport Canada in the formulation of new rules and regulations to promote the viewpoint of the AME. We are represented on various committees and working groups involved with aircraft maintenance and licensing.

[www.atlanticame.ca](http://www.atlanticame.ca)



## Central AME Association



### About Us

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. Our chapter is one of five similar associations across Canada that collectively supports the national body CFAMEA. Our organization works with Transport Canada in the formulation of new rules and

regulations and provides a collective viewpoint for all AMEs. CAMEA is a not-for-profit organization run by a volunteer group of AMEs. We elect members of our organization to be part of our Board of Directors. Members of CAMEA are comprised of AMEs, AME apprentices, students, non-licensed persons working in the industry and corporate members.

**email:** [camea@mymts.net](mailto:camea@mymts.net)

## PAMA SoCal Chapter



### NEXTGEN event on the calendar

Duncan Aviation will be hosting a NEXTGEN presentation at The 94th Aero Squadron in VNY. Please block out time on your calendar for Wednesday, Dec 9th, 2015, from 8:30am-3:00pm. Duncan has informed our chapter that they will be sending further information along on this event as it becomes available. We will in turn, provide that to you.

### Free "Common Mistakes" available to SoCal PAMA community

As a limited time offer V-Log is offering the SoCal PAMA Community a free digital copy of "Twelve Common Logbook Mistakes." To access the free eBook, just visit: <http://logbookbestpractices.com/pama-2/>

[www.socalpama.org](http://www.socalpama.org)

**Does your professional association have some interesting news or upcoming events you'd like to make your members aware of?**

**Contact AMU's editor, John Campbell, at: [amu.editor@gmail.com](mailto:amu.editor@gmail.com)**

## Central Ohio PAMA



### COAGO 2015: Beautiful Day, Not So Beautiful Ending!

The 2015 Central Ohio Aviation Golf Outing (COAGO) was held on Friday, September 11th At Kyber Run Golf Course, just outside Johnstown, Ohio. This was the 13th year that the outing has been co-hosted by COPAMA and the Professional Pilots Association (PPA) to raise funds for the COPAMA Scholarship Fund. Roughly 128 players attended this year's event. After a moment of silence to observe the 14th anniversary of the 9/11 attacks, the golfers started off with flags adorning their carts on a spectacular morning.

An oncoming storm front forced an abbreviated lunch, award ceremonies and prize raffle. Due to the haste, an unintentional clerical error occurred during the determination of first, second and third place teams. The issue was resolved before the end of the outing but the storm made retakes of the award photos impossible. The raffle was concluded under the course's shelter with golfers, volunteers and raffle prizes all trying to keep dry.

COAGO 2015 webpage is now available for viewing sponsors, team starting hole positions and other event data. The final revision is coming soon which will include winning teams and player awards, so please check back.

### YAA HangarFest, Saturday August 22nd! One Great Event!

YAA conducted this year's HangarFest at OSU Airport's Hangar #8. The weather was perfect and lots of people turned out to share in the auctions and fanfare of this year's fundraiser. Entertainment was provided by the CBUS Big Band, a group of swing dancers who danced to the music, catering by Cameron Mitchell and static display aircraft on the ramp. Admission was free and you may find more information about YAA and the event at [www.youthaviationadventure.org](http://www.youthaviationadventure.org). If you weren't able to attend, please consider making a donation at their website below.

COPAMA President, Joe Lippert made a \$1,000 donation from the COPAMA Scholarship Fund to help them provide training for youth interested in aviation. We send our congratulations to Rick Ochs, Tim Beech and all the HangarFest Committee and volunteers that helped make the event so memorable!

[www.copama.org](http://www.copama.org)

## PAMA Dallas – Fort Worth



### About Us

The DFW Chapter of PAMA is a non-profit association dedicated to promoting professionalism and recognition of the Aviation Maintenance Technician through communication, education, representation and support, for continuous improvement in aviation safety.

email: [curtislandrum@charter.net](mailto:curtislandrum@charter.net)

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We invite you to contribute your AME association and PAMA newsletters to AMU magazine. Keep in touch with your membership, and promote upcoming symposiums and social activities.

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# AirMaintenance UPDATE

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[HOME PAGE](#) | [CURRENT ISSUE](#) | [FEATURES](#) | [NEWS](#) | [ARCHIVE](#) | [EVENTS](#) | [CLASSIFIEDS](#) | [JOBS](#)

**Dec-Jan 2013**

AMU Chronicles  
 Aviation Terms - Part 2  
 HPF Explained  
 Human Factors  
 The Regs

**Upcoming Events**

- 5 **Nov**
- 11 **Nov** Middle East Business Aviation Summit @ Al Maktoum International Airport
- 16 **Nov** Pacific AME 50th Anniversary Celebration

**Features**

**AMU Chronicles**

Not So Blazing - Borescopes: A large part of our job maintaining aircraft is the never-ending task [...]

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# Life Status Update



**Hypoxia, carbon monoxide poisoning, pilot fatigue and complacency are significant contributors to the growing numbers of incidents involving flight crews falling asleep while in command of an aircraft.**

**Hypoxia is the silent killer that creeps in with little or no advance notice. Thankfully, there are systems to alert pilots when oxygen becomes scarce. It's up to us to use them.**



BY GORDON WALKER, AME 'E'  
Professor of Avionics, Centennial College

**P**eople used to talk about remembering where they were when they heard that JFK had been shot. I was too young for that, but I remember that my favourite cartoons and TV shows like Rocketship 7 and Captain Kangaroo were cancelled in order to broadcast his funeral. I DO remember where I was when I heard about John Lennon suffering the same fate. I was doing an "A" check on

a 737 outside Dorval's Hangar #5, listening to the news using the AM radio function of the ADF.

Several years later, October 25, 1999 (to be precise) I was sitting in a dark and dingy north Florida bar, trying to explain the "offside" and "icing" rules to a bunch of "good ol' boys" so that they'd allow me to watch the Leafs beat the Dallas Stars on the smallest TV set in the place. The game was interrupted by a toothy talking head telling us the weird tale of golfer Payne Stewart.

Stewart's Lear Jet had departed Florida bound for Texas, but instead of turning left at Georgia, it flew on in complete radio silence for another four hours or so, before plummeting earthward and crashing into a field in South Dakota. F-16 fighter



Courtesy of ASU College of Technology and Innovation

The high altitude chamber at Arizona State University's College of Technology offers classes, training, human subject research and product development testing on the effects of high altitude on the human body, specifically hypoxia.

jets were dispatched to intercept, observe, and attempt to contact the Lear. Rumour at the time was the jets were ordered to shoot down the Lear if it threatened to crash in a populated area. The Pentagon denies this to be true. Of course, this was pre-9/11 . . . who knows what would happen in today's terrorist-conscious world?

Investigation determined the passengers and crew aboard the Lear were incapacitated due to hypoxia, or lack of oxygen. The effects of hypoxia are remarkably similar to the effects of alcohol. At the onset, a sense of euphoria and lack of concern, leading to impaired judgment and reduced ability to execute tasks involving motor skills. Ultimately, the victim of hypoxia will experience a loss of consciousness, and eventually death.

It's easy to understand why a pilot experiencing hypoxia would fail

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Students in Utah State University's professional pilot program recently experienced oxygen deprivation as part of a unique training opportunity. The training allowed participants to experience symptoms that accompany loss in cabin pressure.

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to recognize the need to immediately access supplementary oxygen.

This situation can occur in a pressurized aircraft when it loses pressurization at altitude. If an aircraft depressurizes suddenly, the loss of consciousness can occur in a matter of seconds, leaving pilots with little time to assess the situation and take corrective action. If the depressurization is gradual, that sense of euphoria similar to drunkenness can impair the pilot's judgment to the point of failing to take the correct course of action, and donning the oxygen mask.

Another cause of oxygen starvation is carbon monoxide poisoning. Because carbon monoxide will more easily bond with red blood cells, it effectively "blocks" oxygen from doing so. This can result in the same tragic end as hypoxia caused by loss of pressurization. Carbon monoxide poisoning is most often associated with exhaust leaks but cigarette smoke can also be a major contributor to the pilot's physiology in terms of vulnerability.

In addition to the dangers of hypoxia and carbon monoxide poisoning, pilot



**These pilots are subjects in a test to help understand the causes, symptoms, and repercussions associated with hypoxia.**

fatigue and complacency are human factors, which are significant contributors to the growing numbers of incidents involving flight crews falling asleep while in command of an aircraft. The increase in the scope and function of automated flight control systems and flight management systems has resulted in a situation where pilots often find themselves functioning as little more than passengers, monitoring the computers that are actually flying the aircraft. There is a certain irony here, in that humans are not particularly good at performing tedious monitoring tasks, but computers ARE. We've got it the wrong way around—the computers should be monitoring the pilots, who should be flying the aircraft!

Those involved in the evolution of the cockpit environment have recognized this somewhat paradoxical situation, and are moving toward resolving the problem of crew incapacitation. Whether it's from hypoxia, carbon monoxide poisoning, fatigue, or complacency, an unconscious pilot in command is clearly a very dangerous situation.

A carbon monoxide detector has become a mandatory piece of safety equipment in many households, so it is no surprise that we are now starting to see these life saving devices appear in aircraft cockpits.

In fact many aircraft are now being equipped with a small, panel mounted device, commonly referred to as a pulse oximeter. As the name suggests, the pulse oximeter is capable of monitoring not just the carbon monoxide level in the cockpit, but also cabin altitude, pilot heart rate, and pilot blood oxygen saturation level (remember hypoxia). It is very similar to the

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Hypoxia recognition systems are now being used to monitor pilots . . . to ensure that they are awake and alert. If no activity has occurred, the system will start to issue alerts . . .

device hospitals clip onto a patient's finger for similar monitoring purposes. The pilot is prompted at regular intervals to insert their finger into the device, and note the results. Should there be any anomalies in heart function or blood oxygen levels the pilot knows to take corrective action.

Hypoxia recognition systems are now being used to monitor the pilots (who are monitoring the autopilots) to ensure that they are awake and alert. If no activity has occurred (such as pressing soft keys or rotating selector knobs) after a given period of time, the hypoxia recognition system will start to issue visual and eventually, aural alerts. If there continues to be a lack of response from the pilots, the automatic descent mode will be engaged to fly the aircraft to a lower altitude. It will take the aircraft to approximately 14,000 feet, and if there is still no pilot response detected, it will descend again to approximately 12,500 feet. The rationale is that the pilots will be roused by the alerts, the descents, and the increase in available breathable oxygen.

Would these systems have prevented the Payne Stewart crash? No one can say for sure, but it seems there would have been a greater likelihood of the pilots regaining consciousness once the aircraft descended to a lower altitude. It is certainly a step in the right direction.

And by the way, once those good ol' boys understood "icing" and "offside" they quite enjoyed the hockey game. As did I... Leafs won 4-0!

**Q:** How does a hypoxia recognition system determine pilot incapacitation?

**Answer to previous question:**

Three primary tools used to perform visual inspections are:

- Magnifying glass
- Mirror
- Flashlight

GORDON WALKER entered the avionics industry after graduating from Centennial College in 1980. His career with Nordair, Air Canada, CP Air, PWA, and ultimately Canadian Airlines took him to many remote corners of Canada. Since leaving the flight line to pursue a career as a college professor, Walker has continued to involve himself in the aviation/avionics industry by serving on several CARAC committees concerned with the training and licensing of AMEs. As well, he has been nominated to the CAMC Board of Directors, and has been elected President of the National Training Association (NTA). ■

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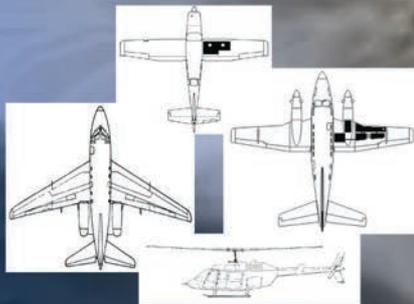
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# Flight of the Catbird

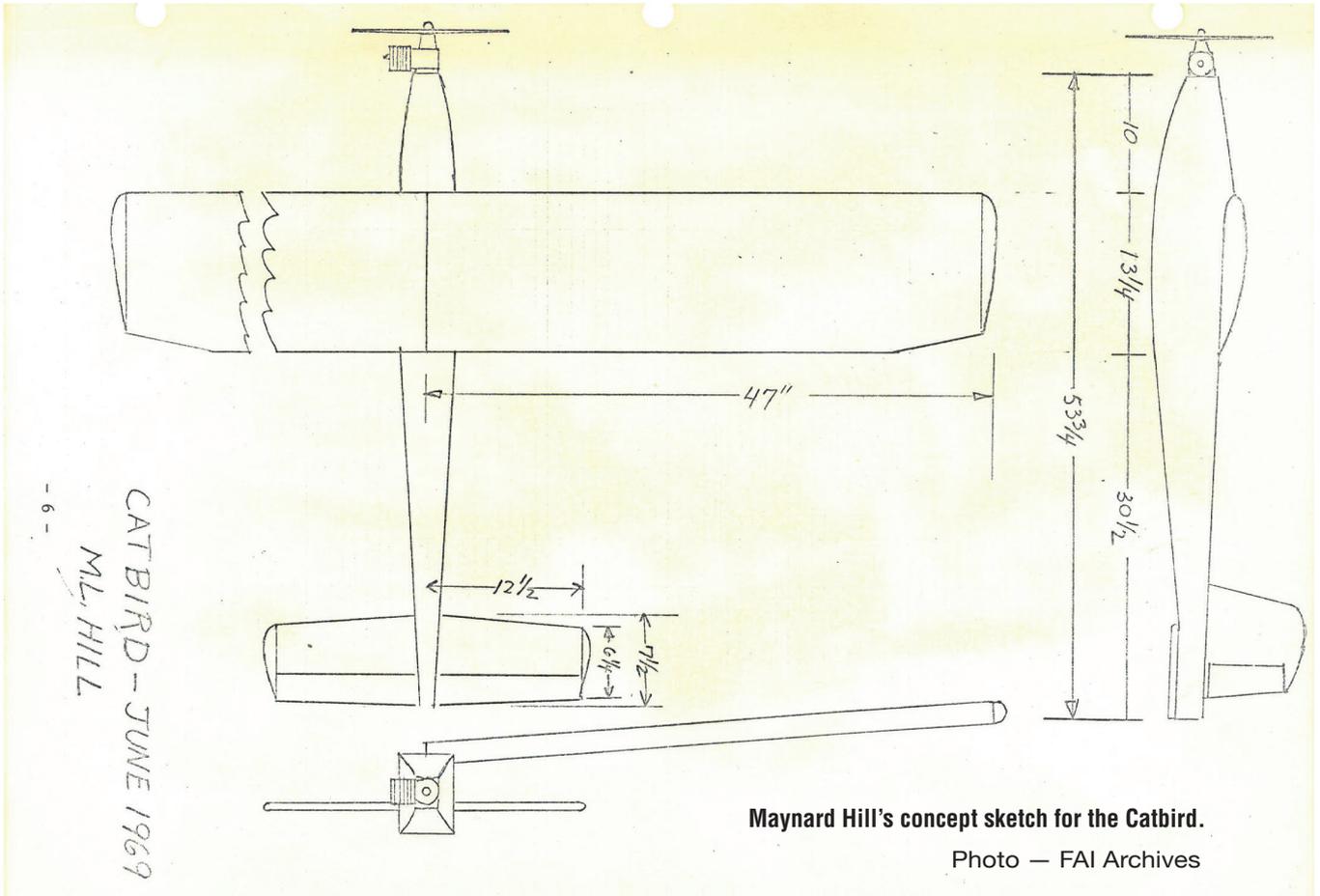


**Drones and RC aircraft are often in the news these days — not in a good way though. Perhaps now is the right time to take a break from all that (and from your more serious AME labours) to remember the stratospheric flight of a remarkable model aircraft and the man they called the “Lindbergh of Model Planes.”**

**R**emarkable times produce remarkable people, so it's been said. In the radio control flight aeroplane community few names are more exalted than Maynard Luther Hill, the American metallurgist who in 1970 set a Fédération Aéronautique Internationale (World Air Sports Federation) world record in “gain in altitude” for Aeromodelling and Spacemodelling (Class F) that has not been broken since. Hill's “Catbird” launched at 5:24 p.m. on September 6 of that year from the former Naval Weapons Laboratory Airfield in Dahlgren, Virginia and soared to an astounding 26,920 feet

(8,205 metres) during a near perfect 63-minute flight. This is what happened on that day.

The Catbird rose on its own power from hand launch. Approximately 43 minutes were spent climbing and 20 minutes in diving back to the ground. According to Hill's gripping documentary of the flight, no complications in maintaining a stable flight showed up. In previous record flights control problems were encountered due to weak radio signals at the long range or too cold temperatures. This time, a special optical tracking unit was used by the pilot to view his aircraft



Maynard Hill's concept sketch for the Catbird.

Photo — FAI Archives

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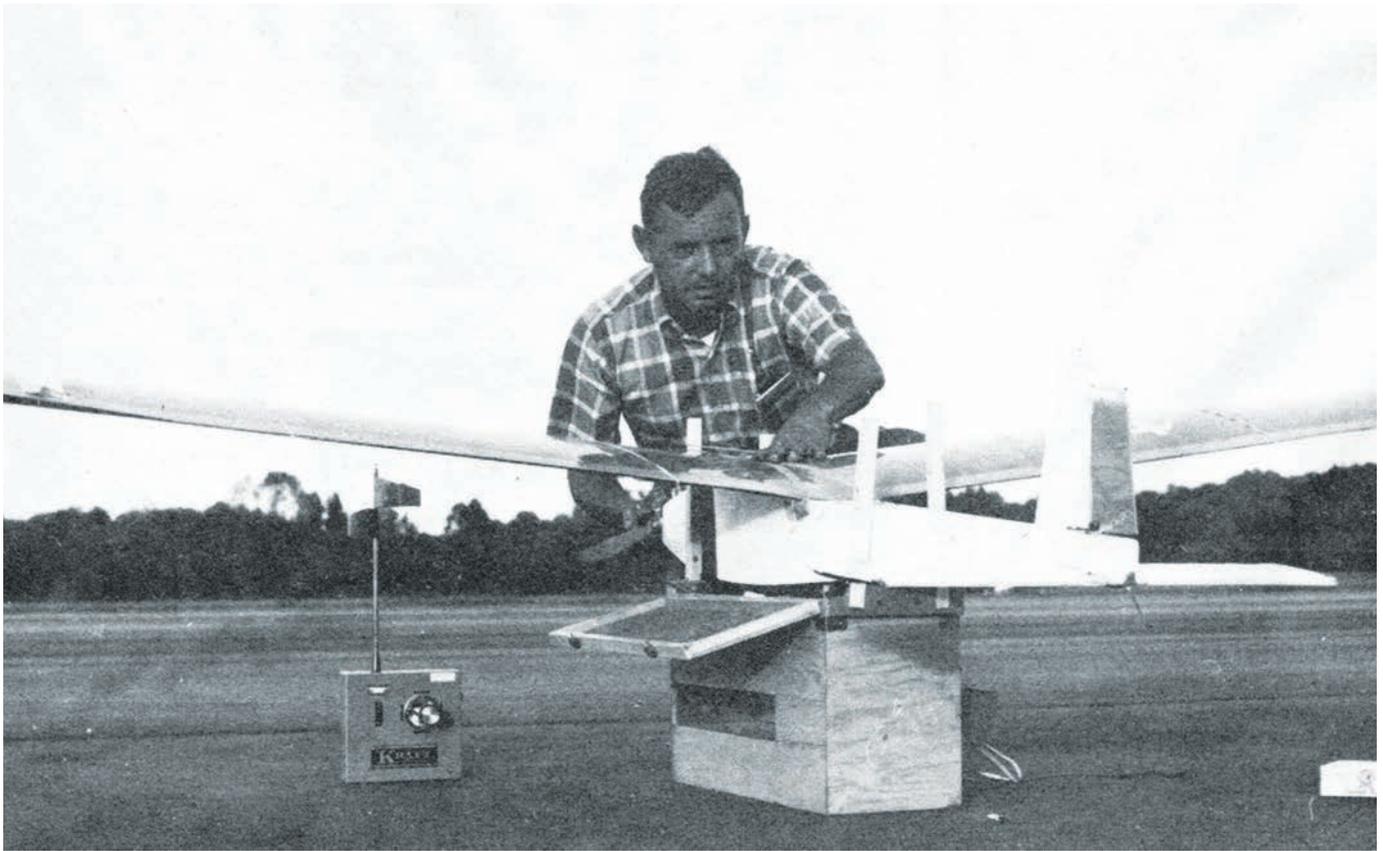
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Above: Maynard Hill

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at altitude and electrically controlled by the observer for one hour. Evaluations of the range radar and elevations were taken every 30 seconds throughout the flight to track the exact position of the model.

According to Hill's report, if the model had been lost a rather complex process would have ensued. "The big trouble with this procedure is that 99 times out of 100, the airplane has moved to a new point in the sky that's outside the field of view of the optics," he said at the time.

"So, no airplane is found. It is literally like looking for a needle in the haystack." If the model were upwind there would have been only five to six minutes to reposition it, otherwise the radar would have reported that it had reached the boundaries. Safety rules demand full down elevator, putting it into a vertical dive and locking it to track it down to the ground. According to Hill's report, he had already dumped several model aircrafts on previous attempts and collected their pieces.

On this attempt the model aircraft landed at a distance of 32 feet from the takeoff point. "I can honestly say that when my airplane was 27,000 feet high, I didn't feel very good," Hill later wrote about the flight as he pushed Catbird into the -35F sky. "I had a cramp in my ribcage muscles, I needed to go to the bathroom, my heart was pumping heavily, my nose itched, my eyes hurt, my adrenaline was overflowing..."

In order to claim the world record the model aircraft had to be landed 1,600 feet (500 metres) from where it had been launched. For Hill, it was mission accomplished, but the flight was not perfect. The model landed with no fuel remaining



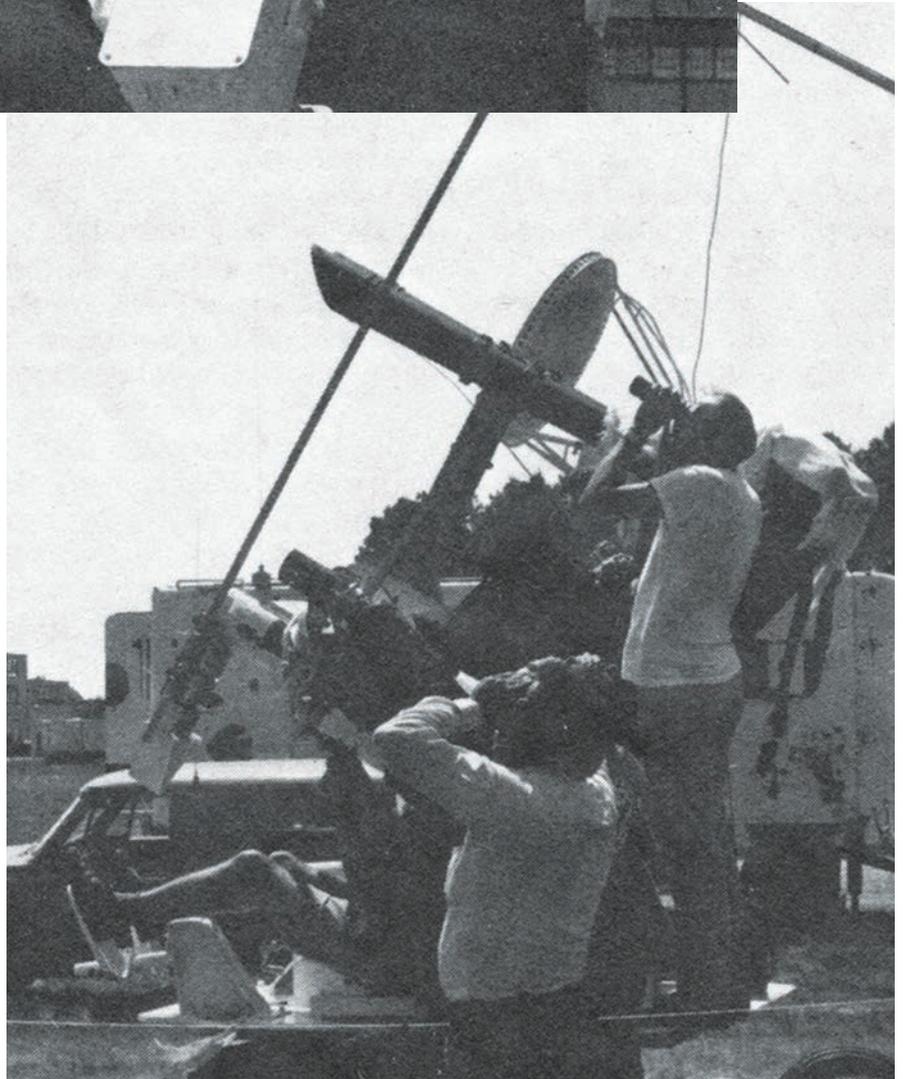
**Above and right: tracking the Catbird.**

Photos — Flying Models Magazine

as the tank had only been filled to the three-quarter mark for the flight.

In the “Description of the Flight” in the 45-year-old Record Claim it was mentioned that the fuel air mixture setting at takeoff was not optimum, so a slow climb rate resulted. Additionally, Hill screwed the needle valve too lean. It was estimated that a flight up to 30,000 feet (9,150 metres) would have been possible if not for these errors in judgment by the pilot, yet it seems he had no regrets.

“I think I’ve had a million pleasures and excitements from my hobby, but somehow, none is greater than a successful flight up through those long tubes to a place where nobody else has ever put an R/C model,” said Hill. On the following day, two other attempts to reach 30,000 feet were made but poor visibility halted these attempts at about 21,000 and 23,000 feet, respectively.





**Maynard Hill launching The Spirit of Butts Farm on its fateful flight across the Atlantic. Loretta J. Foster photo**

Maynard Luther Hill was born into the Golden Age of Aviation on February 21, 1926, in the coal-mining town of Lehigh-ton, Pennsylvania. In his autobiography, he numbered Charles Lindbergh and Amelia Earhart among his childhood idols, but was always more fascinated by miniature aircrafts than their full-sized equivalents. “By age nine,” he writes, “I had acquired a fairly serious addiction to balsa wood and glue.”

In 1943, he joined the US Navy and during the Second World War served in Panama. After the war ended Hill took two degrees in Metallurgy at Pennsylvania State University and served as a program manager for remotely piloted vehicle remaining in this field for most of his career. He became a pioneer in developing unmanned aerial vehicles (drones) for the US military.

“Maynard’s achievements in aeromodelling are unique,” says Sandy Pimenoff, President of Honour and Alternate Delegate for Finland of the FAI Aeromodelling Commission. “He set an incredible number of Model Aircraft World records, topped by the unbelievable Atlantic crossing of his TAM model, a feat that created worldwide notice and admiration.”

The Spirit of Butts Farm (also known as TAM 5) was the

first model aircraft to cross the Atlantic Ocean. The aircraft was launched August 11, 2003 by a Hill-led team from Cape Spear, Newfoundland and Labrador, and landed at Mannin Beach near Clifden, Ireland 38.9 hours later. It was recognized by the FAI as a double world record flight for its duration of 38h 52 min 19 sec and straight-line distance of 1,881.6 miles (3,028.1 kilometres) using an autopilot and telemetry system to track the flight’s progress.

Beginning in the 1960s, Hill set 25 world records for speed, duration and altitude, and invented a method of stabilizing aircraft through the use of the electrostatic field that exists in the atmosphere. He served for years in the FAI International Aeromodelling Commission (CIAM): as Chairman of the RC Subcommittee, as organizer of courses for International Judges, and as a never-failing source of information and technical expertise. Additionally, he was included into the Model Aviation Hall of Fame in 1977. Several of his planes, including the Spirit of Butts Farm, are on display at the National Model Aviation Museum in Indiana. Another plane is in the National Air and Space Museum’s collection. Maynard Hill died June 7, 2011 of cancer at the age of 85 years. ■

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# Communication

## Breakdown



**Last year, an AME conducting a maintenance ground run of a Beech aircraft across Calgary International Airport ended up in an awkward, potentially lethal situation. What happened on that shift?**

**O**n March 29, 2014, an Air Georgian Aircraft Maintenance Engineer was required to conduct a maintenance ground run following work on the engine of a Beech 1900D aircraft (C-GWGA). At approximately 0000, the AME requested permission to conduct a ground run from the Calgary Airport Authority (CAA) airport duty manager, as is required by local policy. The AME was given permission to conduct the ground run at the holding bay of Runway 29 within the next 30 minutes. This was the first time the AME had been directed to this location for a ground run. The AME and an apprentice completed preparations for the ground run, reviewed the Jeppesen airport diagram, and started the aircraft.

At 0020:39, the AME contacted the NAV CANADA Calgary International Airport (CYYC) tower controller on the ground frequency with a request to taxi to the holding bay of Runway 29. The controller was expecting the call, as the airport duty manager had advised the tower of the approved request. The controller cleared C-GWGA to taxi on Taxiway N and Runway 26 to hold short of Taxiway Y. The clearance was acknowledged and read back correctly. The AME did not turn on the transponder, and the controller assigned no transponder code.

Approximately one minute later, C-GWGA departed from its position in front of the Air Georgian hangar on Apron V. The controller was providing

air traffic services to arriving and departing aircraft when C-GWGA began to taxi. It was the controller's experience that maintenance personnel did not initiate taxiing as quickly as operational flight crews after receipt of instructions. Therefore, the controller did not expect C-GWGA to start taxiing so soon after being cleared.

C-GWGA exited Apron V at the north end and turned left on Taxiway M heading west. It then continued on Taxiway M to Taxiway Y, and then turned left heading south for Taxiway C. At 0022:12, the crew of a Boeing 737-700 (B737) called the tower controller for takeoff clearance on Runway 17R.

The controller visually scanned the runway from south to north and then confirmed the scan by looking at the airport surface detection equipment (ASDE) display from north to south. The controller noticed a primary target on Taxiway Y near the intersection with Taxiway M, but concluded it was a vehicle heading for the access road that passes south of the threshold of Runway 35L.

At 0022:22, the controller cleared the B737 for takeoff on Runway 17R. C-GWGA continued to taxi on Taxiway C, and at 0024:10, crossed the hold line at the threshold of Runway 35L as the B737 crossed overhead climbing through 500 feet above ground level (agl). C-GWGA continued on to Runway 35L, and at 0024:49, called on ground frequency informing the controller that C-GWGA was on Runway 35L.

The controller visually confirmed the aircraft was on the runway and immediately gave instructions to turn the aircraft around to clear the runway and to proceed on Taxiway C to hold short of Runway 26. C-GWGA was then taxied to the holding bay of Runway 29, the ground run was completed, and the aircraft returned to Apron V without further incident.

## Safety management systems

At the time of the occurrence, the AMO had an approved safety management system (SMS). The operator's SMS Manual sets out how it will comply with Transport Canada's requirement for an SMS. An internal company quality assurance (QA) audit conducted on December 18, 2013 found 62 individuals who had no current SMS training.

A TSB review of the training files of six AMEs at the Calgary base found that five of them did not have SMS training provided by Air Georgian at the time of the occurrence. Air Georgian SMS Manual Section 8.3(a) states:

"All other employees that have not undergone the training shall undergo a training program within the first 30 (thirty) days of employment. Whenever possible, this training should be completed as part of the initial hiring process."

## Aircraft maintenance training program and records

The Air Georgian aircraft maintenance training program is documented in the company Maintenance Policy Manual, in accordance with the applicable regulations. However, the training files of the six AMEs at the Calgary base contained inconsistencies in both format and data content. There was no standard format provided for the training records.

Only two AME files contained an Air Georgian computer-generated training status report. Both training status reports had numerous fields with missing data and overdue training courses.

The company's December 2013 QA audit found numerous examples of employees not having current training on human factors, the Maintenance Policy Manual, the SMS, and the Canadian Aviation Regulations (CARs). Of the six training files reviewed, the majority still did not have this training documented at the time of the occurrence.

## Aircraft Maintenance Engineer

The occurrence AME was certified and licensed in accordance with existing regulations. The AME had been licensed since February 2011. Eleven months of his experience was with Air Georgian holding the position of crew chief.

Records indicate that the AME maintained an Aircraft Certification Authority (ACA) for the following series of aircraft: C208, BE90 (King Air 200), BE02 (Beech 1900C/D) and DASH 8 100/200/300. The ACA documented that ground run and taxi authority had been granted for the Beech 1900 following training completed on May 7-8, 2013. The training is recorded on the Engine Run/Taxi Checklist and Authorization form. The form and the operator's Maintenance Policy Manual do not detail the exercises required or performed relating to engine run and taxi training.

Air Georgian does have a simulator program on taxiing designed for AMEs. This program is not required for the initial authorization to taxi aircraft but is expected to be completed within a year. The AME had not yet received or been scheduled for this component of the training after having been authorized to taxi aircraft for almost 11 months. The training given to the AME consisted of only basic procedures to start and maneuver the aircraft.

## Calgary International Airport

CYYC consists of three runways, numerous taxiways and eight aprons and is equipped with an ASDE (airport surface movement radar) that provides a real-time display in the tower of aircraft and other vehicle traffic operating on airport maneuvering areas.

The type of ASDE at CYYC, the NOVA 9000, is designed to run continually and requires minimal intervention from control staff. To enhance safety during poor visibility, the ASDE is configured with virtual stop bars which are located in the vicinity of the physical hold lines; these stop bars are only depicted on the ASDE display.

Aircrews and vehicle operators have no indication that ATS is using this feature. Virtual stop bars reduce the potential for runway incursions by sounding an alarm when a target enters (or crosses) a runway without the stop bar being disabled first. The tower controller is responsible for disabling stop bars for all aircraft or vehicles entering (or crossing) an active runway. Aircraft that have landed (or are on the runway) and exit will not trigger an alarm.



The AME had not received training related to taxiing . . . Consequently, the AME did not follow the intended taxi route even though he encountered numerous taxiway signs . . .

### **Multilateration system**

CYYC is one of three airports in Canada to have installed a multilateration (MLAT) system for surface surveillance. MLAT uses a network of ground sensors to receive signals from transponders. It calculates a vehicle or aircraft position by interrogating its transponder from multiple antennas. According to the Calgary Tower Unit Operations Manual, all aircraft are expected to keep their transponders on when maneuvering on aprons, taxiways and runways. Aircraft that have not previously received a transponder code from ATS are instructed to use transponder code 1000 in order to permit the civil registration to be displayed on ASDE if the aircraft is equipped with a mode S transponder. The AME was not aware of the requirement for transponder usage while taxiing. The controller did not assign a discrete code or instruct the AME to use transponder code 1000. It was the controller's experience that aircraft taxiied by maintenance personnel were not assigned transponder codes as consistently as aircraft on departing flights.

### **Aircraft Maintenance Engineer training**

The AME had not received training related to taxiing on the maneuvering area. Consequently, the AME did not follow the intended taxi route even though he encountered numerous taxiway signs, airport lighting and landmarks that indicated the aircraft was not where it should have been. The company training received by the AME was inadequate to prepare him for the complex nature of taxiing an aircraft around a large airport at night, and resulted in a runway incursion.

### **Airside vehicle operations at Calgary International Airport**

Prior to issuing a takeoff clearance to the B737, the controller conducted a scan of the ASDE display to confirm the runway was clear. When he saw a primary target heading south from the intersection of Taxiway Y and Taxiway C, he made the assumption that it was a vehicle. This determination was based on the controller's experience observing vehicles behaving similarly in the past. This assumption was further reinforced by the fact that controllers are used to seeing uncorrelated ASDE targets on the taxiways in CYYC generated by vehicles that are not in contact with ATS.

### **Airport surface detection equipment and virtual stop bars**

The ASDE installed at CYYC worked as designed. At the time of the occurrence, the controller's primary method of scanning was visual, which was appropriate given the weather and visibility. The controller used the ASDE as a tool to improve

visual observation of traffic on the maneuvering areas. The virtual stop bar feature was available but it was not used, as it was not required given the visibility. With the controller working alone, during the hours of darkness and with visibility of five statute miles in mist, this extra tool could have been useful. If the virtual stop bar feature on ASDE is not enabled, there is an increased risk that the controller will not be alerted to an unauthorized movement across the runway hold line.

### **Findings as to causes and contributing factors**

The company training received by the AME was inadequate to prepare him for the complex nature of taxiing an aircraft around a large airport at night, and resulted in a runway incursion. C-GWGA was not assigned a transponder code as prescribed in the Calgary Tower Unit Operations Manual. This resulted in the controller not having a clear picture of where the aircraft was taxiing and, therefore, being unable to intervene prior to the aircraft crossing the hold line.

Except for reduced/low visibility operations, the Calgary Airport Authority does not require positive control over vehicles operating on a taxiway. This resulted in the controller making an incorrect assumption that C-GWGA was a vehicle.

### **Safety action taken**

On April 14, 2014, the Calgary Airport Authority (CAA) issued a letter to all operators at the Calgary International Airport (CYYC) detailing changes to the Airside Traffic Directives. The letter stated, in part, that the CAA would no longer recognize an AME's licence as sufficient authorization to tow or taxi an aircraft on the YYC airfield.

All AMEs who tow or taxi aircraft must have an AVOP licence. In addition, the CAA has decided to equip all of its airside vehicles with transponders so they can be identified on the multilateration (MLAT) system with discrete codes.

### **Air Georgian Limited**

The company conducted an internal safety management system (SMS) investigation into the occurrence and produced an initial SMS report. The company investigation identified root causes and recommended short- and long-term corrective actions. As a result of this internal investigation by Air Georgian Limited, the company developed new policies and procedures along with a training program to support maintenance activities related to the taxiing of aircraft. As of January 2015, approximately 70 percent of the company's maintenance personnel had completed the training. Personnel have been restricted from taxiing aircraft until they have completed training. ■

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## College Kudos

A lifetime of involvement pays dividends that keep on coming.

**M**ost AMEs currently working in our industry started their careers by enrolling in a Transport Canada approved training facility. With over a dozen colleges offering this program across Canada, it has become the standard first step to a career in Aircraft Maintenance.

Back in 1974, my college of choice offering this program was Centennial College in Scarborough, Ontario. I was a local kid, having grown up not far from the Ashtonbee Campus, so it was a perfect solution to feed my latent mechanical and aviation hunger. I had worked for a year after high school to generate the necessary funds to fuel my post-secondary education. When the time came for enrollment however, I was torn between two different career paths. I also wanted to pursue a career in graphic art and apply to the Ontario College of Art.

As fate would have it, I applied to Centennial first and was told that the program was full. I immediately embarked on a desperate mission to get in on a cancellation, and luckily, after many phone calls, secured a spot in the fall semester. Interestingly, all thoughts of art school faded once I knew my future direction. In retrospect, I realize it was the right decision. It is much better to have a career as an Aircraft Maintenance Engineer with art as a hobby, than the other way around!

The amazing part of that decision to enroll at Centennial College is how it has evolved into a 40-year, lifelong relationship. I remember all too well how impressed I was with the quality of the instructors (now professors). I still have a copy of my original resume from 1975 that lists under “future aspirations” to return some day to teach at Centennial when my training and qualifications would allow.

My first job interview took place right in Centennial’s hangar when John Luty, owner of Nordair in Montreal, came to hire six new apprentices. I was over the moon when I was offered the job and set out on my first career adventure in a new city, living on my own for the first time. That first year went fast, working in the hangar in Dorval and spending time up in the Canadian Arctic. Being an apprentice was not easy and I began to miss the familiarity of life in Toronto. I decided to take a job at Dehavilland in Downsview and continued my apprenticeship there until I wrote my AME licence in 1978.

Soon after obtaining my AME credentials, I made the jump to Air Canada. During the tail end of my 10 years there, I began teaching part time back at Centennial College. Life had come full circle. I was still a local guy, but now instead of being a student, I was one of the teachers. I immediately loved the job. It was challenging in a different way from wrench-

ing on aircraft, but equally rewarding. For two years I worked days at Centennial and evening shift at Air Canada. Then the full-time job offer came and it was time to make a decision. It was a tough call. I still remember nervously walking across the aircraft tarmac to HR with my resignation letter in hand. Working for Air Canada was a dream job, and having 10 years seniority was not to be taken lightly. It was a job that many young AMEs would have given much to obtain.

Fortunately for me it was the right decision and I settled into my new life as a Professor of Aircraft Maintenance. It was a wonderful place to work. Just the absence of shift work alone made it heavenly. Add to that a dedicated group of fellow professors and a hangar full of airplanes to play with, and I felt truly blessed. The students were ever changing and always kept you young. They hung on every tidbit of information you could provide and to quote a Chinese proverb: “Always brought joy, if not in arrival, in departure!”

Centennial also had a great Professional Development Program, and encouraged teachers to increase their teaching skills and technical qualifications. I happily embraced it and took the opportunity to do endorsement courses on new aircraft, engines and soft skill training that greatly enhanced my teaching ability and knowledge base. Having additional free time also allowed me to get involved with the AME Association of Ontario. This not-for-profit organization has a mandate to “promote and mentor” AMEs across Ontario and does great work liaising with Transport Canada, colleges, and industry to provide vital feedback on the reality of maintaining aircraft in Canada. It is an association that I truly believe in and have been a member for almost 30 years. Happily, as of May of 2015, I am honoured to have become the president.

As a member of the Board of Directors of the AME Association, nothing gives me greater pleasure than to attend Centennial College’s award events and present our bursaries to deserving Aircraft Maintenance students. This, along with being involved with their Aviation Program Advisory committee, helps me maintain that personal bond that was started so very long ago.

I urge you all to get involved, and do something to give back to the college that gave you your start in aviation. Kudos to all the colleges for their superb efforts, but a special, personal acknowledgement goes out to Centennial College. Thanks for the memories and a lifetime of learning. *For more published writing by Sam Longo, please visit [www.samlongo.com](http://www.samlongo.com)* ■

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