

Clare Leavens Award • Joe Chase Award • Aviall High Achievement Award



AirMaintenance

The Magazine for Aircraft Maintenance Professionals

UPDATE



Transport Canada Approved for R/T

Drones

and the potential for
unmanned aircraft

Class of 2017

called to the Hall

The Morphing Wing

a new twist on wing design

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

December - January 2017

Volume 15/Issue 4

\$7.95

RAPCO,inc.



REPLACEMENT AIRCRAFT PARTS CO.

Rapco, Inc. can help you reduce maintenance costs...this is good for you and your customer. With the impact fuel prices have had on general aviation flying, and the resulting impact on maintenance facilities, everyone needs to find a way to decrease their operating costs, without sacrificing quality or safety. Rapco can help.

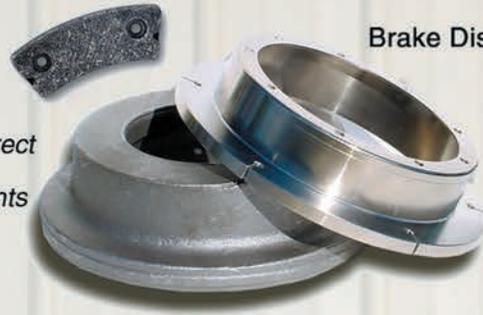
All Rapco parts are FAA-Approved, warranted better than the OEM, to save you and your customers money. Call now to see how we can help you - 1-800-527-2726

Vacuum Pumps



Easily check vane wear

Brake Discs



Over 80 direct brake disc replacements

Electroless Nickel plating

Regulator & Fittings



De-Ice Components



Visit: <http://www.rapcoinc.com/acappguides.html> for individual specific application guides for most popular aircraft

Request an e-card at www.rapcoinc.com

PARTS DEPARTMENT

RAPCO,inc.
REPLACEMENT AIRCRAFT PARTS CO.



1-800-527-2726

NO PLANE NO GAIN

RAPCO,inc.
REPLACEMENT AIRCRAFT PARTS CO.

www.rapcoinc.com

visit www.noplanenogain.org

The forest-powered flight of Alaska Airlines

First of its kind renewable biofuel made from residual wood

Fall cleanup usually means raking leaves and piling windfall for the burn barrel (if your municipal bylaws allow). And yes, it can be a hassle. But Alaska Airlines has a slightly different slant on the value of detritus. The Washington state-based company made history in November by sending out a commercial flight using jet fuel made from forest residuals—limbs and branches that remain after harvesting managed forests. The alternative jet fuel was produced through the efforts of the Washington State University-led Northwest Advanced Renewables Alliance (NARA). The demonstration flight departed Seattle-Tacoma International Airport on the morning of November 14th for Reagan National Airport in Washington, D.C. The flight was fueled with a 20 percent blend of sustainable aviation biofuel, which is chemically indistinguishable from regular jet A fuel.

While the 1,080 gallons of biofuel used on the flight had minimal impact to Alaska Airlines' overall greenhouse gas emissions, if the airline were able to replace 20 percent of its entire fuel supply at Sea-Tac Airport, it would reduce greenhouse gas emissions by about 142,000 metric tons of CO₂, the company reckons. This is equivalent to taking approximately 30,000 passenger vehicles off the road for one year.

NARA is a five-year project that launched in 2011 and is comprised of 32 member organizations from industry, academia and government laboratories. November's flight represents its efforts to develop alternative jet fuel derived from post-harvest forestry material that is often burned after timber harvest. The forest residual feedstock used to power Alaska Airlines Flight 4 was sourced from tribal lands and private forestry operations in the Pacific Northwest. In addition to producing the biofuel used for the flight, other key tasks of the project included evaluating the economic and environmental impacts associated with harvesting unused forest residuals for biofuel production. ■

Departments

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

Features

10



Drones . . . and the potential for unmanned aircraft 10

Class of 2017 Called to the Hall 20

The Morphing Wing A new twist on wing design 30

Hard Highway Landing Raising the Bar: Beechcraft A36 Bonanza C-GPDK, E-1728 34

AMU is viewable online: subscribe and download at www.amumagazine.com

AirMaintenance Update

Unit 7, 11771 Horseshoe Way
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
art director: Cliff Vickstrom
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

production manager: Chrissie Auclair
circulation: Anne Gervin

Corporate Member of:



contributors: Sam Longo, Gordon Walker

This publication neither endorses nor confirms the information contained within. The appropriate authorities should be contacted prior to commencing work on any aircraft or aircraft part or procedure.

Publications Mail Registration No. 0007198278

ISSN 1703-2318

Upcoming Events

Safety Summit moves to Dallas in 2017



The 13th annual CHC Safety & Quality Summit will take place in Dallas-Fort Worth, Texas from September 27-29, 2017. Each year, CHC's Safety & Quality Summit attracts representatives from across the aviation and oil & gas industries to share knowledge and best practices aimed at developing and maintaining a robust safety environment.

Since its inception in 2004, more than 7,000 delegates from over 25 countries have attended what has become one of the premier internationally recognized aviation safety events, dedicated to improving safety through excellence in human factors.

The 2017 event will build upon the success from last year's Summit, which had more than 600 delegates in attendance. For 2017, the Summit will address the theme: 'Can we truly manage all of the risk: what if the barriers are not as robust as we think?'

"We are excited about offering the event for the first time in the Dallas-Fort Worth metroplex, home to our global Operations Centre," said Duncan Trapp, vice president of safety and quality for CHC.

Following the opening speakers, the three-day event includes over 100 workshops on various industry topics delivered by experts from across the aviation safety and human factors world.

The 2017 summit will be held at the Gaylord Texan Resort Hotel & Convention Center. Information as well as a formal call for papers, will be made available in the near future. For information, visit www.chcqualitysummit.com.

UNITED STATES

MRO Latin America

January 25 – 26, 2017

Cancun, Mexico

www.mrolatinamerica.aviationweek.com

U.S. Sport Aviation Expo

January 25 – 28, 2017

Sebring, Florida

www.SportAviationExpo.com

Aero-Engines Americas

February 2 – 3, 2017

San Antonio, Texas

www.aeroenginesusa.com

HAI Heli-Expo

March 7 – 9, 2017

Dallas, Texas

www.heliexpo.rotor.org

Marvel of Flight

March 31 – April 1, 2017

Defuniak Springs, Florida

www.marvelofflight.com

MRO Americas

April 25 – 27, 2017

Orange County Convention Center

Orlando, Florida

www.mroamericas.aviationweek.com

If you have any upcoming events you'd like to see listed, contact AMU's editor, John Campbell, at: amu.editor@gmail.com

Advertisers Index

APS Brakes / Aero Incorporated	32	Concorde Battery	33	ProAero Engines Inc.	16
Aeroneuf Instruments Ltd	31	Eagle Fuel Cells Inc	14	Progressive Air	16
BKD Aerospace	5	Gregoarsh Aviation	44	Propworks Propeller Systems	21
Canadian Aero Accessories Ltd	43	Hartwig Aircraft Fuel Cell Repair	22	Rapco Inc	2
Canadian Propeller Ltd	13	JetBed	7	Schweiss Bi-fold Doors	17
Casp Aerospace Inc	17	MARSS	37	U.S. Air Tool Company	36
		NAASCO	15		

the Amazon stairclimber

the AUTOMATED lifting solution



- safe, dignified passenger transfer
- self-propelled: no lifting required
- versatile: used on commercial and corporate aircraft
- simple and easy to operate: training provided
- lifts 350 lbs. / 160 kg with the push of a button
- portable: use at base or take it with you

- compact and lightweight
- transports passengers quickly
- ensures fast and efficient turn times
- reduces risk of injury to staff and passengers
- unique, specialized design
- patented braking system



BKD Aerospace Industries Inc.

Call us for a quote or visit our website for more details.
Watch our online videos at www.bkdaerospace.com

Tel: (604) 247-2128
Fax: (604) 214-9825

info@bkdaerospace.com
Unit 7 — 11771 Horseshoe Way
Richmond BC V7A 4V4 Canada

STCs & new products

Lowes launches sockets with internal flexible grip

Lowes has launched a new socket wrench with the ability to grip the flats of a bolt head, and squeeze increasingly tighter as more torque is applied. Steel Grip Sockets are intended to remove rusted, damaged and rounded bolts and nuts. Steel Grip Sockets are also said to provide hands-free holding of bolts and nuts for removal in hard-to-reach places. The tool features an internal flexible grip member made of alloy steel. Steel Grip Sockets come with a lifetime warranty and are sold in both metric and SAE sets. **For more information visit www.lowes.com**



Five-blade carbon fibre Pilatus propeller from Hartzell

Hartzell Propeller has received an amended STC for installation of its newest five-blade composite swept tip prop on Finnoff Aviation P&W PT6A-67P engine upgrades for Pre-NG Pilatus PC-12s. The new technology five-blade propeller can replace the four-blade Hartzell aluminum propeller that is standard equipment on more than 780 legacy PC-12s. The 105-inch diameter, composite propeller is the same propeller that is also available as standard equipment for Pilatus's newest 2016 model PC-12 NG aircraft.



For information visit www.hartzellprop.com

Five-step fire containment kit isolates thermal runaways

The Evolution Hot-Stop 'L' fire containment kit is designed to contain a personal electronic device that reaches thermal runaway until it has burned out. The 25-by-25-inch zippered bag accommodates devices with lithium-ion batteries including laptops, defibrillators, tablets, cell phones, portable chargers, battery packs and more. The five-step kit carries burn certification #60-322534 and is said to fulfill all FAA requirements for containing fire, sparks and flames with or without water. Operators using the kit are in compliance with FAA SAFO recommendations. The kit includes gloves. **For information visit www.globalparts.com**



Malabar introduces transportable heavy-load axle jacks

Malabar's 35- to 95-ton "fly-away" axle jacks are said to be readily air transportable with optional protective transport cases. Their designs include air operated and dual manual hand pumps (high and low pressure). Other features include extension screw and hand pump parts plated to resist corrosion, Skydrol-resistant paint and a one-year warranty.



For more information visit www.malabar.com

Insulated screwdrivers rated to 1,000 volts

The FELO line of insulated screwdrivers is said to be tested and certified to comply with all safety standards, including a working rating of 1,000 volts after safety testing of each tool at 10,000 volts. VDE tests are performed according to IEC60900, DIN 60900 and VDE 0860 specifications. Each tool is machined to German standards. **For more information visit www.bondhus.com**



Scissor shear designed for close work

Kett Tool Company's new P-2080 scissor shear features a straight-handled body design and variable speed motor that allows operators to control speeds from zero to 2,500 rpm. Requiring a 90-psi air source, Kett's scissor shear is 12.25 inches long and weighs four pounds. Its design is said to provide the versatility to work in close quarters while maintaining comfort and control.



For more information visit www.kett-tool.com

To announce your STC or new product, email a JPG photo and a product description to amu.editor@gmail.com or amumag2015@gmail.com

JetBed™

Easy to Carry • Easy to Stow • Ready to Go



"Thank you for finally providing a solution to a comfortable, restful sleep on a corporate jet ... back support is superb ... the quality of your bed is evident... a real winner."

Lusardi Construction Co.



The Comfortable Way to Fly

Easy to use, easy to stow!
Removable mattress, for easy cleaning. Meets or exceeds FAR-25-853a standards for flammability. JetBed™ weighs no more than 20lbs!

Available for:

Cessna CJ-1
Cessna CJ-2
Cessna CJ-3
Cessna XL & XLS
Cessna XLS-PL, XLS Plus
Cessna Encore & Ultra Encore
Citation X & Sovereign
Gulfstream G200
Gulfstream 550
Gulfstream G-IV
Gulfstream G-V
Challenger 300
Challenger 600 Series
Falcon 2000
Global Express
Learjet 45
Hawker 800
Falcon 50

"... a long flight was proof that JetBed was the right decision. Without hesitation, I would recommend JetBed to any operator seeking ease, reliability and quality ... Kudos to you and your Jet Bed staff for such a quality and innovative solution. You have surpassed all of my expectations ..."



JetBed™

"... a great addition to our cabin requirements ... deployment is extremely easy ... stores easily ... definitely a satisfied JetBed customer."

Qualcomm Flight Department



BKD

mobility products

Approved distributor

Tel: 604.247.2128 Fax: 604.214.9825

www.bkdaerospace.com

info@bkdaerospace.com

BKD Aerospace Industries Inc.

MAJOR INFRASTRUCTURE INVESTMENT PENDING FOR NAV-CAN



NAV CANADA has announced plans to increase the level of its capital expenditures by investing \$170 million in fiscal year 2017 — \$40 million more than its typical annual average. Much of the capital expenditure from now to 2019 will focus on key facilities, including area control centres, air traffic control towers and flight service stations. In addition to the expansion, refurbishment or replacement of these facilities, NAV CANADA will also continue to upgrade power systems and make important investments in air traffic management technology and new business systems. A significant amount will also be devoted to modernizing critical elements of the communications, navigation and surveillance infrastructure, including continued investment in space-based ADS-B, which is set to revolutionize global air traffic surveillance. NAV CANADA has invested over \$2 billion in new technology and facilities over the past two decades.

YYC OFFICIALLY OPENS NEW INTERNATIONAL TERMINAL



Calgary International Airport's new International Terminal officially opened for operations in late October, moving

all U.S. and International flight operations at YYC to the new terminal facility. The opening of the new terminal at YYC marks the completion of the largest single infrastructure program in the airport's history—the Airport Development Program.

“In 2014 we opened Canada's longest runway and today we welcome the world to the most advanced airport terminal in Canada,” said Garth Atkinson, President and CEO of the Calgary Airport Authority. “Our new International Terminal not only ensures YYC Calgary International Airport remains a major contributor to the economy of western Canada, it also represents a significant new contribution to Canada's transportation infrastructure overall.”

The new 186,000-square-metre (two million-square-foot) terminal adds 24 aircraft gates at YYC, and incorporates numerous technologies and processes designed to streamline the passenger experience throughout the airport. These include North America's first call-to-gate passenger boarding system, North America's first full CATSA Plus enhanced passenger screening system, enhanced U.S. and Canadian customs technology, a state of the art Crisbag tote-based baggage system and the YYC LINK, a custom-designed and Canadian-built passenger shuttle service that transports passengers between the domestic and international facilities.

PW617F1-E GRANTED TYPE CERTIFICATION FOR EMBRAER PHENOM

Pratt & Whitney Canada announced that its PW617F1-E engine has received type certification from Transport Canada for Embraer's new entry-level Phenom 100 EV launched during the EAA AirVenture Fly-In and Convention in July 2016. Specially designed for point-to-point travel in a new generation of entry-level jets, the PW600 engine family is reportedly built with half the parts of a conventional turbofan, and comes equipped with dual-channel full-authority digital engine control, which translates into

reduced pilot workload and engine monitoring with longer time on wing.



P&WC has delivered close to 2,300 PW600 turboprops worldwide. Out of those, some 700 engines have been delivered to Embraer to power their Phenom 100 jet. Embraer has been a key customer for P&WC since 1969.

BELL CELEBRATES THE ICONIC 'HUEY'



The name 'Huey' has become synonymous with the term helicopter since the day Bell rolled out the prototype XH-40 at its Fort Worth facility in Texas six decades ago. And now the original “Number 1” ship of that seminal line of prototypes, tail number 54459, has just completed a year-long restoration, funded by Bell Helicopter. The restoration was done to commemorate the aircraft's 60th anniversary, and was unveiled at a ceremony hosted by the U.S. Army Aviation Center of Excellence at Fort Rucker, Alabama on October 20, 2016, sixty years to the day from its first flight.

Following its first flight, the XH-40 would go through a series of modifications, and was ultimately contracted for inclusion in the U.S. Army inventory. At that point, it was officially designated as the Bell UH-1, the iconic 'Huey,' where it would then become the world's first mass-produced turbine powered helicopter.

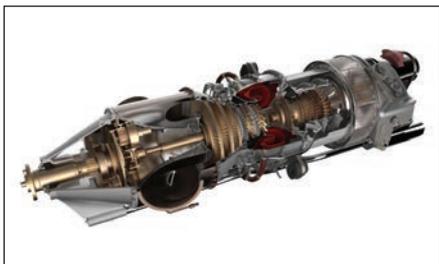
CH148 CYCLONE CONDUCTS ASW TESTS

A CH148 Cyclone helicopter from 12 Wing Shearwater recently conducted its first anti-submarine warfare events with the submarine HMCS Windsor off the coast of Nova Scotia. The exercise was linked to an ongoing Operational Test and Evaluation being conducted by the Helicopter Test and Evaluation Facility at 12 Wing. ASW is a component of underwater warfare that employs surface warships, aircraft and other submarines to find, track and deter, damage or destroy enemy submarines.



This was the first time a Cyclone has engaged in such activity, representing an important milestone in the evolution of this new aircraft, which provides wings for the fleet and state-of-the-art air power for the Royal Canadian Air Force.

NEW GE AVIATION ENGINE FEATURES 35 PERCENT PRINTED PARTS



General Electric recently completed testing a 35 percent-additive manufactured demonstrator engine designed to validate additive parts in its clean-sheet-design Advanced Turboprop (ATP), which will power the all-new Cessna Denali single-engine turboprop aircraft. Additive components reduce the ATP's weight by five percent while contributing a one percent improvement in specific fuel consumption.

Additive Manufacturing (often called '3D printing') refers to a process by which digital 3D design data is used to build up a component in layers by depositing material. An additive CT7-2E1 technology demonstrator engine, dubbed the "a-CT7," was designed, built and tested in 18 months, reducing more than 900 subtractive manufactured parts to 16 additive manufactured parts. The ATP engine architecture is derived from the CT7, allowing for part commonality between the two additive test programs.

The ATP will utilize more additive parts than any production engine in aviation history; 855 subtractive manufactured parts will be reduced to 12 additive parts. Additive components constitute 35 percent of the ATP's total part count. The 12 additive ATP parts include sumps, bearing housings, frames, exhaust case, combustor liner, heat exchangers and stationary flowpath components. By comparison, the CFM LEAP engine includes one additive part category, the fuel nozzle tip. The additive components for a-CT7 and ATP tests are built at GE Aviation's Additive Development Center (ADC) in Cincinnati, Ohio. GE expects to run its first full ATP engine test by the end of 2017.

WESTERN AERO REPAIR CERTIFIED AS A WOMAN BUSINESS ENTERPRISE



Denver, Colorado-based Western Aero Repair has been certified as a business owned and controlled by a woman by the National Women Business Owners Corporation, the first national certifier of women business enterprises. Over 700 public and private sector individuals participated in establishing the standards and procedures of this certifica-

tion review; the goal is to increase the ability of women business owners to compete for contracts at a national level.

"Certification provides a marketing opportunity for women business enterprises to participate in outreach programs," says Kim Balfanz, president of Western Aero Repair, Inc. "In addition, this program will enable us to develop relationships with larger companies and create opportunities for future partnerships with them and public and private companies."

FEDS ANNOUNCE AEROSPACE BOOST



Federal Minister of Innovation, Science and Economic Development, Navdeep Bains has announced an investment of up to \$54 million in a consortium of 15 Canadian companies and academic institutions that will develop cutting-edge electric and aerodynamic systems. The funding will be delivered under the Technology Demonstration Program, which supports collaborative research and projects that develop next-generation aerospace technology. Bombardier will lead the consortium; its partners are Rolls-Royce, Thales, Microturbo (Saf-ran), Liebherr, OPAL-RT, Quaternion Aerospace, FusiA, Axis, the University of Victoria, Ryerson University, the University of Toronto, McGill University, the National Research Council Canada, and Polytechnique Montréal.

"Canada's aerospace industry is an innovation leader, contributing 30 percent of Canadian manufacturing investments into R&D – \$1.9 billion in 2015 alone," said Jim Quick, president and CEO of the Aerospace Industries Association of Canada. "Thanks to the government's support, our industry will continue to lead the way in creating high-value, innovation-focused jobs that contribute to our reputation as a global aerospace leader." ■



Drones and the potential

Sky-high drone growth presents challenges and opportunities, but neither regulatory bodies such as the FAA or corporate giants like Boeing and Airbus are completely sure where this maverick technology is headed or what impact it will ultimately have on the aviation industry. Global Aerospace has authored a White Paper on the topic.



Above left: NASA and FAA officials convene to discuss drone traffic management.

Above right: The DJI Phantom is a popular example of the small, battery-powered quadrotors available for recreational use. Many of the commercially available small multirotor drones now come with features such as built-in cameras and internal GPS.

for unmanned aircraft

During 2016, much was written about the proliferation of drones and the potential for the utilization of unmanned aircraft across many diverse industries. Uses range from local, line-of-sight inspections to international cargo delivery. But on August 29, 2016, a moment the industry had been anxiously awaiting finally arrived: Part 107 of the Federal Aviation Regulations was enacted by Congress. By far the biggest change was the relaxation of rules around who could legally fly drones in the United States. Requirements for a pilot license were dropped. Instead, commercial drone operators must now hold a remote pilot airman certificate with a

small UAS rating or be under the direct supervision of a person who does. (An important fact: the direct supervisor must be able to immediately take control of the drone.)

New operators must pass an aeronautical knowledge test, be vetted by the Transportation Security Administration (TSA) and be at least 16 years old. For licensed pilots, the test is replaced by requirements to hold a Part 61 certificate and complete a short training course.

From an industry perspective, it's encouraging to see the appropriately rigorous nature of written tests for new operators. Certification for operators, while stopping short



Above: The Northern Research Institute in Norway employs an unmanned aerial system in its research focused on the arctic region.

 **Manitoba
Aviation Symposium
2017** 

Join us as we celebrate our 4th Annual Symposium 2017, featuring over 30 exhibits, networking events, educational sessions, guest speakers, banquet dinner, and AME Skills Competition.

The convention is an annual event planned jointly by the Central AME Association (CAMEA) and Manitoba Aviation Council (MAC). This convention is the largest event of its kind between Toronto and Calgary and brings together participants from North-western Ontario, Saskatchewan and Manitoba.

Register today at:
www.manitobaaviationcouncil.net
or
www.camea.ca

March 1 & 2, 2017
Victoria Inn
1800 Wellington Ave
Winnipeg, MB



Above: Drones can remove at least some risk from tricky operations.

of hands-on practical training and testing, is detailed enough to require some serious study and commitment. The pass rate at the end of October was 86 percent suggesting the FAA has set the bar at about the right level. Almost 9,000 people have passed the test.

For some in the industry, the operational restrictions in Part 107 remain too stringent. Restrictions of flights beyond visual line of sight (VLOS), night flights and flights over persons not directly participating in the operation are most frequently cited by those wishing to exploit the technology to its greatest extent.

Operations are now allowed in class G airspace without Air Traffic Control (ATC) permission. This change alleviates a heavy burden for operators who previously would have had to contact any helipad or

WESTERN CANADA'S FACTORY AUTHORIZED PROPELLER FACILITY





CANADIAN
PROPELLER
& AIRCRAFT COMPONENTS

Complete Maintenance Support & Sales:

- Metal & composite propellers
- Turbine & reciprocating governors
- NDT and on wing maintenance
- Experienced, factory trained with licensed, certified personnel
- EASA 145.7253





CONTACT US FOR INDUSTRY BEST PRICING ON NEW PROPS AND BLADES
 1-800-773-6853 | 24/7 & AOG Technical Support | canadianpropeller.com



Above: Ground crew members with American Aerospace Technologies Inc. prepare to launch the RS-16 Unmanned Aircraft System to patrol a Colonial Pipeline Company right-of-way during testing in rural Virginia.

FUEL CELLS

All Makes & Models - Piston - Turbine - Rotor - Jet

Quality and Safety.

New

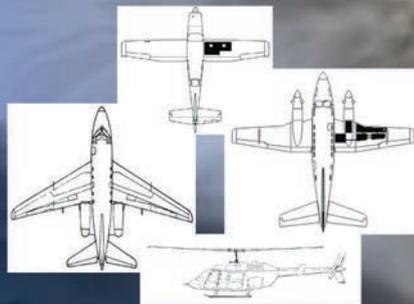
OEM & PMA Replacements
 5 year warranty
 Quality Installation Kits
 FAA Certified TSO & PMA Mfg

Factory Overhauls

Exchanges & Major Overhauls
 5 year warranty
 Over 40 years of experience
 FAA Certified Repair Station

Valves

Stainless steel drain valve kits



Technical Support / Sales
800-437-8732

Tel: 715-479-6149
 Fax: 715-479-6344

Online Catalog
www.eaglefuelcells.com

© 2014 Eagle Fuel Cells-ETC, Inc.

airport within five miles of their operation under their Section 333 authorization. Nevertheless, the burden is clearly on the drone operator to yield right of way and not to operate in a careless or reckless manner.

From a risk perspective, another significant item is the continued absence of any aircraft airworthiness certification requirement. Essentially, any manufacturer can sell a drone that can be operated legally without any regulatory oversight at all. This is one area where a considerable amount of diligence will be required of insurance carriers.

How do the new regulations affect insurability? Without insurance, many operators will be unable to perform the contracts on which they bid. And, without an insurable platform, their business is unsustainable. While we are not aware of any drones that currently fall into this category, it is possible that some units may develop a reputation for high failure rates over time. Effective initial certification could eliminate some of those potential issues.

Big hats, no cattle

If you follow some drone companies on social media, you may conclude they have impressive balance sheets, solid profit margins and expanding workforces. While we are seeing some companies deliver on all three items, for the most part many start-ups (and even established aviation and tech companies) are still trying to identify their niche, purpose and future. It's easy to see why.

The broad use-cases are plainly obvious. From reducing the risks associated with infrastructure inspections by taking people off ladders to optimizing warehouse efficiencies and many things in between, it doesn't take much imagination to see how drones can perform a myriad of beneficial tasks. Nevertheless, significant challenges exist with ongoing technology optimization, largely unproven cost benefits and the risks associated with being an early adopter in the space.

For companies with a few years' experience, the risk will almost certainly pay off. While the funding some start-ups have received is no guarantee of success, for the Fortune 500s the investment and risks are relatively low. Consider what companies like Intel, Google, Amazon and others are doing in this space to develop technologies for drones that will develop applications leading to driverless cars, precise infrastructure inspection and other robotic processes.

For the likes of Boeing and Airbus, the value proposition is different. They can foresee the time when unmanned flight is the present, not the future. At the very least, technology developed with unmanned operations in mind will contribute greatly to the efficiency and safety of traditional manned aviation.

Many big guns have already started acquiring or investing in start-ups. This trend is likely to continue, especially in an age where data is the new gold. Regardless of the role played in achieving the desired output, ultimately it is a data-driven market. For that reason, many hardware companies are pivoting to software or establishing separate units to handle



**Increase your starter generator reliability
with NAASCO's Mercury Mod™ upgrades**

Advanced cooling for greater reliability!

Mercury Mod Phase II

Approved for:
Agusta • Bell • Bombardier • Eurocopter
MD • Schweizer • Sikorsky

HAC

MEMBER NBAA

NAASCO

NAASCO NORTHEAST CORP.
FAA repair station # FD1R135K • EASA.145.4687
www.naasco.com

Scan QR

for more information

To learn more about our cost-saving repair and overhaul programs, contact NAASCO today!

that side of the business. Data is where the profit is going to be derived for all but the few manufacturers who end up with the dominant market share.

Another critical industry element that is starting to manifest itself is the clear need for more traditional aviation companies and pilots to enter the drone market. Aviators may not have the skills to become the best data collectors, much as data professionals may not make the best aviators. Drones are where these two worlds converge and the successful marriage of both skill sets may become the catalyst for those who best utilize the value of their product and succeed in the long run.

So what is the reality?

Global Aerospace has seen a continuous and accelerating need for drone insurance over the last three years. Year-over-year growth has been almost threefold. Some periods have seen nearly a doubling of applications from one month to the next. Only for a short period after the FAA fined Skypan \$1.9 million for illegal flights (October 2015) did we see a brief fall-off in the numbers.

Although they are truly the exceptions, some fleets of drones now number in the hundreds. We have witnessed some operators invest exclusively in a single platform, while others are hedging by testing a number of different systems. For the most part, a gap is developing between industries and the drones they use. The aerial photographer/ videographer can produce a great product from a system that sells for \$2,500 or less. For Hollywood quality, the investment will be

a great deal more than that as cameras alone can approach \$100,000. Start adding the latest Light Detection and Ranging (LIDAR) and multi-spectral payloads and the investment becomes significant, especially if the business intends to build a statewide or nationwide fleet.

Since early September 2016, we have again seen a surge in interest, prompted in part by Part 107. Not only did regulation help operators who might have been risking all by operating illegally, it also paved the way for insurers, investors and those wanting to adopt the technology into their own organizations. With the certainty and attainability Part 107 brings to the industry, we believe we will now see explosive growth from all areas eyeing the future of unmanned aviation.

Of course, not everyone sees the loosening of regulations as a positive development. Within a month of Part 107 becoming effective, we witnessed many operators cancelling their insurance, citing the loss of potential to make money in an increasingly cluttered field as the primary reason.

The rise in the need for insurance coverage for drones is also due to the developing requirement for insurance from companies hiring drone operators. The days of operating uninsured or with a General Liability policy that excludes aircraft operations are short lived; similarly, relying upon the Academy of Model Aeronautics, whose members' policy excludes commercial use, is no longer feasible.

Insurance is available for virtually all operators, equipment and uses. For those in need of a reliable insurance policy, simply find a professional insurance producer to get the process started. A quick web search will generate results.

PROGRESSIVE AIR

GROUP OF COMPANIES



**Lycoming & Continental
Piston Engine & Accessories:**



- Repair
- Overhaul
- NDT
- Airframe Services

1-800-667-0522

PROAEROAV.COM



**Global Distributor of
Certified Piston Engines & Parts**



















1-800-264-6019

PROGRESSIVEAIR.COM

What is the insurance market doing to keep up?

Insurance providers are adapting to the evolving environment in three ways:

- 1) by changing their products;
- 2) by updating the means of distributing and selling those products; and
- 3) by expanding the way in which customers can tailor insurance programs to their individual needs via on-demand products.

Insurance is available from a number of specialist aviation insurance providers. Some have developed specific policy forms to cover the particular needs of the drone market; others still rely upon amended aircraft policies. Some providers offer comprehensive coverage for physical damage to owned, leased or rented equipment and third party liability (covering damage to third party persons and property); others offer only liability insurance. It is now easier to obtain insurance for related risks such as invasion of privacy, malicious damage and hijacking. We anticipate that insurers will continue to expand their product offerings over time, specifically to meet the demand of tech-savvy millennials who dominate the customer base.

For example, a pay-as-you-go solution called Verifyly has hit the market. Verifyly is a smartphone app that allows users to purchase liability insurance in small time increments for a specific location. This may be the solution for up to an estimated 80 percent of uninsured commercial operators. Expect similar or complementary products to become available in due course.

Yet another significant development in drone insurance relates to ways in which operators purchase insurance to meet their specific needs. From one commercial contract to the next, operators may be using different equipment or may be required to carry different liability limits.

Combine that need with insurance coverage that responds accordingly, and you have a tool that charges premiums consistent with the specific needs of the user. Adoption will take time and investment but this type of system could revolutionize the way drone insurance is procured.



CASPA aerospace inc.
Since 1970

Aircraft Safety and Life Support Equipment

Repair • Overhaul • Exchange • Sales

Fire Protection



Oxygen Cylinder Assemblies



Crew Masks



Cartridges



Floor Covering



Securaplane Batteries, Camera and Security Systems



www.caspaerospace.com

98 Columbus Street, Pointe Claire, Quebec H9R 4K4
Tel: 514.630.7777 • Fax: 514.630.9999 • info@caspaerospace.com

Going big

Commercial drone use is developing quickly. The release of Part 107 has proven to be a significant milestone, allowing an entirely new group of operators to start flying. There are a number of lofty projections about the anticipated market value of the commercial drone industry by 2020 and beyond. While these are interesting — but debatable — observations, the doubling of insurance applications we have seen between July and September 2016, is real evidence that explosive growth is unlikely to be a fad. But what about the companies that want to use drones in a big way? Many companies may have a nationwide or even global need for the applications that drones permit. Is it better to go it alone and develop your own program or call in an established operator to perform the flights for you? Different companies are following both strategies successfully. We have seen companies go it alone, only to migrate to using external resources. Others are taking a blended approach. A great deal depends upon

New
One Piece
800-746-8273

DOORS



- AVIATION
- AG DOORS
- SHOP DOORS
- BARN DOORS

HYDRAULIC

"One-Piece" DOOR

OR

BIFOLD

STRAP LIFT and auto latch


...Lift Straps

Say YES... to Strap-Lift Doors

Say NO to Cable Lift

SCHWEISSDOORS.com



Above: Industry giants such as Lufthansa are open-minded about the potential of drones in the area of data collection.

the type of data required, the scale and complexity of the project and the level of investment needed. Other factors could include something as simple as the corporate culture of your organization or existing internal resource levels.

In many ways, complexity may be the most significant driving force. An analogy can be drawn with how construction companies tend to use outside experts for such jobs as scaffolding and crane services. Scaffolding is complex and highly specialized, while cranes are expensive and might only be useful for a small part of the project. Similarly, while the investment may not be as great, a farmer may decide that there is little point in owning specialized drone equipment used only for a limited part of the year.

One common tip, whether using internal or external services, is to choose the right tool or range of tools. Clearly multi-rotor is better for local jobs requiring precision and fixed wing for larger scale projects. There are many platform choices. What weight is the payload? Is endurance or heavy-lift capability more important?

The benefits of using an external provider include the

ability to easily measure results, scale faster with less up-front investment, experiment with different contractors and systems, and manage risk better (risk of drones not working for you, or risk of accidental damage or reputational damage). The downsides could include a contractor who may promise more than they are able to deliver.

Additionally, you might lose control of the mission or project. Maybe the right path forward is to find a blend between internal and external – start with smaller tasks and expand from there. Alternatively, you can operate the drones yourself while subcontracting the flight management, data analysis or cloud services to others.

A final word on the matter for now is to remind the aviation community that the drone industry is growing before our eyes in ways that will affect many of our lives and at a speed that will challenge our expectations. Developing a drone program will involve investment . . . and risk. ■

(Global Aerospace is a provider of aerospace insurance, with offices in London, Canada, and throughout the United States.)

Thinking of advertising in AirMaintenance Update?

Get the exposure you need for your
company or business.

Visit our website and download our
media kit to see our advertising rates
for AMU magazine and to advertise online.

www.amumagazine.com

CLASS OF 2017: Called to the Hall



Once again, Canada's Aviation Hall of Fame has identified a group of individuals (and one organization) worthy of special honours this coming summer.

Canada's Aviation Hall of Fame will induct four new members and recognize a Belt of Orion recipient at its 44th annual gala dinner and ceremony to be held June 15, 2017, at Vancouver International Airport. The new members are:

- James Erroll Boyd, WWI pilot and co-founder of the Air Scouts of Canada
- Robert John Deluce, founder of Porter Airlines
- Daniel A Sitnam, founder of Helijet Airways and Pacific Heliport Services
- Rogers Eben Smith, NASA/NRC test pilot and RCAF pilot
- The Royal Canadian Air Force 'Golden Hawks' aerobatic team, (Belt of Orion Award)

CAHF inductees are selected for their contributions to Canada's development through their integral roles in the nation's aviation history. This year's inductees will join the ranks of the 224 esteemed men and women inducted since the Hall's formation in 1973.

"The CAHF is proud to honour these four well-deserving individuals for their significant contributions to Canadian aviation, and to Canada's development as a nation," said Rod Sheridan, CAHF chairman of the board of directors. "Our 2017 inductees come from backgrounds that span the width of Canada's unique aviation industry. Aviation has brought Canadians together as a country, unlike any other form of transport. Our new inductees reflect that cohesion through their pioneering activities and spirit."

JAMES ERROL BOYD was an early entrant into the Royal Naval Air Service from the Canadian Infantry, flew anti-Zeppelin operations over the UK and coastal patrols from Dunkirk until being interned in the Netherlands. Postwar, he flew mail along the St. Lawrence and graduated to long distance over water, in record-setting flights to Bermuda and Haiti. His great claim to fame was his west to east trans-Atlantic flight in October 1930 in Bellanca WP-2 Columbia/Maple Leaf.



James Errol Boyd

It was the first crossing by a Canadian and completed in the hazardous autumn season, a feat not repeated until made necessary by the demands of war 10 years later. Boyd then put his fame to work to promote “air mindedness” in the Canadian public by sustained work through the Toronto Star and Star Weekly magazines.

He also co-founded the Air Scouts of Canada that laid the foundations for the Air Cadet organization. Upon the outbreak of war in 1939 he offered to serve again and became a central figure in the Clayton-Knight Committee whereby young Americans were recruited to join the RCAF prior to Pearl Harbor. His entire adult life was spent in furthering the cause of aviation on the North American continent. He died in 1960.

ROBERT JOHN DELUCE has been engaged in the aviation industry all of his life since he began working for his parents’ White River Air Services as a teenager in the 1960s. His subsequent career has taken him through a succession of positions in a host of Canadian aviation companies operating mainly in central Canada. Chief among them are norOntair, Austin Airways, Air Creebec, Air Manitoba, Air Alliance and Canada 3000.

In 2000, he began discussions which culminated in the launch of a new concept in regional air travel from the then Toronto Island Airport in October 2006 under the banner of Porter, using 20 new Bombardier Q400 aircraft and providing a “flying refined” experience at modest fares. Porter has grown to become a real power in the heavily travelled eastern Canada area and has expanded into US destinations. A former Minister of Transport credits Bob Deluce with saving the Island Airport, now named Billy Bishop Toronto City Airport, from ultimate failure.



Robert Deluce

DANIEL A. SITNAM has amassed an outstanding record as an entrepreneur in rotary flight operations in British Columbia and as one of the industry’s most progressive and admired company leaders. Thirteen years after a chance encounter had

PROPWORKS
PROPELLER SYSTEMS

Overhaul • Repair • Sales

Winnipeg 1-888-679-2965
Edmonton 1-888-457-1910

Avia • Dowty • Hartzell • Hamilton Standard
Hamilton Sundstrand • McCauley • MT Propeller
Sensenich • Governors • Non-Destructive Testing

FACTORY TRAINED TECHNICIANS - EASA APPROVED
AMO #105-99

www.propworks.ca



Daniel Sitnam



Rogers Smith

**THE BEST PLACE
IN THE WORLD
TO TAKE A LEAK**



FUEL CELLS

QUOTES ON:
Cherokee Tanks
Fuel Cells & Metal Tanks
Repair, overhauled & new
Technical Information or
Free Fuel Grade Decals



MONARCH PREMIUM CAPS
Premium Stainless Steel
Umbrella Caps
for your
Cessna 177 through 210

www.hartwig-fuelcell.com info@hartwigfuelcell.com

HARTWIG
AIRCRAFT FUEL CELL REPAIR
Keeping aircraft in the air since 1952

US: 1-800-843-8033 **INTL: 1-204-668-3234**
CDN: 1-800-665-0236 **FAX: 1-204-339-3351**

led to his first experience with helicopters, he and business partner Alistair MacLennan launched Helijet Airways offering two-crew, twin-engine IFR harbour-to-harbour services between Vancouver and Victoria. Thirty years later he is still president and CEO of Helijet International and its subsidiary, Pacific Heliport Services.

In addition to guiding this company to success where many others failed, Danny Sitnam is legendary for his proactive mentoring and development of staff, especially female flight crew, and his insistence on core company values of safety, customer dedication, mutual respect and trust and professionalism. The Helicopter Association International and the BC Aviation Council have recognized his accomplishments.

ROGERS EBEN SMITH is one of the most renowned test pilots in the western world and has been recognized internationally as such by his peers for many years. He received his aeronautical degrees from the University of Toronto, following which he served as a fighter pilot in the RCAF.

A lack of test flying opportunities led him to the National Research Council's National Aeronautical Establishment where he was involved with automated stability trials on helicopters. Dual citizenship allowed him to accept an offer from NASA to join its test pilot program and then the Cornell Aeronautical Laboratory where he was heavily engaged in developing fly-by-wire systems.

A return to the NAE as Chief Test Pilot was followed by 18 years at NASA Ames from which he retired as Chief Pilot



Royal Canadian Air Force Golden Hawks

and Director of Flight Operations. His experimental test flying there has been characterized as being at the frontiers of knowledge. Known as one of the “Canadian mafia” among test pilots worldwide, he went on to work for SAAB, EADS and Dornier and to lead the Society of Experimental Test Pilots.

ROYAL CANADIAN AIR FORCE GOLDEN HAWKS

Belt of Orion Award for Excellence

The RCAF Golden Hawks aerobatic team was formed in March 1959 to celebrate the 50th anniversary of flight in Canada and the 35th anniversary of the Royal Canadian Air Force. It was the first official Canadian national aerobatic team and its mandate was to showcase RCAF capabilities to the Canadian public.

The Golden Hawks were to operate Canadair F-86 Sabre Mk 5 aircraft from RCAF Station Chatham and to exist for one year. From a standing start, the team under the leadership of S/L Fern Villeneuve (CAHF 2006 Inductee) developed a brilliant non-stop program featuring new formations and routines not previously used and had an extremely successful 1959 airshow season.

Though stood down at the end of the season, popular demand resulted in the team’s reinstatement and it embarked on an unparalleled record of success until it was disbanded in 1964 after 317 shows, a 100 percent serviceability rate and an estimated 15 million spectators. The legendary team became a symbol of the professionalism, skill and daring needed to

be a fighter pilot in the RCAF and its legacy lives on 50 years later in the form of names of sports teams, trophies, films and aircraft on display in the trademark metallic gold and red livery of the Golden Hawks Sabres. CAHF 2015 inductee Col (Ret’d) George Miller flew with the team in 1962-63. The contribution of the Golden Hawks to Canada’s aviation story was profound and well merits the award of the Belt of Orion. ■

Hall of Fame Dinner and Ticket info

The 2017 induction ceremonies and gala dinner will be held June 15, 2017, at Vancouver International Airport. For ticket information contact the Hall directly (780-312-2084) or visit www.cahf.ca

Canada’s Aviation Hall of Fame office is located at the Reynolds-Alberta Museum in Wetaskiwin, Alberta, south of Edmonton, Alberta, with the Hall’s displays in the museum’s hangar. The Hall was founded in 1973, and its inductees have come from all across Canada, having led extraordinary lives as military and civilian pilots, doctors, scientists, inventors, engineers, astronauts and administrators. The CAHF strives to increase the public’s understanding and interest in aviation history by making its displays, archives, records and artifacts accessible to current and future generations. The heroism and courage embodied in the Members of the Hall serves to kindle the spirit of adventure in Canada’s youth.



AME Association of Ontario

c/o Skyservice F.B.O. Inc., PO Box 160, Mississauga, Ontario L5P 1B1

tel: 1-905-673-5681 fax: 1-905-673-5681

email: association@ame-ont.com website: www.ame-ont.com



Ontario 2016 AME Conference

The annual Ontario AME Conference and Tradeshow was held on September 28-29 at the Hilton Meadowvale Resort and Conference Centre in Mississauga. This year's program is somewhat different, as it had two large plenary sessions for all to attend and eight breakout sessions. The theme was "The Future of the Profession" and several speakers made presentations showing exciting possibilities for the future. The Tradeshow area had over 50 exhibitors, some of whom were new this year. On Thursday we started off with the Annual General Meeting for the Association. This was followed by more training sessions. This year's training topics included: Conflict Resolutions; Mind or Maintenance; Transportation Safety Board of Canada; Advanced Power Solutions; "Frankenplanes Kill" -STC & Installer's responsibilities; Unleaded Avgas; Global Express Vision; Maximizing the life of your lead acid batteries; Continental Motors diesel engines; PT6A Hot sections; and a three-hour recurrent HF training session.

A big thank-you to the conference committee and volunteers that worked very hard to give us this wonderful training and networking opportunity. We were pleased to have the airline maintenance staff join our Conference this year to truly make this an event for all AMEs.

Association Annual General Meeting

Our Association's Annual General Meeting was held during the conference on Thursday, September 29, 2016 at 08:30 am. Over 50 members and observers were in attendance to receive the Board of Director's Annual Report and discuss the association's activities.

President Sam Longo welcomed everyone and introduced the directors and resource personnel. Our Treasurer Jasper Megelink presented the financial statements and we appointed Wilson Chartered Accountants as auditors for the next fiscal year.

President Longo then briefed the attendees about several association-training courses that are run throughout the year, and he pointed out that we provide scholarships to students at the various college aviation programs and we serve on the Program Advisory Committees of six Colleges. He brought our attention to the new improved web site, which is more stylish, easier to update and more secure. We also have a new promotional video.

We received the latest membership report, which showed 229 Full Members and a total membership of 449. Sam went on to explain some of the many activities and benefits of our association including: complimentary aviation magazine subscriptions; free admission to the Canadian Warplane Heritage Museum; discounts on purchases at Work Authority and Downsview Chrysler; reduced AME related insurance rates; membership in the discount cost program Perkopolis; and tool discounts from Gray Tools. Members are invited to comment about the many benefits that are available.

An invitation was made to all association members who wish to attend the monthly Board of Directors meetings and to assist in various association projects. The board's goals are to grow membership, educate, communicate and provide balanced finances with a disciplined budget.

Sam, along with VP Stephen Farnworth made a short presentation about the Canadian Federation of AME Associations (CFAMEA) and the upcoming CFAMEA AGM. They were looking forward to meeting the other regional association delegates with a proposition to make CFAMEA bigger and better.

Awards Dinner

We had a very well attended banquet and awards night on the Wednesday evening. This year's entertainment was comedian Gilson Lubin. Each year we present awards at our annual dinner. The 2016 awards were:

- Clare Leavens [contribution to the association] Award: Bart Debowski and Carolyne Mounsey
- Gordon B. Rayner [teacher/public servant] Award: Wade Culliton
- Robert McCombie [outstanding work] Award: Paul Hodgins
- Aviall High Achievement [for professional skill and leadership] Award: John Longo
- The Hall of Fame Award: Dave Snedden

Congratulations to all the award winners and a big thank-you to the organizers of this year's symposium!

— Submitted by Stephen Farnworth for the Board of Directors

ONTARIO

PACIFIC

Pacific AME Association



About Us

PAMEA is a non-profit association comprised of aircraft maintenance engineers, aircraft maintenance personnel and aviation industry

corporate members. PAMEA is an active member of the Canadian Federation of AME Associations (CFAMEA).

www.pamea.ca email: pamea@telus.net



SIIT puts emphasis on practical AME training

Last fall, the Canadian government gave \$2 million to the Saskatchewan Indian Institute of Technologies (SIIT) to expand the college's Aircraft Maintenance Engineering (AME) program. Aimed at First Nations/Metis students, but open to all qualified applicants, SIIT's AME program started in 2010 in response to the aerospace industry's urgent need for more AMEs. (This year's enrollment is evenly split between First Nations/Metis and non-First Nations/Metis students.)

"For the money, which is being applied to our state-of-the-art Saskatchewan Aviation Learning Centre (SALC) in Saskatoon, we are getting a working Cessna Citation to use for teaching our AME students, plus the necessary support equipment and hydraulic jacks," said Bill Wilkinson, SIIT's AME program head. "This will supplement the two Beechcraft Barons that we use for piston engine training, plus our operational Piper Cheyenne and Aeronca Champ; and the Bell UH-1H we use for our helicopter module."

Since it began five years ago, SIIT's AME program has graduated 23 AMEs. This is in line with the two-year program's emphasis on small classes and individualized instruction.

"We are working with all kinds of students; some of them are older and have been out of conventional classrooms for quite some time," said Wilkinson. "Our approach is to get all of our students up to speed and learning through a 50/50 mix of classroom and practical instruction, during two September-June terms that average 7.5 hours per weekday."

SIIT's AME program reflects the institute's larger focus on providing First Nations/Metis students with access to a wide range of trades training—not just in aviation, but also in business, construction, information technology, and practical nursing. SIIT has three campuses and seven career centres located across the province.

For first-year student Montana Lachance-Wapass, becoming a certified AME is in line with his goal to travel the world. "I want to see everything, and do hands-on work that earns a good income," he said. "Becoming an AME will make this possible." According to the Saskatchewan Aviation Council website, "As a licensed AME, you can expect to earn from between \$37,000 to \$67,000 per year, with an average being around \$55,000 per year. Along with a regular salary, most companies provide dental and health plans as well."

In getting his education at SIIT's SALC, Lachance-Wapass has chosen an AME school that is based in a purpose built-facility in Saskatoon. The SALC was constructed using \$4.6 million in funds provided by the provincial and federal governments, Boeing, Lockheed Martin, and Rockwell Collins. "Our industry partners have helped make this school possible," said Wilkinson. "Without their help, plus money from the province and the federal government, we wouldn't be here."

SIIT is certified as an Approved Training Organization by Transport Canada. AME graduates earn a SIIT Aircraft Maintenance Engineer Category M training diploma. This prepares them for AME apprenticeships in the private sector, and gives them each 18 months of credit towards the 48 months of industry experience they need to get AME licences.

"We start students from the ground up, starting with showing them what the tools are and how they are used," explained Wilkinson. "From here, we bring our students along in learning about airframes, aircraft systems, electricity, hydraulics, machinery, and wiring systems. By the time they are done, they know how to troubleshoot and repair a range of aircraft."

Today, SIIT AME grads are working throughout Saskatchewan and across Canada, including supporting aircraft for First Nations/Metis owners and operators. "Our students are getting the training and well-paying jobs they want, and the aviation industry is getting much-needed AMEs," said Wilkinson. "It is definitely a win-win."

Well-loved member passes

Andrews, William Joseph (Bill/Andy): passed away peacefully and went to be with the Lord on September 19, 2016 at the age of 81 years. Bill will be lovingly remembered and sadly missed by his wife Betty, children: Kenneth of Calgary, Alberta, Kevin (Sandy) of Penticton, BC, Keith of Kelowna, BC, Douglas (Bonnie) of Victoria, BC, and 11 grandchildren. His son, Bryan Terence, sadly predeceased Bill. His love of life and people, touched the lives of all who knew him, well loved for his humour, generous spirit, compassionate and thoughtful, never ending ability to fix things. A luncheon will be held at a later date for family and friends. Condolences may be sent to the family through www.providencefuneralhomes.com. (250-493-1774)

About our Association

The Western AME Association is one of five similar associations across Canada, and 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, under the auspices of the association, runs an annual symposium/workshop. This workshop is a two-day event that features speakers on a variety of related topics, as well as an industry tradeshow with over 50 booths from various companies, suppliers, manufacturers and other organizations. Attendance at this and our various other smaller workshops may be counted towards the recurrent training requirements required by Transport Canada.

www.wamea.com



Central AME Association



2017 CAMEA Outstanding AME Award nominations

Our association represents and serves the Aircraft Maintenance Engineers (AME's) of Manitoba. As part of this service we will publically recognize an outstanding AME at our annual symposium dinner. This award recognizes any AME or manager holding an AME license in Manitoba that has performed an extraordinary act of service or has shown leadership, dedicated technical service and has been active in nurturing and training other mechanics. We are asking that all AME's take the time to nominate someone you feel is worthy of the "CAMEA Outstanding AME Award."

Manitoba Aviation Symposium 2017

Wednesday, March 1 – Thursday, March 2, 2017
Victoria Inn, 1808 Wellington Avenue
Winnipeg, Manitoba

CAMEA Supports Manitoba Skills Competition

Gifts of recognition and support were given to the first, second, and third place winners of the Manitoba Skills Competition. Gift Certificates to Canadian Tire in the amounts of \$100 – \$50 and \$50 were given to the medal winners. Congrats to Tyson Griffiths (1st place), Bill Buchan (2nd place), and Matt Wilkie (3rd place).

About CAMEA

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 six similar associations across Canada who collectively supports the national body CFAMEA (Canadian Federation of Aircraft Maintenance Engineers Association). Our organization works with Transport Canada in the formulation of new rules and regulations and provides a collective viewpoint for all AMEs.

www.camea.ca

Canadian Federation of AME Associations



www.cfamea.com

CFAMEA /TCCA October Meeting (Excerpts)

In attendance at the October 17 meeting between Transport Canada and CFAMEA was:

- Transport Canada:
 - Jeff Phipps, Chief, Operational Airworthiness, Standards
 - Ryan Hennigar, Project Manager Maintenance Performance Standards
- CFAMEA Representatives:
 - Bob Rorison, President Pacific AME Association
 - Rod Fisher, President Western AME Association
 - Sam Longo, President Ontario AME Association
 - Uli Huber, President Atlantic AME Association
 - Owen Duffley, Treasurer Atlantic AME Association (Observer)
 - Steve Farnworth, VP Ontario AME Association (Observer)

Regulatory Development in action

• STD 571 Appendix G, ELT Maintenance. The current maintenance requirements for the 121.5 MHz (TSO-C91a) have been rewritten with Industry Input to include the 406 MHz ELT (TSO- C126). The NPA should come out soon and the amendment will be ready in con-

junction with the amended 406 ELT Equipage requirement outlined in STD 605.38

- IPB (internal Process Bulletin) on SFAR 41C addressing experience and skill. These certified aircraft have now been deemed to be equivalent to AWM 523 commuter category with regards to the experience and skill gained by AME's applicants. As such, applicants will qualify for M1 license only in the future. The IPB 2015-02 will be the guidelines used until an AC will clarify the subject, which currently allows applicants to obtain either an M1 or an M2 rating.
- General changes to STD 566 dealing with License; TC will follow the ICAO standards for information contained on the licence credential, which will in the future include nationality, date of birth, and TCCA is considering removing the photo requirement and extending the validity period to 10 years from the current 6 years.
- Internal Process Bulletin (IPB) stopped new approvals for AWM 563 (Distributors) in order to determine future requirements for this AWM standard. It is a particular problem with AMO's that distribute parts, components in addition to their ratings such as avionics AMO's that also distribute parts and equipment.
- Standard 571, Appendix H, - This is being worked on with a revised version for evaluation of undocumented aircraft parts.
- Standard 573, AMO Ratings, - the way ratings are currently issued requires some realignment and changes are coming

- CAR 573, PRM Requirements – This also requires some review and may allow more authority to the applicant to select the person and review his qualifications.

Items for TCCA submitted by CFAMEA Directors

CFAMEA: Access to the CARs by AMEs and others. Right now there is no direct access via TC Standards

TC – This is a Fed Government decision, CARs regulations found on Department of Justice website, Standards on Transport Canada website. Both are part of Canada.ca.

CFAMEA: concerns of NTA dismissal of CFAMEA from meetings.

TC – We don't have to allow NTA to our meetings so why should they allow us to theirs? Best way to deal with changes to regulatory requirements that affect both groups is to ensure the use of the CARAC process and Focus Groups where TCCA will oversee and administer future changes.

CFAMEA Issues re: Transport Canada its lack of accessibility to inspectors. Specific concerns have not been reported.

TC – Surveillance is our number one concern, so majority of manpower is focused there and this leaves less time for service. This along with a backlog of unfilled positions makes it hard to provide the same service.

CFAMEA: would like to know the number of AMEs in Canada and if the AME population is increasing or decreasing with the aging work force.

TC – handout on AME statistics given out, total 17,457. This info is available by contacting TC but does not appear on any website.

CFAMEA: Concerns by some Air Operator entities in Canada for the need of an alternative method for the issuance of type specific aircraft certification authority for aircraft out of production.

a) Many aircraft operating commercially in Canada have not been in production for many years and in some instances have been significantly modified over their lifespan.

b) The current methods of training are done in house through documentation and in house training because of major/minor alterations covered under specific supplemental type certificates, issued for individual aircraft.

c) It has become non-cost effective to provide blanket training through type courses provided by, as example, Flight Safety. This is largely due to the cost to air operators of sending staff for training on aircraft to which they may be the only operators of older aircraft types.

d) Most large air carriers have in place an approved safety management system, effective quality assurance, and control, specific for their operation and mission profiles.

e) Training of the AME by the schools is not parallel to the operator's aircraft type.

This has provided a pool of potential engineers with basic knowledge of theory of flight.

f) Older aircraft systems are not taught or even briefly touched on, as the schools are geared towards student employment in the major commercial air carriers.

Summation

Being as most large air carriers have geared their maintenance training through their safety systems and quality assurance programs; no need

exists for an employee to possess an M2 license issued by the federal government. It is recognized, however, that there is a need for basic aircraft general knowledge program, supplied through ATOs.

It is therefore recommended that sections:

- 402.02(03) requirements and issuance of AME license
- 571.10(11) maintenance release
- 573.06 training program

All other related Air Regulations to be amended to reflect no industry need for an M2 license issued by the minister for the certification of large aircraft over 12,500 lbs including helicopters. This would be pursuant that the air carrier proves an acceptable level of safety can be maintained.

Option two would be for the minister to invoke a global exemption for air carriers operating large and small aircraft to supply their own training and issuance certification for specific aircraft operating under a type certificate, and no longer in production.

TC – 571 allows for one-time approval for type courses to be conducted by an AMO provided it is just to their employees. This is a possibility for older aircraft where it is hard to find courses for. Also Airworthiness Notice AN-C004 Edition 7, 31 March 2005 allows for release of 1900, 1900C and 1900D without an endorsement course, as TCCA approved type training is required for transport category airplanes and turbine helicopters.

CFAMEA: Is the plan for SMS implementation for 702, 703, 704 and AMO's still being pursued or will the SMS remain a requirement for the CAR 705 related world only?

TC – For now, SMS will stay in the 705 world and there will likely be no new SMS requirements develop for other certificate holders in the near future. TCCA is currently reviewing ICAO SMS requirements for future implementation.

CFAMEA: UAV maintenance progress is CFAMEA on the advisory panel ref maintenance.

TC – For now the new UAV rules will maintain UAVs based on manufacturer recommendations. When rules are developed for larger UAV that have an Approved Type Design they will include new rules for maintenance and ICAs. These future requirements may be developed using CARAC and focus groups that would be chaired by TCCA and supported by stakeholders such as CFAMEA.

CFAMEA: If there is a curriculum review for AME license, will CFAMEA have a representation?

TC – At such time when the review takes place, there should be a Focus Group and CFAMEA should be part of that Group, together with NTA and other stakeholders

CFAMEA: Are the CAR's 566 going to be moved to an AC or similar for easier amendment?

TC – It looks like they will be staying in 566 for the foreseeable future.

CFAMEA: If TC is getting out of the examination business, will the CCAA, NTA and CFAMEA be part of the process?

TC – The winner of this international tender in about a year's time will have to provide equivalent service and standards as TC has now. Database of over 1,000 questions to be collected for automatically generating exams. This will allow exam completion from anywhere in the world from a controlled and secured place. It is unlikely that CFAMEA could win this contract on their own but may be able to partner with schools, etc. It was also highlighted that unless we are

truly National Organization, the chances of winning such a contract would be very difficult.

CFAMEA: Any new update on the MPM and MCM revisions not requiring prior TC Approval (PNR Pilot project review).

TC – The review is in its final stages and should be done by year’s end and roll out in New Year.

CFAMEA: SIs are kept out of public view; can they be made available to ALL and accessible via internet?

TC – The SIs are for internal use and will stay internal. However if a request for an SI is sent to TCCA they should be able to provide the request document. (CFAMEA brought up that you can’t ask for something you don’t know exists with no TC reply.)

CAMEA’S relationship with TCCA has been good although we have not had many issues to present them. TCCA attended our most recent symposium and also participated in a panel discussion with association members. TCCA is committed to maintain communication with the AME’s and has plans to attend AME conferences across Canada whenever possible. In particular, since CFAMEA is a national organisation with regional representation it is a good venue to “spread the word”. The future and purpose of the CFAMEA came under extensive discussion amongst association members during our AGM and it was agreed by all members that a review is necessary.

*Minutes submitted by Uli H. Huber
President Atlantic AME Association*

Atlantic AME Association



Upcoming Events

- ARAMC 2017 will be held in St. John’s, Newfoundland from April 26-28 at the Delta St. John’s, 120 New Gower Street.
- ARAMC 2018 will be held in Halifax, Nova Scotia from April 18-20 at the Delta St. John’s, 120 New Gower Street.
- ARAMC 2019 will be held in Moncton, New Brunswick from April 24-26 at the Delta St. John’s, 120 New Gower Street

Objectives and By-Laws of AME Association Atlantic

To provide a forum of AMEs elected by AMEs or AMEs voluntarily offering to serve on such a body, to act as a vehicle to represent the views and objectives of the AME Association (Atlantic) Inc. at any level required to preserve or alter as the case may deem necessary, the rights, privileges and legislation of AMEs as a whole.

www.atlanticame.ca

Central Ohio PAMA



November Meeting: FAA’s “Compliance Philosophy”

We moved the November meeting to the first to avoid conflict with the National Election. Our first winter gathering included dinner and a presentation from the Columbus FSDO Manager, Kevin Tyree and FAASite Program Manager, Mark Harden. The two inspectors collaborated to present attendees with the FAA’s current “Compliance Philosophy” concerning how compliance can be obtained at the lowest level, while maintaining transparency of safety data. The FAA has adopted a new strategy toward enforcement that utilizes and focuses on training and remedial training coupled with an examination of procedures. Statistics show that this approach has resulted in more favorable outcomes and the Administrator has fully adopted this approach going forward.

We wish to thank the local FAA FSDO management team for bringing this information to our group. Attendees who registered at

the FAASite Website will receive AMT credit for viewing the presentation.

October Meeting: MMS Aviation

Our first meeting of the fall featured Dwight Jarboe of MMS Aviation presenting an update on Missionary Maintenance Services. Dwight is stepping down as the head of MMS Aviation and you may see more about that announced transition soon. His wife has plans for his two-month sabbatical he’s taking, then it’s back to the MMS hangar floor to help out as needed. Dwight’s update started with the history of MMS which began in 1975 on a farm near the airport they now call home. In August of 1982, MMS started building their first hangar on Richard Dwoning Airport (I40) in Coshocton, Ohio and Dwight joined then in 1983. The first aircraft they worked on were fabric covered but that changed when the Heliocourier aircraft came along.

One hundred and sixty Christian Organizations currently use aircraft to provide transportation, food and health services around the world. Their mission is to help with the local needs and in the process also minister and spread their Christian message.

He shared some facts from a book and movie titled "End of the Spear" which tells the story of five missionaries that were killed in 1956 and the return 50 years later of Steve Saint, son of Nate Saint who was one of those killed. Dwight also spoke of the Samritan's Purse disaster relief organization who are one of the first responders to events like the recent hurricane in Haiti and the good work that they do.

MMS performs work on missionary aircraft, only charging for the parts used. Their staff is paid by fundraising by its personnel and churches who support their work. They worked primarily on fixed wing aircraft until two years ago when the first helicopter from Mercy Air in South Africa arrived for some of their care.

The availability of AVGAS in third world countries has caused some groups to disassemble and mothball their aircraft until some

satisfactory reliable diesel engine is found for replacement. MMS currently has nine apprentices in their program with three that have A&P certificates and are finishing up their training next year. Dwight extended an open invitation for interested people to come and visit them and their facility. We want to thank Dwight for his presentation and wish him, his wife and the MMS group well in their mission.

At the end of the meeting we presented him with a check to support their AMT apprentices who are working toward A&P certification and service in missionary aviation. We also opened the floor for nominations for the upcoming Board of Directors election at our November meeting. Steve Brown and current Board Members Gene Sprang, Earl Redmond, Jeff Gruber and Lowell Dowler were nominated and will appear on next month's ballot.

www.copama.org

PAMA Dallas – Fort Worth



About Us

The DFW Chapter of PAMA is a non-profit association dedicated to promoting professionalism and the recognition of the Aviation

Maintenance Technician through communication, education, representation and support, for continuous improvement in aviation safety.

email: curtislandrum@charter.net

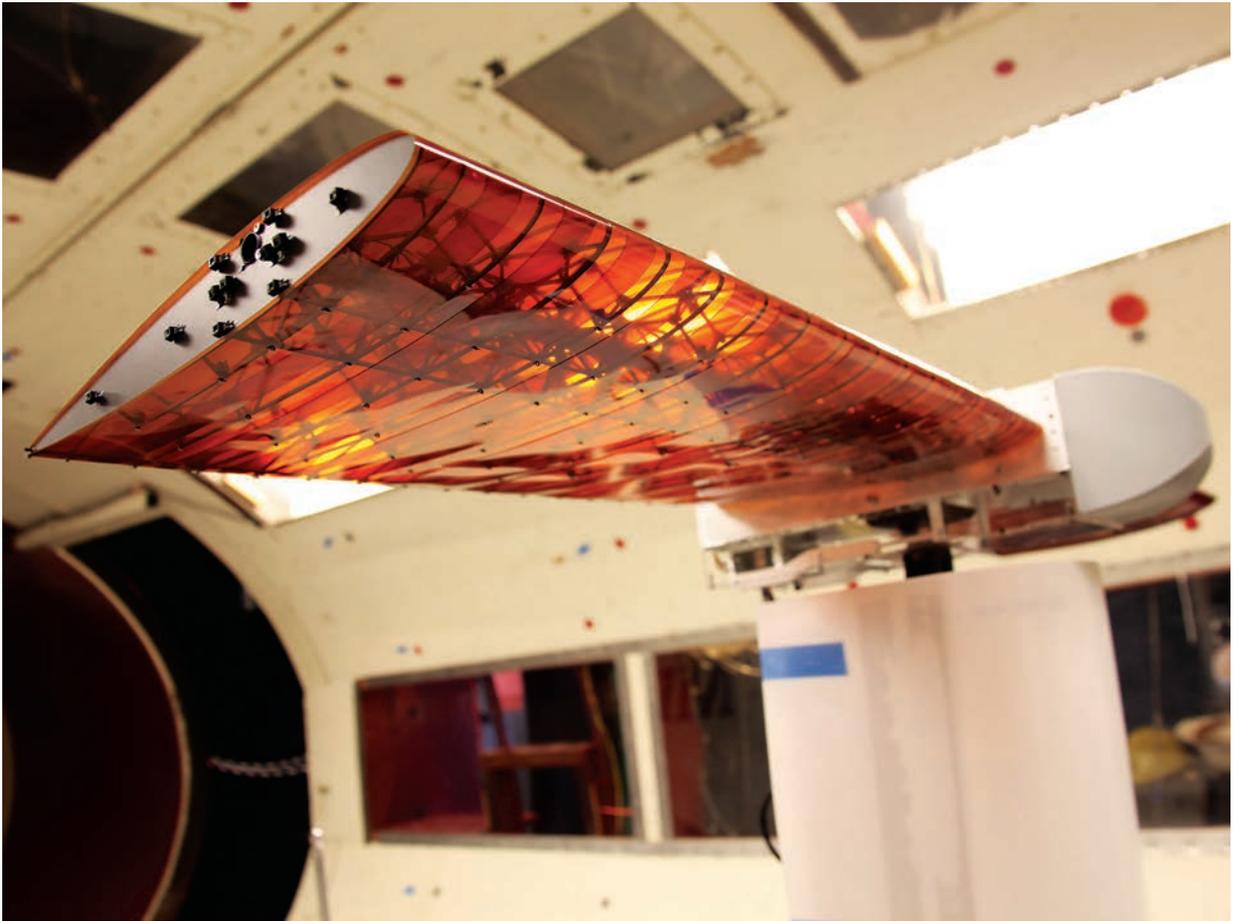
www.pamadfw.com

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

A new twist on wing design could mean more efficient manufacturing and flight.

The Morphing Wing



Above: The theory behind MIT's Morphing Wing project is that the whole shape of the wing can be changed and twisted uniformly along its length by activating two small motors that apply twisting pressure to each wingtip. (MIT photo)

When the Wright brothers accomplished their first powered flight more than a century ago, they controlled the motion of their Flyer 1 aircraft using wires and pulleys that bent and twisted the wood-and-canvas wings. This system was quite different from the separate, hinged flaps and ailerons that have performed those functions on most aircraft ever since.

But now, thanks to some high-tech wizardry developed by engineers at Massachusetts Institute of

Technology and NASA, some aircraft may be returning to their roots, with a new kind of bendable, “morphing” wing.

The new wing architecture — which could greatly simplify the manufacturing process and reduce fuel consumption by improving the wing’s aerodynamics, as well as improving its agility — is based on a system of tiny, lightweight subunits that could be assembled by a team of small specialized robots, and ultimately could be used to build the entire airframe.

A “skin” made of overlapping pieces that might resemble scales or feathers would cover the wing. The new concept is described in the journal *Soft Robotics*, in a paper by seven people: Neil Gershenfeld, director of MIT’s Center for Bits and Atoms (CBA); Benjamin Jenett, a CBA graduate student; Kenneth Cheung, a CBA alumnus and NASA research scientist; and four others.

Researchers have been trying for many years to achieve a reliable way of deforming wings as a substitute for the conventional, separate, moving surfaces, but all those efforts “have had little practical impact,” Gershenfeld says. The biggest problem was that most of these attempts relied on deforming the wing through the use of mechanical control structures within the wing, but these structures tended to be so heavy that they canceled out any efficiency advantages produced by the smoother aerodynamic surfaces. They also added complexity and reliability issues.

By contrast, Gershenfeld says, “We make the whole wing the mechanism. It’s not something we put into the wing.” In the team’s new approach, the whole shape of the wing can be changed, and twisted uniformly along its length, by activating two small motors that apply a twisting pressure to each wingtip.

This approach to the manufacture of aircraft, and potentially other technologies, is such a new idea that “I think we can say it is a philosophical revolution, opening the gate to disruptive innovation,” says Vincent Loubiere, a lead technologist for emerging technologies and concepts at Airbus, who was not directly involved in this research. He adds that, “the perspectives and fields this approach opens are thrilling.”

Like building with blocks

The basic principle behind the new concept is the use of an array of tiny, lightweight structural pieces, which Gershenfeld calls “digital materials,” that can be assembled into a virtually infinite variety of shapes, much like assembling a structure from Lego blocks. Simple miniature robots that would crawl along or inside the structure as it took shape could do the assembly, performed by hand for this initial experiment. The team has already developed prototypes of such robots.

The individual pieces are strong and stiff, but the exact choice of the dimensions and materials used for the pieces, and the geometry of how they are assembled, allow for a precise tuning of the flexibility of the final shape. For the initial test structure, the goal was to allow the wing to twist in a precise way that would substitute for the motion of separate structural pieces (such as the small ailerons at the trailing edges of conventional wings), while providing a single, smooth aerodynamic surface.

Building up a large and complex structure from an array of small, identical building blocks, which have an exceptional combination of strength, light weight, and flexibility, greatly simplifies the manufacturing process, Gershenfeld explains. While the construction of light composite wings for today’s aircraft requires large, specialized equipment for layering and hardening the material, the new modular structures could be



AERONEUF
INSTRUMENTS LTÉE/LTD

REPAIR - OVERHAUL - CERTIFICATION - SALES
RÉPARATION - RÉVISION - CERTIFICATION VENTE



Transport Canada AMO 27-91



EASA.145.7189

Since 1988
Depuis 1988





























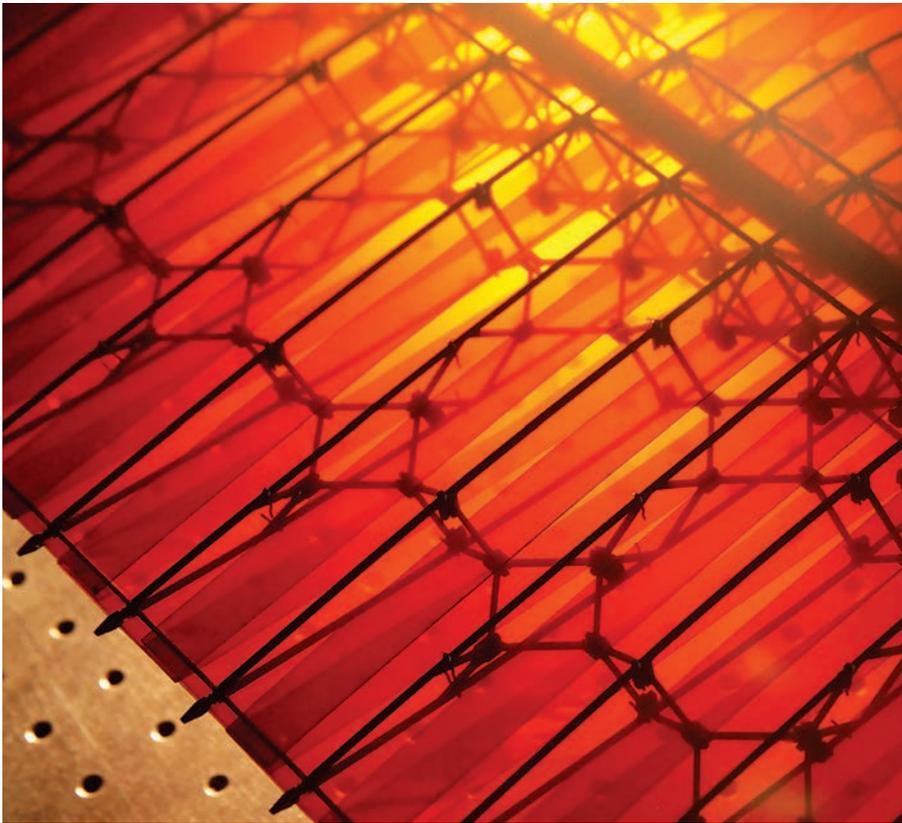
Now in Laval, located between Mirabel and Trudeau airports to better serve you !
Maintenant à Laval – Entre les aéroports Mirabel et Trudeau pour mieux vous servir !

Your solution for Avionics Maintenance

Votre solution en Maintenance d’Avioniques

Ground Equipment
Équipement au sol

600, 3^e Avenue, Laval, Québec, H7R 4J4
Tél: (514) 631-2173 Fax: (450) 627-2199
www.aeroneuf.com • info@aeroneuf.com



Above: Tiny structural pieces called Digital Materials can be assembled into a virtually infinite variety of shapes. MIT photo

rapidly manufactured in mass quantities and then assembled robotically in place.

Gershenfeld and his team have been pursuing this approach to building complex structures for years, with many potential applications for robotic devices of various kinds. For example, this method could lead to robotic arms and legs whose shapes could bend continuously along their entire length, rather than just having a fixed number of joints.

This research, says Cheung, “presents a general strategy for increasing the performance of highly compliant — that is, ‘soft’ — robots and mechanisms,” by replacing conventional flexible materials with new cellular materials “that are much lower weight, more tunable, and can be made to dissipate energy at much lower rates” while having equivalent stiffness.

Saving fuel, cutting emissions

While exploring possible applications of this nascent technology, Gershenfeld and his team consulted with NASA engineers and others seeking ways to improve the efficiency of aircraft manufacturing and flight. They learned that “the idea that you could continuously deform a wing shape to do pure lift and roll has been a holy grail in the field, for both efficiency and agility,” he says. Given the importance of fuel costs in both the economics of the airline industry and that sector’s contribution to greenhouse gas emissions, even small improvements in fuel efficiency could have a significant impact.

Wind-tunnel tests of this structure showed that it at least matches the aerodynamic properties of a conventional wing, at about one-tenth the weight.

The “skin” of the wing also enhances the structure’s performance. It’s made from overlapping strips of flexible material, layered somewhat like feathers or fish scales, allowing for the pieces to move across each other as the wing flexes, while still providing a smooth outer surface.

The modular structure also provides greater ease of both assembly and disassembly: One of this system’s big advantages, in principle, Gershenfeld says,

"BlackSteel"®
The
PROVEN ORIGINAL

Precision Tolerances

Proprietary Heat-Treatment

Sinusoidal Radius

HIGH PERFORMANCE STARTS WITH THE RIGHT PARTS

APS has designed a high quality brake disc that has established itself as the benchmark among aircraft brake discs. A true blend of strength and durability. CNC machined from a rigid one piece design these brakes are built to provide unparalleled performance. Heat treated to give it the "BlackSteel" appearance, with our "BlackSteel" name proudly engraved on the side; APS offers the ultimate in braking performance.

APS
aviation products systems, inc.

Find all of our available brake components at
WWW.APSBRAKES.COM

is that when it's no longer needed, the whole structure can be taken apart into its component parts, which can then be reassembled into something completely different. Similarly, repairs could be made by simply replacing an area of damaged subunits.

"An inspection robot could just find where the broken part is and replace it, and keep the aircraft 100 percent healthy at all times," says Jenett.

Following up on the successful wind tunnel tests, the team is now extending the work to tests of a flyable unpowered aircraft, and initial tests have shown great promise, Jenett says. "The first tests were done by a certified test pilot, and he found it so responsive that he decided to do some aerobatics."

Some of the first uses of the technology may be to make small, robotic aircraft — "super-efficient long-range drones," Gershenfeld says, that could be used in developing countries as a way of delivering medicines to remote areas.

"Ultralight, tunable, aeroelastic structures and flight controls open up whole new frontiers for flight," says Gonzalo Rey, chief technology officer for Moog Inc., a precision aircraft motion-controls company, who was not directly involved in this work, though he has collaborated with the team. "Digital materials and fabrication are a fundamentally new way to make things and enable the conventionally impossible. The digital morphing wing article demonstrates the ability to resolve in depth the engineering challenges necessary to apply the concept."

Rey adds that, "The broader potential in this concept extends directly to skyscrapers, bridges, and space structures, providing not only improved performance and survivability but also a more sustainable approach by achieving the same strength while using, and reusing, substantially less raw material."

And Loubiere, from Airbus, suggests that many other technologies could also benefit from this method, including wind turbines: "Simply enabling the assembly of the windmill blades on the spot, instead of using complex and fuel-consuming transport, would enhance greatly the cost and overall performance," he says. ■



Above: NASA successfully completed flight tests of a morphing wing technology. Flap angles were adjusted from -2 degrees up to 30 degrees during the six months of testing. NASA photo

WWW.CONCORDEBATTERY.COM

You asked We listened



RG-380E/40B
RG-380E/44
RG-380E/46



RG-390E
RG-390E/25

Two sturdy lifting straps have been added to the RG-380E and RG-390E Series batteries. Shipping now!

Thanks for choosing Concorde.

CONCORDE BATTERY CORPORATION
626-813-1234 | 1-800-757-0303

...the heart of your aircraft®
CONCORDE



Hard Highway landing



Photo: Osoyoos Times

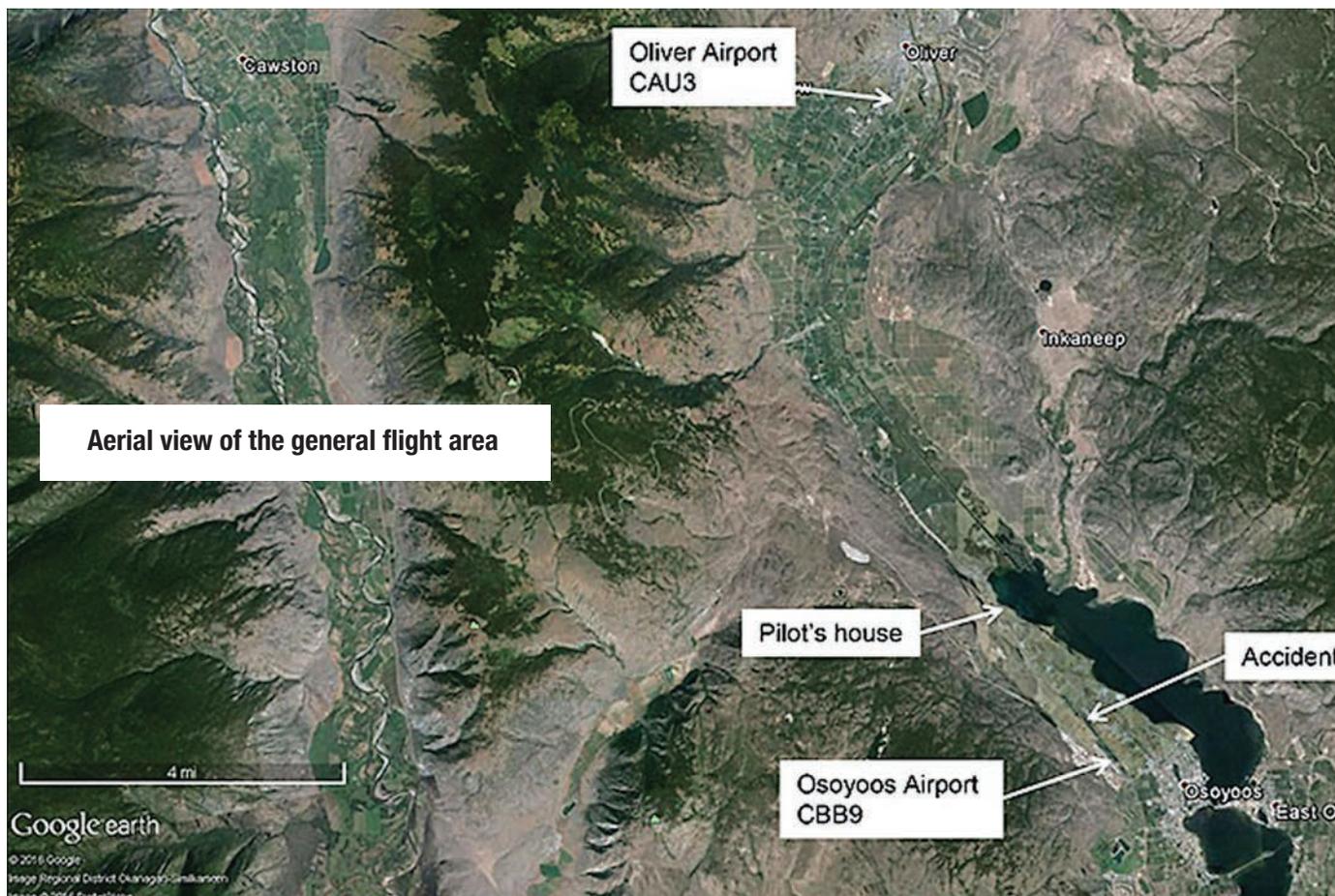
The wrong fuel leads to a bad outcome for a Beechcraft A36 in southern British Columbia.

On July 7, 2015, at approximately 1645 Pacific Daylight Time, a privately operated Beechcraft A36 Bonanza (registration C-GPDK, serial number E-1728) departed the Oliver Airport, British Columbia, with only the pilot on board for a flight to the Boundary Bay Airport, British Columbia. Approximately six minutes after takeoff, the aircraft suffered an engine power loss, and the pilot carried out a forced landing on Highway 97. The aircraft struck a truck and a power pole, and came to rest on the edge of the road. The pilot was able to egress, but sustained serious burns. A post-impact fire consumed most of the aircraft. The accident occurred 0.27 nautical miles northeast of the Osoyoos Airport, British Columbia, at a ground elevation of 1,035 feet above

sea level, during daylight hours. There was no signal transmitted from the emergency locator transmitter.

History of the flight

On 30 June 2015, the pilot had flown from the Boundary Bay Airport (CZBB) to the Oliver Airport (CAU3), British Columbia. During that flight, the pilot had noted engine anomalies, and had captured on his cellular phone video images of the instrument panel display showing fluctuations in engine fuel flow and engine revolutions per minute. The pilot sent the videos by text message to the aircraft maintenance engineer who had maintained the aircraft. The videos showed that the fuel flow had been fluctuating by



Aerial view of the general flight area

approximately 10 pounds per square inch, with a corresponding fluctuation in engine speed of 25 rpm. In an exchange with the pilot by text message, the AME suggested that the fuel flow and engine rpm fluctuations may have been caused by a dirty fuel nozzle or vapour lock from the use of automotive gasoline.

The flight continued to CAU3 without any appreciable power loss. While in Oliver, no maintenance was carried out to address the engine defects, and the aircraft remained in an outdoor parking area at CAU3 from June 30 until July 7, the day of the occurrence. During those eight days, the daily high temperature was 34 to 38C.

On July 7 at 1532, the pilot filed a visual flight rules flight plan with the Kamloops Flight Information Centre, with a planned altitude of 10,500 feet above sea level. The CAU3 fuel transaction log showed that the pilot made a fuel purchase of 57 litres of 100LL aviation fuel at 1608. The aircraft departed CAU3 at approximately 1640 in a southbound direction.

Minutes later, as the aircraft was climbing through 6,000 feet asl, the engine lost power. The pilot attempted to restart the engine three times, twice with the auxiliary pump on and once without the auxiliary pump. There was no change in engine power. Unable to reach Osoyoos Airport (CBB9) to carry out an emergency landing, the pilot attempted to land on Highway 97. The aircraft was southbound when the left wing struck a commercial semi-trailer truck. The driver of the truck was not injured, and there was minor damage on the left

rear of the trailer. The aircraft then collided with the road surface, and a fire erupted before the aircraft came to rest against a power pole beside the road. The Royal Canadian Mounted Police received notification of the accident at 1655.

Wreckage and accident site examination

Investigators examined the accident site and the aircraft wreckage in Osoyoos on July 8.

Impact damage on the highway surface indicated that the nose wheel of the aircraft made the first ground contact, approximately 275 feet after striking the semi-trailer. This evidence is consistent with the aircraft being in a steep nose-down attitude. Upon impact, the nose wheel, including a part of the shock strut fork, separated from the aircraft. The nose wheel was found approximately 100 feet north of the point where the aircraft came to a rest.

The separation of the nose wheel caused the propeller to strike the road surface, leaving three ground scars. These ground scars and the propeller damage are consistent with the aircraft's engine rotating at a slow speed on impact. The right wing-tip tank separated from the wing and was found on the west side of Highway 97, approximately 40 feet north of the wreckage. The aircraft struck the power pole at the most in-board portion of the leading edge of the left wing. The fire destroyed the forward two-thirds of the fuselage and most of the left wing. There was only minor fire damage to the right wing.

Due to the extent of fire damage, examination of the aircraft was limited, and focused on the engine and fuel system, including the wings and tip tanks. The right wing was damaged at the inboard point of attachment to the fuselage, but the area containing fuel was largely undamaged. The interior of the fuel tank was examined; however, there was no remaining fuel. Both tip tanks were empty, but emitted a strong odour of MOGAS. The fuel selector valve was found pointing to the right-hand tank,

and the fuel selector valve filter/screen did not contain contaminants. The engine was removed and examined at an engine overhaul facility. It was completely disassembled, and all parts were examined for pre-impact and pre-fire anomalies. There were no indications of engine problems or defects that could have led to a loss of engine power. It was not determined why the emergency locator transmitter (ELT) did not transmit an emergency signal.

The aircraft was manufactured in

1981, and purchased by the pilot in June 2010. Records indicate that the annual maintenance inspection had recently been completed, and the aircraft was certified, equipped, and maintained in accordance with existing regulations.

The aircraft was equipped with a Teledyne Continental Motors model IO-520-BB fuel injected, direct-drive, air-cooled, horizontally opposed six-cylinder engine. In April 1997, the engine was overhauled in preparation for the addition of a supplemental type certificate turbocharging system.

Approximately one month (37 hours of flight time) later, a Tornado Alley Inc. turbonormalizing and GAMI fuel injection system was installed. This type of system maintains the original Beechcraft fuel requirement. It does not increase the overall power output of the engine; rather, it is used to maintain sea level manifold pressure (roughly 30 inches of mercury) at higher altitudes. By eliminating the progressive horsepower reduction that occurs with normally aspirated engines as the aircraft climbs, the turbo normalizing system reduces the time required to climb to a specific altitude.

The aircraft was designed for operation on grade 100LL (blue) or 100 (green) AVGAS. The airframe fuel system consists of the following components: four fuel tanks, a fuel quantity indicating system, an auxiliary fuel pump, a fuel tank selector (with integrated fuel strainer and drain), and the associated fuel lines to the engine compartment.

The fuel tanks consist of a rubber fuel cell and a sump located on the underside of each wing. The auxiliary fuel pump is electric and is located between the fuel selector valve and the engine-driven injector pump. The pump is controlled by an on/off switch, and provides pressure for starting and emergencies. The pump can purge the system of vapour caused by extremely high ambient temperature and reduce the chance of the fuel vaporizing. It can also provide pressure to the engine should the engine-driven injector pump fail. The engine fuel distribution system was removed in 2011, about 76 flight hours prior to the accident, for troubleshooting. It was tested, and no anomalies were found.

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

13-1529 'Pancake' Air Drill

NY **USATCO** CA
U.S. Air Tool Co.

Serving the aerospace & metal working industries since 1951!

Toll Free US & Canada: 800-645-8180 www.USATCO.com

USATCO U.S. Air Tool Company, Inc.
 Ronkonkoma, NY tel: 631-471-3300 fax: 631-471-3308
 Rancho Dominguez, CA tel: 310-632-5400 fax: 310-632-3900

Pilot

Records indicate that the pilot held a private pilot licence for aeroplanes, validated with a current medical certificate. He had been licensed since April 1997 and had accumulated approximately 490 hours of flying time. His previous aircraft had been a 1974 Cessna 182P Skylane, which he owned and flew from April 2001 to July 2011. In the previous year, he had flown 12 hours in the Beech A36, and had made the same trip from Boundary Bay, where he stored his aircraft, to CAU3 and return numerous times.

Fuel

The investigation determined that the pilot/owner had been using MOGAS, and there was a strong odour of MOGAS in the tip tanks. However, the last record of fuel for the aircraft was at CAU3, where there is a self-service 100LL AVGAS distribution system. Records showed that that fuel had been certified for fuel density and that clear and bright tests were completed. There were no reported issues with the CAU3 fuel. The Transport Canada publication Aeronautical Information Manual is introduced to aviators during initial flight training and provides guidance on the use of MOGAS. AIM section 1.3.1 Fuel Grades states “The use of aviation fuel other than specified is contrary to a condition of the Certificate of Airworthiness and, therefore, a contravention of regulations. A

fuel which does not meet the specifications recommended for the aircraft may seriously damage the engine and result in an in-flight failure.”

In July 1987, Beechcraft released a Safety Communique covering piston powered aircraft titled, “Use of Automobile Type Gasoline in Beech Aircraft.” The document details issues related to the use of automotive gasoline in aircraft certified for aviation gasoline. This includes information concerning vapour pressure and vapour lock. The document also carries a warning that states “Do not use autogas in Beech airplanes which are certified for aviation gasoline.”

Vapour lock

Vapour lock occurs when fuel, normally in liquid form, changes to vapour while still in the fuel delivery system. This change causes a reduction in pressure to the engine-driven fuel pump and disruption of fuel flow to the fuel injection system. It can result in transient or complete loss of engine power. An aircraft engine is more likely to undergo vapour lock with increased temperatures, lowered pressures (density altitude), higher Reid vapour pressure (RVP) of the fuel, or a combination of any of these factors.

The RVP is widely used as an indicator of volatility of petroleum products.

Because AVGAS has a lower and more uniform vapour pressure than automotive gasoline does, it will remain in the

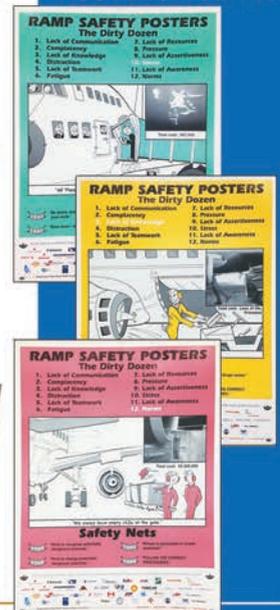
Maintenance and Ramp Safety Society

A Non-Profit Society Dedicated To
Reducing Aviation Human Error

ORDER YOUR
POSTERS TODAY!

The tools that we offer to help achieve a zero accident rate consist of:

- ▶ **Posters**—High impact, non stop reminders how to reduce human error
- ▶ **Videos**—High quality productions that show how to reduce human error.
- ▶ **Membership**—Access to human factor specialists help reduce human error
- ▶ **Training**—Courses designed by experts to help you reduce human error
- ▶ **'GroundEffects'**—Specialized articles to help you reduce human error



These Tools Save Lives and Money!

Are you going to deny yourself and your company the most important wish of all—SAFETY?



121 - 19140 28th Ave, Surrey, B.C. Canada V3S 6M3

▶ tel: 604.531.9108 ▶ fax: 604.531.9109 ▶ email: marss@marss.org

Visit our website to view the full selection or to order your posters today! ▶ web: www.marss.org

REMEMBER!
Safety and Profit
Work Together



When the results were compared with identical conditions in a carbureted engine, it was noted that vapour lock occurred sooner with the fuel-injected engine . . . In the absence of mechanical issues, it is likely that the aircraft's engine was starved of fuel due to a vapour lock, and lost power . . . a post-crash fire ensued, caused by spilled fuel igniting.

liquid state at a higher ambient temperature during reduced atmospheric pressure at high altitude.

The FAA Technical Center produced a report titled Auto-gas in General Aviation Aircraft. The report details a series of tests that the Center had conducted on aircraft piston engines to compare MOGAS with AVGAS and to examine their tendency to cause vapour lock.

When the results were compared with identical conditions in a carbureted engine, it was noted that vapour lock occurred sooner with the fuel-injected engine. During a test sequence, the boost pump was left off, except for recovery from vapour lock. More often than not, the electric boost pump was required to recover from a vapour lock sequence in the fuel-injected engine. A test sequence was also conducted to demonstrate that the 43C initial tank temperature and the takeoff fuel flow were the worst case for a generic suction feed (low wing) fuel system. The test determined that takeoff and climb power settings resulted in the most fuel turbulence and high engine compartment temperatures. Also, lower atmospheric pressure, as the aircraft continued to climb, increased the probability of vapour lock.

Post-impact fire

The post-impact fire started prior to the aircraft's collision with the power pole, and the aircraft was engulfed by fire only seconds after impact. The ignition source of the fire is unknown. Possible ignition sources included fuel contact with hot engine parts, sparks created from metal contact (separation of the nose landing-gear wheel) with the road surface, and electrical arcing. The battery of the Beech A36 is located in the engine compartment and as such, could also have been an ignition source in the occurrence.

Analysis

No mechanical issues that would have resulted in an engine power loss were identified during the investigation. It could not be determined what type of fuel was being fed to the engine at the time of the power loss. However, since the pilot had a history of using MOGAS and the aircraft tip tanks emitted a strong odour of MOGAS, it is likely that there was a mixture of aviation fuel (AVGAS) and MOGAS in the aircraft fuel tanks. While the possibility of vapour lock is increased with use of MOGAS, it may also have occurred with AVGAS because the aircraft climb performance allowed it to climb to a higher density altitude (8,700 feet) while the fuel temperature remained high.

If MOGAS is used in aircraft that are not certified for its use, there is an increased risk of engine power loss due to fuel delivery issues such as vapour lock. The cellular phone video shows that the pilot had been experiencing fluctuations in engine fuel-flow and engine rpm that were consistent with vapour lock. In the absence of mechanical issues, it is likely that the aircraft's engine was starved of fuel due to a vapour lock, and lost power as a result.

In the event of a power loss or engine failure, the Beechcraft Pilot's Operating Handbook and Airplane Flight Manual directs the pilot to turn on the boost pump and adjust the mixture to full rich; however, the pilot had previously regained full power by adjusting the fuel mixture only. Furthermore, the Tornado Alley website suggests that with an actual or incipient vapour lock, the pilot should turn on the boost pump, then after the climb is complete, return the boost pump to off and re-lean the mixture.

The engine power loss occurred at approximately 6,000 feet above sea level. This altitude should have allowed the aircraft to glide a total of 8.5 nautical miles. The Osoyoos Airport is at an elevation of 1,100 feet asl and is about seven nm from the estimated location of the engine power loss. The pilot's previous success in regaining full engine power may have delayed selection of a forced landing area. The nearest airport was then not an option, and Highway 97 was chosen as the next best emergency landing area.

Findings as to causes and contributing factors

1. It is likely that the aircraft's engine was starved of fuel due to vapour lock, and lost power as a result.
2. The pilot's previous success in regaining full engine power may have delayed selection of a forced landing area.
3. During the forced landing on the highway, the aircraft struck a truck, then a pole; a post-crash fire ensued, caused by spilled fuel igniting.

Findings as to risk

1. If automotive gasoline is used in aircraft that are not certified for its use, there is an increased risk of engine power loss due to fuel delivery issues such as vapour lock.
2. If aircraft are not fitted with crashworthy fuel-system components that retain fuel or with systems that eliminate ignition sources, the risk of injury or death due to post-impact fire is increased. ■

(The Transportation Safety Board authorized the release of this report on October 13, 2016. It was officially released on November 3, 2016.)

Aviation Services

Applus⁺ RTD

NDT & Inspection

**CARs AMO 76-90
ALL NDT METHODS**

X-ray • Ultrasonics • Bond Testing
Eddy Current • MPI • LPI

EXPERIENCED STAFF OF CERTIFIED TECHNICIANS

#8, 2280 Pegasus Way N.E. Calgary, AB T2E 8M5

p: (403) 274-8214 • **f:** (403) 274-8457 • **w:** www.applusrtd.com

**Leading
Edge
Technology**



**Beaver & Otter
Safety & Performance
Modifications**

- Beaver – STOL Kits
- Wing Angle Kits
- 5370 Upgross Kits
- Otter – STOL Kits
- 400-lb. Upgross Kits
- Float Stretch Kits
- “Yukon” Cargo Door



Walter Turbine Otter Conversions
*“the most cost effective
Turbine Otter Conversion
on the market”*



**TC approved (AMO# 80-07)
for Maintenance,
Repairs, Structures,
Welding & Manufacturing**

www.stolairus.com / stolairus@telus.net
6095 Airport Way, Kelowna, BC V1V 1S1
(North end of Kelowna Int'l Airport)
Phone: (250) 491-7511
Fax: (250) 491-7522

**ENGINE APPROVED KITS
NEW DPU 7-7070 VIDEO RECORDING**

MACHIDA



- HD VIDEOSCOPIES
- BORESCOPIES
- BLENDING SCOPES
- CUSTOM SCOPES

WWW.MACHIDASCOPE.COM



PHONE: 1-800-431-5420 - 1-845-365-0600 EMAIL: INFO@MACHIDASCOPE.COM

Aviation Services

**Canadian Aero
Accessories Ltd.**



**Component Sales
Overhaul & Repair**



Authorized repair Station For

GOODRICH

**Ice protection systems
PowerSystems**

170 George Craig Blvd. N.E.,
Calgary, AB, Canada T2E 7H2

ph: 403.250.9077

sales@cdnaero.com
www.canadianaero.com



Heli Technology Inc

SPECIALIZING IN BELL HELICOPTERS

204, 205, 206, 212 & 407

- Dynamic Component Overhaul •*
- Genuine Bell Parts Sales •*
- Exchange & Rental Program •*
- Field Maintenance •*
- In-House Reworks & Machining •*

OVER 30 YEARS EXPERIENCE

Phone: (250) 566-4401
Fax: (250) 566-4333

PO Box 18, 3010 Selwyn Road
Valemount BC V0E 2Z0

**Contact AMU Magazine
to advertise**



phone: (604) 214-9824
toll free: 1-877-214-9824
amumag2015@gmail.com

SAVEONJETFUEL

- **Enviro Tanks**
- **Bulk Jet Fuel**
- **Avgas**

Toll Free: 1-866-353-3030
www.saveonjetfuel.com
SERVING THE HELICOPTER INDUSTRY

When flying is what you do, we're here.

Sealand Aviation, located at Campbell River on Canada's West Coast, provides experienced and efficient aircraft maintenance and service.

- Transport Canada approved for repairs, maintenance, structures, welding, and manufacturing.
- A&P and IA on staff for US inspections and US annuals.
- EASA Part 145 Approved



• 2300 Airside Drive, Campbell River Airport
• 2880 Spit Road, Campbell River Floatplane Base

www.sealandaviation.com • 1.800.331.4244

Aviation Services



**SINGLE PISTON • TWIN PISTON • SINGLE TURBINE • TWIN TURBINE
JETS • HELICOPTERS • APPRAISALS**

*Certified Aircraft Appraisals
Member of National Aircraft Appraisers Association*

LORNE GRAY AGENCIES LTD.

TEL: 403-547-1024 FAX: 403-547-0037 EMAIL: INFO@AIRCRAFTCANADA.COM

www.aircraftcanada.com



Pitot-Static Test Adaptors

For all Types of Aircraft

Nav-Aids Ltd

1-877-332-3055 www.navaidsltd.net

FLYRITE

ACCESSORY OVERHAULS
AMO 90-97 EDMONTON, AB

STARTER-GENERATOR



**Overhauls
Modifications
Service
Rentals**

OVERHAULS BY THE BOOK!

SAFRAN POWER (GOODRICH)
SKURKA/APC ▶ THALES (AUXILEC)
BENDIX ▶ B&C STARTERS

1-888-439-6020

flyrite@incentre.net

Ph. (780) 439-6020
Fax (780) 439-6106

AirMaintenance Update has a new address



Alpha Publishing Group Inc.

**Unit 7, 11771 Horseshoe Way
Richmond BC V7A 4V4 Canada**

Do you have any story ideas for AMU?

By contributing articles to AMU, you are able to promote your skills and expertise; and you provide valuable information to the aviation and aerospace community.



Email ideas for articles to
AMU's editor, Ian Cook, at:
amu.editor@gmail.com

Maverick, by the Numbers

At the intersect of summer fun and serious industry lies Maverick Helicopters, a tourism-based outfit that has put smiles on countless faces for many years now. As Maverick celebrates its 20th anniversary, the bullet points of its success are worth a read.

Maverick Helicopters is a tourism-based aviation company now celebrating its 20th year of operation. Entrepreneurs Greg and Brenda Rochna had a vision to create a company that would provide a true VIP-level experience that they felt was not previously offered in the helicopter industry. To that end, the husband-and-wife team launched Las Vegas-based Maverick Helicopters in 1996, debuting with one aircraft and a small staff. Today, it's said that Maverick Helicopters operates the world's largest and youngest fleet of Airbus EC130/H130 ECO-Star helicopters and holds the industry's top safety record. As the company celebrates two decades of service, here are 20 of its most interesting facts:

1: Number of helicopters Maverick Helicopters started with in 1996.

4: Number of terminals Maverick Helicopters operates out of Las Vegas, Grand Canyon South Rim, Grand Canyon West Rim, and Maui, Hawaii.

7: Years Maverick Helicopters has been the exclusive helicopter operator at Las Vegas Motor Speedway. It provides expedited helicopter transfers to NASCAR, Electric Daisy Carnival and the many driving schools located at the track.

7: Consecutive awards for "Best Air Tour" from the Southern Nevada Hotel Concierge Association's (SNHCA) Concierge Choice Awards.

12: Minutes of Maverick Helicopters' Vegas Nights flight, which showcases breathtaking views of the Las Vegas Strip and iconic landmarks.

12: Number of helicopters that can land at the bottom of the Grand Canyon at one time on Maverick Helicopters' exclusive landing site.

13: Number of languages the MavStar Language System — an exclusive, multilingual GPS-based narration system — offers aboard some of Maverick Helicopters' Las Vegas flights including Cantonese, Portuguese and Spanish.

40: Number of shuttles used for complimentary ground transportation to and from the Las Vegas Strip; 15 of which are limo coaches.

45: Minutes of flight from McCarran International Airport to the bottom of the Grand Canyon West Rim.

47: Number of helicopters in Maverick Helicopters' fleet.

90: Consecutive hours Maverick Helicopters remains open during Electric Daisy Carnival, Las Vegas. In 2016, 22 helicopters were used to fly to Electric Daisy Carnival.



A heliYoga session at a remote landing in Nevada's Valley of Fire State Park may not be every AME's cup of tea, but it is an offering from Maverick Helicopters and an insight to the forward thinking company's business model.

428: Number of employees at Maverick Helicopters; 84 of which are pilots.

1,200: Hours pilots are required to have flown before flying with Maverick Helicopters.

2,755: Hours of training Maverick Helicopters' maintenance technicians recorded for 2015. More than 1,900 of those hours were provided through the company's homegrown training courses.

80,000: Total components in the Airbus EC130/H130 ECO-Star helicopter.

200,000: Number of guests Maverick Helicopters flies annually.

400,000: Total flight hours logged since Maverick Helicopters' inception; 350,000 of which were flown in Airbus EC130/H130 ECO-Star helicopters.

2.2 million: Approximate number of passengers Maverick Helicopters has flown during its 20 years of operation.

\$3.3 million: The new acquisition price of an Airbus H130 ECO-Star helicopter retrofit to Maverick Helicopters' standards.

\$5 million: The amount Maverick Helicopters invested in its Las Vegas 6,000-square-foot terminal in 2015 to make it one of the most elaborate helicopter terminals in the world. ■

Canadian Aero Accessories Ltd.

Component Sales

Overhaul & Repair



Trusted
Experience
Since 1964



CALL US FOR THIS & MORE !

- Fire Bottles • Oxygen Bottles • Escape Slides • Life Rafts
- Starter Generators • AC Generators • Generator Control Units
- Boost Pumps • Fuel Pumps • Blowers • Valves • Brakes
- Hydraulics 5606 and Skydrol • Electronics/GCUs
- Actuators - Hydraulic and Electrical

Authorized repair Station For

GOODRICH

Ice protection systems PowerSystems

170 George Craig Blvd. N.E., Calgary, AB, Canada T2E 7H2

ph: 403.250.9077 • fax: 403.250.6841

sales@cdnaero.com

www.canadianaero.com





BREAKING-IN IS HARD TO DO.

OUR DYNO TEST CELL MAKES IT EASY.



The only one of its kind in North America, our Dyno Test Cell is the most reliable and accurate engine break-in method for both horizontally opposed and radial engines. The Dyno Test Cell allows our expert technicians to apply consistent loads and temperatures for the best initial break-ins available.

Aero Recip's Dyno Certified Engines perform to OEM specs – guaranteed.

With a 31,300 square foot facility centrally located in Winnipeg, Aero Recip is the largest piston engine and accessory overhaul shop in Canada.

AERORECIP.COM | 1.800.561.5544 | INFO@AERORECIP.COM



AERO RECIP IS A GREGORASH AVIATION COMPANY



GREGORASHAVIATION.COM



ULTIMATE
Oil Coolers



DYNO
POWER
EXPERIMENTAL

