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# AirMaintenance

The Magazine for Aircraft Maintenance Professionals

# UPDATE

Transport Canada Approved for R/T



## So who's going to fix 'em?

## The air traffic control tower: Sending out signals

## PAMA and AME news

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# Best in Show?

It's not written in stone that tradeshow have to be boring and repetitive with endless plodding between booths and aisles. Occasionally things happen at industry events that actually go beyond the ho-hum. For example, Dallas Airmotive and H+S Aviation took it up a level with an entire on-floor rebuild of an M250 engine during this year's Heli-Expo 2015 in Orlando, Florida. Why would they do that?

"We believe in demystifying the engine maintenance experience for customers," said Dallas Airmotive President, Doug Meador. "Re-assembling a helicopter engine at Heli-Expo allows our expert engine technicians to not only demonstrate their skills, but to also answer questions from the audience, as well as display parts of the engine one normally doesn't have the opportunity to see. This M250 demonstration is another example of how we develop deep and lasting relationships with helicopter operators around the world."

The M250 Build began on Tuesday, March 3, the second day of the Florida show, with the maintenance team assembling the compressor and gearbox. Day two featured the assembly of the turbine module and the mounting of the compressor and gearbox stack. Finally, on day three, the team completed the final installation and associated plumbing. Amelia Rose Earhart, an avid aviator who successfully flew around the world last year re-tracing her namesake's famous flight path, hosted the three-day event.

Combined, H+S Aviation and Dallas Airmotive are OEM-authorized to support over 20,000 helicopters powered by PW200, PW210, PT6C, PT6T, M250, RR300, CT7 and T700 engines. During the HAI Heli-Expo Convention, it was announced that Pratt & Whitney Canada has designated Dallas Airmotive and H+S Aviation Aftermarket Services operations as overhaul facility centres for the P&WC turboshaft engines and for MRO services.

— John Campbell  
Editor

## Departments

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

## Features

- So Who's Going to Fix 'Em?** 10  
By Mike Broderick
- New Apprentices and Transport Canada Publications** 16  
By Norm Chalmers
- Sending Out Signals** 26  
By Gordon Walker
- Seven Questions About Borescopes** 32  
Industry forum
- Raising the Bar: Running Out of Time** 34  
Beechcraft H35, N375B



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### AirMaintenance Update

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# Upcoming Events

## Static Display in Vancouver



In response to interest that has been expressed by the OEMs in the past, the Helicopter Association of Canada is moving forward with plans to have static display of aircraft on the West Terrace of the Vancouver Convention Centre, located on Vancouver's spectacular downtown harbour. HAC is working with Transport Canada and local authorities to finalize the details of the fly-in-fly-out event. The cost of placing an aircraft on the terrace will range from \$2,500 to \$8,000, depending on the size of the aircraft and the space required. Current HAC Operator-members and Associates will receive a significant discount on space. For more details, contact [fred.jones@h-a-c.ca](mailto:fred.jones@h-a-c.ca)

### CANADA

#### Northern Air Transport Association Conference

April 27 – 29, 2015

Yellowknife, NWT; [www.dnn.nata-yzf.ca](http://www.dnn.nata-yzf.ca)

#### Bagotville International Air Show

June 20 – 21, 2015

Saguenay, Quebec

[www.saibagotville.com](http://www.saibagotville.com)

#### Aircraft Spruce Appreciation Day

June 27, 2015

Brantford, Ontario

[www.aircraftspruce.com](http://www.aircraftspruce.com)

#### Wings over Wasaga

July 3 – 5, 2015

Wasaga Beach, Ontario

[www.wingsoverwasaga.com](http://www.wingsoverwasaga.com)

#### Vintage Wings & Wheels Show

July 19, 2015

Hamilton, Ontario

[www.warplane.com](http://www.warplane.com)

#### Abbotsford Air Show

August 7 – 9, 2015

Abbotsford, British Columbia

[www.abbotsfordairshow.com](http://www.abbotsfordairshow.com)

### UNITED STATES

#### AEA International Convention & Trade Show

April 8 – 11, 2015

Dallas, TX

[www.aea.net](http://www.aea.net)

#### Regional Air Cargo Carriers Association Spring Conference

April 28 – 30, 2015

Scottsdale, Arizona

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

#### Discover Aviation Days

May 30 – 31, 2015

Blaine, Minnesota

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

#### Wings over Gaylord

June 20 – 21, 2015

Gaylord, Michigan

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

#### Deke Slayton Airfest

August 8 – 9, 2015

La Crosse, Wisconsin

[www.airfest.com](http://www.airfest.com)

#### Maintenance, Repair, and Operations Americas

April 14 – 16, 2015

Miami, FL

[www.mroamericas.aviationweek.com](http://www.mroamericas.aviationweek.com)

### INTERNATIONAL EVENTS

#### Aircraft Interiors Expo 2015

April 14 – 16, 2015

Hamburg, Germany

[www.aircraftinteriorsexpo.com](http://www.aircraftinteriorsexpo.com)

# Advertisers Index

APS Brakes / Aero Incorporated .....	28	Eagle Fuel Cells Inc .....	30	Progressive Air .....	17
Aeroneuf Instruments Ltd .....	15	Gregoarsh Aviation .....	44	Propworks Propeller Systems .....	36
BKD Aerospace .....	5	Hartwig Aircraft Fuel Cell Repair .....	36	Rapco Inc .....	2
Canadian Aero Accessories Ltd .....	43	MARSS .....	27	Schweiss Bi-fold Doors .....	37
Canadian Propeller Ltd .....	12	NAASCO .....	35	Superior Oil Coolers .....	20
Casp Aerospace Inc .....	31	Perimeter Aviation .....	20	U.S. Air Tool Company .....	19
Concorde Battery .....	13	ProAero Engines Inc. ....	11	Western Propeller Company Ltd .....	29

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## STCs & new products

### Machida ramps up its videoscope line

**Machida Inc.** recently unveiled several newly designed products, including the new DPU 7-7070 Digital Processor that will be paired alongside the new 2.4mm-diameter Videoscope, which boasts LED technology and two-way articulation (up/down 140 degrees). This scope and processor combo has over 12 features including video recording in high-definition, easy to use software, picture-in-picture, new updated zoom features, and portable image archiving that can be saved and shared. This digital processing unit with a 10-inch monitor comes in a portable pelican case and can be paired with any of Machida's scopes from its videoscope line.

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



### Tiger Tugs' new mover for MD 500 series helicopters

**Tiger Tugs** has announced its new helicopter mover designed specifically to handle the MD 500 series helicopters. The new lift system is said to completely stay away from the skids or struts to provide a safe and secure way to move the MD 500 series helicopters. It also features a support saddle that lifts the helicopter from the belly. The saddles are covered with a soft dense neoprene rubber to protect the skin and are molded to match the curvature of the belly of that helicopter. A wireless remote control system allows the operator to maneuver the helicopter in tight hangar spaces while controlling it from any vantage point.

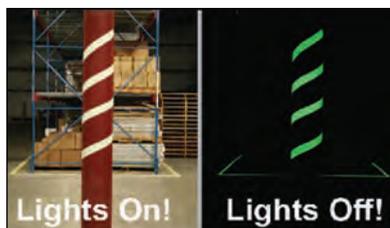
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### Glow-in-the-dark floor safety tape from Visual Workplace

**Visual Workplace, Inc.** now offers Glow Floor-Mark, a peel and stick, glow in the dark safety product that helps building and vehicle personnel find their way in the dark, whether it's night time, during a power failure, a building fire filled with smoke, a natural disaster or other emergency. It glows brightest for the first 60 minutes then fades to remain lightly visible for several hours in total darkness. Glow Floor-Mark is light green when lights are on, and emits a green/yellow glow when lights are off. The tape has a thin profile designed specifically for industrial environments where forklifts and floor-scrubbers may be in use.

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



### Flexible nozzles for aerospace sealant application

**PPG Industries** has developed flexible nozzles that are easily shaped by hand at room temperature for use with cartridges to apply aerospace sealants. Sembend nozzles are available in Semco packaging and application systems by PPG. Sembend nozzles are said to offer advantages over standard bent nozzles and were developed to respond to customer needs for on-site shaping to meet specific requirements. They are made with a proprietary plastic material, and operators slowly bend them with their hands to form the shape desired for the application. Applying heat or using tools is not required.

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



### Micro AeroDynamics' Vortex generator kit for twin-engine aircraft

**Micro AeroDynamics** has received FAA and EASA STC approval for the Vortex Generator kit it has designed for the Diamond DA42, DA42NG and the DA42M-NG twin-engine models. The addition of VGs to the leading edge of the wings and both sides of the vertical stabilizer reduces Vmc, provides improvement in slow speed stability and handling, and reduces accelerate/stop distance. Micro VG kits come with the STC, all required installation tools, detailed drawings and illustrated instructions, templates for properly positioning the VGs, spares, and Loctite Depend 330 for permanent adhesion. For more information visit [www.microaero.com](http://www.microaero.com)



### Lloyd's tool kit lets you drill dead center every time

**Lloyd's Rivet Drill Guide** is a new kit of tools for removal of rivets from sheet metal and is said to drill dead center every time. These tools can be used with threaded or straight jobber bits, and with any 1/4-inch drill, 90-degree, 45-degree, or snake drill, pancakes. Because of their compact design they will work in tight areas such as inside of wings or under floors. The foot of each guide is designed to fit within the pitch of most rivet patterns, and the vinyl handles on the drill guides are red in case they are dropped in the bowels of an aircraft.

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



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## VIHA BUBBLE GETS EURO STC APPROVAL



Victoria, BC-based VIH Aerospace (VIHA) has received a European Aviation Safety Agency Supplemental Type Certificate (STC) approval for an aftermarket replacement crew bubble window installation for the Bell 407 helicopter. The VIHA designed and engineered bubble window is a direct replacement unit that has been developed to easily install to the existing door without any adjustment or modification. The crew bubble window installation is designed to provide the pilot greatly improved visibility relative to the right side of an aircraft without the requirement to open windows or doors and is ideal for utility and long-line operations. The kit consists of an acrylic plastic clear bubble window, retainers, and all necessary attach hardware. All support documentation is also included in the VIHA kit.

## CONAIR AVRO AIRTANKER RETURNS HOME TO CANADA



A BAE Systems-built Avro RJ85 Airtanker has arrived back in Canada after completing nearly three months of aerial fire-fighting missions in Australia. The aircraft is one of three RJ85s owned by Conair Group Inc. of Abbotsford, BC. Conair has heavily modified the region-

al passenger jetliner and fitted it with a large external tank enveloping the mid-underbelly fuselage. This tank contains over 11,500 litres of fire retardant or water, released through a computer-controlled system. Conair foresees the RJ85 Airtanker serving in its fleet for the next 20-25 years.

Contracted by the State of Victoria to strengthen its armoury against wildfires during the Australian summer season, the RJ85 (painted as Tanker 162) was used to support ground-based firefighters by flying low over scrubland and forest wildfires and delivering the retardant to help suppress the flames. Dubbed as the “future generation in aerial firefighting,” Conair chose the RJ85 as the platform for this demanding role because of its excellent high and low speed performance, four-engine reliability even in the demanding conditions of high altitude and hot temperatures, and excellent short airfield performance.”

## NEW LONG-RANGE FALCON 8X TAKES TO THE AIR



Dassault Aviation says its new flagship, the ultra-long range Falcon 8X, has now successfully completed its first flight in which it “demonstrated excellent handling qualities,” according to its test pilot, Eric Gérard. “We reached each of the performance objectives set for the first mission and, in a few cases, surpassed target goals. I am confident that the remainder of the flight test program will proceed just as smoothly.”

Company chairman Eric Trappier said the Falcon 8X program is “right on target for mid-2016 certification and second half 2016 deliveries.”

Unveiled in May 2014 at the European Business Aviation Convention &

Exhibition (EBACE), the Falcon 8X is said to offer the greatest range and longest cabin in the Falcon line of business jets. With eight passengers and three crewmembers, the 8X will be capable of flying 6,450 nm (11,945 km) at Mach 0.80. Like the 7X, the Falcon 8X can make approaches up to six degrees, allowing it to serve challenging airports such as London City Airport and Lugano, Switzerland that are normally not accessible to large cabin aircraft. The aircraft will have a balanced field length of about 6,000 ft. and an approach speed at typical landing weight of 107 knots.

## BELL DELIVERS FIRST 429WLG IN NORTH AMERICA



Bell Helicopter has made the first delivery of its Bell 429 Wheeled Landing Gear (WLG) in North America, placing it in the hands of professional NASCAR driver and CEO of solar energy performance certificate (EPC) company SunEnergy1, Kenny Habul who says he chose the aircraft for its “exceptionally spacious cabin, excellent avionics options and impressive power and range.” The Bell 429WLG helicopter was unveiled in October 2013 at the National Business Aviation Association (NBAA). It combines the capabilities of the Bell 429 with the added operational flexibility of retractable, wheeled landing gear which is intended for use in limited spaces and situations that require ground taxi, such as positioning closer to fixed-base operators. A fully integrated glass cockpit with two or three multi-function displays, dual digital autopilot and an integrated electronic data recorder help increase situation awareness and safety margins.

## QUEBEC FUND READY TO INVEST IN AJW GROUP



Quebec's Fonds de solidarité FTQ has announced it will invest US\$15 million in AJ Walter Aviation, a division of the AJW Group, and a specialist in the supply, exchange, repair and lease of commercial aircraft spare parts. This is the second investment by the Fonds in AJW Group, the first being C\$12 million announced in 2013 for the launch of facilities for the repair and maintenance of aircraft components in Montréal by AJW Technique. "This second investment by the Fonds de solidarité FTQ in a world leader such as AJW Group shows our commitment towards Québec's aerospace sector and its workers," said Jean Wilhelmy, Senior Vice-President, Aerospace, Construction and Services at the Fonds de solidarité FTQ.

With net assets of \$10.5 billion, the Fonds is a development capital fund that channels the savings of Quebecers into investments in all sectors of the economy to help create and maintain jobs and further Québec's development. The Fonds is a partner, either directly or through its network members, in more than 2,450 companies.

## PUSH IS ON TO RESTORE P-3 ORION TO SERVICE

Orion Aerial Firefighters announced that it has begun its campaign to restore the P-3 Orion aircraft to service. "The US Forest Service has a shortage of large air tankers, which dangerously reduces its firefighting capabilities," said Dale Head, CEO of Orion Aerial Firefighters. "The P-3 drops in terrain that other aircraft have trouble dealing with, and pilots feel that the maneuverability of a turboprop and the relatively short wingspan allows the P-3 to get to places other airtankers just cannot."

In 2011, after 20 years in service fighting fires in the United States, the US Forest Service (USFS) cancelled the contract for six P-3 airtankers due to a dispute between Aero Union, the owner of the P-3 fleet, and the USFS, regarding maintenance practices. At the time, Tom Harbour, director of the Forest Service's Fire and Aviation Management program, said "Our main priority is protecting and saving lives, and we can't in good conscience maintain an aviation contract where we feel lives may be put at risk due to inadequate safety practices." When the negotiations came to an impasse, the USFS terminated the contract for the P-3s, who were in the middle of a firefight in Texas, and the pilots flew the six aircraft home.



Orion Aerial Firefighters has now assembled a team of engineers, maintenance experts and pilots who intend to return these aircraft to aerial firefighting. A detailed discussion about the P-3s can be found on the Orion Aerial Firefighter website, [www.orionaff.com](http://www.orionaff.com).

## AIRBUS HELICOPTERS UNVEILS ALL-NEW H160

Airbus Helicopters has unveiled its all-new H160, which integrates as many as 68 different Airbus Helicopters-patented technologies. Its payload lift and range are targeted toward a wide variety of uses, including oil and gas operations, public services, air medical and coast guard duties along with commercial transport, and private and business aviation. With a factory-spec cruise speed of 160 knots the H160 can carry 12 passengers at distances of up to 120 nautical miles for oil and gas missions, and has a 450-nm range with 20-minute reserve in public service or search and rescue tasks. The H160 features the largest-ever

Fenestron shrouded tail rotor, and the all-new Biplane Stabilizer whose design involves a staggered placement of the dual-level, interconnected stabilizers. This feature is said to facilitate pilot maneuvers and reduce aerodynamic penalties in low-speed flight and hover. An additional feature is Airbus Helicopters' initial production use of its Blue Edge main rotor blades, which reduce exterior noise levels by 50 per cent (3 dB) and also allow a payload increase of up to 100 kilograms when compared to traditional rotor blades, depending on flight conditions.



To power its H160, Airbus Helicopters has selected the new Turbomeca 1,100 shaft horsepower Arrano engine, which offers significant reductions in fuel consumption for improved range and payload performance, along with a reduced environmental footprint. The helicopter's first flight will take place in 2015 and service entry is planned for 2018.

## ANOTHER STC FOR HARTZELL



Hartzell Propeller Inc. has received an STC for the company's new lightweight Scimitar prop for Cessna 172RG Cutlass aircraft — more than 1,100 172RG aircraft have entered service. The Scimitar is a two-blade composite spinner with an aluminum compact hub and a 2,400-hour, six-year recommended time between overhauls, offering better tolerances and corrosion resistance. ■

# So who's going to fix 'em?

There's a lot of negative talk these days about the lack of upcoming aircraft maintenance professionals. To compound the issue, the number aircraft in service is rapidly growing. So, it's up to the industry to ensure there's a ready pool of qualified technicians waiting in the wings. A new association is willing to take charge of the situation.



BY MIKE BRODERICK  
Helicopter Engine Repair Overhaul Services

Well, here we are once again. Welcome back to our “All Maintenance All The Time” bi-monthly get-together. Now, after reviewing all of my articles, there is one recurring assumption on my part — that I have an audience of Aircraft Maintenance professionals joining me every other month. Is this a big assumption on my part? I hope not. But we keep hearing about a shortage of Aviation Technicians and that the shortage is exacerbated by a bunch of retirees from my group of Seasoned Citizens. If this is true, I

am then losing my audience. Argh! We can't have that! Are we as an industry suspecting or really experiencing a shortage? Maybe it's a combination of both. I know that the word I get from those who should know — business owners, directors of maintenance, and overhaul shop supervisors — a good mechanic is getting more difficult to find than a comb at a bald guy's convention.

My friends at Aeronautical Repair Station Association (ARSA), and Aviation Technician Education Council (ATEC) also share this concern about a shortage of technicians. And to either validate or alleviate their suppositions, these two prestigious US organizations commissioned a study: “Policy Solutions for a Stronger Technical Workforce” by the researchers at the College of William and Mary's Thomas Jefferson Program in Public Policy.

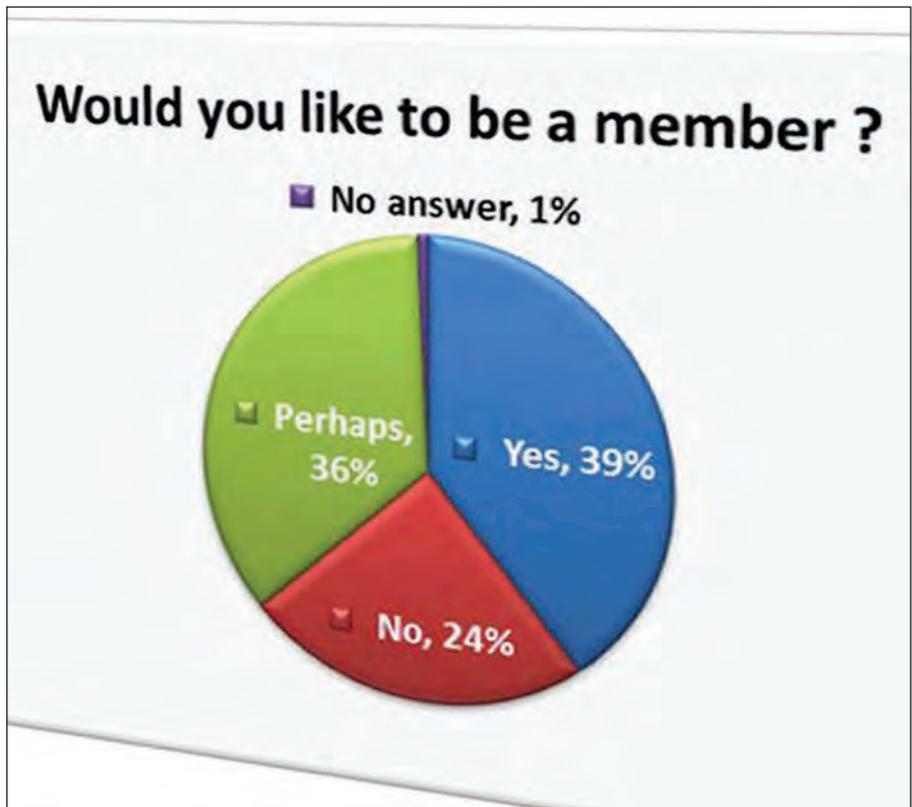
This study does shed some light on finding, retaining and growing a world-class aviation maintenance workforce. However, even this research team is frustrated that they found supporting evidence for their conclusions challenging. Also, even though their research is confined and segregated by geographical regions within the US, I suggest the hypothesis

drawn from this report can be applied globally though more research from a global perspective is needed to validate my assumption. I used this report as reference along with an FAA forecast on aircraft activity for the next 20 years, in preparation of today's epistle.

### Findings from the study

“Mainly due to the same data limitations as the Government Accountability Office (GAO) mentions in their report we were unable to conclusively say whether a labor shortage exists for any particular region.

“Overall, we found inconsistent employment trends among many of the regions, with only the Southern and Western-Pacific regions showing periods of steady growth over the last decade. Wages have remained relatively flat since the Great Recession (2008-2013). Education completion rates have been on the rise for most regions. Based upon these results we present three hypotheses to explain the variation, for which future research is required.



Above: A recent survey of aircraft maintenance professionals showing the percentage of those wishing to pursue employment in a field related to aviation.



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The transferability of maintenance and electronic skills sets has led to heightened competition among industries for the growing number of student graduates.



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“First, for regions with employment growth but little to no increase in post-secondary completion or vice-versa, employment migration from neighboring states may be occurring.

“Second, the growing Technical workforce demand, coupled with the transferability of maintenance and electronic skills sets, has led to heightened competition among industries for the growing number of student graduates.

“Third, despite a rise in student completion rates a larger share of the existing workers is retiring, thus the replacement rate is insufficient to meet employment demand.”

Okay, so after 72 pages of research they have concluded they are pretty sure there is a shortage or the imminent threat of a shortage. They are still not quite sure why, but think it has possibly to do with wages, which might explain how other industries needing the skill set possessed by the Aviation Technician are “stealing” them from the hangar before they get there. But I believe wages are only part of the equation. I also contend that knowledge about our profession is lacking. We need to educate and inspire our future



**Turbomeca and other major manufacturers fully support the new International Association of Helicopter Maintenance Professionals initiative.**

generation about the joy and job satisfaction of keeping those complicated flying machines from falling out of the sky. To quote the president of the Helicopter Association International (HAI), Matt Zuccaro: "... We are competing for the hearts and minds of the next generation when they consider their careers. Their options are varied and many. We must remain competitive in compensation, benefits, work environment, job stability, career advancement, safety culture and prestige..."

Now, It is no secret that the preponderance of my technical experience (40+ years) is from those aircraft with the rotating wings. So it also stands to reason I attended this year's HELI-EXPO. As a part of my participation at this event I was honored to be included in a study group to review and discuss accrued data from a survey conducted to determine the state of the Helicopter Maintenance Profession. There were 456 responses from both current technicians as well as students in enrolled in aviation studies. This survey was global in its scope; it consisted of 23 questions and was available for 90 days on web-

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sites sponsored by HAI; the European Helicopter Association (EHA); Safran Turbomeca and Helicopter Maintenance Magazine.

After three hours of analyzing the resulting survey product, our 15-member group from the global Helicopter Maintenance profession concluded we do have a dearth of incoming technicians and among all the valid reasons offered, a major one is lack of knowledge about our profession, followed by concerns about competitive pay and job security. Finally noted, and maybe part of the knowledge deficiency, a lack of respect for our profession as a career choice. Some of this lack of respect comes from outside perceptions and some is industry generated.

Let me give you a personal example from a recent outside-the-industry experience. At a party last week I was introduced to another guy as: “This is Mike, he is in the helicopter business...”

The first question asked was: “Oh are you a pilot?” To which I replied with my stock answer: “Nope, my job is to keep the pilot safe, I am a professional Helicopter Technician!”

With a somewhat disappointed look he said, “Oh just a mechanic.” My response: (expletive deleted!)

Everybody knows about the pilots. They are the glamorous members of aviation society who are in the public eye every day. They are the ones you thank when you exit the aircraft for

bringing you safely to your destination. Their heroics are renowned. It is the fighter pilot who gets the medal for the most number of enemy aircraft shot down. It is the pilot who gets credit for finding the hiker lost in the mountain wilderness. The technician is normally behind the scene quietly doing their job, providing a safe aircraft for the pilot to do their job.

Am I jealous of the pilot? Nope, not one bit. I have the utmost respect for their skills and most pilots have a somewhat conscious respect for our skills. Pilots and Aviation Technicians share a symbiotic relationship, with one profession dependent upon the performance of other.

And to paraphrase a refrain from a 1988 Bette Midler song, as Aviation Technicians we believe we are the wind beneath the pilot’s wings or, in my case, rotor blades. And trust me, we are very happy when the pilot brings them back to us for maintenance.

However, it would be nice to sometimes to hear a “Thank you” for a smooth running, safe aircraft. But maybe it is more of a compliment that a safe, smooth operating aircraft is the expected norm. Maybe no comment is the best form of gratitude. Hmm... have to think about that one.

Now as I am sure you have noticed, and part of the industry respect thing, I have not referred to myself or my profession as “mechanic” and my first name is for sure not “Justa”. The following definitions will perhaps shed some light for my choice of my/our vocational description:

MECHANIC: "...a person who repairs and maintains machinery, motors etc..."

TECHNICIAN: "...a person skilled in mechanical or industrial techniques or in a particular technical field..."

I believe "Technician" is a better description for our profession don't you? And as I said it is part of the respect thing which if you think about it begins with us.

So with all that said I believe we have a challenge ahead of us, and it is up to us to perpetuate our profession. Aviation is facing expanding global markets as the FAA is forecasting a global growth in aircraft numbers of two per cent a year for the next 20 years (current numbers stand at approximately 400,000 combined Commercial and General Aviation, globally registered civilian aircraft). Which makes it obvious that we can expect an increased demand for a highly skilled, government-certificated labor force.

As professional Aviation Technicians we need to work with business and our trade organizations such as HAI, NBAA, EHA, etc., as well as our region's Regulatory Agencies on the existing regulatory framework which impacts the professional training programs. Together we must overcome the looming retirements of more experienced employees; and the threat of skill gaps due to changing technologies. We need to gain an audience with high school students and educate and inspire them to consider our profession as career choice. The time for action is now! No more handwringing about our shrinking numbers.

In closing, you should know that I am practicing what I am preaching. As a result of our meeting in Orlando we are in the early stages of forming a global association of Helicopter Maintenance professionals. Our mission is to promote our profession worldwide. We have a president, and we have support from the HAI, & EHA, as well as Turbomeca and other major manufacturers (OEMs). Our new association president has been charged with taking this association from concept to reality before next HELI-EXPO in 2016. A tall order, but trust me we have chosen the right man for the job. I am confident you will be hearing about us soon as we are determined that the International Association of Helicopter Maintenance professionals will be a leading voice in the perpetuation and preservation of the Aviation Maintenance Professional.

So until next time, practice saying, "My name is not Justa, and I am Aviation Maintenance Professional Technician."

*Over the past 35 years MIKE BRODERICK has served as a shop technician, engine shop supervisor, Engine Program Director, Director of Maintenance, Director of Operations, and owner of a Rolls-Royce engine overhaul and MD Helicopter component overhaul shop. He is a certified A&P, and holds a Bachelor of Science degree in Aviation Administration. As well, Mike has been appointed as an FAA representative for the FAA Safety Team (FAAST) and is a member of the HAI Tech Committee. Mike is currently working in business development for TRACE Worldwide Corp. Mike is a regular contributor to Air Maintenance Update. ■*

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# New apprentices and Transport Canada publications



“Risk management” or “Safety”? Perhaps they are just words, but there’s a world of difference in their meaning and in the spaces between life and death issues.



BY NORM CHALMERS  
Pacific Airworthiness Consulting

**G**ood day good aviation people. The fact you are reading this provides documentable evidence towards proving your goodness. AMU Magazine has printed over 20 of these essays over the last five years. That is about 40,000 words addressing most of the regulations affecting you. It seems that I am running out of topics to write about. If you have any suggestions, questions or issues you can contact me directly. In this issue I discuss some of the problems facing our industry.

Over the years I have heard complaints about apprentices out of aviation school and other new

members of our aviation maintenance industry. These complaints are about these new people being complacent and/or apathetic. All of you know about the “Dirty Dozen” of aviation. Go ahead and look that up. Complacency is one on that list of destructive factors. Many years ago when the Dirty Dozen was penned, apathy was not as much of a problem. The non-aviation professional bureaucrats who have taken over Transport Canada (TC) are leading this charge into apathy. TC has banished the word “Safety” from their language and replaced it with the phrase “Risk Management”. The link between risk management and safety has been cut by carefully crafted risk management baffle-gab. It leads me to believe that the mysterious person in Ottawa is a student of a Mr. Lennon who has been quoted as saying “A lie told often enough becomes the truth.” To see what I am referring to please go to TC at: <http://www.tc.gc.ca/eng/civilaviation/standards/sms-menu-618.htm>



A crewman performing a pre-flight inspection in an Airbus A320.



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**When safety precautions are taken, and when maintenance is performed correctly, commercial airline travel is among the safest modes of transportation.**

In the real world outside Ottawa, this apathy toward safety will continue infecting publicly owned aviation companies where the mantra is “Shareholder Profits”. These companies, like TC, drive away all of their good safety conscious people that helped build them. On this same topic, I know many TC inspectors leaving early or just sitting back and toughing it out until retirement.

Still on the same topic, we look at TC’s SMS inspections and Program Validation Inspections (PVI). PVIs are the activities that replace audits on non-transport category maintenance companies. These inspections focus on documentation

and look for non-compliance with TC’s Staff Instruction SUR 001. This document is now hidden from public access along with all other TC internal documents. In the region where I reside, TC management has assured me that the PVI program as TC practices it here is the same in all parts of Canada. The following is my opinion based on my observations.

You, the operators and maintainers (victims), are bullied into compliance with these SUR 001 “Minister’s Expectations”. Dealing with the TC’s so-called findings and the related examples working toward an “Acceptable” Corrective Action Plan (CAP) can take up to two years. The interpretation of

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## UPDATE

The Magazine for Aircraft Maintenance Professionals

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compliance with these expectations is left up to the individual TC inspector who can drag out the acceptance of your CAP for months or years.

Recently, an AMU reader and aviation manager wrote me to say, "Transport Canada never stops amazing me. There are days it's so stupid it's difficult to believe." And, "Yesterday I received the same rejection, Part 2 for all 4 CAPs. Cookie cutter BS."

He went on to comment something about "inmates are still running the asylum in Ottawa." These are one person's stated opinions. I want to poll our readers regarding views regarding TC oversight program of SMS PVs and PVI's. I ask you two questions:

- 1) Does TC force you to comply with their Minister's expectations?
- 2) How long does it take to have your CAP accepted?
- 3) How much money does this cost you including lost time, consultant fees and any other you have linked to this.

Your identification will be kept confidential. I will summarize the numbers and include them in a future issue. Watch this space.

On another front, TC publishes bulletins for public consumption. Unfortunately this area seems to be short on credibility at times. TC's Aviation Safety Letter TP 185E Issue 2/2014 follows the normal format with a section for information related to "Maintenance and Certification". For the benefit some of our readers, "Maintenance" is self evident to those of us thinking in aviation terms. The word "Certification" is broadly applied to the approval of companies and aeronautical product data. The subject area "Certification" is the broad area of type certificates, supplemental type certificates, repair approvals, parts manufacturing approvals and the list goes on.

In this issue of the Safety Letter the topic for the section titled "Maintenance and Certification" is "Certificate of Registration"(CofR). CofR is an aircraft owner issue/responsibility and has no relevance to maintenance or to certification. In addition, a TC Airworthiness Manager wrote the article when TC has an army of CofR specialists in Ottawa

and in every region. They don't know who does what.

I also note that Safety Letter publishes TC's condensed versions of Transportation Safety Board of Canada investigations. Unfortunately these versions are late by up to three years after the reports are released. These reports can contain information critical to the operation and maintenance of your aircraft. You can access them directly at the Board's internet site: <http://www.tsb.gc.ca/eng/rapports-reports/aviation/index.asp>

Most of the causes are flying problems but some are caused by manufacturing or by maintenance activities. In most of them there are lessons regarding company procedures and training.

A bigger source of accident reports is the (US) National Transportation Safety Board which is at the internet site : <http://www.nts.gov/investigations/AccidentReports/Pages/aviation.aspx>

In Europe, countries have their own accident sites that I can point out if you show interest.

The advertisement features a collection of power tools against a blue background with a faint pattern of tools. The tools shown include:

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

Below the tools is the USATCO logo, which consists of a globe with an airplane flying over it, and the text "NY USATCO CA" and "U.S. Air Tool Co." The logo is flanked by "NY" and "CA" in large letters.

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This is further evidence that Ottawa is running thinner on safety people who can contribute to the Safety Letter.

In the same issue, the Guest Editorial is by the Director, Aviation Security Policy, Aviation Security Directorate, Transport Canada. Managing area security is not a topic for people drawn to the Safety Letter. This is further evidence that Ottawa is running thinner on safety people who can contribute to the Safety Letters. At best, that is consistent with the push to SMS instead of Safety.

On a more positive note, I did receive a reply from TC Ottawa regarding the TC publication Civil Aviation Safety Alert (CASA) No. 2014-02. I asked for clarification of the term “artificial stall warning system”. The answer stated, “I think this article will help answer your two questions which explains the difference between a natural stall warning and an artificial stall warning system.”:

[http://flighttraining.aopa.org/magazine/1998/April/199804\\_Flying\\_Smart\\_No\\_Dumb\\_Questions.html](http://flighttraining.aopa.org/magazine/1998/April/199804_Flying_Smart_No_Dumb_Questions.html). I am pleased that it was “no dumb question”.

That’s all for now folks. Until next time, be good and do right.

Please be aware that I am not a lawyer or legal expert. What I write in my column is not legal advice or legal opinion. If you face a legal issue, you must get specific legal advice from a lawyer and preferably one with experience in the aviation matters in your own country/state.

*Editor’s Note: In our February/March 2015 issue on pages 30 and 33 the captions below two photos indicate that shoulder harnesses are now required for passengers. The document referred to is an Advisory Circular that is not mandatory. Note that CAR 605 does require that most aircraft have a shoulder harness for each front seat. The editor, who claims full responsibility for the misleading message, provided the wordings in those captions. Sorry for the misdirection, one and all.*

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

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# AME Association of Ontario

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## What's in it for me?

The success of our AME associations is dependent on two main factors. First: the volunteers who run the association and the dedicated people who organize our trade shows, symposiums and training courses. Second: the members who pay their dues and attend the activities that have been organized.

The recent cancellation of an AME workshop and subsequent financial hardship caused to one of our fellow associations is of concern to us all. The leadership at our associations is very dependent upon the various individuals who give of their time and energy to ensure that these groups continue to exist. Not all of our members need or want trade shows, workshops or re-current training. It is difficult to cater to everyone. When we sign up new members we are often asked: "What's in it for me?" They want to know what they are going to get for their membership fees. The standard reply is that there is a reduced entry for the annual symposium, workshops and other training sessions available during the year, as well as other benefits including some free aviation magazine subscriptions. The individual then decides whether they are getting their money's worth from this. No one takes into account the intangible benefits from membership.

Having an association that represents Aircraft Maintenance Engineers is, as they say, priceless. Whether an AME needs advice, is concerned about his licence privileges, or is apprehensive about the future, the association is available to help. You may not realize it, but our AME Associations are constantly monitoring the CARs CARAC process, Transport Canada Service Instructions, and proposed regulatory changes. We are continually ensuring that no licence privileges are lost, that licensing requirements are fair, and that training standards are accurate. For example: a few years ago Transport Canada began a process that was going to download the administrative function of issuing and renewing the AME Licence. To ensure that no outside group took over this function, our associations got together under the CFAMEA banner with a proposal to take this over. Eventually TC decided not to proceed with this idea.

We have representatives on most aircraft maintenance college Program Advisory Committees and we have delegates at the CARAC committees and working groups. In order to show our credibility we need to show a large membership base. We also need a large membership to cover the costs of these advisors and delegates; although they volunteer their time, it is only fair that we cover their expenses. Remember to renew your membership and urge others to join. What's in it for me? Now you know.

## Career Days

Our association had representatives at the two Careers in Aviation Expos held in February. Sam Longo was a session speaker for maintenance held February 7 at the Canadian Warplane Heritage Museum in Hamilton and Stephen Farnworth spoke at the Canadian Aviation and Space Museum in Ottawa on February 22. The day-long events featured four educational panels including helicopter and fixed wing pilots of varying disciplines; education and flight training; various aviation professional such as TSB inspector, air traffic controller, aviation sales, marketing and more; and maintenance and aerospace opportunities and educational paths.

The day also provided countless networking opportunities for young adults, as panelists and exhibitors shared key industry information with young aviators. Students also had the opportunity to tour the museums.

## Annual Workshop/Symposium

Planning continues for our annual AME Workshop scheduled for September 30-October 2. Please save the date to your calendar. Again this year we will be having two days filled with educational sessions as well as a full house of displays from industries supporting aircraft maintenance.

— Submitted by Stephen Farnworth  
For the Board of Directors



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

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# Atlantic AME Association



## About Us

The Atlantic AME Association is one of five similar associations across Canada; the others being the Western, Ontario, Central and Pacific associations. These associations represent regional interests, as well as, concerns of national importance. The Canadian Federation of Aircraft Maintenance Engineers Associations (CFAMEA) is a national body, which is supported and financed by all the regional associations and which represents the associations at the national level.

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

A separate committee under the auspices of the association runs an annual Conference. This workshop is a two-day event, which 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 the various

sessions held during the conference may be counted toward the recurrent training requirements required by Transport Canada.

### The Purpose And Objectives Of This Association Are:

1. To promote and protect the profession of the Aircraft Maintenance Engineer. To develop, maintain and improve representation and consultation with regulatory bodies that affect or may affect the profession of the Aircraft Maintenance Engineer;
2. To represent the views and objectives of the membership of the Association;
3. To promote and develop the knowledge, skills and proficiency of the profession of the Aircraft Maintenance Engineer through education, publication and research;
4. To cooperate and associate with groups, associations and organizations on matters of mutual interest;
5. To promote honourable practices among the membership and between persons in the aviation industry. The Association is non-union, non-sectarian and non-partisan.

email: [ben@cfamea.com](mailto:ben@cfamea.com)

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

# Western AME Association



## About Us

The Western AME Association is one of five similar associations across Canada, the others being the Atlantic, Ontario, Central and Pacific associations. These associations represent regional interests as well as concerns of national importance. The Canadian Federation of Aircraft Maintenance Engineers Associations (CFAMEA) is a national body which is supported and financed by all the regional associations and which represents the associations at the national level.

The Western AME Association is run by a volunteer group of AMEs who are elected by the member AMEs to the Board of Directors. The membership is comprised of AMEs, non-licensed personnel working

in the industry, students and apprentices as well as corporate members. A separate committee, under the auspices of the association, runs an annual symposium/workshop. This workshop is a two-day event, which 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 toward the recurrent training requirements required by Transport Canada.

email: [info@wamea.com](mailto:info@wamea.com)

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## 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).  
**email: pamea@telus.net**

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## Central AME Association



### About Us

The Central Aircraft Maintenance Engineer Association is an organization dedicated to maintaining and enhancing the standards, rights and privileges of all AME members in the central region of Canada. Our chapter is one of five similar associations across Canada that collectively supports the national body CFAMEA. Our organization works with Transport Canada in the formulation of new rules and regulations and provides a collective viewpoint for all AMEs. CAMEA

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

**email: camea@mymts.net**

**www.camea.ca**

## Central Ohio PAMA



### 2015 Maintenance Symposium

The site of the 2015 Maintenance Symposium was the Columbus State Community College Conference Center, located in the Center for Workforce Development Building, 315 Cleveland Avenue in Columbus, Ohio. The format was a one-day, multiple session event with presentations arranged by the FAASite Program Manager, Inspector Mark Harden and registration through the FAA Safety website.

This year's program included a selection of presentations by video teleconference and vendors. Jay Wilkins, manager of the Columbus FSDO, introduced his staff and inspectors from the Cincinnati FSDO were in attendance to handle their technician's IA renewals. Our keynote speaker was Greg Feith, retired NTSB Senior Air Safety Investigator and television news analyst for several cable news channels. He stressed several ways of breaking the chain of events that usually lead up to every aviation accident. He pointed out we should not be

bystanders when we see something dangerous or someone performing an incorrect or careless act.

His presentation included highlights of his career beginning with a Cessna 210 crash on a Colorado mountaintop when he was an Embury Riddle COOP with the Colorado NTSB office. He said that was the event that changed his path from aviation maintenance to a career in accident investigation.

In 1985, he was chosen for his relative youth to be the other inspectors in his NTSB office to go to Bolivia and investigate the crash of an Eastern Airlines Boeing 727 that flew into Mount Illimani on the arrival to La Paz.

The crash site was at 19,600 feet and prevented access for an initial assessment of the wreckage except by aerial photography. An estimated 50 feet of snow fell on the debris field before Greg's team of investigators and Bolivian mountain guides made the lengthy climb to the site. He almost lost his life when an ice-bridge broke through on

the climb and they found the tail section but the FDR and CVR had broken loose and they are yet to be found.

His presentation continued with other cases and accident investigations where some of the causes were obvious and preventable by using documented and accepted procedures and practices. In one of his final slides he asked us to count the three rabbits then showed us the slide. The slide appeared and then was replaced by another as he told us the importance of an investigator to not have preconceptions on what they'll find. He then showed us the slide again and said you could also see three ducks!

We want to thank Mr. Feith for his informative slide show, Mark Harden and the other FAA representatives and presenters for the information they shared and all who attended the 2015 Maintenance Symposium.

We also want to thank the Vendors at the Symposium for providing the snacks for the morning and afternoon breaks and raffle prizes for the COPAMA raffle. Please support them through your patronage. For other information and updates about the Symposium, please visit the CSCC AMT Symposium webpage.

### **COPAMA/GE District Seven Science Day Awards**

On Saturday, March 21, Jim Kulp of G.E. and Joe Lippert, Earl Redmond and Lowell Dowler of COPAMA attended and judged six aerospace related entries for this year's GE/COPAMA Science Day Awards. Our 2015 winners received a crystal diamond shaped award from G.E. and a monetary award from the COPAMA Scholarship Fund.

### **Avionics Mandates**

This month's meeting on February 10 featured Brad Primm, President of Lane Aviation and his presentation: "Avionics Mandates and What's New at Lane Aviation."

The evening started with a light dinner of subs and chips provided by Lane, then a short update on upcoming events by COPAMA

President Joe Lippert. The Maintenance Symposium in March and the possible topics for April and May were discussed.

Mr. Primm then started his presentation that was both informative and entertaining with the main topic of upcoming mandates and intermixed "infomercials" about Lane Aviation History, Services and Highlights.

We'd also like to thank Ed Bannen of Honeywell who helped explain some of the many acronyms that appeared during the PowerPoint presentation and the other attendees who participated in the technical discussion. The equipment review included units from the 978 MHz UAT boxes for light aircraft to TSO certified units for up to Air Transport Category aircraft.

Lane Aviation was incorporated on May 1, 1935 by Foster Lane and will celebrate their 80th year of operations this year. They were around and operated out of Ohio State University Airport during World War II helping train Navy Cadets while Port Columbus was taken over for military manufacturing. They also were around to witness the creation of the FAA and NASA in 1958 and opened one of the first FAA Repair Stations in 1963.

The Lane ramp was the start of Jerrie Moch's first female solo flight around the world on March 19, 1964 and finished there 30 days later on April 17. Our own COPAMA member Cliff Kelling, who served on our Board of Directors, was a big part of preparing her Cessna 180 "The Spirit of Columbus" for that exceptionally long trip. This year's Maintenance Symposium will occur on the 51st anniversary of her departure.

Brad also announced Lane's General Aviation Customs terminal at the east end of their complex, new de-icing trucks entering service and construction of new facilities at the west end near the FAA Control Tower. We want to thank Brad and Lane Aviation for the presentation and use of their facility and to all who bought tickets and provided prizes for the raffle, which helps support the COPAMA Scholarship Fund.

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

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## **PAMA SoCal Chapter**



### **February 2015 Meeting Wrap**

The SoCal Chapter would like to thank Greg Piland, Repair Station General Manager, Mike Struble, A&P Mechanic/Inspector, Aircraft Window Specialist and all at Lee Aerospace for their time and generosity in hosting the February 2015 Chapter dinner meeting and

excellent technical presentation and demonstration on "Aircraft Window Inspection & Construction" at the 94th Aero Squadron Restaurant in Van Nuys, California. To learn more about Lee Aerospace, visit [www.leeaerospace.com](http://www.leeaerospace.com) or contact your local Southern California rep Mike Struble directly (316) 689-1236.

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

# Sending out signals )))



**That's not Voodoo science going on in the Air Traffic Control tower, nor is it rocket science. But there is a whole lot of tech. Here's how some of it breaks down.**

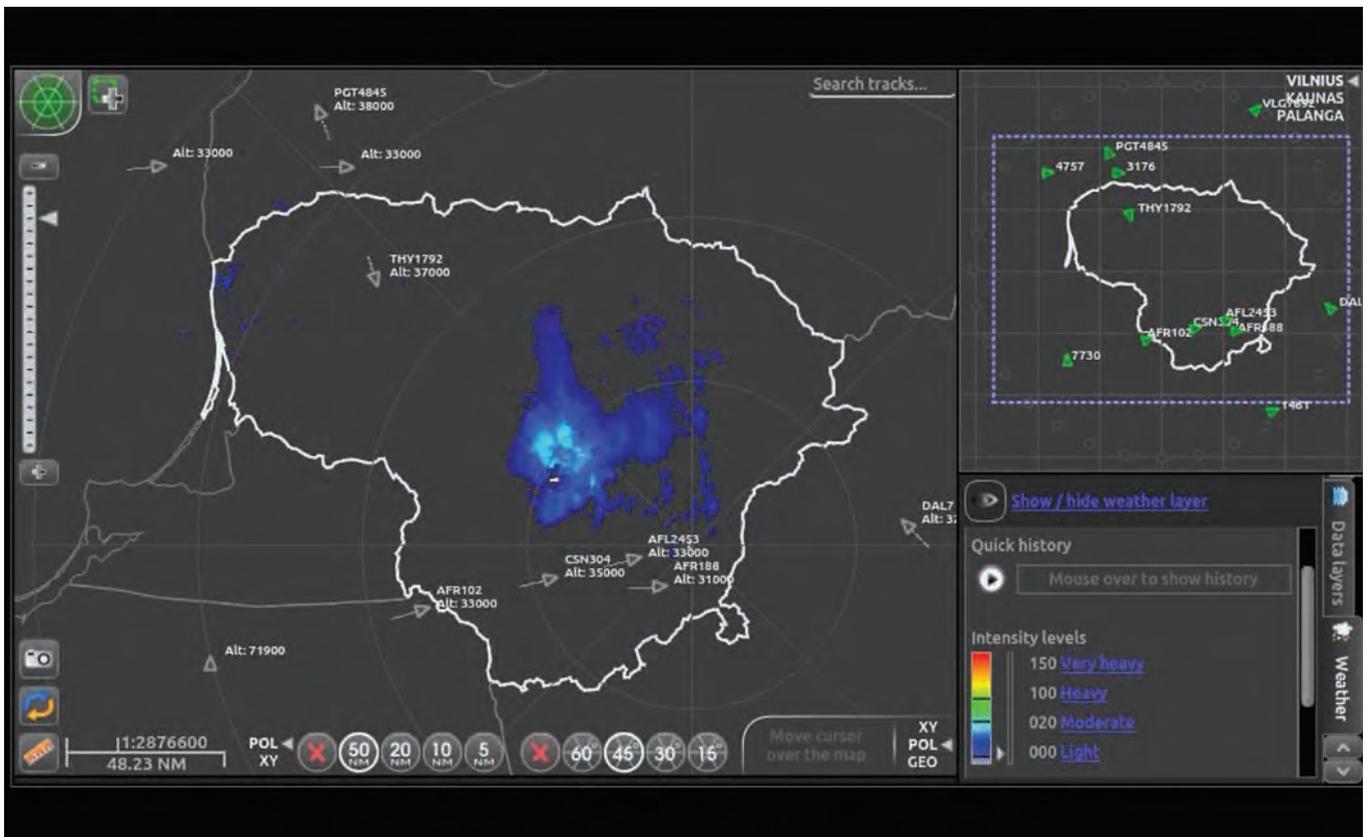


BY GORDON WALKER, AME 'E'  
Professor of Avionics, Centennial College

**A**viation has always captured the imagination of the general public because much of it seems mysterious and puzzling to those on the outside of the industry. Like a magician's trick, the secret of getting the caramel into those little chocolate squares of that trademarked, un-nameable chocolate bar; or what kind of meat is contained in the wonton soup dumplings, the wonders of the flying world are questions without answers to most members of the public. Further, there is perhaps no area of aircraft operations more enigmatic than that of the Air Traffic Controller. At best, most of us know only the stereotypical Hollywood version of the harried air traffic controller

chain-smoking in a darkened room as he juggles dozens, if not hundreds of flights, all of which are in danger of running out of fuel/crashing into one another/being flown by passengers because the pilots have died of food poisoning, or experienced some other similarly tragic crisis. This notion is of course very far removed from the reality of the situation. Controllers are NOT allowed to smoke on the job any more.

A recent conversation with a neighbour revealed that he was a retired controller, who worked at Toronto's Pearson airport during the same period of the late 1980s as I did. We realized that we had in fact spoken to one another on the ground control frequency (121.90 MHz) many times back in those days of big hair and bad music. It occurred to me that apart from the occasional request for a radio check or tow clearance to move an airplane, and a common, shared disdain for those who fly and break those airplanes, aircraft maintenance engineers and air traffic controllers really don't know



Above: Primary Surveillance Radar.

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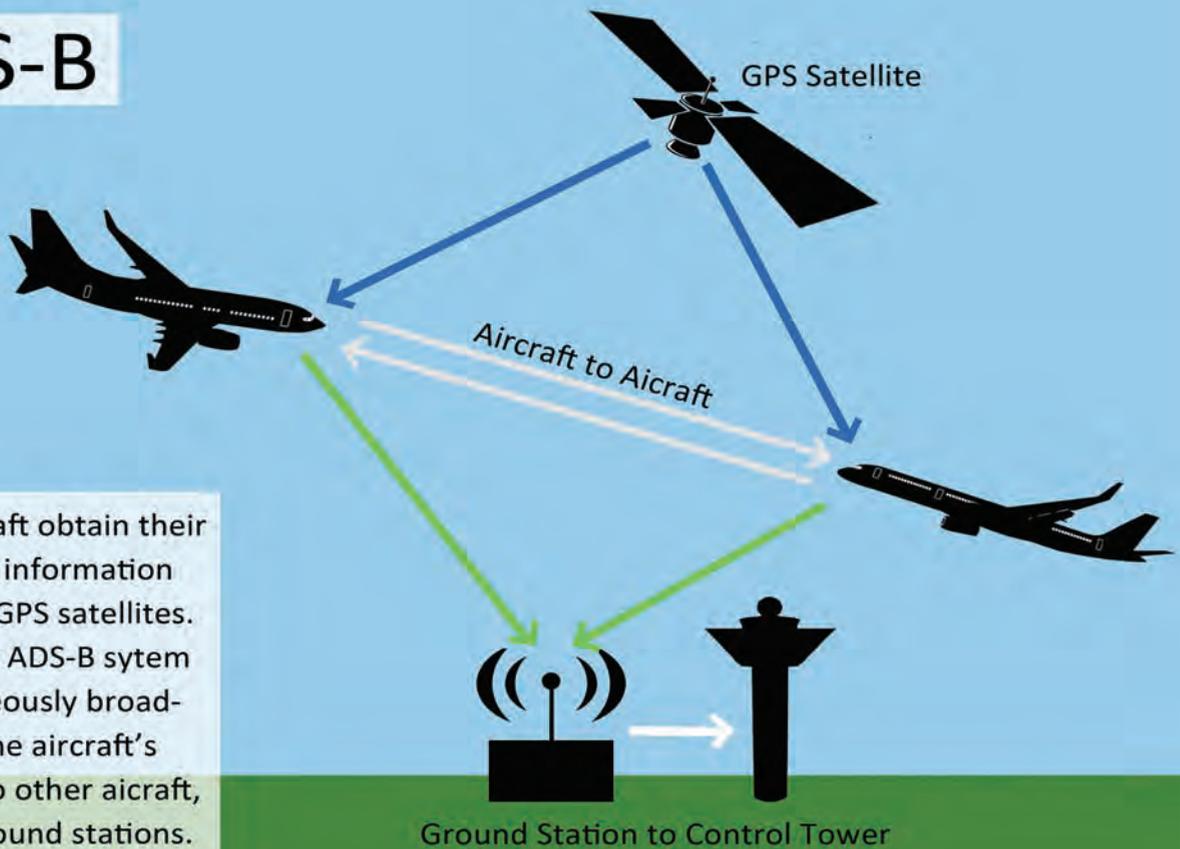
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# ADS-B



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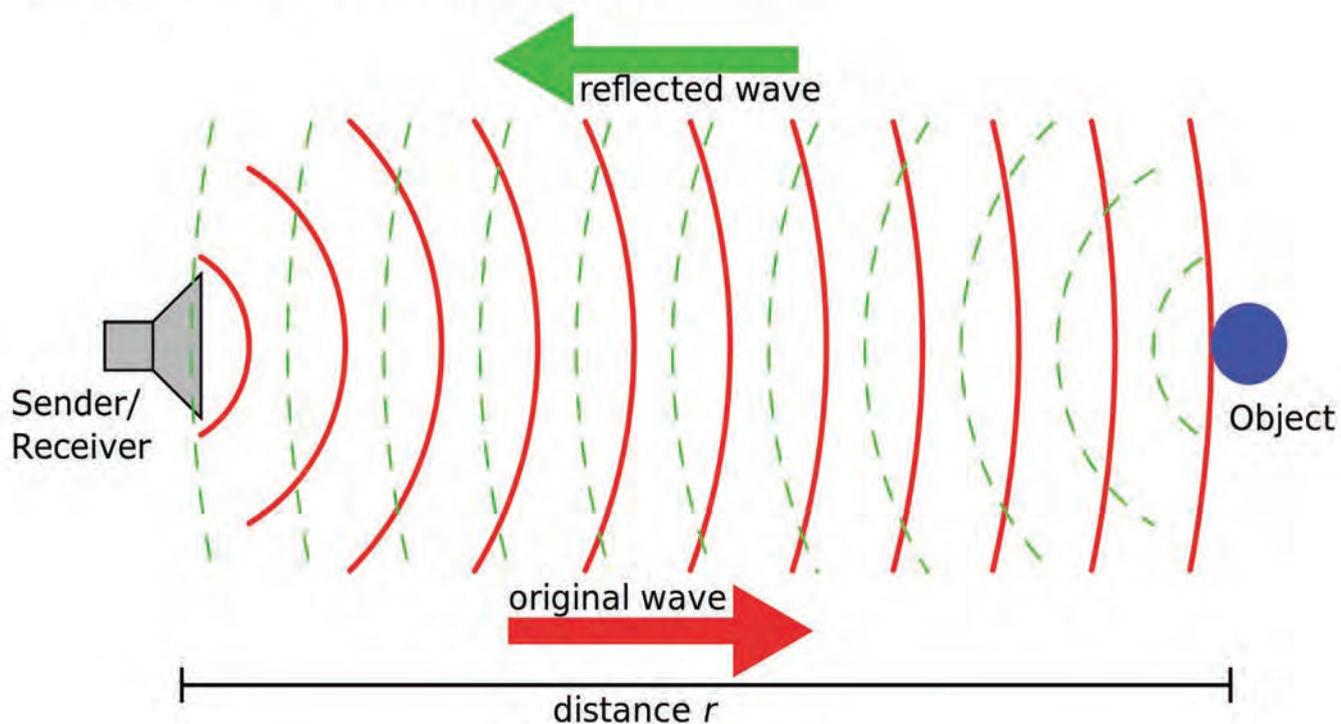
much about one another's world. I will attempt to rectify that situation by providing a little insight into the workings of the Air Traffic Control (ATC) system.

Most of us are aware of the avionics device known as the ATC Transponder, and we know it has something to do with letting controllers know where the aircraft is located. However, its full function, and theory of operation remain somewhat sketchy to many in the aircraft maintenance world. Fear not... all will be revealed!

The aircraft's ATC transponder is simply a radio capable of both transmission and reception. (Hence called a "Transceiver".) Rather than receiving and transmitting voice communications, like the VHF Com radio used by pilots to talk to the ATC controllers, the ATC transponder receives and transmits short bursts of radio frequency (RF) energy, known as "pulses". Those large, rotating dish antennas you see at the airport are transmitting pulses, which will be received by the aircraft's transponder.

When the transponder receives those pulses, it knows that it is being

# The Sonar Principle



“interrogated” by the ATC rotating dish antenna, and it automatically begins to transmit “reply pulses” back to that rotating antenna. Those reply pulses are processed and routed to the ATC controller’s screen to provide a visual indication of the aircraft’s position, identification, and, if the transponder is operating in Mode “C” the altitude of the aircraft. The position of the aircraft is determined by synchronizing the sweep of the rotating antenna with the sweep of the controller’s video display. For example if the reply pulses are received when the antenna is pointing north, it means the aircraft must be north of the airport.

The distance of the aircraft from the antenna is determined by measuring the elapsed time between interrogation and reply. The four-digit selector on the transponder’s control head allows the pilot to enter a code that will determine the pattern of reply pulses transmitted, and enable the controller to better identify the aircraft sending those pulses. Certain codes are used to signify specific information to the ATC facility.

For example, if the pilot selects a code of “1200” this identifies the aircraft as operating under Visual Flight Rules (VFR). Other codes are used for emergency situations, such as loss of communications radio or hijack alert. If the transponder is operating in Mode “C” the reply pulses will be sequenced in such a way as to convey the pressure altitude of the aircraft to the ATC facility. This altitude information comes from the aircraft’s altimeter, air data computer (ADC) or some other type of altitude sensing device aboard the aircraft.

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A vital part of communication between the control tower and aircraft: the aircraft's ATC transponder, which is a radio capable of both transmission and reception. (Hence called a "Transceiver".)

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The rotating dish antenna we discussed is actually known as the Primary Surveillance Radar (PSR) and attached to it is another antenna called the Secondary Surveillance Radar (SSR) antenna. It is the SSR that actually sends and receives the interrogation and reply pulses, with the PSR simply receiving the reflected RF energy from the aircraft's metal airframe. This method of surveillance radar has been the world standard for ATC since the beginning of controlled airspace, and clearly, despite its limitations, it has worked quite well for several generations.

As Bob Dylan observed way back in the 20th Century, the times they ARE a-changing, and with that comes the next generation of all things...including avionics systems, and air traffic control technology. The FAA's so called "Next Generation" of ATC is largely based on the use of the new method of air traffic control known as Automatic Dependent Surveillance Broadcast. (ADS-B) Although conceptually quite simple, ADS-B is radically different from the old radar-based surveillance systems. Rather than having an airborne transponder which replies to ground based interrogations, the ADS-B system uses the aircraft's global positioning system (GPS) to determine its position, and in turn transmits this information (and much more) to not only the ATC facilities, but to any other appropriately equipped aircraft in its vicinity. Using the aircraft's GPS and onboard computers, the ADS-B transmits information such as aircraft identification, position, altitude, heading, and velocity.

It is also capable of receiving this same information from all other ADS-B equipped aircraft within range. This provides flight crews with air traffic information previously only available to the ATC controllers, thus reducing collision risk by increasing situational traffic awareness. This is of tremendous importance in regions such as Canada's Hudson Bay area, where surveillance radar has never previously been available. Additional information such as weather, terrain (for moving map displays) and traffic information broadcasts, including notifications of temporary flight restrictions/notices to airmen (TFR/NOTAMS) can

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also be received by aircraft employing universal access transceivers (UAT) as part of their ADS-B installation.

The spin-off benefits of ADS-B include expediting climbs to more efficient altitudes, reduced separation time/distance between aircraft, multiple approach paths, reduced time in holding patterns, all of which reduce expenses, delays, and environmental damage.

One must also ponder the effect of ADS-B on the requirement for air traffic controllers. With pilots able to monitor all traffic in their immediate vicinity, is the requirement for ATC controllers as great as it once was? Will we eventually see ADS-B systems coupled to the aircraft's autoflight system, such that the aircraft can automatically perform collision avoidance manoeuvres? Will this mean we can eliminate the need for both pilots AND controllers? I don't know... but I'm confident we'll still need somebody to fix those airplanes once they land.

**Q:** What is the primary difference in the theory of operation between sur-

veillance radar (ATC transponder) and ADS-B?

Answer to previous question:

**Q:** Which interphone system is typically a "NO GO" item?

**A:** You should consult the MEL to find out, but it will likely tell you that the "FLIGHT" Interphone system must be operational.

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

# Seven Questions about Borescopes



If you've ever had the need to diagnose in tight, tough-to-reach places, then read on.

**H**elicopter maintenance professionals frequently use borescopes to look inside engines or places inside a helicopter that are not otherwise visible without disassembly. Since disassembly can create more problems and is time consuming, borescopes allow us to effectively diagnose problems or determine the soundness of components while saving time and money. Here are answers to some common questions about borescopes.

**Q:** When purchasing a borescope, how should I determine which probes, extensions and the type of lighting are used around the camera lens? What type of lighting control is best to have?

**A:** In determining which scope is right for your helicopter inspection, it is important to know the length

needed to reach the area of inspection, and the diameter of the space you need the scope to pass through. It is also important to consider image resolution quality, the need for a 90-degree side view, and whether or not you require four-way or two-way articulation. The amount of bends required to reach the area of inspection can play a factor on the size of the scopes outer diameter. For example, if the inspection area has a lot of bends a smaller diameter scope will be more efficient as it will be able to make more turns.

In the same respects, a larger diameter scope has a limited bending radius. This needs to be considered, as it will restrict the inspector from making 90-degree bends or passing through guide tubes. Machida offers high-quality flexible borescopes with diameters as small as 2.4mm with articulation and HD Video Recording.

**Q:** How important is the digital quality of the camera in the borescope?

**A:** The quality of the scopes internal camera plays a huge role with the image output. With new camera technology available in today's market place, you now have access to cameras as small as 1mm x1mm without losing any resolution quality. These smaller high-tech cameras paired with high-resolution processors, allow inspectors to get into narrow places while also being able to take photos and video in high-definition.

**Q:** How important is the light source and control of it?



**The Slim Lever Type Scopes are available in diameters from 1.5mm to 6.0mm and can be customized. The smooth two-way angulation is excellent and allows for inspections into remote areas.**



**Machida DP7-7070 processor with video recording.**

**A:** The amount of lighting needed is very dependent on the type of inspection to be performed. New LED technology allows for more white light than older halogen lamps. Machida has recently introduced a videoscope with an auto LED lighting feature that adjusts automatically to the amount of light needed and can also be manually adjusted by the push of a button on the ergonomic handle. This saves time for the operator and assures the inspector has the required lighting for the job at hand.

**Q:** What are the pros and cons of using a joystick controller?

**A:** Videoscopes with joystick articulation allow the operator to easily control the distal tip 360 degrees. Since there can be many passes needed to make the proper inspections, a joystick controller makes it hard to revisit and navigate the scope back to the point of inspection. This can make it difficult to quickly revisit the area and

can be time consuming. However, with a knob type scope such as Machida has, you can feel the clicks which helps you navigate back to the inspection site. Machida also offers guide tubes that can assist with getting back to the point of inspection quickly and accurately. Using the correct guide tube for your engine inspection can lessen inspection time, getting your helicopter back in service quicker and avoids costly scope repairs.

**Q:** What is the correct way to use the borescope?

**A:** A borescope is an investment that can save thousands of dollars when used properly. The operator should always read the borescope manual of operation before operating the borescope and become familiar with its options and capabilities. After using the borescope, it should be cleaned and stored properly in its case. Machida recommends that there be an operator logbook kept of when the unit is used and returned back to its proper storing area.

**Q:** I have a limited budget. What considerations should I have regarding cost?

**A:** You want to be sure the borescope you purchase meets your needs. Choose the best value borescope for the job you need it to do, realizing that best value doesn't mean lowest cost!

**Q:** Should the borescope manufacturer provide free training on the product?

**A:** Not all manufactures provide free training. There are boscopes that are easy to use where just the provided instruction manual is sufficient. More complicated products, such as boscopes with a measuring capability require special training. Machida has been known for over 40 years for our quick response to inspection and maintenance operator questions. Our scopes are ready to use upon delivery and our staff is always a phone call away to assist with any technical concerns or borescope questions.

*(Thanks to Machida Borescopes for this product background. [www.machidascope.com](http://www.machidascope.com))*



# Running out of time



**Oil starvation and a clear status report from a pilot in distress bring drama to coastal Florida skies.**

**O**n January 4, 2013 at 1419 eastern standard time, a Beechcraft H35, N375B, owned and operated by a private individual, experienced a loss of engine power while in cruise flight and was destroyed when it impacted a house, while on approach to the Flagler County Airport (XFL), Palm Coast, Florida.

The pilot and two passengers were fatally injured. Instrument meteorological conditions prevailed and an en route instrument flight rules (IFR) clearance was obtained for the flight, which departed Saint Lucie County International Airport (FPR), Fort Pierce, Florida, and was destined for Knoxville Downtown Island Airport (DKX), Knoxville, Tennessee. The personal flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91.

The airplane arrived at FPR after flying from St. La Maris, Bahamas. The passengers cleared U.S. Customs about 1145. The airplane was subsequently refueled, and departed for DKX under visual flight rules.

According to air traffic control information provided by the Federal Aviation Administration (FAA), the pilot contacted Daytona Approach control about 1407, and reported vibrations and an “oil pressure problem.”

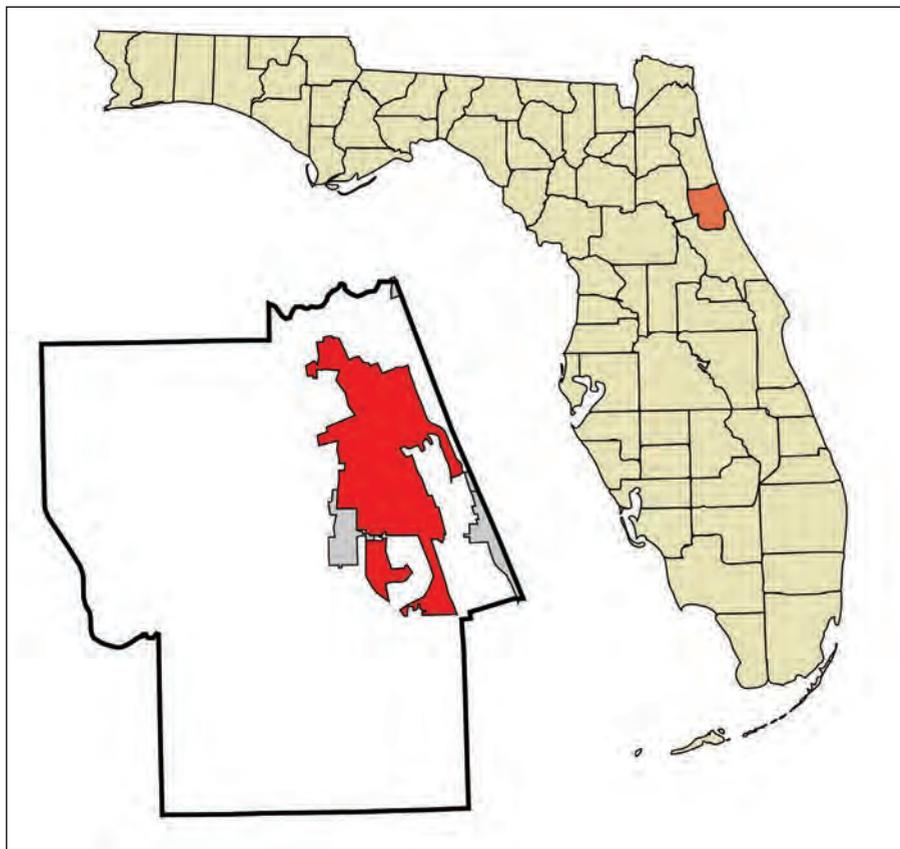
The controller advised the pilot that the airports in the area were IFR with cloud ceilings of 900 to 1,000 feet above ground level. The pilot received radar vectors for an airport surveillance radar approach to runway 29 at XFL, which was about eight miles north of the airplane’s position. At 1411:06, the pilot reported that the engine oil pressure was “zero” with “cool cylinders.” At that time, the airplane was flying at an altitude of 5,300 feet mean sea level (msl), and was located about 2.5 miles from the approach end of runway 11, at XFL. The airplane continued to be vectored to a point about 6.5 miles northeast of the airport and was provided headings to the south and then west, to the final approach course for runway 29. The airplane was subsequently cleared to land about 1416. Radar

contact with the airplane was lost when the airplane was about two miles from the runway, at an altitude of 200 feet msl. At 1418:27, the pilot transmitted "...we need help; we're coming in with smoke." There were no further communications from the airplane. The XFL airport director observed the airplane as it approached runway 29. He described the weather conditions as instrument meteorological conditions with a low ceiling and mist. He observed the airplane "break out" of the cloud layer, very low, just above the tree line. The airplane's wings were level as it descended and disappeared in the tree line.

Another witness, who was an airline transport pilot and flight instructor, reported that the airplane looked "slow" as it exited clouds, was in a nose high attitude, and appeared to "stall" prior to descending below the tree line, with smoke following about 10 seconds later.

**Personnel Information**

The pilot, age 58, held a private pilot certificate, with ratings for airplane single-



**Location of the crash in Flagler County, Florida.**

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engine land and instrument airplane. The pilot's logbooks were not recovered. His most recent FAA third class medical certificate was issued on December 31, 2012. At that time, he reported a total flight experience of 1,300 hours, which included 30 hours during the previous six months. The pilot reported 1,100 hours of total flight experience, with 50 hours during the previous six months on an FAA medical certificate application dated February 4, 2010.

### Aircraft Information

The four-seat, all-metal, low-wing, retractable-gear airplane was manufactured in 1957. It was powered by a Continental Motors IO-470-C1, 250-horsepower engine and equipped with a Beech 278 propeller assembly. According to Beechcraft, the airplane was originally manufactured with a Continental Motors O-470-G series engine, which could be modified post manufacturer with a fuel injected engine per Beech Kit 35-648, "Engine Conversion to Fuel Injection on the Beech Model H35 Bonanza." No documentation for the engine that was installed on the accident airplane was found.

The airplane was found to have been modified with the addition of 15-gallon fibreglass wingtip fuel tanks, which would have included a wingtip tank fuel transfer pump mounted in each respective wing's wheel-well, to allow fuel to be transferred from each wingtip fuel tank, to its respective wing. There was no record of a supplemental type certificate for the installation of wingtip fuel tanks found in the airplane's FAA airworthiness file.

According to FAA records, the pilot purchased the airplane on May 30, 2008, though the airplane's maintenance records were not located. According to an FAA inspector, it was reported that the pilot traveled with his personal logbook and the airplane's maintenance records onboard the airplane. Additional information obtained by the FAA inspector revealed that the engine's No. 1 and No. 4 cylinders were replaced due to low compression during early December 2012; however, no work orders or other associated documentation could be located.

A friend of the pilot reported that he believed that the airplane's last annual inspection was performed around September-October 2012. He stated that he was not aware of any previous engine issues with the airplane, except for a small oil leak.

In a written statement, the lineman who refueled the airplane at FPR reported that he noticed "visible oil leaks" on the airplane's nose gear strut. In addition, after he informed the pilot of a fuel imbalance prior to refueling, the pilot informed the lineman that the airplane's right fuel pump was not working.

### Meteorological Information

The weather reported at XFL at 1350 was: wind 360 degrees at seven knots, visibility three statute miles, ceiling 900 feet broken, 1,400 feet overcast, temperature 15C, dew point 13 C, and altimeter 30.22 in/hg.

## Communications

The following information, which contains excerpts of recorded communications, was obtained by an NTSB air traffic control specialist through interviews and review of communications and radar information obtained from the FAA:

At 1349:34, the pilot contacted Daytona Beach approach control and reported that he was at 4,500 feet. Eight minutes later, the pilot requested a climb to 6,500 feet. The approach controller informed the pilot that they had received a pilot report (PIREP) reporting that the cloud tops were at 7,000 feet. The controller advised the pilot to maintain at or above 7,000 feet, and remain in VFR conditions. The pilot complied and climbed to 7,500 feet. At 1407:01, the pilot reported, "...we got a vibration in the prop, I need some help here." The approach controller informed the pilot that the closest airport was at his 12 to 1 o'clock position and five miles, and asked him if he was instrument flight rules (IFR) capable and equipped. The pilot stated, "I'm IFR, we're just getting a little vibration. We've got an oil pressure problem; we're going to have to drop quickly here." When asked to clarify the nature of the problem, the pilot stated, "...we got a propeller or something going, I'm backing it up here to see."

According to the approach controller, Ormond Beach Airport, which was located approximately six miles to the southeast of the airplane's position, was considered briefly, however, because runway 8/26 was closed for construction and there had been a strong tailwind for runway 17, that airport was not an option. The approach controller subsequently cleared the flight to XFL, instructed the pilot to descend and maintain 2,000 feet.

About 1408, the approach controller instructed the pilot to continue his present heading, and informed him that he would get him as close as he could to the Flagler airport for a runway 29 approach. He advised the pilot that the weather ceiling at XFL was 900 feet, and that an instrument approach was necessary. The controller subsequently asked the pilot if he could accept an airport

surveillance approach (ASR) into XFL and the pilot replied that he was "...lovely with that." (An ASR approach was a type of instrument approach wherein the air traffic controller issued instructions for pilot compliance based on an aircraft's position in relation to the final approach course, and the distance from the end of the runway as displayed on the controller's radarscope).

Flagler County Airport did not have a published ASR approach. The controllers determined that to best handle the emergency it was necessary to offer the pilot an unpublished ASR approach to runway 29 at XFL using area navigation (RNAV) approach minimums. This determination was based on the information obtained from the pilot, and the need for the pilot to conduct an instrument approach into the airport due to the IFR weather conditions.

At 1409, the pilot checked in with the arrival controller and reported he was at 7,000 feet descending to 2,000 feet. The arrival controller instructed the pilot to descend and maintain 3,000 feet, and to turn right to a heading of 060 degrees. According to the arrival controller, he assigned the airplane 3,000 feet because he wanted to ensure the airplane was high enough to remain clear of an antenna that was located northwest of XFL.

About 1410, the controller advised the pilot to expect an ASR approach to runway 29 at XFL.

At 1411:06, the pilot reported, "...we got zero oil pressure, but we've got cool cylinder head temperature." The controller acknowledged the pilot's transmission and instructed the pilot to turn right to a heading of 090 degrees and to descend and maintain 2,000 feet.

At 1411:47, the controller informed the pilot that he would provide guidance along the RNAV runway 29 approach and that the straight in minimum descent altitude (MDA) was 560 feet.

At 1413:46, the controller instructed the pilot to turn right to a heading of 180 degrees and advised that the airplane was about six miles east-northeast of XFL on "a base leg for about a four and one-half to five mile final." The pilot acknowledged the turn and said, "...we're starting to see some ground here."

At 1414:27, the controller instructed the pilot to descend to 1,600 feet and to turn right, to a heading of 200 degrees.

At 1415:01, the controller informed the pilot that the airplane five miles southeast of XFL. About 35 seconds later, the controller provided the pilot turns to intercept the final approach course and informed the pilot that he was four miles straight in for runway 29, which the pilot acknowledged.

About 1416, the controller informed the pilot that the airplane was three miles from the runway, asked him to advise when he had the airport in sight, and cleared the airplane to land on runway 29.

At 1417:25, the controller told the pilot that the airplane was below radar coverage, instructed him to contact the XFL tower, and provided missed approach instructions, "if you don't have the airport in sight, climb straight ahead to 2,000 [feet]."

At 1417:59, the pilot transmitted, "...do you read me?" The controller immediately responded that he had him loud and clear and asked the pilot if he

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## ... examination of the propeller blade by an NTSB metallurgist revealed evidence of exposure to temperatures that approached the melting point of the blade ...

had the airport in sight at his 12 o'clock and a mile. The pilot did not respond.

At 1418:27, the pilot transmitted, "...we need help; we're coming in with smoke." The arrival controller informed the pilot that Flagler Tower was waiting for him, and that he was cleared to land.

At 1418:55, the XFL tower controller called the arrival controller and informed him that the airplane did not make it to the airport.

### Wreckage Information

The airplane impacted trees and a residence about 3/4 mile from the approach end of runway 29, slightly left of the extended centerline. The initial impact point (IIP) was identified as a pine tree that was about 60 feet tall and contained broken limbs about 30 to 35 feet above ground level. Various components of wreckage extended from the IIP, on a heading of 288 degrees magnetic for 50 feet. The remainder of the airplane impacted the roof of a detached single family home and a large fire ensued, which destroyed most of the airplane and dwelling.

The airplane's left outboard wing, with about one-half of the corresponding aileron attached, displayed evidence of a tree strike and was found at the base of a tree located about 60 feet from the back of the house. The inbound portion of the left aileron was observed near the right wing, which was inverted and located along the back of the house. The empennage came to rest inverted on the backside edge of the roof alongside of a section of the right wing inboard leading edge. Other remains of the fuselage and left wing were found inside the house. Examination of the airplane's flight control cables did not reveal evidence of any pre-impact failures. The right flap actuator remained intact and was observed in a flap-retracted position. The landing gear actuator was not observed and the pre-accident position of the landing gear could not be confirmed.

The engine was found inverted on the floor of the house. It sustained a significant amount of thermal and impact damage, which destroyed all accessories, with the exception of the propeller governor, which was intact, but fired damaged. A large hole was observed in the crankcase, which contained a portion of the No. 4 connecting rod. The engine was forwarded to Continental Motors Inc., Mobile, Alabama, for further examination.

The propeller remained attached to the crankshaft flange. The spinner was dented and did not display spiral dents. Both propeller blades displayed light chordwise scratches. The outboard section of one propeller blade was missing about four to six inches of its tip. The propeller blade was cut inboard

of the missing section and forwarded to the NTSB Materials Laboratory, Washington, DC, for further examination.

Subsequent teardown of the engine under the supervision of the NTSB investigator-in-charge revealed that the crankshaft exhibited lubrication distress, thermal damage, and mechanical damage at the No. 4 connecting rod journal. The crankshaft oil transfer passage at the No. 4 journal sustained mechanical damage and contained displaced journal material. The remaining crankshaft oil transfer passages were unrestricted. Only fragments of the No. 4 connection rod bearing were recovered and they displayed lubrication and thermal distress. In addition, the number No.4 connecting rod was fractured at the base of the I-beam and exhibited extreme thermal and mechanical damage consistent with a loss of lubrication. The oil galleys and passages in the left and right crankcase halves were intact, clear, and unrestricted.

Subsequent examination of sectioned propeller blade by an NTSB metallurgist revealed that it exhibited extensive evidence of exposure to elevated temperatures that approached the melting point of the blade. This included complete removal of the paint, a thick oxide skin, and internal slumping of the blade material. The blade fracture surface exhibited characteristics consistent with separation while at elevated temperatures. The blade also showed a gradual deformation toward the camber side adjacent to the fracture. The deformation was accompanied by transverse cracking and stretching of the oxide layer on the flat side of the blade indicating deformation after or during high temperature exposure.

### Medical and Pathological information

An autopsy, performed on the pilot by the Office of the Medical Examiner, District 23, St. Augustine, Florida, determined the cause of death as "multiple blunt force injuries." At the time of the accident, the pilot was using medication for hypertension and had well-controlled diabetes. It was unlikely that either condition significantly affected the pilot's performance at the time of the accident, the medical examiner concluded.

### Probable Cause of Crash

The National Transportation Safety Board determined the probable cause(s) of this accident as follows: A total loss of engine power after the failure of the No. 4 connecting rod due to oil starvation, which resulted in a subsequent forced landing. Contributing to the accident was the pilot's failure to clearly state that the aircraft had lost all power and the air traffic controllers' incomplete understanding of the emergency, which resulted in the controllers vectoring the airplane too far from the airport to reach the runway. ■

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## A Touch of Grey

Too many ageing Aircraft Maintenance Engineers are a clear sign something is amiss.

An ongoing topic with aircraft maintainers and federal authorities is the unique issues that arise keeping ageing aircraft aloft. The “age issue” is also emerging as a major factor pertaining to the folks that fix them. Walk into most aircraft maintenance hangars and you will likely discover a large proportion of the personnel are sporting grey and thinning hair.

This “touch of grey” phenomenon is not entirely without merit. Just as the flying public lets out a silent sigh of relief as they witness their uniformed captain step on to the aircraft with sufficiently grey temples, most people trust age and experience when their safety is at stake. Despite being somewhat less glamorous, this also holds true for the pilot’s number one partners in safe aviation, the AMEs who maintain these complex flying machines.

Current Transport Canada statistics list 13,332 Aircraft Maintenance Engineers in their database. Statistics Canada’s most recent (2006) study of the industry shows the number of Aircraft Mechanics and Inspectors at 15,600. The disparity in numbers is likely due to job descriptions and technicians in the workforce without Transport Canada licence status.

The revealing component of these 15,600 skilled workers relates to their age. Two-thirds of our aircraft maintainers, approximately 10,900, are between 35 and 74, and the survey, being from 2006 now means that the lowest age is actually 44. Add to these statistics the reality of growth in aviation, estimated at a conservative seven per cent (2008-2018) and we start to see potential problems. This scenario is perhaps not of crisis proportions but certainly worthy of serious attention. Will we in fact have enough AMEs in 2020 and beyond to support our growing aviation need?

One of the ongoing discussions at our monthly AME association meetings is the lack of interest in younger people entering our trade. This appears to be a common scenario across all technical trades, so we are not alone. However, after having taught aircraft maintenance for 22 years at Centennial College, I have witnessed firsthand some of the challenges that have plagued the nearly 3,000 graduates who passed through my classroom door. All of the Transport Canada accredited colleges do a fine job recruiting and training potential new candidates for AME licences. The tricky part seems to be the transition from new apprentice to qualified Aircraft Maintenance Engineer. Not surprisingly, the first hurdle, for these maintenance fledglings, is low wages. Add to that a very real expectation of serious responsibility along with daunting

federal exams and lengthy logbook requirements, and the starry eyed visions of careers in aviation quickly fade.

I recently ran into two ex-graduates of mine in a coffee shop. It is always a pleasure when such chance encounters happen and the discussion drifts to their current employment. In this case, one was teaching computer software and the other was working as an auto mechanic. Despite a true love of aviation, both of these individuals had to survive, so a career in aircraft maintenance was abandoned. This scenario is far too common. We need to save as many as possible.

Harold “Rex” Terpening definitely had that drive and determination. An early Air Engineer and author of “Bent Props and Blow Pots” in the summer of 1933, he shoveled coal 12 hours a day on a stem-wheeler ship out of Fort McMurray. His goal was to save enough money so that he could work for “free” to finish his Air Engineer apprenticeship. His adventures in the north are legendary and his career long and rewarding. Now a figurehead in many Aviation Halls of Fame, he perhaps epitomizes the right stuff required to pursue the aircraft maintenance dream. Determination also seems to have affected his longevity. This coming July 23, Rex will celebrate his 102nd birthday!

Rex did what was necessary to achieve his goal, and some of that spirit must be inherent in all apprentice AMEs. However, that is only a small part of the equation for a healthy aircraft maintenance future. We, as an industry, must also do what is right to support our next generation. Perhaps it is time for more government sponsorship to help “top up” struggling apprenticeship wages, rewarding companies for investing in new blood. AME Associations across Canada already do great work by providing student bursaries and promoting our profession at career fairs and trade shows, but we need to do more. Transport Canada could work harder to streamline apprentice logbook procedures, which seem to be the most challenging part of licencing requirements. This, in turn, could relieve some of the frustrations in obtaining the elusive licence and its resultant higher wages.

We all need to pull together to ensure our future remains aloft, not grounded by lack of vision and insufficient qualified technicians. AMEs and the greater aviation community must take up the challenge to actively promote and mentor our youth. The future of safe aviation in Canada may well depend on it. *For more published writing by Sam Longo, please visit [www.samlongo.com](http://www.samlongo.com)* ■

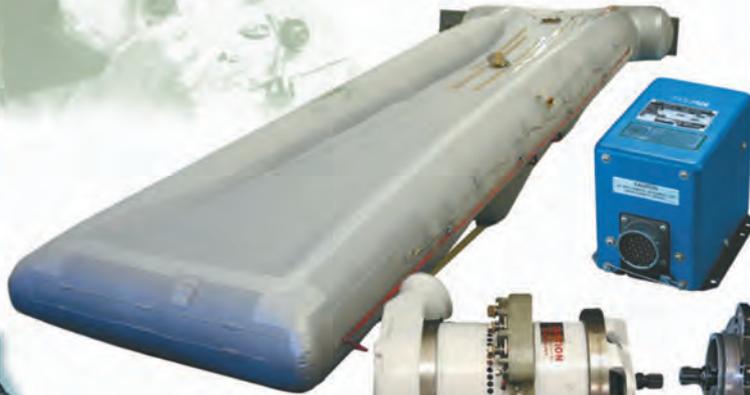
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