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

AMU

AirMaintenance UPDATE

The Magazine for Aircraft Maintenance Professionals

Transport Canada Approved for R/T

Data for major repairs and modifications

2014 Recurrent Training Exam

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

June - July 2014
Volume 13/Issue 1

$7.95

RAPCO, inc.

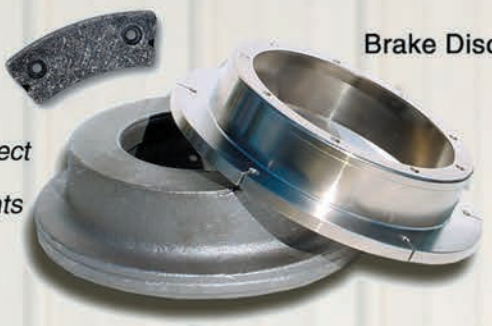
REPLACEMENT AIRCRAFT PARTS CO.

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

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

Vacuum Pumps

Easily check vane wear



Brake Discs

Over 80 direct brake disc replacements

Electroless Nickel plating

Regulator & Fittings

De-Ice Components

Leads, boots, modules, brushes & more

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

Request an e-card at www.rapcoinc.com

PARTS DEPARTMENT

RAPCO, inc.
REPLACEMENT AIRCRAFT PARTS CO.

1-800-527-2726

NO PLANE NO GAIN

visit www.noplanenogain.org

RAPCO, inc.
REPLACEMENT AIRCRAFT PARTS CO.

www.rapcoinc.com

The world of composites

In the department "Industry Forum" this issue you'll read a thumbnail sketch of the new Blackshape CF300 Prime two-seater, the first ultra-light sport aircraft made entirely from carbon fibre. There's also a bit about the Supplemental Type Certificate awarded to Hartzell for the installation of its composite prop on diesel Cessna Skyhawks.

Recently, scientists at the IBM Research lab in Almaden, California announced they'd discovered a new class of polymer materials that can potentially transform manufacturing and fabrication in the fields of transportation, aerospace, and microelectronics. IBM claims these new materials are resistant to cracking, stronger than bone, and have the ability to self-heal (reform to their original shape) while being recyclable back to their starting material.

These three separate points of conversation lead here toward one direction: the world of composites. The aviation business is said to be one of the largest and most important to the composites industry. A report authored by Chris Red, owner of Composites Forecast and Consulting in Phoenix, Arizona, suggests that from 2011 through 2020, aircraft OEMs and their suppliers are expected to produce more than 28 million pounds of composite primary and secondary structures for the General Aviation market.

"At the peak in 2017, the calculations indicate that the GA composites market will be valued at more than $1 billion," says Mr. Red.

Composites have found their way into empennage assemblies, fuselages and wings, among scores of other applications — carbon fibre-reinforced polymer (CFRP) structures, in particular, because they are significantly stiffer than similar aluminum structures of the same strength, with reduced maintenance costs to boot. "They [also] eliminate a significant number of heavy, drag-inducing fasteners," says Mr. Red.

The composite boom is truly on now. What will this mean to you, the AME, in the years ahead in terms of regulations, routines, tools, and training? Well, time will tell.

— John Campbell
Editor

Departments

Features

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

AirMaintenance Update
Unit 7, 11771 Horseshoe Way
Richmond BC V7A 4V4 Canada
phone: (604) 214-9824 • **fax:** (604) 214-9825

email: amumagazine@outlook.com **website:** www.amumagazine.com

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

production manager: Chrissie Harvey
circulation: Anne Gervin
contributors: Mike Broderick, Norm Chalmers, Sam Longo, Stuart McAulay, Brian McNair, Gordon Walker, Sue Yost

Publications Mail Registration No. 0007198278

Published by Alpha Publishing Group (2004) Inc.

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

Subscription Rates: 1 Year: $40 2 Years: $60
AirMaintenance Update is published 6X annually.

Corporate Member of:

HAC · Helicopter Association International · NBAA

ISSN 1703-2318

Upcoming Events

CANADA

A Gathering of Harvards & Heroes
June 20 – 22, 2014
Tillsonburg, ON
www.harvardsandheroes.com

Spectacle Aérien Montréal
June 28 – 29, 2014
Montreal, QC
www.montrealairshow.com

Waterloo Air Show
June 28 – 29, 2014
Kitchener, ON
www.waterlooairshow.com

Yellowknife International Airshow
July 12, 2014
Yellowknife, NWT
www.spectacularnwt.com

Whitecourt Airshow
July 26 – 27, 2014
Whitecourt, Alberta
www.whitecourtairshow.com

Abbotsford Air Show
August 8 – 10, 2014
Abbotsford, BC
www.abbotsfordairshow.com

Canadian International Air Show
August 30 – September 1, 2014
Toronto, ON
www.cias.org

UNITED STATES

National Biplane Fly In
June 5 – 8, 2014
Freeman Field
Junction City, KS
www.nationalbiplaneflyin.com

Golden West Fly In & Airshow
June 6 – 8, 2014
Yuba County Airport, California
www.goldenwestflyin.org

Fly Iowa 2014
June 28 – 29, 2014
Iowa City Municipal Airport
Iowa City, IA
http://flyiowa.org

National Cherry Festival Air Show
July 5 – 6, 2014
Traverse City, MI
www.cherryfestival.org

Genesco Air Show
July 11 – 13, 2014
Genesco, NY, www.1941hag.org

AIAA Propulsion and Energy Forum and Exposition
July 28 – 30, 2014
Cleveland, OH
www.aiaa.org

Seafair Air Show
August 1 – 3, 2014
Seattle, Washington, www.seafair.com

Pikes Peak Regional Airshow
August 8 – 10, 2014
Colorado Springs, CO
www.pprairshow.org

Cleveland International Air Show
August 30-September 1, 2014
Cleveland, OH
www.clevelandairshow.com

INTERNATIONAL

Roma International Air Show
June 27 – 29, 2014
Rome, Italy
www.romaairshow.net

Advertisers Index

Canadian Aero Accessories Ltd.

Component Sales

Overhaul & Repair

Trusted
Experience
Since 1964

CALL US FOR THIS & MORE !

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

Authorized repair Station For

GOODRICH

Ice protection systems **PowerSystems**

170 George Craig Blvd. N.E., Calgary, AB, Canada T2E 7H2
ph: 403.250.9077 • fax: 403.250.6841
sales@cdnaero.com

www.canadianaero.com

STCs & new products

Synthetic metal-cutting fluids for nearly every job

5ME's Cyclo Cool 900 series synthetic metal machining fluids meet heavy-duty, high-heat machining requirements at a lower cost than semi-synthetics and soluble oils. The low-foaming fluids are formulated for machining titanium, Inconel, beryllium copper, hardened steels, stainless steels, and other exotic alloys. The coolants contain lubricants that penetrate the cut zone heat barrier in order to absorb heat from the tool and the part, minimizing tool-tip work hardening and premature wear. The lubrication package covers a wide range of applications, from light-duty, high-speed (10,000 to 15,000 rpm) aluminum milling to heavy-duty drilling and tapping of hardened steel and hard-to-machine metals. **For more information visit** www.5me.com

New cockpit windows for Eclipse 550 and 500

PPG Industries' aerospace transparencies group has begun delivery of glass-faced acrylic windshields and side cockpit windows for the Eclipse 550 jet. These windows are said to combine the chemical and abrasion resistance of glass with the lighter weight of acrylic. The PPG windshields also fit the Eclipse 500 and are available as replacements for that aircraft model. **For more information visit** www.ppg.com

New chromate-free wash primer qualified for use

PPG Industries' aerospace business has qualified a new chromate-free wash primer coatings system to SAE International's Aerospace Material Specification 3095 for airline exterior paint. The system has Desothane HS/CA 8800 buffable topcoat applied over new chromate-free Desoprime CF/CA 7530 epoxy wash primer and new chromate-free, high-solids Desoprime CF/CA 7065 polyurethane primer. A system using a Desothane topcoat, Desoprime wash primer and Desoprime primer is said to have volatile organic compound (VOC) levels more than 60 percent lower than a standard system. In addition, the Desoprime wash primer has good washability, and is formulated for electrostatic application. **For more information visit** www.ppg.com

Digital humidity sensor for aircraft environmental control systems

Ametek Sensors & Fluid Management Systems has developed the smartest and most accurate humidity sensor available for aircraft environmental control systems (ECS). The advanced humidity sensor contains a sensing element and electronics that convert the water concentration in the air to a standard CAN Bus output. The humidity sensor uses a capacitance technique with signal processing to measure the water content. The humidity sensor has passed tests in accordance with DO-160, substantiating the requirements for its location on transport aircraft. The sensor is intended for air ducting where humidified air is carried to seating areas.

For more information visit www.ameteksensors.com

Guard Electric chain hoist now CSA Approved

Columbus McKinnon Corporation is now offering the CM Man Guard electric chain hoist with CSA approval for the Canadian market. The American-made CM Man Guard is for heavy-duty lifting applications with an H4 duty rating and long service life. It provides operator safety through overload protection designed to help prevent serious injury or catastrophic damage to the hoist, load and supporting structure. The hoist is metric rated and available in capacities ranging from one-quarter to three tons with standard lifts up to 20 feet. The Man Guard joins CM's Canadian portfolio of chain, rigging and hoist products.

For more information visit www.cmworks.com

Innovative Solutions' Auto Throttle System receives STC

Innovative Solutions & Support, Inc. has received an FAA STC for its Auto Throttle System and standby display unit incorporated into its Integrated Flight Management System. The Auto Throttle allows a pilot to control the power of the aircraft's engines by setting a desired flight characteristic rather than manually controlling fuel flow. The system provides a Maximum Continuous Thrust, Speed Hold and Speed Protection mode. When engaged by the pilot, the IS&S Auto Throttle System manipulates the throttles automatically to hold the selected airspeed. **For more information visit** www.innovative-ss.com

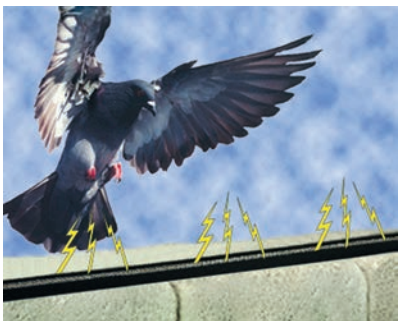
To announce your STC or new product, email a JPG photo and a product description to amu.editor@gmail.com or amumagazine@outlook.com

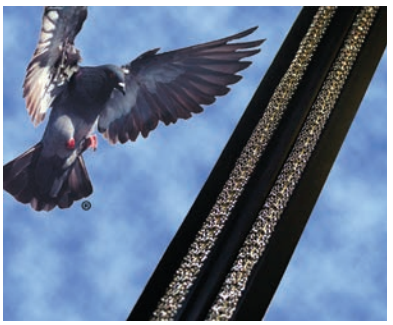
Patented technology from Bird-B-Gone effective as an electric bird deterrent system

Bird-B-Gone Inc. says the newly patented "anti-arcing" and "glue trough" technology on its Bird Jolt Flat Track product creates a safer electric track bird deterrent system.

Bird Jolt Flat Track is a low profile, electric track bird deterrent system that produces a mild electrical shock when birds land on its surface. The shock will not harm birds, but will condition them to stay away from the area. The product is offered in a variety of colours: clear, black, stone, grey, red and terra cotta. Each colour is available in 100-foot rolls and can be purchased in a kit that includes all the tools necessary for installation.

For more information visit www.birdbgone.com





Weldon announces New PMA Approved Fuel Boost Pump

Weldon Aerospace has announced the new FAA-PMA approved 18020-A replacement fuel boost pump for select Lake and Mooney aircraft. Similar to all Weldon 18000 series fuel pumps, the 18020-A is rated for continuous duty with consistent flow and low amp draw. It features metal vanes that won't fracture, single solid shaft design for durability, and dual shaft seals for extended life.

For more information visit www. weldonpumps.com

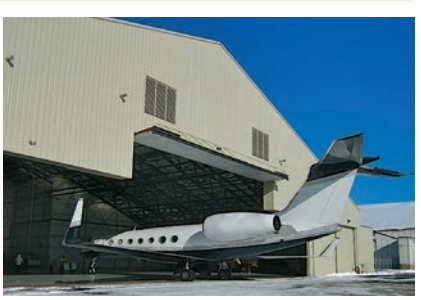
Eagle Creek receives certification for Garmin G950

Eagle Creek Aviation Services has received an STC for Garmin G950 glass flight deck installations in Twin Commander aircraft. The G950 offers an integrated glass flight deck and new levels of situational awareness. The Garmin G950 integrates all primary flight, navigation, communication, terrain, traffic, weather and engine instrumentation on a 12.4-inch multifunction display and two 10.4-inch primary flight displays. Engine data is displayed on the MFD, providing an integrated appearance. This STC allows for customization and offers optional equipment including Garmin's new TCAS systems and GWX-70 radar. **For more information** www.eagle-creek.com

Big swinging doors from Hydroswing now bigger than ever

Hydroswing now manufactures single-panel hydraulic doors that will fit walls up to 150 feet wide and 40 feet tall. The company says its doors have almost 100 per cent seal-ability, and that they have less than 70 percent of the moving parts of bifold doors and 50 percent less moving parts than sectional, bottom rolling, or top hung doors, with 95 percent less maintenance costs. The Hydroswing can be retrofit to replace bifold, bottom rolling, top hung, sectional or fabric doors, and is also intended for new builds, steel, post and frame or block structures, and even the tensile building market.

For more information visit www.hydroswing.com



To contribute articles and share your expertise with fellow readers, contact John Campbell at amu.editor@gmail.com or amumagazine@outlook.com

CARBON FIBRE AVAILABLE FOR SPORT AIRCRAFT

The world of sport aviation is currently being revolutionized by the use of strong, light composite offerings such as the Blackshape CF300 Prime two-seater, the first ultra-light sport aircraft made entirely from carbon fibre. Powered by a 100-horsepower Rotax 912 ULS engine, the Prime is said to be capable of a maximal speed (VNE) of 340 km/h, cruising speed at 75 per cent throttle up to 275 km/h, and maximum takeoff weight (MTOW) of 560 kg. With two tanks totaling 110 litres, the range at cruising speed is up to a factory-spec 1,100 km. In economy mode (225 km/h), the maximum range can reach 1,700 km. Standard equipment on the Prime includes retractable landing gear, digital instrumentation combining EFIS-EMS-GPS, variable pitch propeller, autopilot, survival cell and ballistic parachute. The options list includes more complete instrumentation and a more sophisticated cockpit.

Approved by Transport Canada for the Advanced Ultralight Aircraft (AULA) class, a more evolved 115-hp version with a 750 kg MTOW is in preparation for certification in Canada and the United States. A demonstration model was scheduled to be available for testing as of April at the Lachute Airport, 40 minutes west of Montreal. Aircité Aviation-Aviasport will distribute the Blackshape CF300 Prime in North America.

COMPOSITE PROP AWARDED STC FOR DIESEL SKYHAWK

The Federal Aviation Administration (FAA) has awarded Hartzell Propeller a Supplemental Type Certificate (STC) to install the company's recently type certified high performance Bantam series three-blade propeller on diesel-powered Cessna Skyhawk aircraft. The Hartzell Bantam propeller series are small, lightweight two- and three-blade propellers with a thin, wide chord and swept high performance airfoils. The recent approval covers installation of Hartzell's three-blade Bantam propellers, featuring carbon fibre structural composite blades and composite spinners, on Cessna C-172s with Centurion diesel engines.

"Geared diesel engines, like the Centurion and the Austro Engine AE-300, require an ultra lightweight, slow turning propeller with a higher blade count because the airframes they power are extremely weight-sensitive," said Hartzell Propeller Vice President of OEM Sales and Product Support Gary Chafin. The Bantam three-blade propeller weighs 35.3 lb., including spinner, and replaces the previously supplied wood-core propellers. The superior strength of the carbon fibre structural composite material enables the Hartzell Propeller engineering team to design blades with wider chords and thinner airfoils, ultimately leading to higher performance and durability.

FIRST AIR ADOPTS FLYHT'S LIVE BLACK BOX

FLYHT Aerospace Solutions Ltd. customer, First Air, is adding FLYHTStream's automatically triggered, real-time data and live black box streaming capability to its current fleet of 21 Boeing 737, 767, and ATR aircraft. Headquartered in Kanata, Ontario, First Air operates throughout the Canadian Arctic in some of the harshest conditions on Earth, and as a result is continually striving to find ways to improve the safety and operational efficiency of the airline. "FLYHT's Automated Flight Information System (AFIRS) ensures we have 100 per cent visibility on our aircraft at all times," said Brock Friesen, President and CEO of First Air.

CERTIFICATION FOR DASH 8 LONG RANGE FUEL MOD

Paul Markham: Photo

Calgary-based Field Aviation has received an STC from the FAA for its proprietary Long Range Fuel (LRF) modification for the Bombardier Dash 8 series 100-300. Prior to receiving FAA certification, Field Aviation's LRF mod had

been granted STCs from both Transport Canada and the European Aviation Safety Agency. The installation of Field Aviation's LRF modification provides an additional 686 US gallons or 4,600 lb. of fuel. The combination of standard tanks plus the LRF modification will increase the Dash 8's fuel capacity to approximately 10,200 lb. and provide a significant increase in available flight time depending on altitude and power settings.

CANADIAN NORTH TO OPEN NEW TRAINING CENTRE IN EDMONTON

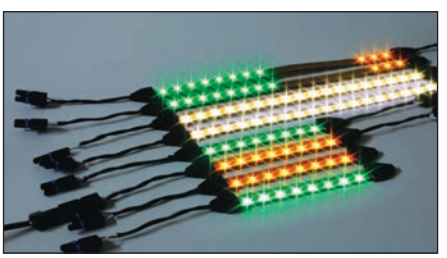
Canadian North has announced it is establishing a new Pilot Training Centre at Edmonton International Airport (EIA) that will house a CAE-built Boeing 737 full-flight simulator. The simulator and facility are planned to be operational and certified by Transport Canada this fall. Training of the first pilots will coincide with the completion of facility construction and simulator set-up.

"Canadian North has grown to the size where investing in its own flight simulator just makes sense," said Steve Hankirk, President of Canadian North. "We are pleased to be working with EIA on this initiative as we know it will have a positive impact on both Canadian North and the economy of the Edmonton region."

LIGHTFORM: THE WORLD'S FIRST LED LIGHTING FILM

In 1989, the 113-year-old, family-run manufacturing firm Grote Industries transformed the commercial vehicle safety lighting industry by pioneering side marker and stop/tail/turn light LED technology. The company's involvement in this alternative lighting environment has led to the development of its line of MIL-spec compliant "LightForm" products, which feature an advanced ultra-thin film (less than 1mm) LED lighting solution for a range of auxiliary lamp applications. Grote's LightForm technology conforms to almost any shape—it can be bent around corners and even folds back on itself—and usually removes the installation cost of drilling, brackets, and fasteners, thereby reducing initial installation downtime, while shaving overall component weight.

During testing protocols Lightform was subjected to harsh conditions including salt baths, extreme humidity, heat and cold, and was found sturdy enough to withstand high-pressure wash tests and multiple hammer blows while allowing users to create custom light patterns in whatever colour, shape and design they require. LightForm's thin substrate weighs a fraction of traditional lighting products, while its highly flexible lamination construction helps protect the diodes, and seals out the environment.



There are seven core products including the Lightform Clear, Smooth, or Dome, but the "Compliance" offering is an ideal choice for lighting applications that are subject to rigorous testing and certification standards such as those found in the aviation industry.

The "Accent" is another member of the Lightform family and a perfect finishing touch for any airplane interior because it can be used to highlight door pockets, consoles, seat areas and aisles or anywhere else that a memorable interior is required. Choosing from any of the seven Lightform products will allow you to fit light into tight crevices, around contoured surfaces, or even directly into fabric. LightForm has a peel-and-stick application that can be used nearly everywhere you want customized lighting.

For more information visit www.lightform.com

AEROSPACE TECH CAMPUS GIFTED BIG-TIME

Airbus Helicopters Canada has donated an AS350 B2 helicopter to the British Columbia Institute of Technology's Aerospace Tech Campus, located in Richmond, BC. The donation of the aircraft took place in mid-May during a ceremony on the campus, which is centered by a 40,000-sq. ft. hangar.

The AS350 donation will allow students at Canada's largest aerospace technology school to learn with one of the most popular aircraft flying in Canada. The AS350 accounts for 76 per cent of the Airbus Helicopters' aircraft flying in Canada and is known as the workhorse for a variety of missions including fire-fighting, heli-skiing, tourism, forestry, and mining.

FACTORY TRAINING FOR TWIN COMMANDER TECHS

Twin Commander-specific training is now available in a factory-authorized course offered by Eagle Creek Aviation Services in Indianapolis. This 42-hour course is designed to meet the training requirements of the technician who will be working on Twin Commander 690 models at a factory-authorized service centre. The class covers 19 different subjects ranging from manuals and bulletins to avionics. ■

You're not the boss of me… (I think)

BY MIKE BRODERICK
Helicopter Engine Repai Overhaul Services

The owner, Pilot in Command, and the Director of Maintenance all share equally in the safe operation of an aircraft—but it's complicated.

The question for today is: Are you sure you know the Federal Aviation Administration (FAA) Code of Federal Regulations (CFR) and their effect on your career as a Professional Aviation Maintenance Technician? Hmm ...good question don't ya think? Welcome back my faithful students! Whaddaya say that today we explore the exciting world of FAA regulations? Now, for you students governed by Transport Canada Civil Aviation (TCCA) and/or European Aviation Safety Agency (EASA), the specifics of the regulations to which I will be referring may not match your regulation number. But, don't turn that page yet! This will be an excellent learning experience for you and me. Why?

Well, I hope you will take the time to comment on today's class presentation, and share your thoughts on how the TCCA or EASA compares and/or differs in their management of the same data. Let's put some life into these tedious and sometimes mind-numbing procedures the governments manufacture to keep our air transportation safe. Okay? Great! So now, with all that being said, let's start with some Cocktail Knowledge (CK) that was the inspiration for today's lesson.

Did you know that the maintenance title of Director of Maintenance for a business aircraft owner, operating under (CFR) Title 14 Part 91, is not a job recognized by the FAA? Yeah, I was a little surprised when I read that too. I got this nugget of CK, from an article written by Sarah MacLeod. For those of you who might not be familiar with Ms. MacLeod, let me provide a short introduction. She is the Executive Director of the Aeronautical Repair Station Association (ARSA), an attorney, and is globally recognized as an expert in aviation regulatory compliance.

Under the Code of Federal Regulations, Title 14 there are five volumes, six chapters and 1,399 parts that deal specifically with Aeronautics and Space transportation. Of those regulations under Title 14, the volumes which pilots and maintainers of aircraft are mostly concerned with are located in volumes 1, 2 and 3; chapter I; Parts 1-199. This issue of AMU will introduce readers to that group, and will include a more detailed look at a few of the more "interesting" parts.

So understanding that Ms. MacLeod for sure knows her stuff, I became curious about this apparent absence of maintenance oversight by a maintenance professional and thus the genesis of today's class topic: Are you sure you know the regulations?

So, thank you Sarah for sparking this discussion. And trust me, as part of our discussion today we will delve into Part 91 regulations a little later in class to find out if the FAA really forgot about the maintenance professional for those flying exclusively under Part 91.

But for now how 'bout we start with some background on the Federal Regulations governing our lives as aviation professionals. Did you know that under the Code of Federal Regulations, Title 14 there are five volumes, six chapters and 1,399 parts that deal specifically with Aeronautics and Space transportation? And today we are going to review and discuss each one of them. Just kidding! I wouldn't do that to you. Heck, I wouldn't do that to me. However, of those regulations under Title 14, the volumes which we (the pilots and maintainers of aircraft within the earth's atmosphere) are mostly concerned with, are located in volumes 1, 2 and 3; chapter I; Parts 1-199. And today I will introduce you to that group and then for good measure we will talk in detail about a few of the more "interesting" parts.

Volume 1, Parts 1-59 are divided accordingly: Subchapter A, Parts 1-3 has to do with definitions; Subchapter B, Parts 11-17 deals with procedural rules; Subchapter C, Parts 21-49 addresses aircraft, which includes certification of parts, airworthiness standards, maintenance... etc. Parts 50-59 are reserved for future use.

Volume 2 Parts 60-77 are divided accordingly: Subchapter D, Parts 60-67 deals with certification for airmen (pilots, mechanics and crewmembers); Subchapter E, Parts 71-77 has to do with designation of airspace for flight; Subchapter F, Parts 91-105 speaks to air traffic and general operating rules for aircraft. Parts 106-109 are reserved.

Volume 3 Parts 110-198 are divided accordingly: Subchapter G, Parts 110-139 deals with air carriers, and operators for compensation or hire and certification and operations; Subchapter H Parts 140-147 talks about Mechanic and Pilot schools, training centers and repair stations; Subchapter I Parts 150-169 deals with all things about commercial Airports; Subchapter J, Subchapter 170 and 171 handles the

Navigational Facilities; Subchapter K, Parts 183-193 Administrative Regulations; Subchapters L-M are reserved for, (God forbid) more regulations; and Subchapter N, Part 198 explains about Aviation Insurance and Part 199 is reserved.

So there you have it. That wasn't so bad now was it? And, as you will see, the regulations all intermesh with respect to the governance of our industry. And, since we don't have the time or the fortitude required to get into depth on each of the Parts, I have selected a couple of the more interesting for our discussion today. Don't laugh, I saw you before when I said "interesting parts". Really, there are some interesting regulations in this group, particularly the info about Subpart 91. Before we get too far along, I want to address a couple of things.

First: for the sake of this article I may abbreviate the content of the subparts we will be discussing. So I suggest that you visit the FAA website www.faa.gov. Navigating to the regulations is very simple.

Next: In place of the word "Subchapter" I am going to use the symbol "§" Now, as promised, let's begin Part 91 and get this Director of Maintenance issue settled. As we know Part 91 contains the general operating and flight rules. As §91.1 prescribes, this section contains the rules governing the operation of aircraft — except moored balloons, kites, unmanned rockets and unmanned free balloons, which are governed by Part 101 of this chapter — and ultralight vehicles which are operated within Part 103 of this chapter) within the United States, which includes the waters within three nautical miles of the U.S. coast. Okay? So let's get specific about who has the maintenance authority.

§91.3 (a) *"The pilot in command of an aircraft is directly responsible for, and is the final authority as to the operation of that aircraft."* **That seems reasonable right?**
§91.7 (a) *"No person may operate a civil aircraft unless it is in an un-airworthy condition."* **Okay that too seems reasonable.** (b) *"The pilot in command of a civil aircraft is responsible for determining whether that aircraft is in condition for safe flight. The pilot in command shall discontinue the flight when un-airworthy mechanical, electrical, or structural conditions occur."* **So the pilot is the guy who makes the decision about the condition of the aircraft. So the pilot doesn't need a technician's input or approval? Oh yes they do! Read on.**

§91.405 *"Each owner or operator of an aircraft:* (a) *shall have that aircraft inspected as prescribed in Subpart E of this part* — **Subpart E is the section of Part 91 that deals with maintenance, preventive maintenance and Alterations** — *and shall between required inspection except as provided in paragraph* (c) *of this section, have discrepancies repaired as prescribed in §43 of this Chapter;* (b) *shall ensure that maintenance personnel make appropriate entries in the aircraft maintenance records indicating the aircraft has been approved for return to service..."*

All right! Finally after sifting through the regulations we are addressing maintenance for §91 operations. §43 deals with maintenance. So let's keep

"The pilot in command of an aircraft is directly responsible for, and is the final authority as to the operation of that aircraft. The pilot in command of a civil aircraft is responsible for determining whether that aircraft is in condition for safe flight. The pilot in command shall discontinue the flight when un-airworthy mechanical, electrical, or structural conditions occur."

digging; don't lose hope we are getting close.
§91.407: **Operation after maintenance, preventive maintenance, rebuilding, or alteration.** (a) *"No person may operate any aircraft that has undergone maintenance, preventive maintenance, rebuilding or alteration unless (1) it has been approved for return to service by a person authorized under §43.7 of this chapter..."*

Okay, so what does §43.7 say? This regulation states who is authorized to approve aircraft, airframes, aircraft engine, propellers, appliances, or component parts for return to service after maintenance, preventive maintenance, rebuilding or alteration. They are as follows:

1. The holder of a mechanic certificate or Inspection Authorization as provided in §65;
2. A repair station as provided in §145;
3. A person holding at least a private pilot certificate may approve an aircraft for return to service after performing preventive maintenance only under the provisions of §43.3(g)
4. The Administrator (FAA)
5. A Manufacturer may approve for return to service any aircraft, airframe, aircraft engine, propeller, appliance, or component part which that manufacturer has worked on under §43.3(j).

So after this walk through Parts 91 and 43 do you now think that the Pilot in Command (PIC) is really the final authority? Well, yes and no. Under the parts of 91 and 43 addressed here, the maintenance personnel must ensure the work is performed correctly and annotated accurately in the aircraft records. The Director of Maintenance can release the aircraft to service. However, it is the owner/operator's/ PIC's responsibility to determine the airworthiness of the aircraft for the purposes of air navigation.

Thus, as you can see from a regulatory perspective, the owner/operator/PIC and the Director of Maintenance share equally in the safe operation of the aircraft, through a somewhat convoluted set of regulations.

Okay had enough? Hopefully our short visit with the title 14, Code of Federal Regulations will wet your appetite to investigate these FAA guidelines on your own. To get you started, for homework I want you to look up §43.3(g) & (j); §145, (The section dealing with Repair Stations). This will be a good exercise for you.

While you are at it take a look at §65 Certification: Airmen other than flight crewmembers § D Mechanics. Specifically §65.81: General privileges and limitations; and §65.91 Inspection Authorization (IA). This will be a good review as to what a Certified Mechanic (A&P) is authorized to do and when an IA is required.

And, in closing, let me leave you with this little tidbit of interesting regulatory CK. In Subchapter G – Aircarriers and Operators for compensation or hire: certification and Operations §120 Drug and Alcohol Testing Program.

§120.105: **Employees who must be tested.**
Each employee, including any assistant, helper, or individual in a training status, who performs a safety-sensitive function listed in this section directly or by contract (including by subcontract at any tier) for an employer as defined in this subpart must be subject to drug testing under a drug testing program implemented in accordance with this subpart. This includes full-time, part-time, temporary, and intermittent employees regardless of the degree of supervision. The safety-sensitive functions are:
(a) Flight crewmember duties
(b) Flight attendant duties
(c) Flight instruction duties
(d) Aircraft dispatcher duties
(e) Aircraft maintenance and preventive maintenance duties
(f) Ground security coordinator duties
(g) Aviation screening duties
(h) Air traffic control duties

Do you see anything in this regulation that says, "the assembler of a new engine, component or aircraft?" You are right; it is not in there. According to the FAA those jobs are "not safety sensitive"… Now, just to put your mind at ease, I would say that the major Original Equipment Manufacturers (OEM) have implemented their own company sponsored drug and alcohol program. But it is NOT under FAA oversight.

So with that I will sign off and as always I appreciate your attention during the presentation. See you next time. Class dismissed!

MIKE BRODERICK *is Vice President of Business Development at Helicopter Engine Repair Overhaul Services (HEROS). Over the past 35 years, he 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 a regular contributor to Air Maintenance Update.* ■

Sending out strong signals

In the second installment of a two-part series, Gord Walker explains why some avionics systems are "vintage" in name only.

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

Driving westbound out of Toronto toward my new home in Port Burwell, I was treated to the spectacle of several wide-body aircraft on final approach to Pearson Airport. After 35 years in the aviation business and nearly 20 years of "Plane Spotting" before that, I'm delighted to say that I still marvel at, and am thrilled by such a sight. The majesty and grace with which those big metal birds seem to float toward the ground, coupled with the engineering marvel that is up to one million pounds of aircraft actually flying, is a vision I find truly moving. Something that saddens me, however, is the lack of panache, style, and distinction when it comes to the appearance of modern airliners.

Just as automobiles of the 1950s, '60s, and '70s offered streamlined body styles, chrome accessories, tailfins, spoilers, hood scoops, and fender flares, commercial aircraft of that time also offered distinctive styling and engine options. One could quickly and easily identify aircraft as being a 727, 737, DC-9, DC-10, or 747 due to their unique appearance. There were some challenges for non-experts of course, who may have had trouble distinguishing an L10-11 from a DC-10; a 707 from a DC-8; or the more obscure VC 10 from an IL 62, but there were styling differences that the trained eye could spot, even at 25,000 feet. However, in the modern era, whether I look skyward, or across

the tarmac at a crowded international airport, I see nothing but a sea of large, wing-mounted twin-engine wide-bodies. They all look the same—subtle differences in winglet style or angle of wing sweep notwithstanding.

No question the present generation of "Heavy Metal" airliners is far more efficient, economical, and environmentally friendly (well, everything is relative) than those old beasts from the past, but they just don't have the same character and style.

The same holds true for avionics systems I believe. Sure, GPS driven, moving map digital colour video displays are nice to look at, easy to interpret, and simple to operate, but they don't carry the same intrigue and challenge as those old post-WWII navigation systems we've been using for the last 70 years or thereabouts. So, as we give a tip of the hat to the aeronautical design engineers of those beautiful vintage passenger jets, let us resume our look at some of the aging, but still available and operational "vintage" avionics systems.

In our April-May 2014 issue *(Read "They're not Antiquated; They're Vintage.")*, we examined the instrument landing system (ILS) with its Localizer providing lateral guidance and Glideslope providing vertical guidance to the runway in conditions of poor visibility. We also looked at Distance Measuring Equipment, (DME) which indicates the distance between the aircraft and the ILS runway. The DME can be used with another vintage avionics system known as the Very High Frequency Omni Range navigation system, or VOR.

The VOR provides enroute navigation information by indicating to the pilot the aircraft's position, relative to the VOR transmitter antenna on the ground. If the aircraft is equipped with a Radio Magnetic Indicator (RMI) the VOR needle will point toward the VOR station selected by the pilot. This indication appears similar to the indication seen when a non-directional beacon (NDB) is tuned using the automatic direction finder, (ADF) but there is in fact a significant difference between the VOR indication, and the ADF indication.

The VOR system works in conjunction with the gyro-driven compass card

> Although a little bit challenging to use, the VOR system has provided us with very effective overland point-to-point navigation capabilities for many years.

in the RMI, whereas the ADF does not. This means that the ADF needle will simply point toward the NDB that the pilot tuned his ADF receiver to. If you were to manually rotate the compass card, the ADF needle would continue to point toward the NDB. The VOR needle on the other hand points toward the RMI's compass card heading that would take the aircraft TO the VOR transmitter selected by the pilot. If we were to manually rotate the compass card in the RMI, the VOR needle would rotate WITH the card, continually pointing toward the compass heading that would take the aircraft to the VOR transmitter. This type of VOR indication, using an RMI is known as "automatic" VOR indication. Manual VOR indication involves the use of a Course Deviation Indicator (CDI) and is a little trickier to interpret.

The VOR system operates by comparing the phase angle of two 30-Hz signals being transmitted by the VOR beacon on the ground. The 30-Hz "reference" signal is a frequency modulated (FM) signal and the 30-Hz "variable" frequency is an amplitude modulated signal. If the aircraft is directly north of the VOR station, the two 30-Hz signals (reference and variable) will be in phase with one another. When the VOR receiver on board the aircraft receives the two 30-Hz signals "in-phase", it interprets this as the aircraft being north of the station, and will therefore drive the RMI needle such that it points to 180 degrees (the compass heading which would take the aircraft TO the VOR station). If the aircraft is directly east of the VOR station, the reference and variable signals will be 90 degrees out of phase; if the aircraft is south of the VOR, the signals will be 180 degrees out of phase; and so on.

In terms of manual VOR indication, the pilot can use the "course select" feature of the horizontal situation indicator (HSI) to select a course of either 180 degrees, or 000 degrees, causing the needle in the CDI to move to the centred "On Course" position. There is a "TO/FROM" indicator associated with the CDI, and it indicates what the aircraft would do, IF the pilot were to actually fly the selected course. In the case of the aircraft being directly north of the VOR transmitter, selecting a course of 180 would take the aircraft TO the station, and 000 degrees would take the aircraft away FROM the station.

The term "radial" is used to describe the 360 degrees around the VOR transmitter, and can be thought of as be-

ing like spokes on a wheel. In our earlier example, we were north of the station, so we were on the 000/180 degree radial (000-From/180 TO). If your aircraft was on the 045 degree radial with a "TO" indication, that would indicate that you are south-west of the VOR station, as flying a heading of 45 degrees would take you TO it.

The VOR system operates in the VHF frequency range of 108-117.95 MHz. (non-localizer frequencies). When a VOR frequency is selected, the DME is automatically tuned to a paired frequency, thus giving the pilot direction to, and distance from the VOR transmitter. This enables accurate pinpointing of the aircraft's current position. Should the aircraft not be equipped with a DME system, a position fix can be established by tuning to multiple VOR stations, noting which radials the aircraft is located on, and determining their intersection point.

The VOR system uses a horizontally polarized antenna, and these are often located on the vertical stabilizer or combined with the VHF communications antenna (the "boomerang" shaped section of the antenna is the VOR/LOC antenna). Although a little bit challenging to use, the VOR system has provided us with very effective overland point-to-point navigation capabilities for many years. Whether it becomes a casualty of modernization or not only time will tell, but it remains in service for the time being.

And of those distinctive old (or vintage) airliners, do you have a particular favourite? My personal choice has always been the Lockheed Super Constellation. That graceful arched fuselage and majestic tripletail makes it, at least in my opinion, the most fetching of all passenger airplanes ever built, the likes of which we're not likely to ever see again. Pity.

Question based on this article; the answer in next issue:

Q: If an aircraft is directly west of a VOR station and the pilot selects a course of 90 degrees, the deviation bar in the CDI will move to the centred, "on-course" position. What will the "TO/FROM" indication be?

Answers to questions from the previous issue:
Q1: What is the purpose of the "Localizer" system?
A1: The Localizer provides lateral guidance to the runway's centreline.

Q2: What is the airborne DME radio called?
A2: The airborne DME transceiver is called an "interrogator".

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).* ■

ONTARIO AME

AME Association of Ontario

c/o Skyservice F.B.O. Inc., PO Box 160, Mississauga, Ontario L5P 1B1
tel: 1-905-673-5681 fax: 1-905-673-6328
email: association@ame-ont.com website: www.ame-ont.com

Ontario AME Association celebrates big anniversary

This year, the AME Association of Ontario celebrates its 30th anniversary. In June 1984 the association was formally incorporated as a not-for-profit company. In fact, efforts to create the association began several years before that. The first meeting of directors was held in 1982 when the seven founding members (The Group of 7) got together to create a vision for the future growth of the AME profession. So congratulations to our founding members: Ed Ruth, Jim Leggat, Will Boles, Harry Hope, Bill Alexander, John Leggat and Gord Aust. Well done!

Your Board of Directors is proud to have reached this milestone and we look forward to continue to serve the aircraft maintenance community in the years ahead.

Centennial College Awards Night 2014

The AME Association of Ontario was on-hand at Centennial College's annual awards evening to present the Association's scholarship awards to the most promising students enrolled in the aviation technician courses. The awards are presented annually. This year's recipients are Carolyne Mounsey, Aircraft Maintenance and Antonio Andrade, Avionics Maintenance.

"Awards Night 2014" was held February 19. The evening was a gala event with Suhana Meharchand, CBC News anchor, as the Master of Ceremonies. Scores of awards were presented by industry and individuals representing various segments such as communications and media, community and health services, engineering and technology, business, academia and transportation. Ms. Ann Buller, President of Centennial College, proudly congratulated each of the award winners.

Our thanks go to Centennial College for holding such a well-organized and successful evening. Good food, fun music and fresh coffee. More importantly, the winning students were inspirational. Congratulations again to Carolyne and Antonio.

The AME Association of Ontario supports the community college aircraft maintenance programs throughout Ontario by way of annual monetary awards to top students.

Annual AME Workshop and AGM

Planning continues for our annual AME Workshop scheduled for September 24-26. Please save the date to your calendar. Again this year there will be two days filled with educational sessions as well as a full house of displays from industries supporting aircraft maintenance. Check our web site at www.ame-ont.com for the latest details.

Submitted by Stephen Farnworth
For the Board of Directors

PAMA SOCAL

PAMA SoCal Chapter

The SoCal Chapter would like to thank Greg Piland, General Manager, Repair Station, Glenn Heil, Director Aftermarket Sales and all at Lee Aerospace for their time and generosity in hosting the February 2014 Chapter dinner meeting and excellent technical presentation 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 or contact Greg and Glenn at gpiland@leeaerospace.com and gheil@leeaerospace.com.

February 2014 Scholarship Fund

Raffle Drawing $284! Thank You Chapter Supporters!
Aero-Nasch/Jet Brella, Aircraft Window Repairs, Business Aerotech, Consolidated Aircraft, Extraord-N-Air, HRD Aero Systems, Lee Aerospace, and Rotorcraft Support.

Employment and Educational Opportunities are broadcast via SoCal PAMA e-mail and posted on the SoCal PAMA website. To receive chapter meeting, employment opportunities and event announcements by email, go to SoCalPAMA.org and on the home page, click the "update email address" button.

Job Opening to Post?

Get the word out through SoCal PAMA. Send postings to SoCalPAMA@gmail.com Include company name, logo, position title, location of position, and contact information. The SoCal chapter offers employment and educational opportunity postings free of charge to the aviation maintenance community worldwide.

SoCal PAMA Website

Advertise your company on SoCalPAMA.org and support SoCal PAMA. It's only $50 for 12 Months. Contact Nikki King or Gail Erwin for posting a new ad, renewal fees, and artwork updates: nikki@extraordnair.com or gailjerwin@verizon.net

www.socalpama.org

CALGARY AIRPORT AUTHORITY

YYC

April 14, 2014

Re: Aircraft Mechanical Engineer Towing or Taxiing Aircraft at YYC

Effective immediately, The Calgary Airport Authority (Authority) will no longer recognize an Aircraft Maintenance Engineer's (AME) licence as sufficient authorization to tow or taxi and aircraft on the YYC airfield. All permissions given to AMEs in Section eight (8) of the Calgary International Airport Airside Traffic Directives (Airside Vehicle Operator's Permit or AVOP Manual) are revoked. There are no other changes to the Airside Traffic Directive that affect Pilot's authorization to tow or taxi aircraft on the YYC airfield. Also, this does not change AVOP licence holder's permission to escort towed aircraft or tow aircraft within the limits of their respective licence. The Authority understands that this will have operational impacts on our tenants and we will work with our tenants to make the transition as smooth as possible.

Background

There are a few reasons that the Authority has taken this position at this point:

1. A number of recent incidents where AMEs have become lost on the airfield or failed to use appropriate aeronautical radio phraseology
2. A general shift in industry practice in Canada, the US and internationally toward better regulating AMEs who taxi or tow aircraft on airfields
3. The imminent opening of the Calgary's fourth runway which adds to the further complexity to the airfield

Licensing AMEs

All AMEs who tow or taxi aircraft on aprons, taxiways or runways must have an AVOP licence.

1. AMEs may obtain a standard DA-AVOP which allows them to operate vehicles and aircraft on Apron surfaces. Those AMEs that already have a DA-AVOP licence may continue to tow or taxi aircraft within the area limits of their DA-AVOP licence (not on most taxiways or all runways)
2. AMEs that are required, as part of their duties, to tow aircraft on taxiway and/or runway surfaces, will be required to obtain a specialized D-AVOP licence known as a D-AME AVOP licence. This licence will permit the AME to operate vehicles as a DA-AVOP holder and additionally taxi or tow aircraft on aprons, taxiways and/or runways.
3. D-AME AVOP licences holders shall demonstrate the same skills and knowledge level that is expected from a D-AVOP holder

Interim Solution

Operators may choose to use only pilots to taxi or tow aircraft for the purpose of repositioning or the performance of maintenance functions (e.g. run-ups). The Authority will offer, on a temporary basis, the ability for Operators to contact the Airport Security Operations Center to arrange an escort. This service is limited in availability and advanced planning on the part of the Operator will provide the best opportunity for an escort to be available during the time they may require the escort. Operators are expected to pursue the appropriate AVOP license if they choose to continue to use AME's for this purpose into the future.

To arrange for an escort contact the Airport's Security Operations Centre at 403-735-7400.

For additional information on the process to obtain a D-AVOP license please contact the undersigned at 403-735-1516 or cameronn@yyc.com.

Regards,

Cameron Nicolson
Director, Safety
Calgary Airport Authority

2000 Airport Road NE Calgary, AB T2E 6W5 www.yyc.com

PAMA National

PAMA appoints new vice-chair and director

The Professional Aviation Maintenance Association has appointed Dale Forton as its new Vice Chairman of the Board of Directors. Forton, a licensed Airframe and Powerplant Technician with more than 25 years in the aerospace industry, is a 21-year member of PAMA. He is a member of the PAMA Board of Directors, serving as the Great Lakes Regional Director, Membership Committee Chairman and Governance Committee Chairman.

PAMA also appointed Bill Kamm as a Director on its Board of Directors. Kamm, an employee of MPAir, is a licensed Airframe and Powerplant Technician with more than 23 years in the aerospace industry. Kamm, a 23-year member of PAMA, served on the PAMA Board of Directors on the Nominations Committee and is an active participant in the Hartford/Springfield Chapter holding positions of President and Secretary.

PAMA is the national association dedicated to enhancing professionalism and recognition of the Aviation Maintenance Technician through communication, education, representation and support for continuous improvement in aviation safety.

Central Ohio PAMA

Aviation Fuels: MX/Inspection/Safety

Our May meeting featured Stephen Farkas from EPIC Aviation LLC with a discussion of Aviation Fuels: Maintenance, Inspection and Safety. The topic covered avgas and jet fuel production, transport and storage from the refinery to the fuel truck or fueling station where aircraft are serviced.

Stephen discussed the differences in quality control and monitoring between aviation fuel and "mo-gas" used to fuel automobiles and trucks. Aviation fuel goes through 20 to 30 tests for specification match and performance before it is released from the refinery for distribution. That monitoring continues as it is transported and stored at airports. He also made note of 100LL fuel, which is produced by only seven refineries, down from 40 in the 1980s. Since it has a high lead content relative to auto fuel, it can't be shipped by pipeline and travels only by barge, railcar or truck.

The discussion continued with features and maintenance of storage tanks and fuel trucks. He provided checklist handouts to detail their daily, weekly, monthly and yearly inspections. He reviewed differential pressure gauge operation and what the readings indicate about the health of the fuel filter media. His presentation included photos of various foreign objects that have been found in filters on disassembly.

We want to thank Stephen for providing an informative topic for our last meeting of the spring session. The meeting was posted on the FAASTeam website and those who attended received credit toward their WINGS or AMT awards.

OUR NEXT EVENT IS THE CENTRAL OHIO AVIATION GOLF OUTING, which will be held September 5, at Kyber Run Golf Course near Johnstown. Sponsor letters are going out soon and the player registration is set to open on June 1. Details will be posted here on the website and go out to our mailing list friends and members in the June Newsletter.

If you're not on our email list and would like to receive our Newsletter and Events emails, send your request to mail@copama.org with "Add to email list" in the subject line. If you only wish to receive events information, please include that in the body of the post. Please mark your calendar for COAGO 2014 and invite a friend. Hope to see you there!

Flightdocs Maintenance Tracker System

The topic for the April Meeting was "Flightdocs Maintenance Tracking and Mobile Apps" presented by Greg Heine, Flightdocs' Director of Business Development. He started with an overview of their corporation, which was started in 2003 in New York, with just a few corporate operators utilizing their system. Today, Flightdocs tracks over 3,500 aircraft worldwide, and is based in Fort Myers, Florida.

Greg then talked about their upcoming product named Flightdocs Enterprise that will include optional modules used by flight departments, allowing them to gather data from their maintenance and operations to generate reports and documents for internal and corporate use. Their goal is to reduce paperwork and replace paper with "Glass" applications. They also are engaged in creating applications that work on all electronic platforms from mobile devices to mainframe computers. This includes research into future apps using hardware such as the "Google Glasses" and "Microsoft Kinect" to provide worksite viewing of task cards and manipulating document images for viewing. He next spoke about Flightdocs Voice for customers and operators to view new software under development and give feedback as features are completed. This process includes solving Workflow Problems such as: where is the most time spent, errors most common, data missing and duplicate work being performed. They're also reviewing where maintenance teams have the most trouble understanding the functions of the program and where there might be a lack of transparency or communication.

Greg finished by encouraging current customers to sign up for Flightdocs' User Voice, allowing them to stay in touch with software development, participate in Beta Testing and be advised of new Live Releases as they become available. We want to thank Greg and Flightdocs for their presentation and sponsoring the dinner for the meeting.

YAA Spring Event OSU Airport

Several COPAMA members were part of the volunteers to help with the Spring YAA Event at KOSU. President Joe Lippert presented YAA Co-Commander Tim Beech with a check for $1,000 to help support their program that provides aviation training for central Ohio youth. Over 165 youth attended and enjoyed the day of nice weather and aviation education.

Champaign Aviation Museum Gala

COPAMA became a Table Sponsor at this year's Champaign Aviation Museum Gala held April 26, at Grimes Field in Urbana. Shirley and Ralph Graves, Joe Lippert and Lowell Dowler were in attendance to support the fundraiser and listen to the night's main speaker, Amanda Wright Lane, the great grandniece of Orville and Wilbur Wright.

The evening also included dinner, a flyover of the B-25 bomber "Champaign Gal" and a silent auction. The aircraft of the museum were available for view with the focus on the reconstruction of the Champaign Lady B-17.

COAGO 2014 Moves to Kyber Run Golf Course

This year's Central Ohio Aviation Golf Outing will change venues and be held at Kyber Run Golf Course on Friday, September 5. We have contracted with the Golf Digest Tournament Planner website for Sponsor and Player registration, which was scheduled to open around June 1. Sponsor Letters were sent out in May to advise of sponsorship opportunities and guidelines to using the website. Dave Fragale is the 2014 Golf Outing Chairperson and has been negotiating with the course and planning the highlights of this year's event. More information about COAGO 2014 will be broadcast through our monthly newsletters and the website as details become available.

www.copama.org

Data
for major repairs and modifications

BY NORM CHALMERS
Pacific Airworthiness Consulting

The following abbreviations are used here and are often used in the aviation industry. You may come upon them in your day-to-day work.

CAR - Canadian Aviation Regulation which is a law of Canada; **CofA** – Certificate of Airworthiness; **CAA** – Civil Aviation Authority; **EASA** - European Aviation Safety Agency; **FAA** - Federal Aviation Administration; **FAR** – Federal Aviation Regulation (USA); **SMS** – Safety Management System; **STD** – TC approved standard including Airworthiness Manual; **TC** or minister or "tower of darkness" or "the Tower" indicates Transport Canada headquarters in Ottawa; **TC Holder** - Type Certificate Holder/Owner and usually the manufacturer.

Below you will note that the italics denote a quotation. I do this in addition to quotation marks because of the large amount of material that I quote. Please be aware of this as you read on.

In my column I often refer to the FAA or refer to the FARs. This is because most aircraft operating in Canada still have ties that bind them to FAA requirements and because most cross border activities such as imports, exports and commercial operations involve the FAA and the FARs.

Recently two of my clients asked me questions regarding major and minor repairs and the data required for them. This is an area where, in some cases, the FARs may be involved. The words "major" and "minor" used for describing repairs and modifications have been around for a long time. In the olden days before the CARs were enacted we used these but there were a variety of related definitions.

One popular opinion stated, "If a repair involved primary structure then it was a major repair." We had no official definition of "primary structure" but knew it must have been important and was usually related to a big project. In those days there was always much confusion and conflict about their meanings and there still is today.

As with some other words and terms we have used and do use, these are now legally defined but the definitions can lead us into more chaos.

For many aviation legal definitions now, we refer to CAR 101.01(1), which provides legal definitions applicable to all the CARs. The first one I quote is "primary structure".
"Primary structure" means a structure that carries flight, ground or pressure loads; (structure primaire)

Those of you involved in maintenance don't hear much of this term now. It is now mainly used for the purpose of design certification.

The next definition we need is "repair":
"Repair" - means the rectification of deficiencies in an aeronautical product or the restoration of an aeronautical product to an airworthy condition; (réparation)

Note that there are two parts to the definition that seem to say the same thing in different ways. We will often read the term "aeronautical product". For that definition we go to CAR 521.01, which states:
"Aeronautical product" means an aircraft, aircraft engine, aircraft propeller or aircraft appliance or part, or a component part of any of those things.
That includes all bits and pieces of every aircraft.

Referring back to CAR 101.01(1), we examine the definition of the term "major repair":
"Major repair" - means a repair to an aeronautical product in respect of which a type certificate has been issued, that causes the aeronautical product to deviate from the type design defined by the type certificate, where the deviation from the type design has other than a negligible effect on the weight and centre-of-gravity limits, structural strength, performance, power plant operation, flight characteristics or other qualities affecting the aeronautical product's airworthiness or environmental characteristics; (réparation majeure)

Note the words "type certificate". Type certificates are issued to most aircraft types but these do not include amateur built aircraft, military aircraft or experimental aircraft.

The first part of this definition states that to be a major repair, it must cause a deviation to the type design. That terminology can cause confusion. If an aircraft receives damage such a forklift hole in a fuselage skin, the aircraft can be restored in two ways.

The first restoration method involves cutting out the damage and installing a patch. That patch is a deviation from the type design. The pieces installed are not in the aircraft or component parts manual.

The second restoration method involves replacing the damaged parts with new parts from parts manual. With no deviation to the type design, this restoration qualifies as a repair but does not qualify as a major repair no matter how many parts are replaced.

The second part of the definition tells us that the repair must cause "other than a negligible effect" on the stated qualities. If a repair is well designed and installed and it has a negligible effect on those qualities then it does not meet this

definition of major repair. I dispute this definition below.

Since the CARs do not define the word negligible, we go to the Oxford dictionary which states this: "negligible - of very little importance or size and not worth considering".

To provide a contrast I refer to FAA FAR Section 1.1 that provides the following definition:

Major repair means a repair:

(1) That, if improperly done, might appreciably affect weight, balance, structural strength, performance, powerplant operation, flight characteristics, or other qualities affecting airworthiness; or

(2) That is not done according to accepted practices or cannot be done by elementary operations.

This FAR definition uses the terms "improperly done", "might appreciably", "accepted practices" and "elementary operations". Since I do not try to explain the FARs, I'll leave this with you to think about.

Moving on to our next related definition in CAR 101 we examine the meaning of the words "Major Modification":

"Major modification" - means an alteration to the type design of an aeronautical product in respect of which a type certificate has been issued that has other than a negligible effect on the weight and centre-of-gravity limits, structural strength, performance, power plant operation, flight characteristics or other qualities affecting its airworthiness or environmental characteristics; (modification majeure)

This seems to be similar to the definition of the term "major repair". The difference that I see is the use of the words "deviation" and "alteration". That makes it as clear as the lower Fraser River. That's muddy.

If the above doesn't confuse you other than negligibly or appreciably then I applaud you. To understand the above clearly you probably meet one of the two following criteria:

a) Have gone to university and MAJORed in government bureaucratese, (another great word I invented)

b) Have been a MAJOR in the armed forces military intelligence

Next we examine the data that the CARs require for repairs and modifications.

CAR and STD 571.06 define the data requirements into three categories; acceptable data, approved data and specified data. For major repairs and major modifications CAR 571 states the regulation as follows:

CAR 571.06 (1) a person ... shall ensure that the major repair or major modification conforms to the requirements of the relevant technical data

(a) that have been approved or the use of which has been approved within the meaning of the term "approved data" in section 571.06 of the Airworthiness Manual; or

(b) that have been established within the meaning of the term "specified data" in section 571.06 of the Airworthiness Manual.

That part is the regulation. It refers to the Airworthiness Manual meaning STD 571.06(1). The STD defines approved and specified data as follows:

"approved data" - includes:

(a) type certificates, supplemental type certificates, part design approvals, Canadian technical standard order (CANTSO) design approvals or repair design approvals, including equivalent foreign documents which have undergone the type design examination process set-out in Subpart 521 of the CARs or are otherwise accepted in Canada; and

(b) other drawings and methods approved by the Minister or a delegate ....

That covers approved data. The next category option is specified data. This listing is where the Minister of Transport actually specifies the data:

"Specified data" - is information contained in authoritative documents, which, although not approved by the Minister, has been specified by the Minister as appropriate for the purpose of major modifications and major repairs, in conformity with section 571.06 of the CARs. The following are examples of specified data:

(a) drawings or methods described or referenced in Airworthiness Directives;

This is because Airworthiness Directives generally refer to the documents listed in example (b) as follows:

> Once again the minister did his utmost to confuse us. If the document includes a statement of approval, then logic would demand that it would be approved.

(b) data issued by the manufacturer or type certificate holder of the aircraft, component or appliance, such as modification orders, service bulletins, or engineering orders, which include a statement of approval by the applicable regulatory authority or a delegated representative of such an authority ....

Once again the minister did his utmost to confuse us. If the document includes a statement of approval, then logic would demand that it would be approved. I will send an enquiry about this counter intuitive section into the peppermill of the Tower of Darkness where it will probably disappear because there is nobody in Ottawa that can explain it. The next example is:

(c) Manufacturer's Structural Repair Manuals;

Most of these SRMs were written when the rules were relatively loose and they were not formally approved. Now days, in some of these manuals, you will find sections that are approved by the regulatory authority.

The last example in the listing is our old friend AC 43.13:

(d) FAA Advisory Circulars AC 43.13-1 and AC 43.13-2, subject to the following conditions:

(i) the aircraft is a small aircraft, and the alteration does not affect dynamic components, rotor blades, structure that is subject to pressurization loads, or the primary structure of a rotorcraft;
(ii) the alteration does not affect an existing limitation (including the information contained on mandatory placards) or change any data contained in the approved sections of the Aircraft Flight Manual, or equivalent;
(iii) the data are appropriate to the product being altered, and are directly applicable to the alteration being made; and,
(iv) the data are not contrary to the aircraft manufacturer's data.

To use this AC43.13 for a major repair or modification, all of those conditions must be met. Item (iii) means the repair or modification must be exactly as stated in the AC43 wording and drawings.

That is the end of the data requirements for major repairs and modifications. Next we look at the requirements for, what we call, minor repairs and minor modifications. First we have the regulation that states:

CAR 571.06(2) ... a person who signs a maintenance release in respect of a repair or modification, other than a major repair

or major modification, shall ensure that the repair or modification conforms to the requirements of the relevant technical data within the meaning of the term "acceptable data" in section 571.06 of the Airworthiness Manual.

Now we go to the STD 571.06(1), which states:
"Acceptable data" - includes:
(a) drawings and methods recommended by the manufacturer of the aircraft, component, or appliance;
(b) Transport Canada advisory documents; and,
(c) advisory documents issued by foreign airworthiness authorities with whom Canada has entered into airworthiness agreements or memoranda of understanding such as current issues of Advisory Circular 43.13-1 and -2 issued by the FAA, Civil Aviation Information Publications (CAIPs) issued by the Civil Aviation Authority (CAA) of the United Kingdom, or Advisory Circular, Joint (ACJs) issued by the Joint Aviation Authority (JAA) or Acceptable Means of Compliance (AMC) issued by the European Aviation Safety Agency (EASA); and,

Note that this paragraph includes AC 43-13 but without the conditions applicable to specified data above.

(d) drawings and methods found appropriate by a delegate ...

This is another strange statement. Delegates including DARs and DERs normally approve data.

The STD 571.06 repeats the CAR but adds in another couple of sentences as follows:
(a) ... A statement of "No technical objection", or similar wording, by the manufacturer does not constitute "approved", "acceptable", or "specified" data and shall not be used without further approval by the Minister.

This is because people who needed data for major repairs had been sending their proposed repair off to the manufacturers for a "blessing". The manufacturers, usually the sales departments, sent back messages including the wording "no technical objection" which inferred approval.
Information Note: Additional guidance for the classification of modifications and repairs can be found in Appendix A of this standard

That takes us to STD 571 Appendix A. In that document TC provides additional assistance in choosing data. STD 571.06 goes on to address parts made for repairs and modification but I must reserve comments on that for another issue of AMU Magazine.

I have notified TC of errors in the regulations without successful effect. Several years ago she replied to me that they will get around to it. As we all know, Round Tou-its are a dime-a-dozen and we all know what inflation has done to the dime. No amount of poking and prodding will get the Minister of Transport to take care of his/her regulatory structure. A great example of this is my past efforts to notify TC of goof ups in the TC internet site that currently notifies us that:
Please be advised that there was no scheduled amendment for December 2012 (2012-2). The next amendment is planned for the end of 2013 (2013-1).

When I refer to the Minister of Transport, I consider that this is not a person but a position. The person in the position may be good, bad or a fishhead. Whatever kind of person they be, they are placed into the position, and shortly later, out of it before the chair is warm.

That's it folks. Until next issue, be good despite SMS. Do your best to keep aviation safety from going into the same SMS hole as our Canadian rail system, also regulated by TC. Ta-ta for now and beware of the fishheads.

Please be aware that I am not a lawyer or legal expert. What I write in my column is not legal advice nor legal opinion. If you face a legal issue, you must get specific legal advice from a lawyer and preferably one with experience in the aviation matters in your own country/state.

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

the Amazon staircimber

the AUTOMATED lifting solution

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

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

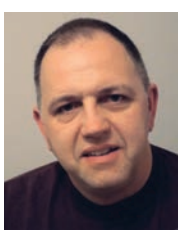
Tel: (604) 247-2128
Fax: (604) 214-9825

BKD Aerospace Industries Inc.

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

info@bkdaerospace.com
203 – 4360 Agar Drive
Richmond BC V7B 1A3 Canada

First-time maintenance manager



BY STUART McAULAY

Terminology and technology have changed the role of the old hangar boss, but whether you know him as the Chief Engineer or the Person Responsible for Maintenance (PRM) much of the big picture remains the same.

I have been an AME for about 25 years now and there were several times over my career when I had learned something new from my supervisor who would then follow up with the phrase "You may need to know that for when you are a Chief Engineer one day." Of course, that was in the days when the hangar boss was referred to as a Chief Engineer. As the regulations evolved so too did the terminology given to the person running the shop. That came to be the Director of Maintenance, the Maintenance Manager, or simply and technically the Person Responsible for Maintenance (PRM). No matter how you call it, this role will someday be attached to someone within the ranks who has developed the necessary skills and seniority to one day become next in line when the person sitting at the big desk moves on. This may be with the company you have served well over the years, or it may be filling a vacancy at another company or perhaps you will even be hired as part of a start-up business like I was at one time. Sure enough, it turned out that certain low key details were worth remembering as my innocent pondering eventually led me to my first opportunity, then another soon after that.

I started my career still green in 1987 after graduating from Centennial College in Toronto and set out to learn how to apply myself to what would become, an often challenging, yet interesting career. At that point I just wanted to get hands on and tried not to screw anything up along the way. As I settled into the routine of maintenance work and subsequently earned my AME ticket as they used to say, it became readily apparent that there would always be opportunities to learn new skills and implement new ideas. Several years of learning about how the industry operates beyond having a growing collection of tools led me to take an active interest in company safety

programs and to pursue a greater understanding of the regulations. My new familiarity with the E & I manual gave way to the Airworthiness Manual until I eventually came to a crossroads in a new Director of Maintenance position as we transitioned to the Canadian Aviation Regulations (CARs). It turned out to be a good time to be introduced to new standards for company manuals because it seemed like we all knew just enough to be confused. More specific training requirements and the introduction of human factors were also introduced as the industry itself rolled ahead into new territory with the new regs and I was determined to roll right along with it.

I had just moved a few provinces away from where I called home and started a new career for myself, and a new life for my family. Fortunately, I remembered that familiar "You may need to know…" message and made sure that I had considered much of what I had learned from my mentors over the years. Even though I did not fully comprehend the overall authority of my new position, I still learned a lot of new things in a short time.

I had stepped into a whole new learning curve working with people who were looking for answers concerning flight school operations, training needs and organizational planning. I really felt like I had something to offer from a forward thinking mindset yet also felt unworthy to carry the load of greater responsibility all at the same time. I had worked toward this kind of opportunity for some time yet there I was thinking twice about my new challenges, priorities and contributions. I nevertheless committed to the journey before me and realized that many aspects of the position were a good fit with my interests and that the rest could be learned along the way. I think it's still like that even today.

The transition from the shop floor to the maintenance office will undoubtedly inspire a new paradigm of how the work is processed and who is ultimately involved. The new PRM will come to realize an entire range of corporate duties concerning employee performance, strategic planning, goals setting and interpreting the events of the day. There is also an expected level of competence in these areas while ensuring that your department continues to perform according to some semblance of the manual. Many managers are still getting their hands dirty in the smaller shops while others retreat to their offices where grease and tools are displaced with printer cartridges and computer applications. Either way, the Maintenance Manager must be in touch with ongoing maintenance activity on a daily basis in order to ensure that the required technical and regulatory standards continue to be met. That in itself demands frequent reflection concerning the weight of responsibility inherited with the position. Management of aircraft maintenance is not an invite to sit back with your feet up on the desk! It requires your simultaneous presence in both familiar and not so familiar corporate functions.

Transitioning to the computer age has been more difficult for some managers than it has for others. There was a time when those with the technical

experience and the grey hairs of authority would be slow to catch on to the digital age but the inclusion of such technology in our everyday world has forced us all to participate on some level. It has changed the way we simply do business.

I remember working on manual revisions with a respected mentor before becoming a manager myself as we literally cut and pasted our manual revisions (yes, with scissors and tape!) into a decided format that could then be re-typed with greater speed and competence by the more efficient administrative assistant. I actually persevered through another manual editing session much in the same manner before summoning the courage to face the keyboard and the magical screen head-on for myself. I knew that it would have to happen sooner or later!

This current generation of up-and-comers grew up knowing the computer business as a normal part of growing up just like breathing. I was not interested in the new technology and my ignorance did not make it go away. For that reason, some of us found it more difficult to really catch on and become effective users. Many of the senior positions still rely on a little help from their assistants for electronic processing yet many have also become leaders themselves in the research and development of maintenance related software and applications. Those with foresight knew this to be a logical progression and have succeeded in guiding the rest of us toward a better way of doing things.

Adapting to the new technology is something that the manager must learn to implement in order to promote a more efficient technical resource that is both more accessible and easier to navigate for the front line technicians. It is no longer unusual to see a laptop loaded with aircraft manuals and tracking systems parked on a table beside the aircraft as it is being maintained. Electronic versions are easily referenced and even log book entries routinely procured using this cleaner format. It also trumps having to interpret some of those messy log entries!

The ability of the manager to draw upon and promote the strengths of the team becomes a healthy conduit for raising self-esteem and sufficiency, all of which must not be underestimated. Adapting to the new technology is something that the manager must learn to implement in order to promote a more efficient technical resource that is both more accessible and easier to navigate for the front line technicians.

Parts inventories and analytical spreadsheets represent other daily fundamentals that have been made more efficient through digital technology. Anyone entering a management position these days must prove some level of competency using computers in everyday work. Even a basic aptitude for pushing a few buttons will get you going until you are able to learn out of necessity and remain on par with the rest of the industry. I can't help but comment on these advances without considering my own trial and error strategy that continues to be just enough to stay the course with a few memorable moments of flash and brilliant personal breakthroughs.

As a Maintenance Manager you will also attain certain skills along the way that will be necessary to the position. Troubleshooting and problem solving skills will become essential but their application is routinely tested through ongoing experience. One day there could be an elusive technical issue on an aircraft that requires additional technical support and the next day an employee is injured on the job or the parts inventory software has a glitch. All of these issues must be tended to in order for life, as we know it, to move forward. Fortunately, being surrounded by other skilled people creates team opportunities where each person contributes various skills to the daily routine.

The ability of the manager to draw upon and promote the strengths of the team becomes a healthy conduit for raising self-esteem and sufficiency, all of which must not be underestimated. Management training is an often-overlooked opportunity for the employer to further invest in some of the social

and business norms known as soft skills that frequently need to be learned by new managers. We have long categorized the aircraft engineer as the strong silent type who buckles down to get the job done. We also look for certain attributes that come into play through both employee and customer relations as we are drawn more toward effective leadership. A manager should learn to become more of a leader than a boss. Leading involves everyone and a good leader recognizes that his influence is only as solid as the group around him. In an ideal setting, everyone makes everyone else look good and we all become aware of the positive byproduct of group mentality over self-preservation. It doesn't come easy when dealing with each other is really an ongoing lesson in patience and intuition. There is a saying that goes, "The best thing about this place is the people and the worst thing about this place is …" well, you know. This probably sounds rather extreme to some yet at the same time more believable to others, which in some way seems to qualify the origin of the statement.

A candidate for a Maintenance Manager position with an Approved Maintenance Organization (AMO) must demonstrate a confident understanding of AMO policies and quality assurance functions to Transport Canada personnel before assuming any responsibilities within the organization. CAR Standard 573.04 outlines those specific attributes and how they specifically relate to a company. The interview process is more company specific and therefore of greater value to the PRM candidate as opposed to general knowledge testing. Chapter 573.06 goes on to describe the training requirements including those inherent to the Safety Management System (SMS). These include maintenance and flight safety philosophy, human factors, accident prevention, safety personnel responsibilities, risk management, incident/ accident reporting and investigation. I wouldn't even have recognized these terms in relationship to my career back when I was starting out. So much of our experience has evolved since then and will continue to evolve as we embrace new ideas through involvement with manufacturing technologies and safety management just like we have seen in recent years.

The ultimate responsibility of the Maintenance Manager rests with his ability to maintain the airworthiness of the many aircraft entrusted to his care. He must dutifully represent the company and take his appointment seriously on a daily basis. He must be willing to adapt to new responsibilities and become fluent in both regulatory jargon and technical data. The Maintenance Manager must exercise control over maintenance operations and delegate signing privileges only to those who will act responsibly on his behalf. This is only part of the picture and comes from sincerely making the most of an opportunity to jump in and learn as you go. Eventually you will be able to apply years of experience to new and appropriately sized challenges but it all takes time. At the end of the day the Maintenance Manager can also be assured that every trying experience and every learning opportunity has shaped him into becoming a valuable person to his industry. ■

JetBed™

Easy to Carry • Easy to Stow • Ready to Go

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

Lusardi Construction Co.

The Comfortable Way to Fly

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

Available for:

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

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

JetBed™

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

Qualcomm Flight Department

BKD
mobility products
Approved distributor

Tel: 604.247.2128 Fax: 604.214.9825

www.bkdaerospace.com
info@bkdaerospace.com
BKD Aerospace Industries Inc.

Heavy Weather Ahead

About two hours into a three-hour flight, an air traffic controller advises the non-instrument-rated pilot of heavy precipitation ahead. The pilot acknowledges the info but says he's going to try to fly around it. No further communications are received.

On October 18, 2013, about 1008 eastern daylight time, a Piper PA-28R-180 operated by a private individual, was destroyed during impact with terrain, following a loss of control in cruise flight near Tifton, Georgia. The private pilot was fatally injured. Instrument meteorological conditions prevailed and no flight plan was filed for the flight that departed Merritt Island Airport (COI), Merritt Island, Florida, about 0750; destined for LaGrange-Callaway Airport (LGC), LaGrange, Georgia. The personal flight was conducted under the provisions of 14 Code of Federal Regulations Part 91. According to information from the Federal Aviation Administration (FAA), the flight was in radio and radar contact with Jacksonville Center while in cruise flight at 6,500 feet.

At 1000, the controller advised that accident flight: "…I am showing an area of heavy and moderate precip starting, ah, extending from your ten to two o'clock and approximately one four miles maintain VFR at all times." The pilot acknowledged the transmission and stated, "Okay, maintain VFR I'll pick around it a little bit…"

No further communications were received from the accident airplane. Between 1010:45 and 1011:40, the controller queried the accident flight three times as radar contact was lost.

Review of radar data revealed that the second-to-last radar target was recorded at 1007:46, indicating an altitude of 6,200 feet mean sea level (MSL), in an area of very light precipitation, and near an area of light to moderate precipitation. The last radar target was recorded 1008:10, with no associated altitude recorded, in the vicinity of the accident site. The last four radar targets were consistent with a descending right 180-degree turn.

A witness, who lived near the accident site, observed the airplane level as it flew over his house very fast, but then went straight down and impacted a field next to his property. He added that it was difficult to see the airplane in the low clouds and the engine noise was very loud. The witness further stated that just prior to impact, something from the airplane fell into the pond at his residence. The component the witness referred to was later presumed to be a separated and unrecovered right main landing gear.

The pilot, age 39, held a private pilot certificate with a rating for airplane single-engine land. He did not possess an instrument rating. His most recent FAA third-class medical certificate was issued on August 4, 2012. Review of the pilot's logbook revealed that he had accumulated about 163 total hours of flight experience; of which 1.7 hours were logged as simulated instrument experience and he had no documented actual instrument experience. He had flown 3.8 hours and zero hours during the 90-day and 30-day periods preceding the accident, respectively.

The four-seat, low-wing, retractable tricycle-gear airplane was manufactured in 1968. A Lycoming IO-360, 180-horsepower engine, equipped with a Hartzell constant-speed propeller, powered it. A review of the airplane's logbooks revealed that its most recent annual inspection was completed on September 1, 2013.

At that time, the airplane had accumulated 6,169.47 total hours of operation. The engine had also accumulated 6,169.47 total hours and 1,307.47 hours since a major overhaul. According to the pilot's logbook, the airplane had flown about one hour from the time of the last annual inspection, until the accident flight. There was no record of the pilot obtaining a weather briefing from flight service or direct user access terminal.

Henry Tift Myers Airport (TMA), Tifton, Georgia, is located about 11 miles southeast of the accident site. Fitzgerald Municipal Airport (FZG), Fitzgerald, Georgia, is located about 18 miles northeast of the accident site. The recorded weather at TMA, at 1015, was: wind calm; visibility 1.5 miles in light drizzle; temperature 21C; dew point 21C; altimeter 30.01 inches Hg. TMA did not record ceiling; however, the recorded ceiling at FZG, at 1015, was overcast ceiling at 400 feet.

Wreckage Information

The wreckage came to rest upright, was fragmented, on a heading about 270 degrees magnetic. An approximate 75-foot debris path was observed on a heading about 090-degrees, beginning with the engine and ending at the empennage. A fuel

odor was noted and vegetation blight was observed throughout the entire debris path. The engine, separated propeller, and instrument panel were buried in an approximate six-by-six-by-three-foot deep impact crater. The cockpit area was crushed and resting on the side of the crater with the door, cabin roof, outboard section of left wing, and nosewheel. A mid-section of left wing was located about 20 feet along the debris path. The inboard section of the left and right wings were located near the end of the debris path.

The left main landing gear had partially separated from the left wing and the right main landing gear had completely separated from the right wing. The right main landing gear was not recovered and was presumed submerged in an adjacent pond. The left aileron and flap remained attached to the left wing and were compressed downward. The right aileron was destroyed and fragments of it, along with the right wingtip, were located about 20 feet north of the debris path. The right flap had also separated from the right wing and was recovered. The landing gear was observed in the extended position and the flaps in the retracted position. The empennage, rudder, and stabilator remained intact at the end of the debris path and exhibited crushing damage.

Control continuity was confirmed from the rudder, stabilator, and stabilator trim to the mid-cabin area, where the control cables were separated consistent with overstress. Measurement of the stabilator trim jackscrew revealed five threads, which equated to an approximate neutral setting. Continuity was confirmed from the right wing aileron bellcrank to the right wing root and the left aileron to the left wing root. The aileron cables were separated at their respective wing roots consistent with overstress. Instruments recovered from the instrument panel included: attitude indicator, panel mounted GPS, communication radio, VOR, and LOC/ILS. The gyro in the attitude indicator was disassembled for inspection. Rotational scoring was observed on the rotor and inside of the gyro housing.

The engine was recovered to a facility for further examination. The magnetos, oil sump, oil filter, and oil screen were not recovered. A partial teardown and examination of the engine revealed that the forward section of crankshaft exhibited a torsional separation. The crankshaft was also bent consistent with impact forces, which precluded rotation. All four cylinders were removed and no pre-impact mechanical malfunctions were observed. The No. 1 and No. 2 (front two) pistons were lodged in the engine due to the bent crankshaft. The propeller governor oil screen was removed and no metallic debris was observed. The fuel pump was destroyed; however, fuel was recovered in the fuel spider and fuel servo. The fuel was clear and consistent in odor with 100-low-lead aviation gasoline. Disassembly of the vacuum pump revealed that the rotor was fragmented, but the vanes were intact. Rotational scoring was observed on the inside of the pump housing.

Examination of the propeller revealed that one blade remained in the hub and one blade had separated. The separated blade exhibited S-bending, chord-wise scratching, and leading edge gouging. The blade that remained in the hub exhibited leading edge gouging.

Medical and Pathalogical Information

The Central Regional Georgia Bureau of Investigation's Medical Examiner's Office, Macon, Georgia, performed an autopsy on the pilot. The FAA Bioaeronautical Science Research Laboratory, Oklahoma City, Oklahoma, performed toxicological testing on the pilot. Though the testing revealed low levels of ethanol in the kidney and liver, the levels may have been from postmortem production, and the absence of vitreous, blood, or urine samples limited the interpretation. Similarly, although diphenhydramine, a sedating antihistamine, was present in the liver and muscle, without appropriate specimens, the investigation could not determine if it was impairing at the time of the accident.

Given the presence of instrument meteorological conditions, including both degraded visibility and precipitation, and the pilot's lack of an instrument rating, the pilot likely experienced spatial disorientation. Further, the circumstances of the accident, including the high descent rate over a confined area and the spiral descent are consistent with the presence of spatial disorientation.

Consequently, the National Transportation Safety Board determined the probable cause(s) of this accident to be the non-instrument-rated pilot's improper decision to continue visual flight rules flight into known instrument meteorological conditions, which resulted in spatial disorientation and a loss of airplane control. ■

Aviation Services

Aviation Services

Aviation Services

BY SAM LONGO, AME A&P

Teachers: Society's Unsung Heroes

As a grade-school youth, I cherished my time at school. My home life seemed to be a chaotic blend of quarreling parents intermixed with woeful inattention paid to their children. Add to this a couple of unfortunate years placed in foster homes and it quickly becomes clear why school became a safe haven for me. Not to pass judgment on my mother and father, as an adult I now realize that they did the best they could, considering their own time and circumstances.

Throughout my life, teachers always seemed to fill the gap left empty by my parents. I still vividly remember the pride I felt at Holy Spirit School, when Sister Marie-Francis took me aside to print posters for the school because I had the best penmanship in grade three. At home I was invisible, but I quickly learned that if I worked hard at school, I could shine. Many teachers seemed to take special interest in me throughout my grade school years. Their ongoing support and encouragement were my saving grace at a time when my need for both was acute. Whether they were fully aware or simply sensed the tragedy of my home life is a question that remains unanswered. To me, they all simply remain, my heroes.

Ask anyone, regardless of their education level, if they have a favourite teacher and you will surely get an enthusiastic response. It is likely that teacher impacted that person's life in a positive way during his or her personal journey. Perhaps that teacher is remembered fondly for pushing them just a little harder or exposing them to some life-morphing revelation. Sometimes that special bond was developed simply because that teacher took the time to listen and offer help in a time of need. It is one of the few professions that can still have a profound impact in our sometimes demanding and difficult lives.

High school produced another great batch of memorable educators. Their interesting lives and characters became role models for my own future development. As always, the ingredients of the relationship remained the same. They took an interest in me, which in turn caused me to grow and learn from their experiences. My grade eleven physics teacher, Mark Geiger, often let me tag along in his nifty white MGB-GT when he set out to pick up dry ice for his lab or silk-screen ink for our dance posters. He was a cool guy and I always felt privileged just to be invited along.

Another aspect of what made some teachers memorable was how they shared small glimpses into their personal lives. I never missed Mister Wideman's history class, simply because, he started each session with an interesting humorous anecdote detailing ongoing adventures with his quirky Alpha Romeo sports car.

Great teachers always seem to share a modicum more of themselves, instantly making their students feel just a bit more like good friends.

When I enrolled at Centennial College, the stakes became considerably higher. I hung on every word my instructors uttered. Their word was Gospel. I was now entering the world of Aviation Maintenance in my adult quest to becoming an Aircraft Maintenance Engineer. Fixing and maintaining aircraft was a serious business, and I dutifully absorbed every ounce of knowledge that was given. Once again, the professors impressed me with their willingness to share their knowledge and experience, all the while encouraging me to push the envelope and do my best.

After many years working in the aviation industry, I finally returned to that very institution to repay the favour, and spent 22 years as an Aviation Maintenance professor. It was a wonderful experience, finally allowing me to become a member of a profession that I continue to hold in great esteem. It also revealed some inherent truths of life as a teacher that I feel obligated to share.

Firstly, teaching is not a job for everyone. Anyone who thinks it is easy has never done it, or perhaps more importantly, has never done it well. It is, without a doubt, one of the most challenging and potentially rewarding careers you could ever devote your life to.

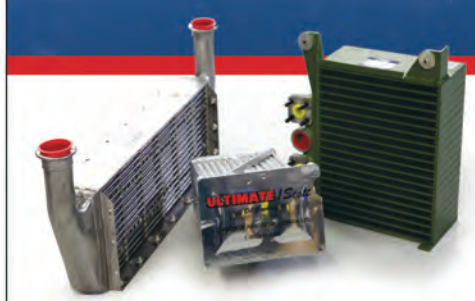
Trust me when I say that only a fool would do it solely for the money. If you don't care about your students, they will know immediately and won't care about you or what you have to say. If you don't love teaching, for you and the sake of your students, please don't bother. However, if you have a passion for your subject, enjoy helping people, and truly care about our future generations, you could end up really making a difference.

It is always a wonderful experience for me when I run into any of my ex-students, now working at airports all over Canada. It is a constant reminder of my younger years in the business and how all those terrific teachers contributed in some small way to help me achieve my goals.

Sometimes, simply saying the right thing at the right time can change someone's world. No teacher should ever forget that, and great teachers, the unsung heroes of our society, should always treasure that power. Whether it's kindergarten or college, shouldering and sharing that gift remains a special kind of joy.

For more published writing by Sam Longo, please visit www.samlongo.com ■

GROUNDED? NOT FOR LONG.



At Ultimate, we provide a wide range of Coolers, Valves, Heat Exchangers and Oil Tanks for your piston or turbine engine. With experienced technicians, we offer a solid warranty and 24 hr AOG Service.

FROM FIXED WING AIRCRAFT TO HELICOPTER

CUSTOM OVERHAUL • EXCHANGE • RE-CORE • NEW

1.800.561.5544 | BRINGLAND@AERORECIP.COM

ULTIMATE Oil Coolers

A GREGORASH AVIATION COMPANY

GREGORASH AVIATION ENGINES PARTS SUPPLIES

ACCESSORY OVERHAULS:

RIGOROUSLY TESTED AND FINELY CALIBRATED, JUST LIKE OUR STAFF.

All Aero Recip accessories are tested and calibrated in house by factory trained technicians with decades of experience. With quick turnarounds and exchange units readily available, we invite you to put us through your most rigorous test.

GUARANTEED QUICK TURNAROUNDS

CUSTOM OVERHAUL • EXCHANGE • REPAIR

AERORECIP.COM | 1.800.561.5544 | INFO@AERORECIP.COM

AERO RECIP (CANADA) LTD.

A GREGORASH AVIATION COMPANY

GREGORASH AVIATION ENGINES PARTS SUPPLIES

MURPHY'S LAW OF PARTS –

You Are AOG. The Part You Need Shows As In Stock. The Wrong Part Shows Up In The Morning.

Accuracy Is Almost As Important As Inventory. That's Where Experience Pays Off.

John Hardy
Director of Spare Parts Sales
13 years of experience

When you need a part, whether airframe, engine or accessory, you need the correct item applicable to your make model and serial number. And when you are AOG, the service you receive can quickly make a bad situation better. That's where experience comes in.

Experience based on years of supporting corporate aircraft in our maintenance facilities as well as in the field. West Star's experience allows you to rest easy. If we tell you we have the part you need and it will be there tomorrow morning, that's what you can count on.

Keep good old Murphy away from your AOG parts situation. West Star's parts experts can keep AOG from turning to SOL.

To read more about the real "Murphy" and his aviation roots, like us on Facebook.

Falcon | Citation | Gulfstream | Learjet | Hawker | Challenger | Global Express | Embraer | King Air | Conquest | Piaggio

www.weststaraviation.com

WEST STAR AVIATION