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Popped plug mainly a US issue



FOLLOWING ORDERS from the US's Federal Aviation Authority after a panel blow-out during an Alaska Air flight on January 5, carriers were ordered to ground planes to carry out safety inspections with 4,324 flights scheduled to use the affected aircraft that week. The data analyst firm OAG, which specializes in the global travel industry, assessed flights scheduled for the week commencing January 8 to identify the airlines most likely to be impacted by the grounding of Boeing 737-900 Max aircraft, and concluded that the "window plug" was primarily a US market issue.

Nine airlines currently operate the affected aircraft variant, which has a panel that can be used for an optional rear mid-cabin exit door. The extra door is typically installed by low-cost airlines using extra seats that require more paths for evacuation. Those doors are permanently "plugged" or deactivated on the aircraft of some carriers. Two US-based carriers, United and Alaska, planned to operate two-thirds of all flights during the week of the January 5 incident.

Of the nine airlines operating the 900-MAX, OAG's research showed that proportionally, Icelandair appeared to be the most affected with 29 percent of their planned Boeing 737 program operated on the variant, while for Alaska it was potentially a one-in-four flight issue.

With yet another controversy surrounding the aircraft, customer confidence in the 737-900 Max may take some time to restore, according to OAG. "Certainly, the airline customers of Boeing will once again be asking some very hard questions," said the analyst. ■

— John Campbell, Editor

Departments

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



33

Features

Starved To Death Fuel exhaustion	10
TC Feedback Transport Canada Service Reports & Comments	18
Raising The Bar: Vanishing Ice Carburetor Icing	28
Off Ramp News Aviation highlights	33

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Upcoming Events

Plan on being in Calgary for AAC 2024



THIS YEAR, AVIATION ENTHUSIASTS, professionals, and pioneers will converge upon Calgary, Alberta to explore, learn, and network at one of the most anticipated aviation events in North America, the Alberta Aviation Conference 2024, which is scheduled for April 28-30. This year, the event will host an AME Competition featuring teams from across North America. AMEs of all experience levels and backgrounds come head to head to compete for the title of top team. Through a variety of challenging troubleshooting, new technology challenges, and timed trials, this competition will showcase the best in maintenance talent.

The conference promises an intriguing program covering topics ranging from the future of Alberta airports to general aviation to “The Magenta Line: Fact or

Fiction.” Keynote speakers will include Shaesta Waiz, who is the first female certified civilian pilot born in Afghanistan, and who in 2017, became the youngest woman to fly solo around the world in a single-engine aircraft. She founded the non-profit organization Dreams Soar, Inc and on October 4, 2017, completed the world solo trip across five continents, with 30 stops in 22 countries in a Beechcraft Bonanza A36.

Another scheduled speaker is Senator Paula Simons, the deputy chair of the Standing Senate Committee on Agriculture and Forestry, and a member of the Standing Senate Committee on Transportation and Communications. She has also served as a member of the Standing Senate Committee on Energy, the Environment and Natural Resources.

Also on hand will be Chris Miles, the Chief Operating Officer for the Calgary Airport Authority,

Since joining The Authority in 2018, Chris has held several executive leadership roles within the organization including Vice President, Operations & Infrastructure where he was responsible for the day-to-day operations, engineering, and construction portfolios. Chris has worked with airlines, airports and industry

trade associations, including the Greater Toronto Airports Authority, Airports Council International - ACI World, Air Canada, Abu Dhabi Airports Company and the International Air Transport Association (IATA) in Geneva, Switzerland. ✈

For information about this event and how to register, visit:

www.albertaaviationcouncil.com

COMING EVENTS

Buckeye Air Show/Copperstate Fly-In

February 16-18, 2024
Buckeye, Arizona
www.buckeyeaz.gov

MCAS Yuma Airshow

March 09, 2024
Yuma, Arizona
www.yumaairshow.com

Fiesta Of Flight

March 09, 2024
Laughlin AFB, Texas
www.laughlin.af.mil

New Orleans Air Show

March 23-24, 2024
NAS JRB New Orleans
Belle Chase, Louisiana
www.neworleansairshow.com

Tampa Bay AirFest

March 29-31, 2024
MacDill AFB, FL
www.tampabayairfest.com

Advertisers Index

Amazon Stairclimber - BKD	2	Concorde Battery	15	NAASCO	27
Aeroneuf Instruments Ltd	23	Eagle Fuel Cells Inc	7	ProAero Aviation	17
BKD 3D Printing	37	Harbour Air	20	Propworks Propeller Systems	38
Canadian Aero Accessories Ltd	44	Hartwig Aircraft Fuel Cell Repair	13	Rapco Inc	43
Canadian Propeller Ltd	36	JetBed - BKD	5	Schweiss Bi-fold Doors	12
CASP Aerospace Inc	36	MARSS	22	STOLairus	40

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Spraycan works upside down

Kano Laboratories, maker of the Kroil brand of lubricating oils, has introduced an innovative, engineered design to its line of its industrial-strength penetrants – Aerokroil with SprayTech. The new 13-ounce aerosol spray can is designed with an integrated straw and the ability to spray in any direction even upside down to loosen frozen and rusted metal parts. The new spray tech design is said to effectively dispense every drop, which is different than traditional propellant-based aerosols. Kroil is said to have the ability to seep into small crevices to pierce through rust and corrosion. www.kroil.com



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AirMaintenance UPDATE

The Magazine for Aircraft Maintenance Professionals



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IPANEMAS REACH IMPORTANT MILESTONE

Embraer's Agricultural Aviation Division says it delivered 65 Ipanema airplanes in 2023, an increase of 18 percent compared to the previous year. As a result, in December the company reached the milestone of 1,600 units produced and delivered over the aircraft's five decades of uninterrupted production. The company plans to increase production of the EMB-203 to 70 planes this year, citing its contribution to Brazil's GDP. "Agribusiness has a significant positive impact on Brazil's Gross Domestic Product, and we are very pleased to see how the Ipanema has contributed..." said Sany Onofre, manager of Embraer's Ipanema Program.



SIRIUS AND BMW WORKING TOGETHER

Swiss aviation startup Sirius Aviation AG has unveiled the Sirius Jet, which is said to be the world's first hydrogen-powered Vertical Take-Off and Landing (VTOL) aircraft. It's fitted with a hydrogen plant that supplies 100 percent of its power, allowing the jet to rely on a battery for only 90 seconds per flight. Designed in collaboration with BMW's Designworks and Sauber Group, which is renowned for its Formula 1 excellence, the aircraft will arrive in two iterations: the Business Jet featuring an 1,150-mile flight range, and the Millennium Jet, which will offer a 650-mile flight range and accommodations for up to five passengers.



CANADIAN CARGO HAULERS BUCKED TREND

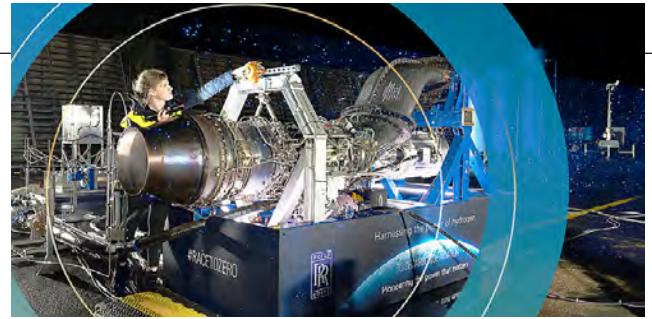
New analysis of data held by WINGX, a provider of market intelligence on the business aviation industry, reveals a 27.1 percent decrease in global business aviation cargo departures between January 1, 2023 and November 22, 2023 compared with the same period in 2019, before



the onset of the Covid-19 pandemic. However, the analysis, which was conducted by Horizon Aircraft, a Canadian based producer of hybrid electric Vertical Take-off and Landing aerial vehicles, reveals Canada's business aviation cargo market bucked the global trend during the same timeframe as the number of departures increased by 8.9 percent compared with the same period in 2019.

TRANSPORT CANADA CERTIFIES AIRBUS H160

Airbus Helicopters has received Transport Canada Civil Aviation type certification of the H160 helicopter, positioning the aircraft type for entry into the Canadian market. The multi-mission craft features technologies such as noise-reducing Blue Edge rotor blades, a canted Fenestron tail rotor for a greater useful load, and Airbus's Helionix avionics suite for reduced pilot workload. With a 15 percent reduction in fuel consumption and 50 percent reduction in perceived sound, the H160 now has customers in energy, private and business aviation, EMS, search and rescue, law enforcement, and military. Worldwide, the H160 fleet has accumulated more than 2,800 flight hours.



HYDROGEN ENGINE DEVELOPMENT PRESENTS CHALLENGES

Rolls-Royce and the company's partner easyJet have started a new set of research tests to develop hydrogen combustion engine technology capable of powering a range of aircraft, including those in the narrowbody market segment. The latest set of tests will address a key engineering challenge of taking low-pressure liquid hydrogen, chilled below -250C, and pressurizing it so that it can then be pumped into an engine. Rolls-Royce has identified three challenges in the journey to enabling hydrogen for use in aviation: fuel combustion, fuel delivery and fuel systems integration with an engine. All elements must be confirmed to operate safely.



BELL SIGNS ON AS FLORIDA SWAMP WATCHER

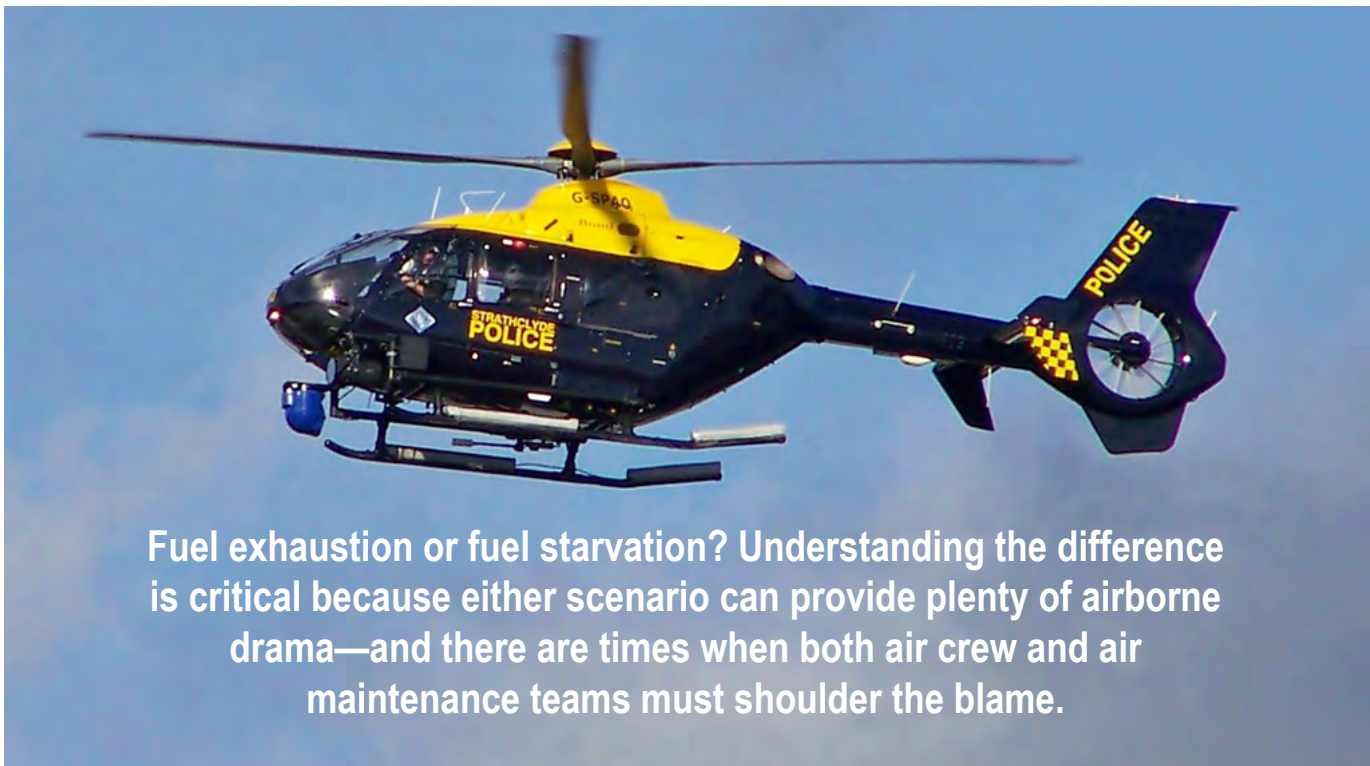
The Florida Fish and Wildlife Conservation Division of Law Enforcement is one of Bell's newest customers for its Bell 505 Jet Ranger X, after signing a purchase agreement for two of the craft to support conservation efforts in Florida. Being responsible for 8,400 miles of coastline, 13,200 square miles of offshore waters, and more than 34 million acres of land, the FWC plans to use the Bell 505s to enhance its fish and wildlife resource management capabilities through patrol and investigative law enforcement services. The Bell 505 features a large open cabin that provides panoramic views for resource management.



NO DOOR? FAA TO CONDUCT BOEING MAX AUDIT

After taking action to ground approximately 171 Boeing 737-9 MAX planes following the dangerous door plug incident, the Federal Aviation Administration on January 12 announced it will conduct an audit involving the aircraft's production line and its suppliers to evaluate Boeing's compliance with its approved quality procedures. The results of the FAA's audit analysis will determine whether additional audits are necessary. It will also increase monitoring of 737-9 MAX in-service events, and make an assessment of safety risks around delegated authority and quality oversight. The FAA is exploring the use of an independent third party to oversee Boeing's inspections and its quality system. ■

Starved to Death



Fuel exhaustion or fuel starvation? Understanding the difference is critical because either scenario can provide plenty of airborne drama—and there are times when both air crew and air maintenance teams must shoulder the blame.

An Airbus Helicopters EC135 was lost after both engines flamed out following fuel starvation.

FUEL STARVATION has been defined as the state in which the fuel supply to the engine is interrupted, although there is adequate fuel on board the aircraft. To be clear, this condition is not the same as fuel exhaustion. The following article contains material published by skybrary.aero which compares the terms “fuel exhaustion” and “fuel starvation,” elaborates on the causes for starvation and gives some recommendations on its prevention.

STARVATION VERSUS EXHAUSTION

Fuel starvation and fuel exhaustion share the same possible outcomes: engine failure, forced landing or controlled flight into terrain (CFIT). The difference is that in the exhaustion case there is no fuel remaining on board (for whatever reason) while with starvation there is (sometimes enough) fuel but for some reason it cannot reach the engine. It is therefore possible in some cases to re-establish the flow of fuel and to regain engine power.

CAUSES AND CONTRIBUTORS

There are several major causal factors for fuel starvation occurrences including pilot factors, which are the most common cause for fuel-related occurrences. Fuel mismanagement can be an issue and this occurs when the pilot forgets to switch fuel tanks when necessary, or switches to the wrong fuel tank, or just doesn't monitor the fuel burn during a flight. Much of the time, the problem stems from a lack of understanding of the fuel system itself, and even lack of familiarity with the aircraft, or lack of experience on the particular aircraft type.

Distractions too can play a role. There have been aircraft accidents in the past in which the pilots allowed a fuel starvation event to occur while preoccupied with something else, like fixing a landing gear problem or becoming disoriented. There's an old adage that applies here: “aviate, navigate, communicate” — in that order. Troubleshooting or allowing yourself to get distracted by other people or events can lead to fixation on that particular problem or event and can cause the pilot to completely disregard other important aspects of the flight — like fuel management.



A privately operated Cessna 310 about to land at Hawarden crashed after power was lost from one engine.

Mechanical problems or failures have been pinpointed as factors in airborne incidents but only very rarely is there actually a fuel leak or a problem with the fuel system that can cause fuel starvation. In these cases, early recognition is key to dealing with the problem. Monitoring the actual fuel burn and the status of the fuel system is essential.

The most commonly occurring technical factors that may sometimes lead to fuel-related events are component failure (problems with the fuel lines, fuel gauges, filter or carburetor); a malfunctioning fuel system (generally caused by a vapour block or a faulty fuel pump); and design-associated factors (such as owner's manual details, fuel system and engine control design) when combined with pilot factors (e.g. lack of familiarity with the aircraft).

A dedicated study made by the Australian Transport Safety Bureau has found that there are some specific aspects of fuel-related events that may arise from the types of operations or pilot experience. In regards to pilot experience, research has found no relationship between the total hours flown and involvement in fuel-related occurrences. A relationship has been found, however, between hours on the specific aircraft type and involvement in fuel related occurrences. That is, pilots with fewer hours on type tended to be involved in a greater number of fuel-related occurrences. Regular Public Transport, commuter and training operations were found to have experienced fewer occurrences than were expected given the hours flown in each category. On the other hand, private/business/general aviation operations were found to have been responsible for a disproportionately large number of fuel-related occurrences.

Fatigue has been found to increase human error rates and may be a contributing factor to the high rate of fuel exhaustion and fuel starvation accidents within categories such as



Agriculture where long working hours are the norm. Alternatively, the high mental workload experienced by pilots in agricultural operations may narrow their attention to tasks such as avoiding terrain and other obstacles as well as continually recalculating load requirements, resulting in reduced monitoring of the aircraft's fuel system. Still, caution must be used when drawing any conclusions about the relative safety of any operations category.

RECOMMENDATIONS

Good knowledge of the performance and characteristics of the aircraft, as well as comparison between the information in the logbook, gauges and the level in the tanks are necessary to avoid fuel starvation. These elements are an essential part of flight preparation. Good fuel management during the flight will then allow the right decision at the right time: to divert or continue the flight. Since most fuel starvation events can be attributed to pilot factors, the following fields offer greatest opportunities for improvement:



Ice crystals in the jet fuel were blamed as the cause of the accident, clogging the fuel/oil heat exchanger of each engine of this Boeing 777-200ER.

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1. Pilot training and procedures
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3. **Standardization** of fuel selection and management systems within operators' fleets;
 Consideration of ergonomic and procedural issues in aircraft fuel systems, when determining airworthiness standards.
4. **Flight** preparation including knowledge of aircraft (performance and consumption) as well as aircraft characteristics (characteristics linked to refueling, visual check, selectors ...)
5. **In-flight** fuel management including timely fuel checks, precise knowledge of flight time elapsed and tank selection

ACCIDENTS AND INCIDENTS

RJ85, VICINITY MEDELLÍN INTERNATIONAL (RIONEGRO) COLOMBIA, 2016

On 29 November 29, 2016, a BAe Avro RJ85 failed to complete its night charter flight to Medellín (Rionegro) when all engines stopped due to fuel exhaustion and it crashed in mountainous terrain 10 nm from its intended destination killing almost all occupants. The Investigation noted the complete disregard by the aircraft commander of procedures essential for safe flight by knowingly departing with significantly less fuel onboard than required for the intended flight and with no apparent intention to refuel en route. It found that this situation arose in a context of a generally unsafe operation subject to inadequate regulatory oversight.



Airbus A340-600 G-VATL's engines ran down in quick succession, victimized by a fuel management problem.

EC35, VICINITY GLASGOW CITY HELIPORT UK, 2013 (As seen on page 10)

On November 29, 2013, control of an Airbus Helicopters EC135 undertaking a night VMC flight for policing purposes was lost after both engines flamed out following fuel starvation. The subsequent crash killed the three occupants and seven on the ground, seriously injuring eleven others. The Investigation found that although the pilot had acknowledged low fuel warnings after both fuel transfer pumps had been switched off, the helicopter had not then been landed within 10 minutes as required. No evidence of any relevant airworthiness defects was found and without FDR/CVR data, a full explanation of the accident circumstances was not possible.

C310, HAWARDEN UK, 2013 (see page 11)

On November 15, 2013, a privately operated Cessna 310 about to land at Hawarden crashed after power was lost from one engine and the experienced pilot appeared to have attempted to initiate a go around rather than land on the grass next to the runway. The Investigation found that both main fuel tanks were effectively empty after normal fuel use during the flight and since unused fuel remained in the auxiliary tanks, it was concluded that fuel starvation attributable to enroute fuel system mismanagement had occurred. The other engine had been at full power but with fuel starvation imminent.

LJ24, VICINITY BORNHOLM DENMARK, 2012

On September 15, 2012, a Learjet 24 experienced double engine failure in daylight as it positioned visually on base leg at Bornholm and an emergency was declared. The subsequent handling of the aircraft then led to a stall from which recovery was not possible and terrain impact occurred in a standing crop at low forward speed shortly after crossing the coastline. The aircraft was destroyed and both occupants seriously injured. Investigation established that the engines had stopped due to fuel starvation resulting from mismanagement of the fuel system and had been preceded by a low fuel quantity warning.

B772, LONDON HEATHROW UK, 2008 (top, page 12)

On January 17, 2008, a British Airways Boeing 777 200ER crash-landed 330 metres short of the intended landing runway, 27L, at London Heathrow after a loss of engine thrust on short final. This un-commanded reduction of thrust was found to have been the result of ice causing a restriction in the fuel feed system. Prompt crew response minimized the extent of the inevitable undershoot so that it occurred within the airport perimeter.



This Boeing 737-300 flamed out near Hellas, Greece

A346, ENROUTE, NEAR AMSTERDAM NETHERLANDS, 2005

On February 8 2005, an Airbus A340-600 was 11 hours into its flight from Hong Kong to London Heathrow when the No. 1 and No. 4 engines ran down in quick succession. A fuel management problem rather than a fuel shortage was then diagnosed but a manual transfer was only partially successful and a diversion to Amsterdam was made on three engines. The investigation found that the master Fuel Control and Monitoring Computer had failed, that timely warnings of automated fuel control system malfunctions were not provided and that alternate low fuel level warnings were inhibited by inappropriate system design.

B737-300, ENROUTE, NEAR HELLAS, GREECE, 2005 (seen above)

On August 14, 2005, a Boeing 737-300 impacted hilly terrain in the vicinity of Grammatiko, Hellas, Greece, approximately 33 km northwest of the Athens International Airport. The 115 passengers and six crew members on board were fatally injured and the aircraft was destroyed. The flight, Helios HCY522, was a planned flight from Larnaca, Cyprus to Prague, Czech Republic via Athens, Greece. The final descent into terrain was the result of both engines flaming out due to fuel starvation after the airplane had been under automatic

control in a high-altitude holding pattern in the vicinity of Athens International Airport.

STATISTICALLY SPEAKING

The National Transportation Safety Board of the United States has published some revealing statistics. According to NTSB data, more than 66 percent of fuel management accidents occurred on flights when the intended destination airport was different than the departure airport. About 80 percent of all fuel management accidents occurred during the day in visual meteorological conditions, while only 15 percent occurred at night.

The NTSB goes on to say that almost half of pilots involved in fuel management accidents hold either a commercial or air transport pilot certificate (48 percent) while pilots holding private or sport pilot certificates make up 50 percent. Only two per cent of accidents involved student pilots.

FUEL STARVATION: A CASE IN POINT

Pilot complacency and overestimation of flying ability certainly can play a role in fuel management accidents. But there have been incidents where improper maintenance and pilot error combined in dramatic fashion.

One such incident was Air Transat Flight 236 (top of page 15), a transatlantic Airbus 330 (C-GIT) bound for Lisbon,



Airbus A330 C-GITS.

Portugal, from Toronto, Canada, that lost all engine power while flying over the Atlantic Ocean on August 24, 2001. Almost four hours into the flight, the A330 began to leak fuel through a fracture that had developed in a fuel line to the No. 2 (right) engine. The pilots noticed low oil temperature and high oil pressure on the engine. Although these readings were an indirect result of the fuel leak, the pilots had no reason to consider that as a cause. Consequently, the captain suspected they were false warnings and shared that opinion with Air Transat maintenance control centre in Montreal, which advised them to monitor the situation.

At this point what the pilots did not know and what the subsequent investigation would reveal is that the fuel leak resulted from fitment of an incorrect part to the hydraulics system by Air Transat maintenance staff as part of routine maintenance.

The engine had been replaced with a spare engine, lent by Rolls-Royce from an older model which did not include



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Rather than referring to the appropriate checklists, the crew on C-GITS actioned procedures from memory.

a hydraulic pump. Despite the lead mechanic's concerns, Air Transat authorized the use of a part from a similar engine, an adaptation that did not maintain adequate clearance between the hydraulic lines and the fuel line. This lack of clearance, on the order of millimetres from the intended part, allowed chafing between the lines to rupture the fuel line, causing the leak.

Once the pilots became aware of their fuel imbalance situation they took action by making a full forward transfer of the fuel in the trim tank. But rather than referring to the appropriate checklists, the crew actioned procedures from memory, and this resulted in the cross-feeding of fuel into an already



The Airbus 330 C-GIT'S landing was rough with extensive damage but no loss of life.

leaking engine. The transferred fuel was lost through the fractured fuel line, which was leaking at about one gallon per second. This caused a higher-than-normal fuel flow through the fuel-oil heat exchanger, which in turn led to a drop in oil temperature and a rise in oil pressure for the No. 2 engine.

Inevitably, No. 2 engine flamed out from fuel starvation and 13 minutes later so did No. 1 engine. The captain was forced to making a gliding descent without hydraulic power for the flaps, alternate brakes, and spoilers. The landing was rough with extensive damage but no loss of life.

As mentioned above, the investigation concluded the fuel leak resulted from fitment of an incorrect part to the hydraulics system but it also revealed that the primary causal factors of the accident were crew actions in mishandling a fuel leak in the No. 2 engine.

Share your field of expertise with readers by writing an article for AMU magazine. Contact our editor, John Campbell via email :

amu.editor@gmail.com



The Airbus 330 C-GITS lost all engine power while flying over the Atlantic Ocean on August 24, 2001. This incident resulted in Air Directive from the FAA.

The accident led to the FAA issuing an airworthiness directive requiring all operators of Airbus models A318, A319, A320 and A321 narrow-body aircraft to revise their flight manuals, stressing that crews should ensure that any fuel imbalance is not caused by a fuel leak before opening the cross-feed valve. ■

(Skybrary is a repository of safety data compiled by regulators, service providers, and industry players. Its key partners include the International Civil Aviation Organization (ICAO) and The Flight Safety Foundation.)



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Reports and Comments

The following are selections of Canadian Aviation Service Difficulty Reports originally published as “Feedback” by Transport Canada.



REPORT: AIRBUS A320-214

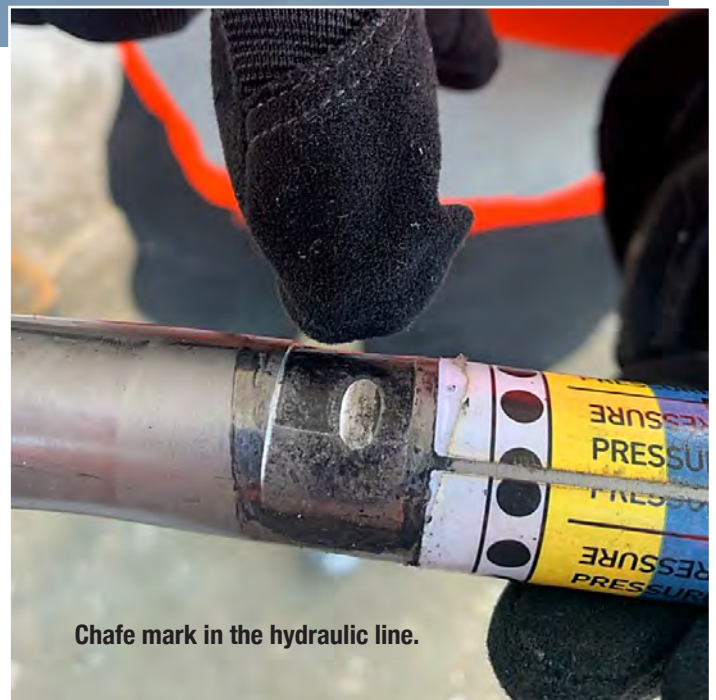
Big Plane – Small Defect

Subject:

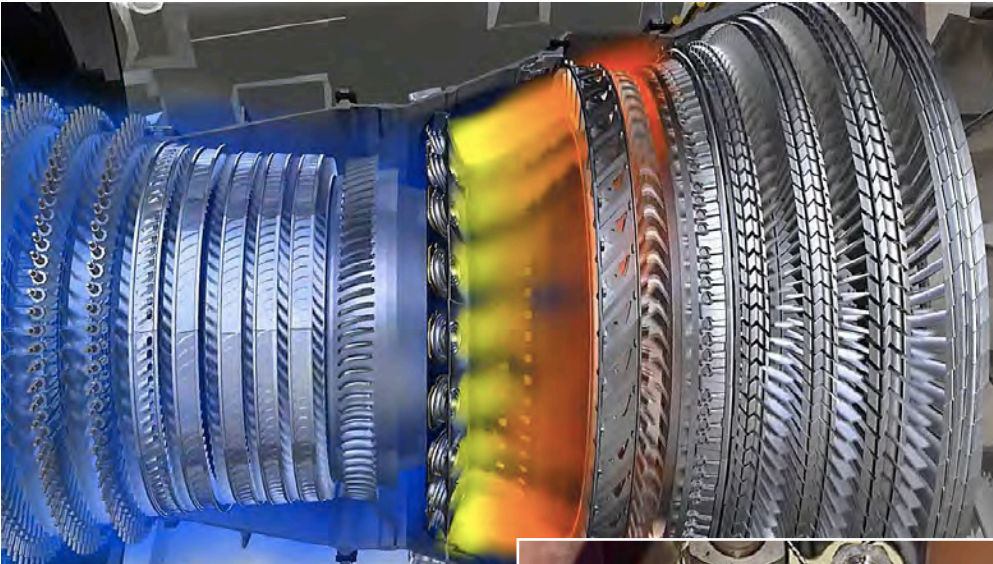
Yellow system reservoir low-level Electronic Centralized Aircraft Monitoring (ECAM) in climb. ECAM procedure applied. Yellow system reservoir indicating empty. Pan declared; the aircraft landed safely. The hydraulic line was chaffing under a clamp, pipe assembly was replaced. The yellow system pressure line in the pylon was replaced in accordance with the aircraft maintenance manual chapter 29-13-49-400-008A. Leak checks carried out, checked serviceable. #1 fan cowl closed and #1 FIREX bottle install.

Transport Canada Comments:

Even the smallest defect can bring down a large aircraft. The defect discovered in the event could be found in all aircraft equipped with a hydraulic system. In this particular case,

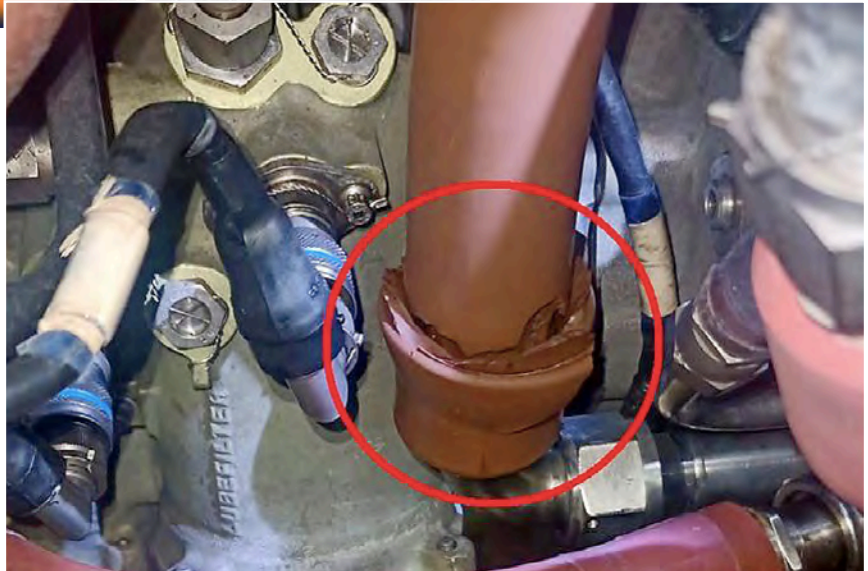


Chafe mark in the hydraulic line.



Left: 2CFM-CFM56
Below: 2CFM-Ruptured fuel line.

the entire contents of the Yellow hydraulic system were lost because of the smallest hole. More redundancy is built into the system on large aircraft to absorb such a loss. Smaller aircraft may not be so lucky. Some of the signs of a hydraulic leak could include the following: blistering paint; dirt build-up around a line or on the structure adjacent to the line; or swollen clamp material. Please be vigilant when performing walk-around or pointed inspections.



REPORT: CFM INTERNATIONAL CFM56-5B3/P

Ruptured Fuel Line

Subject:

Dripping fuel from right-hand engine fan cowl was found on a walk around. Further inspection of the area showed a ruptured integrated drive generator (IDG) heat exchanger fuel line. The fuel oil heat exchanger tube/line was replaced.

Transport Canada Comments:

Transport Canada Civil Aviation (TCCA) would like to make operators and maintainers of this engine and similar engine models aware of this event and to pay particular attention to this line when accessing or inspecting this area. The root cause of the ruptured fuel line is still under investigation, however the congestion of lines and hoses and the protective coating on the ruptured line would have made detection of a fuel leak very challenging at best. Luckily, a fuel leak was noticed during a walk around, the ensuing maintenance inspection located the event line, and a possible serious situation was avoided.

REPORT: BEECH B300 (See photos, next page)

Low Pitch Solenoid and Uncommanded YAW

Subject:

During the final approach into the airport at 50 feet above ground level (AGL), the flight crew brought both power levers back to idle. A left yaw quickly developed, followed by a rapid drop to the left wing. An attempt to go around and level the wings was unsuccessful, and the left-wing tip contacted the runway surface. The aircraft deviated from the centreline toward the left edge of the runway. The nose dropped, and the aircraft proceeded uncontrolled off the runway and into the snow-covered infield. Once the aircraft came to rest, the flight crew egressed the aircraft.

During the investigation into the incident, the left-hand (LH) and right-hand (RH) beta solenoids were disassembled,

Beech-B300 King Air.

Below, right: Wear marks observed in the body of the solenoid bracket.



and there were signs of corrosion noted. Examination of the beta solenoid brackets found wear markings from their respective roller bearings evident along the working line of contact, from the normal in-flight position to the retracted position when the reversing cable is pulled by the pilot utilizing the power lever. The through-thickness hole on the LH bracket was observed. The location of these worn engine assemblies would make it difficult to observe the wearing marks unless disassembly during routine maintenance in the area was performed.

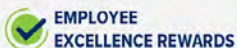
The beta solenoid could not be ruled out as a cause of the propeller blades progressing below the in-flight low-pitch stop setting. The beta valve could not be ruled out from



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Cessna-750 Citation X.
Below: Hose assembly failure location.

having experienced a failure that prohibited it from moving freely, thereby allowing the pressure of the engine oil to drive the blades to a pitch below the normal in-flight idle low stop pitch position.

Transport Canada Comments:

A similar Feedback article was published in Feedback Magazine Issue 1/2004. Since that time, Beech has addressed various factors that may contribute to an inadvertent low-pitch condition. See Beech Communique ME-TP-001, ME-TP-010, and the latest publication of the Aircraft Maintenance Manual. The following defects have been reported in relation to an inadvertent low-pitch condition:

- Solenoid stuck / plunger corroded
- Linkage hardware too tight
- Linkage hardware worn/corroded
- Pedestal Ground Idle Stop Switch intermittently sticking in the closed position
- Solenoid Bracket poor clamping with reversing cable (reversing cable slippage)
- Solenoid Support Bracket Bearing Wear
- Rigging

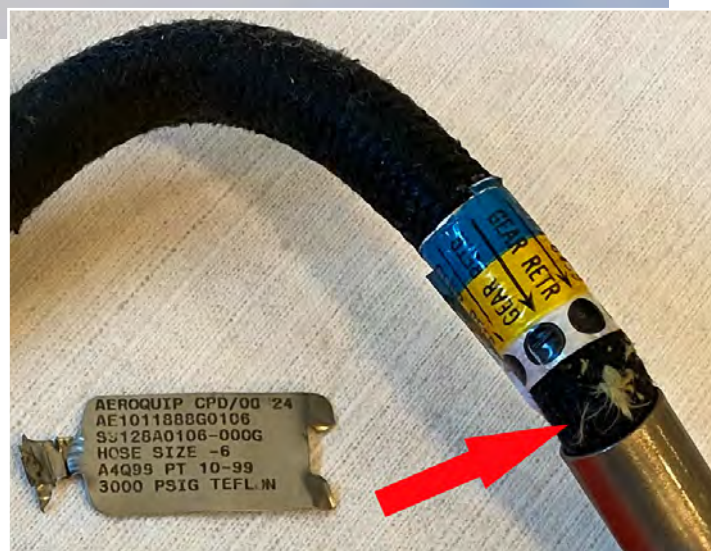
Special attention should be given to the functionality of this system to avoid an inflight occurrence during a critical time such as the landing sequence.

REPORT: CESSNA 750

Right-Hand (RH) Main Landing Gear Retract Hose Failure

Subject:

Enroute the aircraft indicated low hydraulic oil system A. As per the checklist procedures the aircraft returned to the departure airport and notified ATC (Air Traffic Control) of issues. The aircraft successfully completed landing at the airport using emergency brakes. The aircraft was towed to the maintenance hangar and discovered that the RH main landing gear



retraction hose had burst. The aircraft has now been repaired and is back in service. Hose part number (P/N) S3128A0106-000G manufactured 4q99. This hose is original to this aircraft. No applicable SB (Service Bulletin) or SL (Service Letter) has been found related to this part, and there are no TLMC (Time Limit Maintenance Check) requirements for this hose.

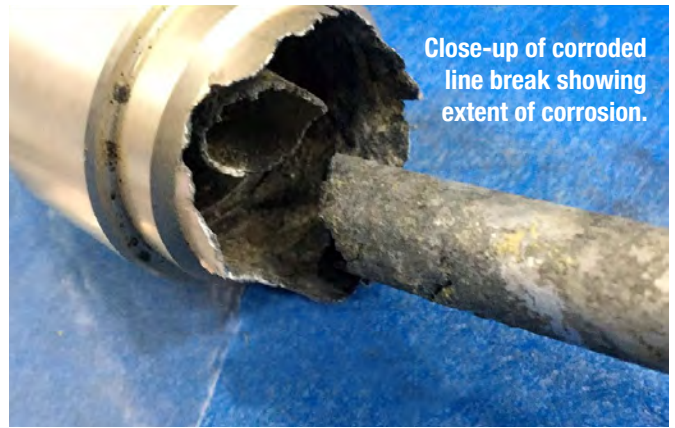
Transport Canada Comments:

Multiple failures of the RH main landing gear retract hose have been reported, including the alternate P/N listed in the Illustrated Parts Catalogue (IPC) P/N AS115-06K0106.

Often, failure will occur during retraction after rotation, or during extension, and accompanied by a Crew Alerting Message (CAS) such as: HYD PUMP FAIL A, or HYD VOLUME LOW A. In one reported case, HYD PTU FAIL CAS message was displayed.

In all cases reported, emergency extension of the gear using the free fall or pneumatic blow-down methods resulted in positive gear down indication and subsequent safe landing. Transport Canada suggests owners, operators, and maintainers pay attention to the age and condition of the RH main landing gear retraction hose. In particular, the section in close proximity to the swage end of the hose assembly.

Bombardier-CL600 2B19.



Close-up of corroded line break showing extent of corrosion.

REPORT: BOMBARDIER CL600 2B19 (RJ200ER) – CRJ100/200

Fuel Feed System Corrosion and Leaks

Subject:

While running the auxiliary power unit (APU), maintenance discovered a fuel leak. The investigation determined that the fuel leak was caused by severe corrosion of the APU fuel feed line. Maintenance attempted to rob a replacement fuel line from another aircraft but found that the line was also corroded at the same location. The fuel lines are to be replaced with serviceable parts.

Transport Canada Comments:

Nine (9) SDRs have been received recently for this issue which includes corroded shrouds, corroded shroud fittings, and corroded and/or leaking fuel lines. All seven (7) of the affected aircraft in the SDRs had been in service for 17 years. This issue was the subject of an investigation by the manufacturer who concluded that these types of defects present a safety risk that is adequately addressed by existing mitigations.

The investigation considered that the issue should be detected during routine operations by the daily walkaround inspections that indicates particular attention should be paid to any evidence of fluid leaks on or around the aircraft. Additionally, these defects can be found through routine main-

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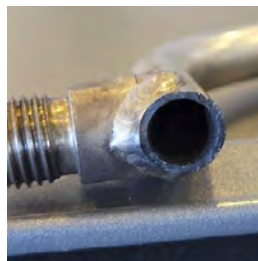
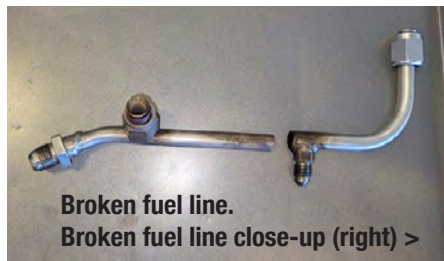
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tenance such as the “below-floor” zonal inspections and the recurrent leak test requirements for the affected lines.

However, the area is still known to be susceptible to significant corrosion defects. The Illustrated Parts Manual, Section 28-20-00, Figure 5, shows the area where defects have been found, and the lines, shrouds and fittings in this area that can be affected by corrosion and develop leaks. Removal of the shroud is required to inspect and find the corrosion defects because they originate inside the shroud and on the lines.

Operators should be aware of this issue and the potential defects in this area and consider whether more frequent inspections are indicated for their operation in order to detect excessive corrosion and ensure the integrity of the lines and shrouds.



REPORT: PRATT & WHITNEY – CANADA PW120A

Cracked Fuel Drain Line

Subject:

During a scheduled engine fuel nozzle replacement, the combustion chamber fuel drain line was found cracked.

Transport Canada Comments:

Transport Canada would like to inform maintainers and operators of PW120A and similar engine models of this event. The investigation into the root cause continues, however, corrosion and stress along the weld seam may have been contributing factors. Please be diligent when inspecting this area and, specifically, this line. ■

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Pacific AME Association



Profile: Key Executive Team Members

Hannah Duffield, President

Hannah is a licensed structures AME and has been in the industry for over five years. Currently working at KF Aerospace, Canada's largest Approved Maintenance Organization, she spends a lot of her time educating other Aircraft Maintenance Engineers through her various volunteer positions at Elevate Aviation and through PAMEA.

Alisha Sohpaal, Vice President

Alisha is a licensed M1 & M2 AME and is proud to be one of the two percent of female AMEs in Canada. She is not only the first female member to join PAMEA but also the first to serve on the Board. Alisha is currently the Person Responsible for Maintenance (PRM) at Iskwew Air and helped launch the Aircraft Maintenance Organization (AMO) in March 2021. She's been working in the industry for the past seven years and is passionate about encouraging young females to pursue careers in aviation. A mentor with Elevate Aviation, Alisha also serves on the Youth Engagement Committee with the BC Aviation Council.

Rod Hayward, Director at Large

Rod Hayward has had an interesting and diverse career as a pilot, engineer, entrepreneur, and educator. Rod's considerable operational experience is combined with the management experience garnered as one of the founders of Terrace based regional airline, Hawkair. Rod holds an M1 and M2 Aircraft Engineers licence as well as a MBA from the University of Northern British Columbia. Throughout his career, Rod

has held a number of Transport Canada approved positions such as Director of Maintenance, Quality Assurance Manager, Safety Manager, and Accountable Executive. Rod's been a member of the BC Aviation Council (BCAC) Operator's Committee and an active member of the YVR Airport Consultative Committee (ACC) while at Hawkair. He recently stepped down as the General Manager/CEO for Hawkair, in order to join the School of Business at the University of the Fraser Valley (UFV) in Abbotsford. Rod teaches both general and aviation business courses in UFV's Bachelor of Business in Aviation program.

Rob Fraser, Director of Training

Rob graduated BCIT in 1986 and spent five years in the corporate avionics world, where he obtained his "E" licence. He then obtained his M2 licence and spent over 30 years in the airline and corporate industry, 13 of which have been as a full time maintenance instructor. He is type endorsed on the CRJ100/200/705/900, and the Dash 8 100/300 and Q400, and specializes in teaching landing gear, hydraulics, airframe fuel, flight deck instrumentation and ice protection, as well as electrical and avionics. Rob is also the chief instructor for taxi/run training at Jazz.

PAMEA has decided to formally transfer Membership Administration to AMEC/TEAC which is currently handled by the Ontario Association. What this means for the Membership is that our web site page will send you to the Ontario Association Membership pages for you to Sign Up if you are a new Member or to complete your renewal as a PAMEA Member. Visit our website at: www.amec-teac.ca/pacific

Western AME Association



Website Crash

Due to our website crash, please temporarily email WAMEA at md@werkasset.com. The Western Aircraft Maintenance Engineers Association (WAMEA) is an organization equipping its members with the

knowledge and professionalism which distinguishes the occupation of Aircraft Maintenance Engineers (AMEs) in the aviation industry (AME-M1 and/or M2 ,AME-E and AME-S and AME-Balloon).

Visit our website at: www.wamea.com



Central AME Association



Cancelled: Manitoba's Annual Aviation Symposium

It is with a sense of regret that we had to announce the cancellation of the CAMEA Aviation Symposium for the year 2024. Despite this development, we are eager to reaffirm our commitment to advancing and safeguarding the Aircraft Maintenance Engineer profession as we embark on the journey into 2024.

While the absence of the event this year is unfortunate, we want to assure you that the Aviation Symposium will make a triumphant return in 2025. The forthcoming edition promises to be a dynamic experi-

ence, featuring over 20 interactive speaking sessions, micro-courses, and soft skill training. We aim to revitalize and strengthen the industry by addressing the current knowledge gaps

Entering the New Year, CAME remains dedicated to analyzing and enhancing our association's objectives. We are steadfast in providing a diverse array of member benefits, training, recognition and mentorship, which will contribute to the overall growth and success of our industry. We look forward to the pleasure of your attendance at our 27th Aviation Symposium in 2025! Visit our website at: www.camea.ca



AME Association of Ontario

#613 - 7360 Bramalea Road, Mississauga, Ontario L5S 1W9
tel: 1-905-673-5681 email: association@ame-ont.com website: www.ame-ont.com



2023 – 50th Ontario Aircraft Maintenance Conference

The 2023 Ontario Aircraft Maintenance Conference was a great success with over 600 attendees participating in 25 training sessions and visiting the 64 exhibitor booths. Numerous companies were recruiting and both the Aircraft Mechanics Fraternal Association and the International Association of Machinists & Aerospace Workers were there to promote their services. The two-day conference was held November 29th and 30th.

The event was opened on Wednesday morning with welcoming remarks by Richard Berg. Richard's father Dick Berg was instrumental in setting up the first Ontario Region AME conference fifty years ago. Richard works with Transport Canada in Ottawa as a specialist in risk management.

We were thrilled to have over 600 attendees join us for this historic half a century milestone in the aviation maintenance industry. The Ontario Aircraft Maintenance Conference has been at the forefront of advancing the knowledge, skills, and innovations that keep our skies safe. This event embodies our commitment to providing relevant, affordable and quality training to Aircraft Maintenance Engineers (AMEs) and all those of all involved in aircraft maintenance.

Fifty successful years is a testament to the unwavering commitment and tireless efforts of a dedicated group of volunteers and the

organizations they represent. We express our gratitude to those individuals past and present for their contributions to making the event a reality. Behind each volunteer over the years stand organizations that have generously supported these efforts, we extend our appreciation to all these organizations for the years of commitment to this event and for helping us reach this remarkable milestone in the aviation maintenance community.

The success of the Ontario 2023 AME conference is owed to the dedication of our volunteers: Cara Tweyman, Carolyne Mounsey, Jasper Megelink, Louis Anderson, Rick Rantz, Shaun Warboys, and Will Boles. Their tireless commitment made this event possible.

The conference was filled with learning opportunities, networking experiences, and the chance to cheer on peers in the AME Skills Challenge. Attendees connected with colleagues, explored cutting edge products and services and immerse themselves in a world of aviation maintenance excellence.

Thank you to all for being part of this incredible journey and together we look forward to shaping the future of aircraft maintenance.

Submitted by Stephen Farnworth

For the Board of Directors

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Quebec AME Association

Association des Techniciens/Techniciennes d'Entretien d'Aéronefs du Québec

C.P. 34510, 3131 Côte-Vertu; CSP Place Vertu, Saint-Laurent, Qc, H4R 2P4
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Best wishes to you in 2024

This year again, we arrive at that busy time of the year when the work we do takes on its full meaning: what a pleasure to see that our contribution to aviation safety allows families around the world to come together to celebrate the end of year celebrations!

On behalf of all of us at the Aircraft Maintenance Engineers Association of Quebec, we wish you a wonderful holiday season and a very happy new year 2024 filled with happiness, health and prosperity. That being said, we can't help but think of all the AMEs who will be working this holiday season to ensure the safety and airworthiness of flights.

About Us

The association's mission is to represent all AMEs in Quebec regardless of the company or the contracts on which they work. Regardless of the type of aircraft on which the AME works, he/she will be welcome. We will simply recognize ourselves as a holder of an AME Transport Canada M1/2, E or S license with an attachment in Quebec.

The Association will ultimately become the AME's voice to Transport Canada's ears and will work with existing AME associations from coast to coast to make our profession stronger and more cohesive. One of the great goals of our association is to elevate ourselves to the status

of a professional and to be recognized as such by the various federal government bodies. The other major mission of our association will be to make our profession better known to the public and to get involved with young people so that they know what AME's work is and consider it as a career choice.

Cette année encore, nous arrivons à cette période chargée de l'année où le travail que nous faisons prend tout son sens : quel plaisir de voir que notre contribution à la sécurité aérienne permet aux familles du monde entier de se retrouver dans le but de célébrer les fêtes de fin d'année!

De la part de nous tous à l'Association des Techniciens/Techniciennes d'entretien d'aéronefs du Québec, nous vous souhaitons de passer un magnifique temps des fêtes et une très belle année 2024 remplie de bonheur, de santé et de prospérité. Cela étant dit, nous ne pourrions nous empêcher de penser à tous les TEA qui travailleront durant cette période des fêtes pour garantir la sécurité et la navigabilité des vols.

Vous pouvez en apprendre plus à notre sujet à l'adresse suivante :

www.ame-tea.com email: info@ame-tea.com

Atlantic AME Association



ARAMC 2024

The 44th Annual Atlantic Region Aircraft Maintenance Conference (ARAMC) is set for April 17 – 19, 2024 at the Delta Hotels by Marriot Beauséjour in beautiful Moncton, New Brunswick. Our committee is working on the final draft of our registration packages which will be emailed soon. For a limited time, the hotel will be offering a limited number of rooms to conference attendees at a special event rate of \$179 per night.

For anyone who has travelled recently, this is an exceptionally generous rate. Hotel room rates are quoted in Canadian dollars and are subject to applicable local and provincial taxes (currently 3.5 percent Municipal Accommodation Tax and 15 percent HST) in effect at the time of check-out. Taxes are subject to change without notice.

Hotel: Discount room rate closes March 17, 2024...so hurry and book your room.

To help our association keep this conference affordable, it is im-

portant that, we take advantage of this great Hotel rate. Hotel facilities (display, banquet, breakout rooms...) are made affordable based on room sales. So please book early.

Reservations can also be made directly with Marriot Reservations at (506) 854-4344 pressing #1 by March 17, 2024.

Important: When making your reservation at the Delta, ask for the Aircraft Maintenance Conference Group rate.

Check your emails and keep an eye out on Facebook and our Atlantic AME Association website.

More information will be available soon. Thank you!

Jacques Richard

ARAMC 2024 Chair

www.atlanticame.com

Central Ohio PAMA



2023 Annual Board Meeting: November 27

The COPAMA Board of Directors met at the Austin E. Knowlton Terminal Building on Ohio State University airport. All members were present for discussion of items on the agenda and future planning. The Board reviewed current Financial Status, adopted a new Documents Retention Policy (DRP), awarded \$7,000 in new scholarship requests and discussed future planning for 2024 and beyond.

Document Retention and Destruction Policy: Purpose of this tool

Certain federal laws prohibit the destruction of certain documents. Not-for-profit organizations should have a written, mandatory document retention and periodic destruction policy. Policies such as this will eliminate accidental or innocent destruction. In addition, it is important for administrative personnel to know the length of time records should be retained to be in compliance.

Document Destruction

The Document Retention and Destruction Policy identifies the record retention responsibilities of staff, volunteers, members of the board of directors, and outsiders for maintaining and documenting the storage and destruction of the organization's documents and records.

The organization's staff, volunteers, members of the board of directors, committee members and outsiders (independent contractors via agreements with them) are required to honour the following rules:

- Paper or electronic documents indicated under the terms for retention in the following section will be transferred and maintained by (fill in the blank based on the organization's practices);
- All other paper documents will be destroyed after three years;
- All other electronic documents will be deleted from all individual

- computers, data bases, networks, and back-up storage after one year;
- No paper or electronic documents will be destroyed or deleted if pertinent to any ongoing or anticipated government investigation or proceeding or private litigation (check with legal counsel or the human resources department for any current or foreseen litigation if employees have not been notified); and
- No paper or electronic documents will be destroyed or deleted as required to comply with government auditing standards (Single Audit Act).

Record Retention

The following table indicates the minimum requirements and is provided as guidance to customize in determining your organization's document retention policy.

Type of Document	Minimum Requirement
Bank statements	3 years
Checks (for important payments and purchases)	Permanently
Contracts (still in effect)	2 years after Contract period
Correspondence (general)	2 years
Correspondence (legal and important matters)	Permanently
Correspondence (with customers and vendors)	2 years
Year-end financial statements	Permanently
Minute books, bylaws, and charter	Permanently
Tax returns and worksheets	Permanently

Because statutes of limitations and state and government agency requirements vary from state to state, each organization should carefully consider its requirements and consult with legal counsel before adopting a Document Retention and Destruction Policy. In addition, federal awards and other government grants may provide for a longer period than is required by other statutory requirements.

www.copama.org



Who We Are

The purpose of SoCal PAMA is to promote a high degree of professionalism among aviation maintenance personnel; to foster and improve methods, skills, learning, and achievement in the field of Aviation Maintenance; to conduct local meetings and seminars; to publish, distribute, and disseminate news, technical bulletins, journals, and other appropri-

ate publications dealing with the trade of Aviation Maintenance; to collaborate with other organizations in aviation in the queries of governmental agencies pertaining to maintenance rules and guidelines.

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The Case of Vanishing Ice

Last issue we saw how carburetor icing can occur at various temperatures and all engine power settings. The following incident involving a Cessna 150 is another example of this.



Above: The occurrence aircraft was manufactured in 1967.

ON THE EVENING OF 05 December 2022, the privately registered Cessna 150G aircraft (registration C-FQCS, serial number 15066475) was conducting a night visual flight rules (VFR) flight from Salaberry-de-Valleyfield Aerodrome (CSD3), Quebec, to Cornwall Regional Aerodrome (CYCC), Ontario, with the pilot and 1 passenger on board. The passenger was the owner of the aircraft, but he did not possess a pilot licence or permit. He had flown with the occurrence pilot on several occasions.

The aircraft departed CSD3 at 1952, turned toward the northwest, and climbed to 1500 feet above sea level. After crossing the St. Lawrence River, the aircraft turned to the southwest toward CYCC, flying north of the shoreline along Quebec provincial Highway A20 (**Figure 1, top of page 29**).

At approximately 2001, shortly after the aircraft crossed the Ontario–Quebec provincial border, the pilot heard a noise and the engine lost power. The pilot, seated in the right seat, conducted a descending 180° left turn toward the northeast

and aligned the aircraft with Ontario provincial Highway 401. At 2003, the aircraft struck a set of 4 electrical power distribution lines before colliding with terrain in the grassy median between the highway's eastbound and westbound lanes, and coming to rest in an inverted position (**Figure 2, page 29**).

There was no fire. The accident site was 0.1 nautical miles (NM) north of Lancaster Airpark (CLA6), Ontario. CLA6 is not equipped with runway lighting.

The aircraft's emergency locator transmitter (ELT) activated, but no signal was detected by the Cospas-Sarsat system. A person who observed the accident reported it to the Ontario Provincial Police, who notified the Joint Rescue Coordination Centre in Trenton, Ontario, at 2016. The pilot and passenger received serious injuries and were transported to a hospital in Ottawa, Ontario. The aircraft was substantially damaged.



Figure 1.

Figure 1. Satellite image showing the route flown.

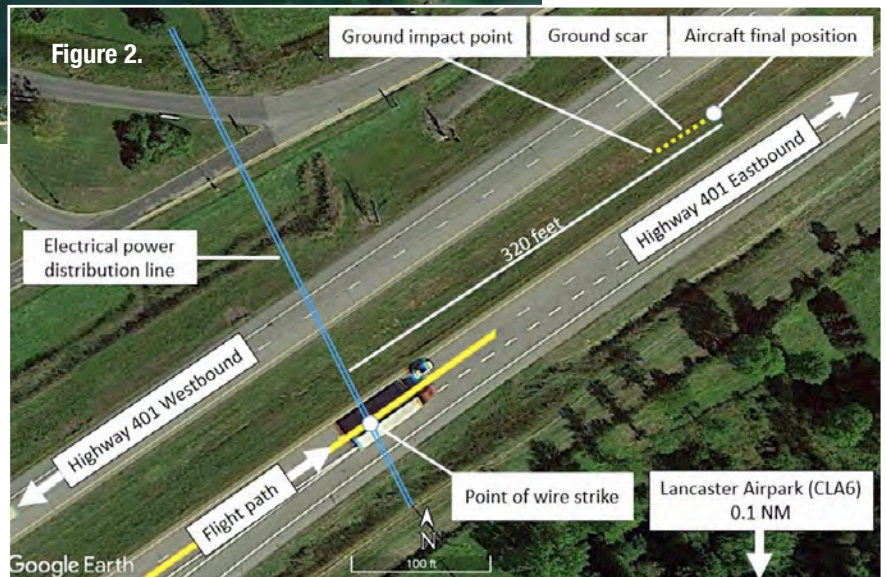


Figure 2.

Figure 2. Aerial view of the accident location.

PILOT INFORMATION

The pilot had obtained a pilot licence – glider in October 2014 and a commercial pilot licence – aeroplane in July 2022. His Category 1 medical certificate was valid. He also held 2 ratings: he had obtained a multi-engine class rating in May 2021, and a flight instructor rating – glider in July 2021. He was in the process of obtaining a flight instructor rating – aeroplane.

Records indicate that the pilot had accumulated 416.7 hours total flight time in airplanes, with 72.3 total hours flown at night. He had accumulated 278.1 hours in single-engine airplanes, and 50.7 of those hours were flown at night. He had accumulated 37.3 hours in Cessna 150 aircraft and approximately 220 hours in Cessna 152 aircraft. In addition, he had accumulated 99.2 hours of flight time in gliders.

Records indicate that the pilot had completed 5 night takeoffs and 5 night landings within the last 6 months in a multi-engine airplane. However, he had not done so in the same class of aircraft as the occurrence aircraft (single-engine aeroplane). As a result, he did not meet the Canadian

Aviation Regulations (CARs) recency requirements to carry a passenger at night in the occurrence aircraft:

Clause 401.05 (2)(b)(i)(B) of the CARs requires the holder of a flight crew permit or licence to complete “at least [...] five night take-offs and five night landings, if the flight is conducted wholly or partly by night” in the same category and class of aircraft as the aircraft being flown.

In section 101.01 of the CARs, a category is defined as follows: “when used in reference to flight crew licensing, the classification of aircraft as an aeroplane, a balloon, a glider, a gyroplane, a helicopter or an ultra-light aeroplane.”

In that same section of the CARs, a class “in relation to the classification of aeroplanes, means aeroplanes having similar operating characteristics to single-engined aeroplanes, multi-engined aeroplanes, centre-line thrust aeroplanes, land aeroplanes or sea aeroplanes.”

The pilot met all other recency requirements stipulated in section 401.05 of the CARs.



The incident aircraft, above, was not insured at the time of the occurrence. Center image: Pilots are reminded that carburetor icing can occur at various temperatures and all engine power settings.

Far right: Ice that forms in a carburetor during flight rarely remains after a crash.



AIRCRAFT INFORMATION

The occurrence aircraft was manufactured in 1967. The aircraft journey log indicated that the aircraft had accumulated 5670 flight hours since new. The last annual inspection was completed on 04 May 2021. The aircraft had undergone maintenance on 26 October 2022, and again on 21 November 2022. The maintenance covered some, but not all, aspects of the annual inspection that are required by appendices B and C of CARs Standard 625.

Under paragraph 605.86(1)(a) of the CARs, aircraft are required to be maintained in accordance with “a maintenance schedule that conforms to the Aircraft Equipment and Maintenance Standards.”

For the occurrence aircraft, these standards required that the aircraft be maintained “at intervals not to expire later than the last day of the 12th month, following the preceding inspection.”

Although there were communications between the owner and the pilot before the occurrence flight indicating that all required maintenance for the annual inspection had been done, there were no records made available to indicate that an annual inspection was completed.

The aircraft liability insurance was valid until 24 September 2022. Therefore, the aircraft was not insured at the time of the occurrence as required by regulations.

The occurrence aircraft was not equipped with a flight data recorder or a cockpit voice recorder, and neither was required by regulation. The aircraft was equipped with a global positioning system (GPS), a Garmin GPSMAP 295. The GPS was recovered and the aircraft flight data for the occurrence flight were successfully downloaded.

The aircraft was also equipped with an ARTEX ELT (mod-

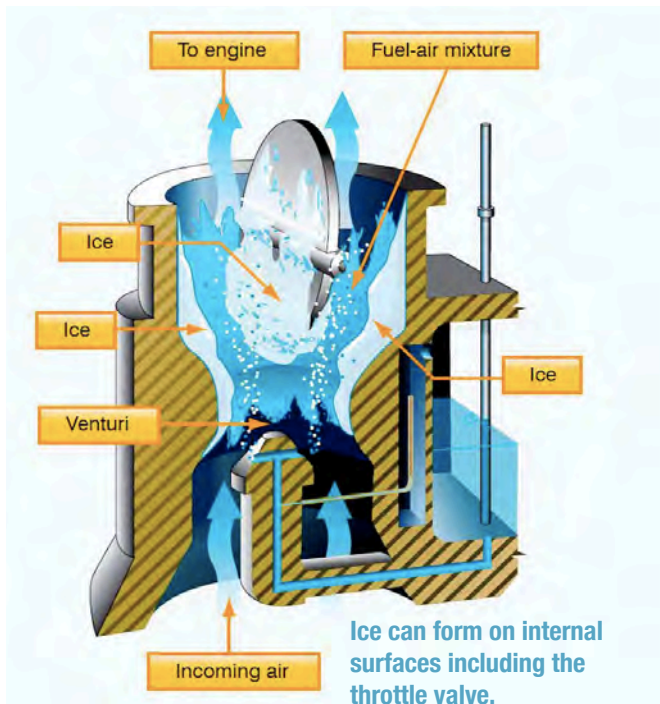
el 345) that was manufactured in August 2022. This model of ELT transmits on frequencies 121.5 MHz and 406 MHz. No ELT signal was detected by the Cospas-Sarsat system at the time of the occurrence. However, during the post-occurrence aircraft recovery, it was established that the ELT was transmitting. The investigation was unable to determine why no signal had been detected.

IMPACT AND WRECKAGE INFORMATION

The occurrence aircraft struck a set of electrical power distribution lines before colliding with terrain. The aircraft damage is consistent with the aircraft having impacted the ground inverted on its right side. The aircraft then slid and came to rest—still inverted—on the grassy median of Ontario provincial Highway 401, approximately 320 feet from the wire strike location. The aircraft was substantially damaged and there was a strong smell of fuel at the site. Remnants of one power line, which had been struck by the left-wing leading edge, were found wedged between the flap and the aileron.

The engine sustained some damage due to impact. Damage to the propeller indicated it was rotating at the time of impact; however, it could not be determined how much, if any, engine power was being produced.

The engine was disassembled and examined to the extent possible at the TSB’s regional facility in Richmond Hill, Ontario. There were no signs of a catastrophic engine failure or of mechanical failure of any major engine components. The carburetor and magnetos were examined at an overhaul facility and found to be serviceable. The carburetor heat system was examined, but due to the extent of the damage, it could



not be determined if the carburetor heat was selected to the ON position, or if the system was functioning at the time of the occurrence.

WEATHER INFORMATION

The weather was suitable for the night VFR flight. The aerodrome routine meteorological report (METAR) issued at 2000 for Montréal/Pierre Elliott Trudeau International Airport (CYUL), Quebec (30 NM east of the occurrence site),

indicated winds from the southeast at 11 knots, a visibility of 15 statute miles, a broken ceiling at 15 000 feet above ground level (AGL), a temperature of 3 °C, and a dew point of -5 °C.

The automatic METAR (METAR AUTO) issued at 1953 for Massena International-Richards Field Airport (KMSS), New York, United States (26 NM southwest of the occurrence site), reported winds generally from the south at 6 knots, clear skies, a visibility of 10 statute miles, a temperature of 6 °C, and a dew point of -9 °C.

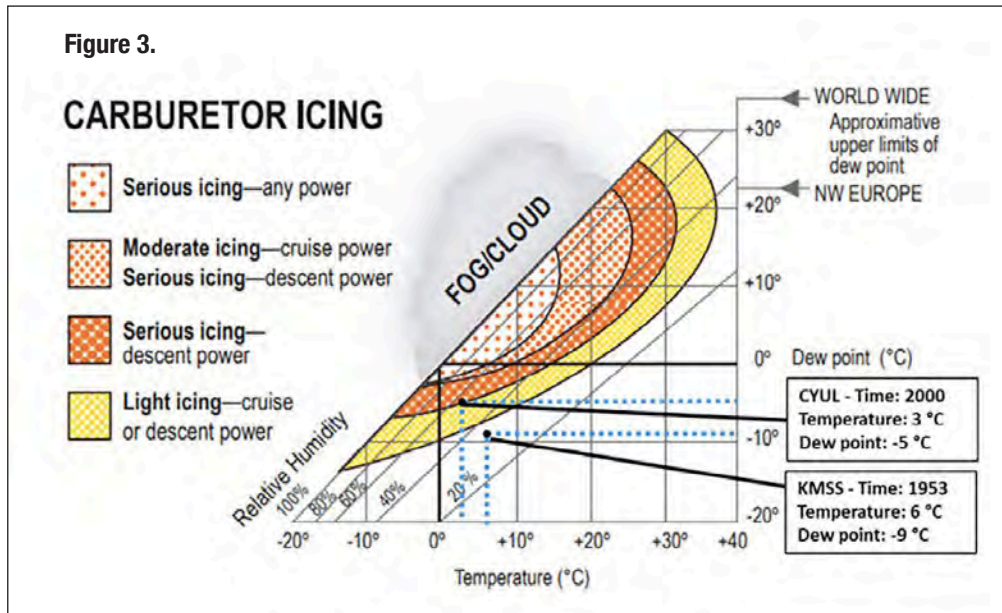
CARBURETOR ICING

Carburetor icing is a phenomenon where water vapour in the air freezes and adheres to internal surfaces of the carburetor. This occurs because the temperature of air entering the carburetor is reduced by the effect of fuel vaporization and by the decrease in air pressure caused by the Venturi effect. If the air temperature in the carburetor drops below freezing, ice may form on internal surfaces of the carburetor, including the throttle valve.

To overcome carburetor icing, aircraft manufacturers provide a system to heat the incoming air and prevent ice accumulation. If significant ice is allowed to develop within the carburetor and full heat is applied to melt it, the resultant water flow through the engine causes the engine to run rough and to lose further power, and it may even cause the engine to quit. Unchecked, the ice can quickly lead to a complete engine failure.

Ice that forms in a carburetor during flight rarely remains after a crash, making carburetor ice difficult to identify as a cause of power loss. Nonetheless, accidents and incidents in-

Carburetor icing potential based on ground-level weather conditions near Montréal/Pierre Elliott Trudeau International Airport, and Massena International-Richards Field Airport.



volving carburetor icing, where engine power loss due to carburetor ice has been suspected, are prevalent in aviation.

To help determine whether atmospheric conditions are likely to produce carburetor ice, charts that compare outside ambient temperature, dew point, and relative humidity have been produced (Figure 3, above).

However, it is important to note that the formation of carburetor ice is also possible in conditions outside those depicted on the charts. Although the chart indicates that the temperature and dew point at KMSS were not conducive to carburetor icing at the time of the occurrence, it indicates that there was potential for serious carburetor icing at descent power in the CYUL area.

MARKING AND LIGHTING OF OBSTACLES TO AIR NAVIGATION

According to the CARs, marking and lighting are required for any “building, structure or object that constitutes an obstacle to air navigation.” The electrical power distribution poles installed alongside Ontario provincial Highway 401 near the occurrence site are approximately 15 m (50 feet) tall and the wires that cross the highway are lower than the top of the towers. Although they are within a 6 km radius of CLA6, they are not defined as obstacles to air navigation, according to CARs, given that their height does not exceed 90 m (296 feet) AGL and, therefore, they are not required to be marked or lit.

NIGHT VISUAL FLIGHT

The principle behind day and night VFR flight is that the pilot uses visual cues (e.g., visual horizon, ground references)

outside the aircraft to determine the aircraft’s attitude. Flying VFR at night involves numerous risks owing to poor visual cues. Fewer visual cues combined with a reduced ability to see at night make it difficult to identify terrain and obstacles to navigation. The surrounding environmental and lighting conditions must therefore be sufficient to allow the pilot to see these visual cues.

The conditions experienced during the occurrence flight were such that visual reference to the surface was possible because of the cultural lighting provided by the Ontario and Quebec provincial highways, and various towns along the planned route. However, it would have been difficult to see the unlit power lines crossing Highway 401 or to see CLA6’s grass runway parallel to that highway.

SAFETY MESSAGES

Pilots and aircraft owners are reminded that the CARs requirements for annual inspections are in place to ensure that aircraft are maintained in accordance with airworthiness standards and, as a result, are safe for operation. Based on the conditions at the time of the occurrence, there was a potential for serious carburetor icing with descent power. Even though the investigation was unable to determine if carburetor icing was a factor in this occurrence, pilots are reminded that carburetor icing can occur at various temperatures and all engine power settings. ■

(This report concludes the Transportation Safety Board of Canada’s investigation into this occurrence. The Board authorized the release of this report on 02 August 2023. It was officially released on 08 August 2023.)



COULSON ATO A CANADIAN FIRST

Port Alberni, British Columbia-based Coulson Aviation, which specializes in aerial firefighting, has received Transport Canada Approved Training Organization (ATO) approval, making it the first aviation company in Canada approved to provide training in aircraft structures. Coulson's ATO allows the company to train students toward their Aircraft Maintenance Engineer – Structures (AME-S) licence at no cost to the student. Coulson hires team members who demonstrate a passion for the aviation industry and positive attitudes to join its workforce.

Once students have demonstrated excellent potential in the industry they are invited to join the ATO program. There is no required tuition to attend the course. The student remains on the Coulson payroll while attending school and can further supplement their income by working for the company outside of schooling hours. Coulson guarantees a full-time position to every student who completes the school portion, offering a path through apprenticeship to a full AME-S licence.

“This approval is a huge milestone and tremendously valuable to Coulson, allowing us to hire, train, and educate hand-selected team members,” says Coulson Aviation President and COO



Britton Coulson. “By going through their schooling and apprenticeship here at Coulson, working alongside licensed team members on actual aircraft and

projects, they become much more well-rounded technicians. As Coulson continues to grow, we see this re-investment in future technicians as a path to sustainably maintain a well-trained and dedicated workforce.”

“Typical ATO schools require students to pay to attend training,” Coulson says. “We pay our students to attend our school, just like any other employee. In return, we expect an ultra-high standard of attendance, performance, and attitude. That is why they are all hand-picked to join this elite program.”

The AME-S course covers sheet metal, composite, wood, and fabric structures. Graduates of the Coulson AME-S program can also expand their licence into the FAA by taking a written exam.

GIPSY MOTH TO FALL UNDER THE GAVEL

The famed auction house Sotheby's is regularly tasked with gavelling-off the rare and the obscure but even by those standards the auctioneer has a gem on its hands in the 1929 De Havilland DH60M Gipsy Moth, featured in the Academy Award-winning film, *Out of Africa*. The aircraft will be up for bids at Sotheby's

inaugural ModaMiami event in South Florida on March 1-2, 2024. The film, a 1985 masterpiece by Sydney Pollack, starred Meryl Streep

and Robert Redford and painted a vivid picture of Kenya's sprawling savannahs and rich cultural tapestry.

Undoubtedly, one of the stars of the movie was the iconic yellow Gipsy Moth biplane piloted by Redford's character, symbolizing his love for the African landscape. This memorable aircraft, central to the film's visual storytelling, was a significant contributor to the movie's multiple Academy Awards, including Best Cinematography.

The 1929 Gipsy Moth G-AAMY brought to Kenya in 1985 for the film was flown by Sir Henry Dalrymple-White, a renowned RAF Wing Commander. It was a key part of the film's production, notably stirring a flock of flamingos in a scene that contributed to the film's cinematic acclaim.

The Gipsy was a member of De Havilland's Moth family, which was a low-cost range of touring aircraft. The DH60G (Gipsy) Moth variant was an improved version of the DH60 (Cirrus) Moth, powered by the 100 hp DH Gipsy I engine. The Out of Africa biplane, entirely operational and last inspected for airworthiness in April 2022, boasts a unique American-made steel construction, an adaptation for durability in warmer climates.

THE QUESST FOR QUIET SKIES

In collaboration with NASA's Quest Mission, the Lockheed Martin Skunk Works team is determined to solve one of the most persistent challenges of supersonic flight – the sonic boom. To that end, Lockheed rolled out its Quest (Quiet SuperSonic Technology) X-59 experimental aircraft during a ceremony in early January in Palmdale, California. Rollout ceremonies are a long-standing aviation tradition, and in the case of the X-59 it celebrated technical advancements, collaboration and innovation that stemmed from years of research, development and production of a one-of-a-kind technology demonstrator aircraft that will reduce the loudness of sonic booms to a gentle thump.

The Quesst X-59 is 99.7 feet long with



a 29.5-foot wingspan for a maximum takeoff weight of 32,300 pounds. Propelled by a General Electric F414 engine, it should reach a maximum speed of Mach 1.5 or 990 mph, and cruise at Mach 1.42 or 940 mph at 55,000 feet. The cockpit, ejection seat and canopy come from a Northrop T-38 and the landing gear from an F-16. With afterburner, its engine will provide 22,000 lbf of thrust.

Next, the aircraft will complete ground tests including engine-run and taxi tests before its next major milestone, first flight, later this year. After the aircraft is validated in initial flight

tests, it will move into the acoustic testing phase. This phase will include flights over populated areas to provide U.S. and international regulators with statistically valid data required to help approve new rules that could allow quiet commercial supersonic flight over land. This would cut commercial flight times to half of what they are today, transforming travel for people around the world.



"Vanilla Unmanned" a new UAV from Platform Aerospace



COLD VANILLA TAKES ON TOUGH ASSIGNMENT

Vanilla Unmanned—a long-endurance, low-cost UAV produced by American manufacturer Platform Aerospace—has now flown a mission for NASA to the inland sheet of Greenland. Thule Air Base, now known as Pituffik Space Base was the destination to which Vanilla carried a sensor provided by the Center for Remote Sensing of Ice Sheets (CRISIS).

The scientific goal was to provide validation data for the ICESAT-2 satellite, which can measure terrain height but cannot differentiate between snow and ice. Vanilla flew along the satellite track to measure snow depth on top of the ice, enabling improved calculations of ice volume.

This payload was previously flown in Deadhorse, Alaska, in 2021 through a similar mission set.

The flight window in April 2023 presented very challenging weather over Greenland. Vanilla flew over 15 hours duration across two flights, including flying through two in-flight icing events.

Platform Aerospace continues to test and demonstrate environmental hardening technologies and techniques to operate the Vanilla UAV in subfreezing conditions, such as testing an anti-icing coating on the propeller. The Danish Air Authorities, Thule Space Force Base, and NASA all gave airworthiness and airspace approvals, due to the flight paths

covering multiple countries' airspace. The baseline Vanilla UAS is not ITAR restricted and can be shipped internationally to provide worldwide support and operational capability.



SUPERBIKE POWER BACKS HEAVY LIFT

The legendary connection between motorcycles and aircraft has been an unbreakable bond basically since the earliest days of their inventions. And now Kawasaki Heavy Industries has added another chapter to the mythic tale with the ongoing development of its uncrewed K-RACER-X2 demo helicopter,

which is powered by the 300-horsepower, supercharged engine from Kawasaki's H2R hyperbike, a tarmac-burning monster motorcycle capable of a claimed 249 mph in top gear. Recently, Kawasaki reached a milestone when the K-RACER-X2 set a record by carrying a remarkable payload capacity of 440 pounds. This accomplishment marks the largest payload ever flown by an uncrewed aircraft developed in Japan.

The test at the Fukushima Robot Test Field's Namie Runway demonstrated the K-RACER's capability to address social challenges by transporting heavy cargo loads that standard drones struggle with, especially in Japan's mountainous regions where there is a substantial demand for deliveries to mountain huts and the upkeep of public infrastructure in these areas.

The K-RACER concept, which debuted in 2020 with the X1 model, has a



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range of 62 miles and distinctive configuration called a compound helicopter. It has a main rotor (diameter: 13 feet), and main wings and propellers on both sides instead of a tail rotor. The left and right propellers counter the torque associated with the main rotor's rotations and generate thrust to move the helicopter forward. In forward flight, the main wings share lift and reduce the load on the main rotor in order to achieve high-speed flight which is not possible for conventional helicopters.

While continuing with the project commissioned by Ina City, Nagano Prefecture, Kawasaki will conduct verification tests of an automated loading and unloading system that requires no human workers in order to establish seamless cargo transport services. In addition, the company will devote increased efforts toward the development of a mass-production version of the aircraft.



CHARGER SETS NEW STANDARD FOR SUPPORTING HIGH VOLTAGE SYSTEMS

Pratt & Whitney Canada has announced the development of an advanced mobile charging unit (MCU) capable of charging high-power batteries at up to 1,500 volts, making it compatible with Megawatt Charging System standards the industry is advancing for high voltage power applications. The MCU was developed in collaboration with the National Research Council (NRC) of Canada and the Innovative Vehicle Institute (IVI) as part of the RTX hybrid-electric flight demonstrator project.

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The NRC focused on the hardware design, assembly, testing and delivery of two charger units, which will be used on the hybrid-electric flight demonstrator project. The charger's bidirectional capability enables it to both charge and discharge batteries, which creates opportunities to recycle unused energy back into the electrical grid.

Pratt & Whitney Canada continues to progress in testing the propulsion system for the RTX hybrid-electric demonstrator, which targets a 30 percent improvement in fuel efficiency and reduced CO2 emissions compared to today's most advanced regional turbo-props. In 2024, the propulsion system will be linked to batteries developed by H55 S.A., which will be charged using the new charger. Hybrid-electric propulsion is a critical component of RTX's strategy for enabling more sustainable aviation and supporting the industry's goal of reaching net-zero CO2 emissions by 2050.



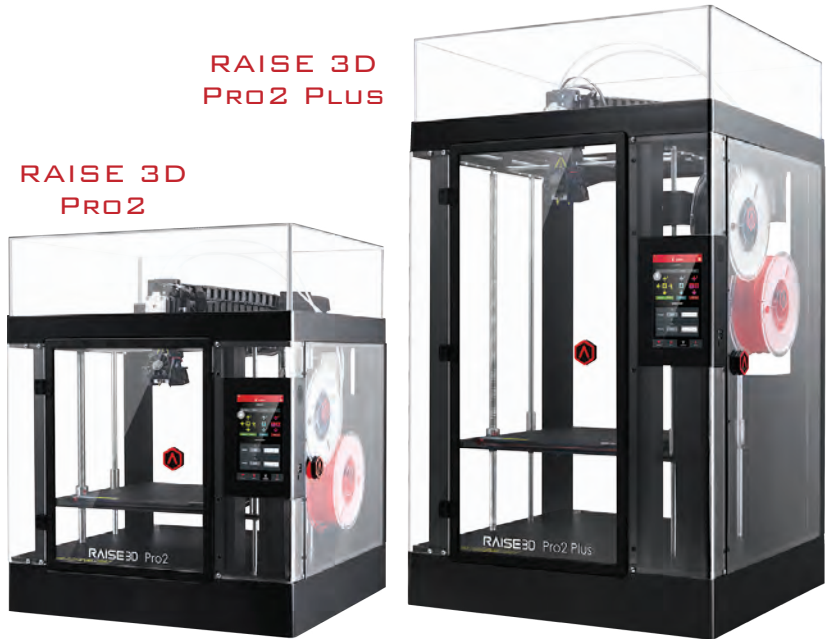
HONEYWELL MUST NEGOTIATE WITH BOMBARDIER

Engine supplier Honeywell International Inc. must negotiate with Bombardier Inc. on the cost of the jet engines it rolls out for the Montreal-based plane maker, a Quebec Superior Court judge has ruled. This decision marks the latest development in an eight-year dispute between the partners. The judge found that Honeywell has an obligation to negotiate in good faith with Bombardier with the goal of reducing the price tag on propulsion systems installed in its Challenger business jets.

The ruling also requires the U.S. manufacturer to hand over a sheaf of



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Slicing Software: ideaMaker. File Types: STL, OBJ, 3MF, OTLP. Machine code: GCODE.
 Supported OS: Windows, macOS, Linux. Network: Wi-Fi, Ethernet. Power-loss Recovery.
 Print Tech: FFF. Head System: Dual-head w/ elec. lifting system. Filament Diameter: 1.75mm.
 Filament Run-out Sensor. Print Head Travel Speed: 30-150 mm/s. Layer Height: 0.01 - 0.25mm.
 Nozzle Diameter: 0.4mm (Default) and 0.2/ 0.6/ 0.8/ 1.0 mm. Max Nozzle Temperature: 300 °C.
 Max Build Plate Temperature: 110 °C. Connectivity: Wi-Fi, LAN, USB port, Live camera.
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sales records to an independent auditor, who will assess whether the company sold turbofan engines to rivals at lower rates, which the contract with Bombardier prohibits.

Honeywell has filed a motion to appeal the decision, a move Bombardier is contesting.

Bombardier first sued Honeywell in 2016, soon after competitors began looking to get in on the market for a long-range “super mid-size” business jet that Bombardier had carved out.

“With the arrival of competitors Bombardier’s relationship with Honeywell became strained,” Justice David Collier wrote. “Bombardier’s market share for super mid-size jets fell as competitors entered the market, while Honeywell became the sole engine manufacturer for all four competing OEMs.”

Bombardier is seeking \$447 million in damages from Honeywell over claims it overpaid between 2012 and 2017. It is also seeking to slash the price in future years. The court has not handed down a ruling on damages.



BUSY BEES BROUGHT BOTTLENECK

On Monday, January 22, passengers aboard a Voepass Linhas Aéreas flight experienced a non-typical delay after landing. The passengers were aboard a VoePass aircraft that had just landed at Greater Natal International Airport (NAT) in Brazil when it was unexpectedly swarmed with bees. The bees forced the passengers to remain in the aircraft for over an hour before the bees were cleared off the aircraft.

The Voepass flight arrived at NAT at approximately 12:30 local time. This was slightly earlier than it was originally scheduled, which was 12:55 local time. After the ATR 72 aircraft taxied to its gate, a colony of bees swarmed the aircraft and later attached themselves under the aircraft’s wing. This forced the passengers to remain inside the aircraft to avoid any encounters with the swarm of bees.



Witnesses reported that the bees were landing on the airplane’s windows, which frightened many of the passengers. Eventually, the flight crew contacted the local airport for assistance removing the bees. The local fire department arrived, investigated the situation and eventually sprayed a liquid on the wing that caused the bees to scatter.

Once the bees had departed the scene passengers were able to deplane the aircraft at around 14:00 local time, which was about ninety minutes after the plane had landed. ■

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Pulling the Plug

In this commentary, Morningstar DBRS looks at the FAA's decision to temporarily ground certain Boeing 737 MAX 9 fleets.



ON SATURDAY, JANUARY 6TH, THE U.S. FEDERAL AVIATION ADMINISTRATION temporarily grounded certain Boeing (B) 737 MAX 9 aircraft for immediate inspection following an Alaska Airline-operated jet's emergency landing after a large section of the aircraft blew out shortly after takeoff. While only minor injuries were reported, the incident raises broader concerns about the safety of the aircraft for both the manufacturer and operators and heightens scrutiny on inspection requirements. This is yet another issue with the 737 MAX line for Boeing that appears to be plagued by design/production and safety issues. We do not anticipate a material credit impact on airlines as a result of this incident unless it results in a prolonged grounding of the impacted aircraft.

The FAA's order to ground the B 737 MAX 9, which some other regulatory bodies worldwide also adopted, should affect an estimated 171 aircraft out of a total 215 in service worldwide, most of which operate in the U.S. Alaska Airlines and United Airlines are two major operators of B 737 MAX 9 aircraft, with 65 and 79 aircraft in service, respectively. As a result of the FAA inspection mandate, both airlines were forced to cancel a number of flights on Saturday and Sunday, representing 20 percent of scheduled flights on Sunday for Alaska Airlines and eight percent for United Airlines. The resulting inspection directive was estimated to require between four and eight hours per aircraft.

The current incident is not unprecedented in the airlines sector or in the Boeing MAX line. There was an extended grounding period of approximately 1.5 years for Boeing 737 MAX aircraft due to safety concerns following two plane crashes in 2018 and 2019, which materially affected airlines that operated the aircraft as well as the manufacturer itself. That said, the current issues under investigation may turn out to be relatively minor, affecting a smaller number of aircraft for a shorter timeframe.

At this stage, the FAA's inspection directive is limited to only a small portion of the total B 737 MAX fleet, but this will still temporarily disrupt operations for certain airlines that have a higher proportion of affected planes (such as Alaska Airlines and United Airlines). While we do not expect a significant long-term impact on the credit profile of the airline sector or airlines themselves unless the current issue results in a prolonged aircraft grounding (such as the identification of a fundamental design flaw), this incident highlights the sector's vulnerability to operational disruptions as well as manufacturing and design vulnerabilities of aircraft models. Such disruptions could be outside of airlines' control and could affect short-term travel activity. ■

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