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AirMaintenance UPDATE

The Magazine for Aircraft Maintenance Professionals

Transport Canada Approved for R/T

AME & PAMA NEWS

THE AIRBUS A380: STILL THE BOSS

RAISING THE BAR: RUNNING ON EMPTY

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Bonus money on the table for experienced techs

CURRENTLY SEEKING OPPORTUNITY? Well, here's a heads-up. Dayton, Ohio-based PSA Airlines says it is offering a series of bonuses totalling up to $32,500 for aircraft maintenance technicians who join this American Airlines subsidiary at its Dayton or Savannah, Georgia maintenance base by April 30, 2024.

Bonus opportunities include a $15,000 sign-on bonus for joining as an aircraft maintenance technician or lead in Dayton or Savannah. A $5,000 sign-on bonus is being offered for those who join at other PSA maintenance bases, including Canton/Akron, Ohio; Charlotte, North Carolina; Cincinnati; Pensacola, Florida; Norfolk, Virginia; Greenville, South Carolina; and Dallas-Fort Worth, Texas.

Other bonuses applicable to all PSA maintenance bases include:

- Experience bonus for qualified aircraft maintenance technicians
- $12,500 bonus for over three years of experience
- $10,000 bonus for over two to three years of experience
- $7,500 for one to two years of experience
- $5,000 toolbox or cash-in option
- $7,500 in relocation assistance for non-local candidates who are hired

"Anyone who loves working on iconic planes like our all-CRJ jet fleet and who wants to be part of a driven, reliable and caring culture that provides unlimited career growth opportunities should apply today to join PSA's maintenance team." said Richard Ugarte, vice president, Maintenance and Engineering at PSA.

In addition to sign-on and experience bonuses, PSA maintenance team members receive flight benefits for them and their eligible family and friends on American Airlines' global network.

To apply, visit:
PSAairlines.com/mechanics-maintenance. ■

— John Campbell, Editor

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Features

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Upcoming Events

Longest-running air show set to return for Year 75

THE CANADIAN INTERNATIONAL AIR SHOW has announced its 75th Anniversary performance headliners. The 2024 initial lineup includes the Canadian Forces Snowbirds and the CF-18 Demonstration team along with the much-anticipated return of the Royal Air Force Aerobatic Team, Red Arrows, and the United States Air Force F-22 Raptor.

"As a team, the Red Arrows are excited to return to Canada in 2024 to help celebrate the Centennial of the Royal Canadian Air Force," said Wing Commander Adam Collins, Officer Commanding, Royal Air Force Aerobatic Team – the Red Arrows. "The visit will highlight the long and enduring partnership between the United Kingdom and Canada – and especially among our Armed Forces."

In addition to the 75th Anniversary celebration, 2024's event will also mark the 100th Anniversary of the Royal Canadian Air Force. "For three-quarters of a century, the RCAF has been an integral part of our air show," said Lori Duthie, Executive Director of the CIAS. "They continue to help us bring aviation history to life by highlighting the marvel of flight and honouring all of our Air Force veterans."

With a legacy that dates back to 1946, CIAS is recognized as the longest-running air show in North America, and it annually welcomes over one million people to Toronto's Waterfront each Labour Day weekend. Amelia Earhart herself attributed her passion for flight to a moment in Toronto, where a CIAS predecessor planted the seeds of inspiration.

CIAS has left an undeniable mark on the world of aviation history with 75 years of significant milestones. The first air show was held in 1948 at the Malton Airport where it was so popular that over 80,000 people stormed the airport, according to a Globe and Mail article at the time.

The show celebrated its 60th Anniversary in 2009 which also marked the 100th anniversary of powered flight in Canada and the 80th anniversary of the Port George IV, now Billy Bishop Toronto Island Airport. Due to COVID, the show was virtual in 2020 but returned in 2021 with a full line-up of performers.

Tickets for the 75th Canadian International Air Show will go on sale in May 2024.
www.cias.org ✪

OTHER COMING EVENTS

Sun 'n' Fun Aerospace Expo
April 9-14, 2024
Lakeland, Florida
Buckeye, Arizona
www.flysnf.org

Atlantic Region Aircraft Maintenance Conference
April 17-19, 2024
Yuma, Arizona
www.atlanticame.com

Alberta Aviation Conference 2024
April 28-30, 2024
Calgary, Alberta
www.albertaaviationcouncil.com

Northern Air Transport Association Conference
April 29 - May 01, 2024
Yellowknife, NWT
www.natacanada.org

Careers in Aviation Expo
May 04, 2024
Ottawa, Ontario
www.careersinaviation.ca

Vertical Flight Society Forum
May 07-09, 2024
Montreal, Quebec
www.vtol.org

BCAC 2024 Conference
May 27-29, 2024
Nanaimo, British Columbia
www.bcaviationcouncil.org

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Citation X & Sovereign
Gulfstream G200
Gulfstream 550
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POWERUP ignition systems now available

Hartzell Engine Tech has rebranded and launched POWERUP Aircraft Ignition Systems which include FAA/PMA approved aircraft magnetos, ignition harnesses, Slick, Bendix and Continental replacements parts and magneto repair kits. Hartzell Engine Tech added the product portfolio last year. It is now the largest Hartzell Engine Tech operation, joining Janitrol Aero, Fuelcraft, Plane-Power, Sky-Tec, and AeroForce Turbocharger Systems. The complete POWERUP product line is available immediately through a global distributor network. Additionally, Hartzell Aviation sister company Quality Aircraft Accessories will begin incorporating POWERUP magneto components into its overhaul processes, replacing legacy Slick components. **www.powerupignition.aero**

Snap-on will build tools to your specs

Snap-on Industrial's Custom Tools & Solutions program works closely with customers to develop one-of-a-kind tools for critical tasks that enhance safety and reliability. Often, tools are modified by end-users to handle an exact task. But modifying any tool can compromise its form, fit or function, posing a danger to the technician. An alternative option is the Custom Tools & Solutions team. When a request arises, Snap-on develops the ideal solution to address your unique application. The Custom Tools & Solutions team designs and engineers your new tool and, when approved, begins the manufacturing process to build it to exact specifications. **www.b2b.snapon.com**

New Sprinter delivers advanced TIG features

Lincoln Electric's new Sprinter 180Si stick welder is designed with a maximum output of 180 amps to enable exceptional stick welding quality. Operators can weld up to 5/32-inch electrodes (6010/7018) and can even choose a dedicated 6010 mode for cellulosic stick electrodes. The 180Si also delivers 200 amps for TIG welding and offers a variety of advanced TIG features including pulse mode with options ranging from .1-100 pulses per second and TIG-ready capabilities with an eight-pin connector for foot pedals, hand amptrols and other devices. **www.lincolnelectric.com**

Helicopter management program is cloud-based

Veryon Tracking+ is Veryon's latest end-to-end helicopter management platform for helicopter operators and maintenance providers. It delivers comprehensive cloud-based software for fleet management, maintenance, inventory, and flight operations and has integrated modules, mitigating the risk of data discrepancies or confusion. Its web-based platform, complemented by mobile app functionality, also empowers users with accessibility anytime, anywhere. Veryon Tracking+ is currently used by over 150 aircraft operators and MROs worldwide to manage over 2,000 airplanes and helicopters from every corner of the industry. Airbus Helicopters has integrated Veryon Tracking+ into its operations worldwide. **www.veryon.com**

Install tool stands-in for stabilizer

McFarlane Aviation's stabilizer bracket installation tool (TOOL 136) ensures proper alignment of the hinge brackets and horizontal stabilizer on Cessna 180, 182, and 185 aircraft. It effectively serves as a stand-in for the aircraft's stabilizer, mimicking the spacing and thickness of the stabilizer hinges during installation. The tool also provides levelling and alignment surfaces. Without the tool, aligning the hinge brackets is extremely challenging. Improper alignment could potentially lead to several issues, like binding of the horizontal stabilizer and malfunctioning of the trim system. **www.McFarlaneAviation.com**

Audio management system is fully digital

PS Engineering's all new HUB50 uses proprietary iOS application to configure more than 250 different parameters, including which stations hear which audio sources, switched and unswitched, input and output impedance, audio levels, music distribution, dimming levels and thresholds. These custom profiles can be stored, modified, reused, and shared in the app. Configurations can be built away from the aircraft, and then quickly loaded in the HUB50 at the hangar or on the ramp. This is very useful when an aircraft is leased for multiple uses such as forestry and medevac. **www.ps-engineering.com**

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

COLUMBIA UNVEILS CHINOOK DEVELOPMENT PROGRAM

Oregon-based Columbia Helicopters says its new development program will redefine Chinook commercial operations worldwide. As the OEM of the Commercial Chinook, the Model 234, Columbia plans to create a new model of super heavy-lift aircraft through converting existing CH-47D Chinook aircraft. This development program, named the 234 Special Purpose (234SP), leverages the existing Model 234 design foundation, while retaining the performance of the CH-47D. Coupled with the planned Chinook Integrated Sustainment Program (CISP), these programs are aimed at providing a fully FAA-certified transport category rotorcraft. The first customer of the 234SP is current CH-47D operator ROTAK of Anchorage, Alaska.

WINNIPEG MRO STAND UP COMPLETED

StandardAero announced it has now completed the stand up of its Pratt & Whitney Canada PW200 helicopter engine MRO capabilities at its Winnipeg, Canada Helicopter Center of Excellence, including support for a new test cell. The company is in the process of transitioning the test cell from its facility in Dallas to Winnipeg, an investment of more than $1 million. StandardAero has also ramped up operations with new tooling and resources and received Transport Canada approval last December. The company provides tip to tail services for Airbus and Bell model helicopters at five facilities located in the U.S., Canada and the U.K.

BOEING LANDS BIG RCAF POSEIDON CONTRACT

The U.S. Navy has awarded Boeing a $3.4 billion contract to begin manufacturing 14 P-8A Poseidon aircraft for the Royal Canadian Air Force and three additional P-8s for the German Navy. In November 2023, Canada announced its decision to acquire the P-8A Poseidon to replace its current fleet of CP-140 Auroras. The first P-8A for Canada is expected to be delivered in 2026. With the P-8 acquisition, Boeing's economic commitments to Canada have the potential to generate annual benefits of more than 3,000 jobs for Canadian industry and partners, and at least $358 million to Canada's gross domestic product over a 10-year period.

PT6A-52 ENGINE CHOSEN FOR PIPER M700 FURY

Pratt & Whitney Canada's PT6A-52 engine (above, right) has been selected by Piper for its M700 Fury aircraft. This is the first time the PT6A-52 engine is used to power a single-engine turboprop.

With the PT6A-52 as its powerplant, the new Piper M700 Fury will offer a factory-spec cruise speed of 301 knots true airspeed, a climb rate of more than 2,000 feet per minute, 25 percent better take-off field length and landing performance compared to the M600SLS aircraft. It will have six-passenger capacity and a maximum take-off weight of 6,000 pounds. The PT6A-52 engine in the M700 Fury retains its full 700 shaft horsepower up to 24,000 feet.


Gulfstream G700

G700 SETS ANOTHER CITY-PAIR SPEED RECORD

Gulfstream Aerospace boasted in February that its all-new G700 surpassed 50 city-pair speed records en route to the Singapore Airshow. The aircraft (Page 8, bottom right) achieved its 50th speed record on a carbon-neutral flight connecting Los Angeles, California to Nice, France, traveling 5,197 nautical miles/9,625 kilometres in 10 hours and 13 minutes at an average speed of Mach 0.90. The aircraft then set its 51st speed record — also a carbon-neutral flight — from Nice to Singapore, making the 5,754 nm/ 10,656 km trip in just 11 hours and 30 minutes at an average speed of Mach 0.90.

Embraer's Phenom 300

De Havilland

GE LAUNCHES NEXT-GEN ROTOR DIAGNOSTICS

South Africa's Henley Air (above) will be the launch customer for GE Aerospace's "Next Generation" Rotor Analysis Diagnostic System, which will be used across Henley's fleet of Bell, Dauphin and Augusta helicopters. The RADS-NG will allow operators to complete their rotor track and balance operations and diagnostics in fewer flights while reducing flight and pilot time and saving fuel, says Matt Burns, general manager of Avionics for GE Aerospace. The RADS-NG will replace the RADS-AT (Advanced Technology) and the AVA (Aviation Vibration Analyzer) as GE Aerospace's portable vibration diagnostics solution for vehicles where permanent installation is not practical or to supplement existing systems.

PHENOM SERIES KEEPS ON SELLING

Embraer's Phenom 300 series has maintained its status as the world's best-selling light jet for 12 consecutive years, while also attaining the best-selling twinjet for the fourth year running, according to data released by the General Aviation Manufacturers Association (GAMA). To achieve this distinction, the company delivered 63 Phenom 300 series aircraft throughout 2023.

The Phenom 300 series has accrued more than 730 deliveries worldwide and operates in over 40 countries. With over two million flight hours logged, the Phenom 300 recently became the most-flown aircraft in the United States, with more than 360,000 flights in a 12-month period.

DE HAVILLAND ACQUIRES FIELD OPERATIONS

Calgary-based De Havilland Aircraft of Canada has purchased the assets and ongoing business of Field Aviation's Alberta aircraft parts manufacturing operations, marking the second acquisition made by De Havilland in the past several months—having recently acquired Mid-Canada Mod Centre and Avionics Design Services in Ontario. These acquisitions will allow De Havilland to grow its manufacturing capacity. "Field's Calgary operations will be integrated into our own manufacturing operations and will play a vital role in our desire to improve our in-house supply chain and ensure we have the parts our customers need, when they need them," said De Havilland CEO Brian Chafe. ■

The Airbus A380: Still the Boss

Since the earliest days of man-powered flight, the size of aircraft has been increasing to capacities never dreamed of by early designers and engineers. The Airbus A380 is currently still the world's largest passenger aircraft but in the following pages Artemis Aerospace attempts to understand why production ended.

The contour of the A380 is larger than other aircraft so more space behind is needed for a safe take-off.

THE AIRBUS A380, designed and produced by Airbus, the European multinational aerospace corporation, is not only the current largest passenger aeroplane in the world, but also the only jet airliner with full length double decks. It has an impressive maximum capacity of 853 passengers, if configured entirely for economy seats, and originally hit the drawing board as a rival to the immensely popular Boeing 747, the original "jumbo jet," which can "only" carry a maximum of 660 in the same configuration.

It first took to the skies in 2007 under the aegis of Singapore Airlines and was widely seen to be the future of the aviation industry. However, after a total of 254 aircraft were built, in 2019 Airbus announced that production of the Airbus 380 would cease in 2021, a surprisingly short timespan considering the Boeing 747 first flew in 1969 and ceased production in 2022. What happened in these fourteen years? And does it demonstrate that bigger really is better?

The Airbus 380 project was launched in 2000 when hub-to-hub flights were becoming popular and there was a significant congestion issue at major hub airports. In addition, extra slots at popular airport hubs such as London Heathrow were not only astronomically expensive, but also rarely became available. As a result, airlines were unable to boost the number of flights into an airport to increase market share. The only way to augment the number of passengers would be to concentrate on the capacity of the aircraft, and there was nothing larger at the time than the Boeing 747 and 777.

The Airbus 380 has an overall length of 72.7 metres, a height of 24.1 metres and a wingspan of 79.8 metres. Although, as mentioned above, it can carry a maximum of 853 passengers (in which configuration it has the lowest fuel burn per seat of any aircraft), it largely carries 545 passengers who are spread between first, business, premium economy and economy class.

In 2000, the projected development cost was €9.5 billion, but complications during development, such as issues with the 330 miles of electric cabling, continually pushed the total up and by 2014 it was estimated to have cost €18.9 billion. In addition, parts for the Airbus came from all over Europe; the nose and centre sections were built in Northwest France, the wings in Wales, the horizontal tailplane in Cadiz in Spain and the rear fuselage and vertical tail fin in Hamburg.

Due to the size of the A380, there were also issues with routes. It was only worth scheduling an Airbus if there was a significant demand for the route and an airline could be expected to fill the aircraft.

More than 5,000 guests witnessed the unveiling of the A380.

The size of these finished parts requires complicated and expensive logistics to transport them to the Airbus factory in Toulouse, and there were also considerable delays in the schedule. The first Airbus was eventually delivered to Singapore Airlines (with the registration of F-WWOW!) with Emirates, Air France, Qantas, Korean Air and Malaysia Airlines also introducing the Airbus to their service.

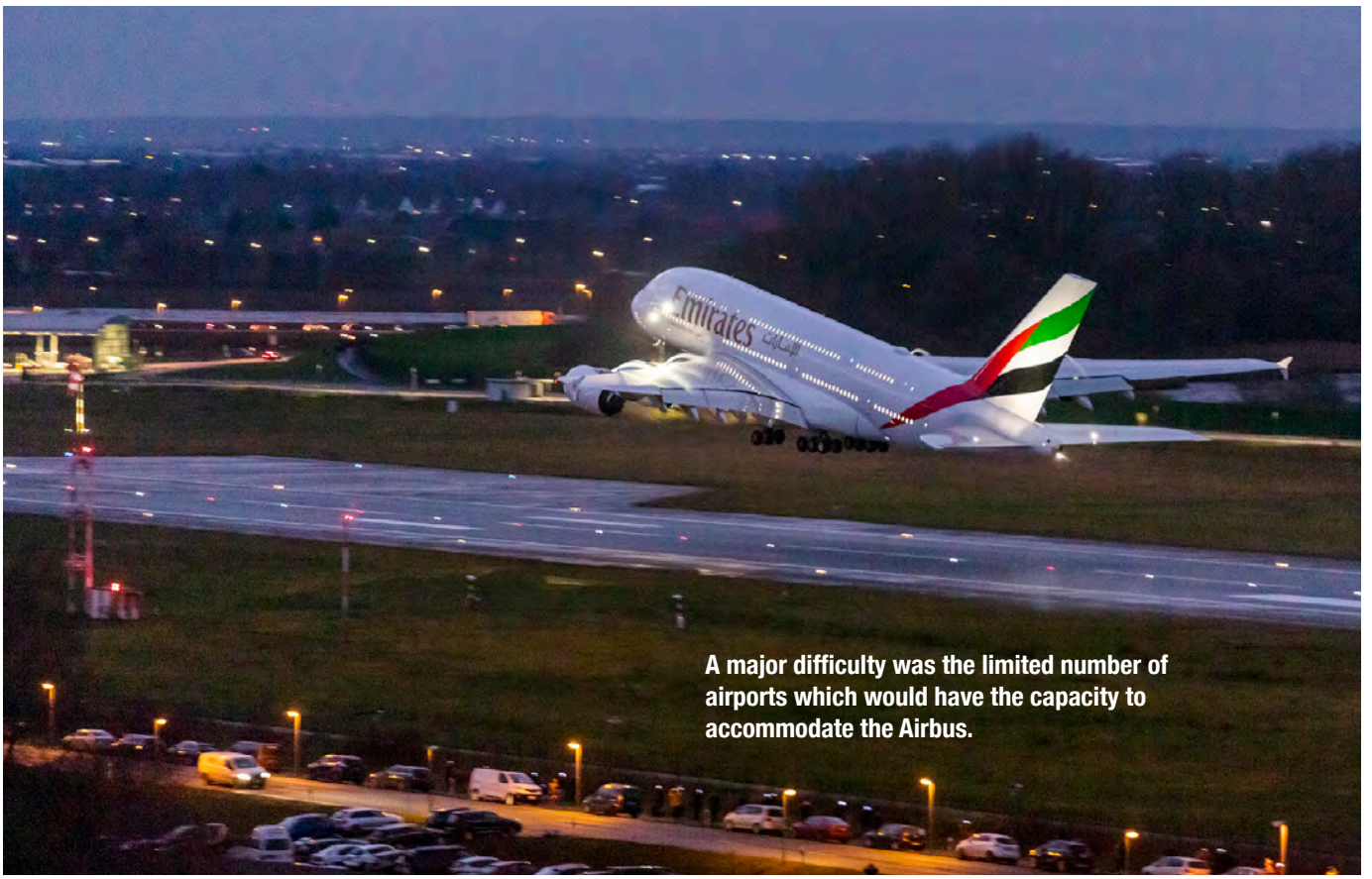
However, although passengers loved the comfort and space of the A380, a number of issues gradually became apparent. With fuel prices rising, the Airbus could only achieve its fuel efficiency with all seats filled—expecting that number

A380: Rock Star Reveal

The A380 Reveal on January 18, 2005, created publicity around the world and won plaudits for its imaginative style. The national leaders of Britain, France, Spain and Germany joined more than 5,000 guests—including customers, suppliers and hundreds of journalists—to witness the unveiling of the aircraft Airbus said would usher in "a new way of flying." The aircraft was painted in a new Airbus livery. By now there were 14 launch customers and 149 orders for the A380 and its freighter version, the A380F. The spectacular Reveal ceremony, held in the A380 Final Assembly Facility, featured fireworks, dry ice, lasers, dancers, and projected images of all of Airbus' aircraft flying around the hall, while a narrator in the form of a hologram wizard spoke of the magic of aviation and how the dream of the A380 had become a reality thanks to the vision and spirit of Airbus. The event was streamed live to hundreds of thousands of people through the airbus.com website—which recorded a record number of visitors—and a number of television channels broadcast it live. (On the following day some 5,000 Airbus employees enjoyed their own special replica Reveal ceremony, which was broadcast live to employees at Airbus sites around the world.)

Following the Reveal, anticipation built towards the A380's first flight, which took place in Toulouse on 27 April, 2005, in front of the world's media. On a brilliant spring day the A380, with the registration F-WWOW and powered by four Rolls-Royce Trent 900 engines, took off for a flight lasting three hours and 54 minutes, jointly captained by Claude Lelaie, Airbus's senior vice president (Flight Division), and chief test pilot Jacques Rosay.

The flight could not have gone more perfectly. Afterwards Rosay said flying the biggest passenger aircraft the world had seen was "like handling a bicycle." And Lelaie enthused: "We now really sense the potential of this magnificent machine."



A major difficulty was the limited number of airports which would have the capacity to accommodate the Airbus.

of passengers wanting to use the routes on a daily basis was unrealistic. As a result, airlines were not recouping their costs.

A total of 251 Airbuses were ordered during its production lifetime, and of these, 123 went to Emirates. From a marketing point of view, there was a perception that the Airbus was the "Emirates" aeroplane which inevitably meant that selling it to other airlines was more challenging.

A further complication is the jet blast contour …the thrust force from the back of the engine. …the contour of the Airbus is larger than other aircraft so more space behind is needed for a safe take-off.

In addition, by the time the Airbus took to the skies, the aviation industry was moving away from the hub-to-hub flying model. Long-haul flights were rising in popularity, but people were increasingly preferring to fly directly rather than waste time changing over at a hub. Newer aircraft were being designed with this in mind that incorporated fewer seats and more efficiency.

The Airbus 380 has an overall length of 72.7 metres, a height of 24.1 metres and a wingspan of 79.8 metres.

Below: During the A380's early stages of construction.

Due to the size of the A380, there were also issues with routes. It was only worth scheduling an Airbus if there was a significant demand for the route and an airline could be expected to fill the aircraft.

Another major difficulty was the number of airports which would have the capacity to accommodate the Airbus. It's around 30 percent larger than the Boeing 747, heavier than other aircraft and has a wingspan approaching the length of a football pitch. The Emirates hub at Dubai was able to receive the Airbus, but many other airports, particularly smaller or older ones, needed extensive and costly remedial works to land and manoeuvre the Airbus safely.

This included strengthening taxiways and runways and widening them to fit the wingspan, as well as possibly moving signage and lighting. More allocated space at gateways would be required, and the purchase of double-decker air bridges. The larger number of passengers would require extra ground support such as more customs provision and security and check-in areas and larger baggage carousels.

A further complication is the jet blast contour—the effect created by the thrust force from the back of the engine. Due to its size, the contour of the Airbus is larger than other aircraft so more space behind is needed for a safe take-off.

Finally, since the inception of the Airbus, fuel prices have risen considerably, and the more fuel-efficient and sustainable twin-engine aircraft are increasing in popularity over the traditional four-engine versions. Due to their increase in reliability, they can now travel for longer distances, and the reduction in fuel use per flight is an added bonus for airlines keen to show their green credentials. Maintenance costs are also lower, as a significant proportion of both routine and unexpected maintenance is centred on the engines.

We will continue to see the impressive bulk of the Airbus 380 crossing the skies for many years to come despite production ending. Although its size is undoubtedly its unique selling point, the difficulties the A380 has encountered in its lifetime demonstrate that bigger is not necessarily better. ■

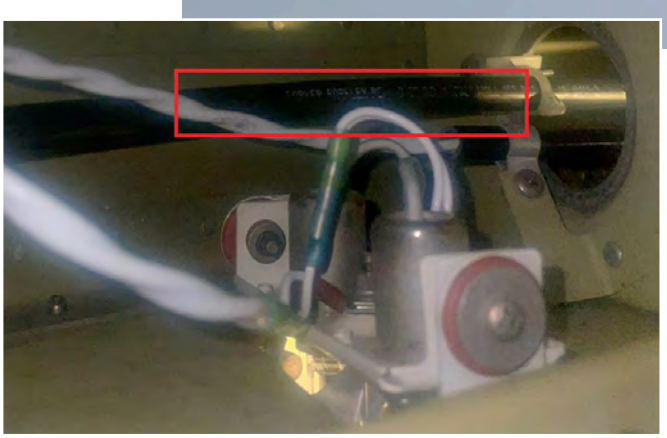
(Artemis Aerospace specializes in component supplies, component repairs, lessor support, flight simulation hardware support, consignment stock management and global aircraft logistics.

Many airports, particularly smaller or older ones, needed extensive and costly remedial works to land and manoeuvre the A380 safely.

In 2000, the projected development cost of the A380 was €9.5 billion, but complications quickly arose.

★ TRANSPORT CANADA ★
Reports and Comments

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



Above: a Beech 1900D Far left: Location of concern above logo light, internal of stabilizer. Left: The melted deice line.

REPORT: BEECHCRAFT 1900D

Deice Boot Inflation Failure Caused by Melting of Deice Line

Subject:

During routine maintenance of the horizontal stabilizer internal inspections, we have found the deice line that runs over top of the logo lights melted and distorted – in one case was melted right through and sealed itself shut not displaying any faults in the cockpit and no inflation of deice boots on tail-let. We have replaced line with superseded Part Number 131823PT6.

Transport Canada Comments:

According to the submitter, the flight crew did not receive any fault indications. However, it is important to note that in SINGLE or MANUAL mode, the TAIL DEICE annunciator may appear to be illuminated normally, giving a false impression of a normal inflation-deflation cycle to the flight crew. Additionally, the instrument panel pneumatic pressure gauge may seem to indicate normal function even if there is a blockage or restriction in the stabilon, stabilizer, or tail-let deice boot line downstream of the tail pressure switch. Despite this, during surface deice operational checks, any insufficient boot inflation or deflation should be investigated further.

Above: a Bell 212
Right: The main rotor gearbox spider with a broken lug separated from the part.

REPORT: BELL 212

Updated Bell Medium Main Rotor Gearbox Spider Inspection

Subject:

The transmission was removed from the aircraft for inspection and conversion to 212 HP status. During this inspection, the spider was found to have a broken lug. There was no prior indication of this failure. This part is being sent to an independent facility for review.

Transport Canada Comments:

Bell has received multiple service difficulty reports (SDRs) of a cracked or broken lug found on the main rotor gearbox spider. Following the investigation of the parts, Bell concluded that an update to the manufacturing planning and the component repair and overhaul (CR&O) instructions for all Bell Medium Helicopters was required. Once revised, the CR&O will have updated instructions for the magnetic particle method used to inspect the spider. Transport Canada Civil Aviation (TCCA) encourages operators and maintainers of Bell Medium Helicopters to review the latest revision of the applicable CR&O prior to inspecting the main rotor gearbox spider by magnetic particle method.

A Diamond DA20 in flight. Right: Fracture of both mount holes. Bottom, right: Fractured mount hole.

REPORT: DIAMOND DA20-A1

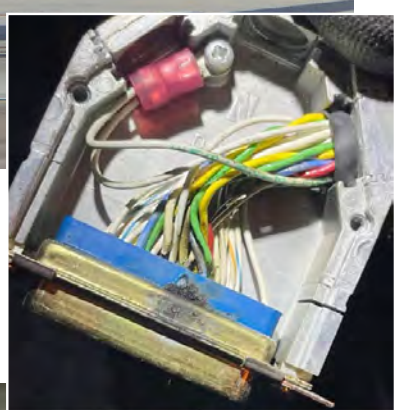
Rudder Pedal Frame Assembly Lower Mount Failure

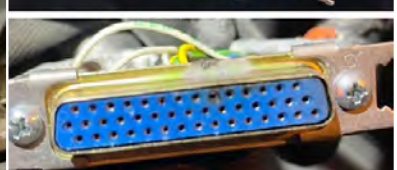
Subject:

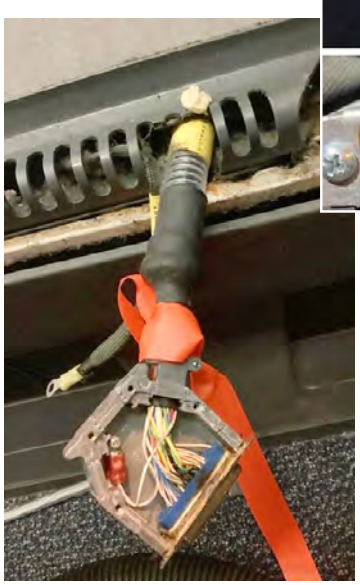
As we can see on the pictures, the rudder pedal frame assembly failed. The lower mounting hole broke off which causes the connecting rod of the brake cylinders to become loose. A pilot reported that the rudder pedals become "stuck sometimes."

Transport Canada Comments:

Upon further inspection, both mounting hole ears have fractured. DA20-A1 and DA20-C1 share a similar design, although this failure mode has not been reported in the past. It is important to recognize that higher time aircraft may require special attention to areas that undergo stress on a regular basis, particularly flight control systems. Owners, operators and maintainers are reminded to submit a Service Difficulty Report if any similar defects are found.







Above: An Embraer ERJ 170 taxiing on the runway. Right: Close-up of the Embraer plug with burnt pins.

Left: IFE wiring cannon plug with burnt connections.

REPORT: EMBRAER ERJ 170 200 SU

Troubles with the In-Flight Entertainment System

Subject:

While troubleshooting the aircraft cabin entertainment system, after it was reported that all video display units from row 18AC to 27AC were inoperative, light smoke and a burning smell were noted originating from electrical plug 11P3402 at seat 24AC when the system was being powered up. The electrical plug was disconnected, and evidence of arcing was observed. Passenger seat 24AC electrical harness A127012-501 was replaced, but the electrical plug 11P3402 had to be deactivated due to a part shortage. The aircraft is currently operating under a minimum equipment list (MEL) extension. The electrical plug will be replaced when it becomes available. Aircraft time: 37100:48 flight hours and 25340 cycles.

While the aircraft was in for heavy maintenance, the IFE power connector at seat 14FD was found to have arcing and burning damage. The harness for the system and connector were replaced at seat 14FD as per the aircraft wiring diagram manual chapter 44-22-51-4 and the supplemental wiring parts manual 20-21-20. No further action was required. Aircraft time: 39418:52 flight hours and 28117 cycles.

While aircraft was in for heavy maintenance, all the left-hand smart video display units (SVDU) up to and including seat 18AC were reported blank. Wiring metered and found no ground present at plug J3 as per wiring manual chapter 44-22-51-04. In addition, found wires WM041-00015-24WH and W041-00015-24BI shorted. Connector 1P3403 at seat 2A was disassembled and found burnt internally. The connector at seat 2A was replaced as per the wiring manual chapter 44-22-51-04 and the supplemental wiring parts manual. Transformer Rectifier Unit was replaced. An operational test of the systems was carried out. Aircraft time: 39418:52 flight hours and 28117 cycles.

Transport Canada Comments:

Recently there has been an increased number of SDRs submitted relating to IFE system on certain aircraft. The IFE system, while not essential for flight, can be essential for an enjoyable travel experience. As a result of the IFE system not being essential, it is sometimes neglected. The system is also located in the cabin, where plenty of abuse can occur. The wiring required to provide the IFE system can contain high voltage and can provide the risk of an in-flight incident, such as fire or smoke in the cabin. Operators are asked to remember the importance of the IFE system wiring even though it is not the most important system on the aircraft.

REPORT: PILATUS PC-12

Main Landing Gear (MLG) Fracture and Collapse

Subject:

The MLG lower trailing link broke away from the upper yoke fitting. The pivot pin attach lug on the yoke fitting, inboard side, broke in half, allowing the lower trailing link bushing and pin to separate from the upper gear leg.

Transport Canada Comments:

This Feedback Article aims to raise awareness in the PC 12 community of potential undetected corrosion being present under specific bushings of the yoke fitting assembly. It is suspected that this corrosion weakens the bore in the yoke fitting which can cause the separation of the lug from the rest of the yoke assembly. This specific aircraft was positioning for take-off at the end of the runway when the lower trailing link broke away. The gear assembly is presently with Pilatus in a Swiss lab for investigation.


Pilatus PC-12, Fractured gear impacting the runway.

Pilatus specifies in their MLG Component Maintenance Manual (CMM) that up to "25,000 flying hours or 30,000 landings (whichever comes first), the overhaul of the MLG is done 'on condition' and requires the disassembly, cleaning, check, repair (if necessary) and assembly of the component". The overhaul consists of an examination and dimensional check of the bushings, but removal is optional.

Transport Canada Civil Aviation recommends that operators pay extra attention to these bushings during all routine maintenance checks for signs of corrosion. The Pilatus MLG CMM provides specific instructions for the subject bushings' removal, inspection, repair and reinstallation.

Piper PA-28.
Right: Inner radius of stub axle lug.

REPORT: PIPER PA-28 161

Main Landing Gear Stub Axle Lug Cracked

Subject:

The right-hand main landing gear was found cracked at the torque link lower attachment point on the stub axle and oleo piston assembly during routine maintenance. The crack was found by visual inspection and was approximately three-quarters of the way through the attachment point, outboard boss. The lower attachment point is not affected by Piper Service Bulletin (SB) 1131A, or SB 1179. Each of these inspections are looking for cracks at the upper torque link attachment point. Federal Aviation Administration (FAA) Airworthiness Directive 67-20-04 and Piper SB 248 require inspection of the torque link and not the lower attachment point. The stub axle and oleo piston assembly were replaced, and the aircraft was returned to service.

Transport Canada Comments:

The Service Difficulty Report (SDR) submitter is correct, Piper SB 1131A and SB 1179 both focus on the upper torque link attachment point. For Piper PA-28 and PA-32 series aircraft that operate in a flight-training role, experiencing hard landings, or where many takeoff and landing operations are performed routinely, it is recommended to pay special attention to the lower stub axle lug as a possible failure point.

A cracked stub axle lug may be partially hidden from view by the inner wheel half when installed. The use of a 10x power magnifying glass, as described in Chapter 32 of the Maintenance Manual, to visually inspect the radii may assist in identifying a cracked stub axle lug. Transport Canada Civil Aviation (TCCA) encourages owners, operators, and maintainers to continue reporting any defects noted. ■

PACIFIC

Pacific AME Association

Mission Statement

The Pacific AME Association shall always promote and protect the professionalism of the AME, while developing, maintaining and improving our relations with regulatory bodies affecting our industry. We shall represent the views and objectives of our members while promoting proficiency through educational collaboration with other groups on matters of mutual interest.

We shall promote honorable practices among our Members and others in the aviation industry, while remaining non-union, non-sectarian and non-partisan.

Formal Transfer

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.

www.amec-teac.ca/pacific

WESTERN

Western AME Association

Our Association

The Western AME Association is one of five similar associations across Canada, the others being the Atlantic, Ontario, Central and Pacific associations. These associations represent regional interests as well as concerns of national importance.

The Canadian Federation of Aircraft Maintenance Engineers Associations (CFAMEA) is a national body which is supported and financed by all the regional associations and which represents the associations at the national level.

The Western AME Association is run by a volunteer group of AMEs who are elected by the member AMEs to the Board of Directors. The membership is comprised of AMEs, non-licensed personnel working in the industry, students and apprentices as well as corporate members.

A separate committee, under the auspices of the association, runs an annual symposium/workshop. This workshop is a two-day event which features speakers on a variety of related topics, as well as an industry tradeshow with over fifty booths from various companies, suppliers, manufacturers and other organizations. Attendance at this and our various other smaller workshops may be counted towards the recurrent training requirements required by Transport Canada.

Visit our website at: **www.wamea.com**

CENTRAL

Central AME Association

About Your Organization

The Central Aircraft Maintenance Engineer Association is an organization dedicated to maintaining and enhancing the standards, rights and privileges of all AME members in the central region of Canada. Our chapter is one of six similar associations across Canada who collectively support the national body AMEC-TEAC (Aircraft Maintenance Engineers of Canada). Our organization works with Transport Canada in the formulation of new rules and regulations and provides a collective viewpoint for all AMEs.

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

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 experience, 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

ONTARIO

Skills Development and Outreach Program

We are approaching the one-year anniversary of the start of our outreach program. This program was developed to visit schools, aviation events and career day fairs to promote aircraft maintenance trades and the Aircraft Maintenance Engineer profession.

We have been to over 30 events with our booth equipped with an aircraft engine and propeller display, a hands-on lock wire demonstration panel, touch-screen aircraft component displays, and a jet engine demo. Youth and their parents can ask our experienced personnel what working on small and large aircraft is like. Lists of approved colleges and course prerequisites were provided.

Our Skills Development Program has benefited 75 people. Participants received courses ranging from online courses in Workplace Mental Health and a certified Soft Skills Program to a 10-day hands-on Composite Materials Inspection and Repair course.

We also offered a custom Industry Readiness Refresher Program. This program included a Blueprint Reading Course, a Math for Skilled Trades Course, and a Measuring Instruments Course, with industry-specific content provided by our association.

We are in the process of obtaining funding to continue these programs next year.

2024 Ontario Aircraft Maintenance Conference

We are pleased to announce that the Ontario Aircraft Maintenance Conference is back! Mark your calendars for October 2 and 3, 2024, as we gather under the theme "Shaping the Future."

This event is a hub of knowledge exchange and networking opportunities and truly offers something for everyone.

Don't forget to consider participating in the Skills Challenge! Show off your expertise, compete with peers and win exciting prizes. We look forward to seeing you there!

Submitted by Stephen Farnworth
For the Board of Directors
www.ame-ont.com

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

QUÉBEC

6 mars, 2024

Hier à Ottawa, l'Association des TEA du Québec, accompagnée par les représentants des autres Associations régionales de TEA du Canada membres de l'AMEC-TEAC, ont eu le plaisir de rencontrer Jeff Phipps et Ryan Hennigar de la Navigabilité opérationnelle, Direction des Normes, Transports Canada Aviation Civile (TCAC).

Cette rencontre nous a permis de discuter des différentes préoccupations de nos membres, de poser leurs questions ce, tout en recevant une mise à jour réglementaire de Transports Canada sur les différents aspects qui peuvent toucher les TEA dans leurs fonctions, leur formation et leurs responsabilités.

Cette réunion, que nous effectuons au moins une fois par année, a été très fructueuse et permet à TCAC de pouvoir discuter directement avec des TEA qui utilisent leurs licences au quotidien. Cela permet au régulateur de mieux comprendre les problématiques que nous vivons et de voir les impacts des réglementations et leur permet également de voir quelles clarifications pourraient nous aider dans la réalisation de nos tâches qui consistent à maintenir les aéronefs et état de navigabilité.

Un certain nombre de documents de travail et de consultations concernant les TEA seront publiées lors des prochains mois par TCAC. Votre Association, en partenariat avec l'AMEC-TEAC et les autres associations régionales de TEA les suivront avec attention et seront parties prenantes de certaines d'entre elles.

Nous pensons que ce travail de collaboration est d'une importance capitale pour les TEA du Canada et il est essentiel que nous échangions avec les représentants de TCAC sur une base régulière.

Nous recevrons bientôt de Transports Canada le compte-rendu de cette réunion que nous enverrons à nos membres par courriel.

Merci pour votre soutien continu !

March 6, 2024

Yesterday in Ottawa, the Quebec AME Association, accompanied by representatives of other Canadian regional AME Associations members of AMEC-TEAC, had the pleasure of meeting Jeff Phipps and Ryan Hennigar from Operational Airworthiness, Standards Branch, Transport Canada Civil Aviation (TCCA).

This meeting allowed us to discuss the various concerns of our members ... that affect AMEs....

This meeting ... allows the regulator to better understand the issues we are experiencing and to see the impacts of the(ir) regulations...

A certain number of working documents and consultations regarding AMEs will be published in the coming months by TCCA. Your Association, in partnership with AMEC-TEAC and other regional AME associations, will follow them carefully and will be stakeholders in some of them.

We believe that this collaborative work is of capital importance for AMEs in Canada and it is essential that we communicate with TCCA representatives on a regular basis.

We will shortly receive documents relating to this meeting from Transport Canada which we will send to our members by email.

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

ATLANTIC

Atlantic AME Association

Message from the President

Thank you, from your Board of Directors, for your continued support of the AME Association (Atlantic) and from all the members of Aircraft Maintenance Engineers of Canada / Techniciens d'Entretien d'Aéronefs du Canada (AMEC/TEAC) for your support of our national Association. It is time again to renew your AME Association (Atlantic) membership. I hope you see value in this membership, with the associations working with the regulator for the benefit of your AME license and privileges.

Square invoices will be sent to all current members of the AME ASSOCIATION during the first week of January 2024. There will be a link within the invoice that you can pay the invoice directly. Should you wish to pay the invoice another way. Just let us know. For those members that were on automatic renewal, please note that we are no longer retaining your card information and that you will need to pay using the link within the invoice.

We have a great website – https://www.atlanticame.com. There you can find information about the 2024 ARAMC, our newsletters and other information of interest to you. Please take a few minutes to look at the Awards page of the website and consider submitting a name, who you feel is deserving of one of the awards, in recognition of their work and dictation to our industry.

Your membership includes; membership in (AMEC/TEAC), magazine subscriptions and a 10 percent discount card to use at any Mark' Work Warehouse in Canada, together valued at over $170. Training courses are presented as demand and place in the Canadian Aviation Co dictates and you will enjoy reduced fees for these events. The AME Association (Atlantic), in partnership with AMEC/TEAC aim to be your voice and support to our Industry.

The ARAMC 2024 is scheduled to take place in Moncton, NB from April 17-19, 2024, at the Delta Hotel Beausejour. The committee will be providing more information as we move closer to the date. Please continue to check our website and follow our Facebook page, for the latest information on your associations work and upcoming events.

This year, for the first time in Canada, we will be celebrating "AME Day". This special day will take place on April 20th and will be observed by Canadian AMEs across the country, as our day to show our work and importance in the safety of the Canadian Aviation community.

To this end, I am asking you to submit photos of AME at work, from Edmundston, NB to Yarmouth, NS to Summerside, PE to St. John's, NL to Nain, NL and all points in between. Photos should cover all aspects of our work, heavy maintenance, field recovery, bush operations, component overhauls etc. Submit photos to: bwpardy709@gmail.com.

Bob Pardy
President
AME Association (Atlantic)
www.atlanticame.com

SOCAL

SoCal PAMA Chapter

Flight Safety Detectives Podcast Episode 211: EVTOL Safety

Flight Safety Detectives Todd Curtis, Greg Feith, and John Goglia discuss the crash of a Joby JAS4 eVTOL aircraft to highlight safety concerns and regulatory challenges. Propulsion units used in eVTOLs pose significant safety risks.

The eVTOL in this crash was being remotely flown during a test flight. The aircraft is powered by six electric motors and is designed to take off and land vertically like a helicopter and cruise like an airplane.

John, Greg, and Todd examine how the design of the aircraft, with a unique configuration of six propulsion units, creates several failure modes that don't exist for currently certified passenger-carrying aircraft. While no one was injured or killed in this crash, Greg, Todd, and John explore risks evident in the accident. They call on the FAA to consider these risks during the certification process.

Several eVTOL manufacturers, as well as some manufactures of large jet transports, are designing their aircraft for either single pilot or autonomous operation. These designs make it difficult to respond to unforeseen emergencies. Greg and John note the crew responses to several past aviation accidents and how a single pilot or an autonomous system may not be able to deal with those situations.

Flight Safety Detectives Episode 210:
Challenger 604 emergency landing mistakes

The jet, which had three crew members and two passengers, was nearing the end of a flight from Columbus, Ohio, when the flight crew declared an emergency to air traffic control. They lost their engines and could not make it to the airport.

Little official information was available at the time of the recording. It was not known whether the aircraft was equipped with a cockpit voice recorder or flight data recorder. The engines appear to be intact, which will help with the investigation.

John and Todd compare this accident to a 1997 Southern Airways DC9 crash in New Hope, Georgia. In that accident the crew was able to land on a road, and the aircraft caught fire after running into obstructions near the road.

In both accidents there were survivors among the cabin crew and passengers. Todd and John encourage pilots to assess their options for making an emergency landing so they are prepared to take action if an emergency occurs.

www.socalpama.org

Central Ohio PAMA

Seven Chosen to Receive 2024 Scholarships

The COPAMA Board received scholarship applications for the 2024 training period and chose seven students to receive this year's scholarship awards. $1000.000 award winners are Sarah Martinez, Nicholas Shelton, Sierra Villalobos, Sesily Wanjema, Eric Williams and Tyler Worthington. We wish them good luck on their testing for their FAA certifications!

Columbus Airshow 2024 at Rickenbacker

COPAMA will once again volunteer a table at the STEM Tent during the Airshow, June 14-16. The US Airforce Thunderbirds will attend along with other flight groups and static displays. Tickets are on sale. Visit their website above for tickets and more information!

Youth Aviation Adventure at OSU Airport

COPAMA will help at the Event on Saturday, May 11, 2024. Youth age 12 to 18 are invited to attend to learn about aviation and the many careers available in the industry.
Visit their website for more information and to register.

www.copama.org

Transportation Safety Board of Canada | Bureau de la sécurité des transports du Canada

RUNNING on Empty

In our February–March issue we discussed the difference between fuel exhaustion and fuel starvation and how understanding the difference is critical. In this drama from Quebec, a case of fuel exhaustion results in collision with terrain.

Above: Incident aircraft on a cold, clear day.

ON THE MORNING OF 26 JULY 2023, the 2 occurrence pilots of privately registered Cessna 150B, C-GFFG met at Lachute Aerodrome (CSE4), Quebec, to conduct a daytime visual flight rules (VFR) flight. The purpose of the flight was for one pilot, who was a flight instructor, to provide instruction to the 2nd pilot on a conventional (tailwheel) airplane.

At 1014, the pilots pushed the aircraft to the fuelling station. They had planned to fuel the aircraft before departure; however, they encountered a delay because a fuel truck was replenishing the local fuel tank, so they elected to conduct the flight without adding fuel. At 1030, the incident aircraft departed CSE4 and flew to Hawkesbury Aerodrome (CNV4), Ontario, where the 2nd pilot practiced takeoffs and landings. At approximately 1130, the pilots landed and shut down the aircraft. They then took off from CNV4 about 1 hour later and headed to Alexandria Aerodrome (CNS4), Ontario.

At 1255, the aircraft arrived at CNS4, completed 2 circuits, and landed on Runway 25. It was then repositioned for takeoff on the threshold of Runway 25. At 1310:57, shortly after taking off and when the aircraft was below 200 feet above ground level (AGL), the engine experienced a momentary partial power loss. The instructor pilot, who was seated in the right seat, took control of the aircraft and performed a low-level 180° left turn to conduct an approach to Runway 07.

During the turn, the aircraft experienced 2 additional partial power losses (at 1311:05 and 1311:15). The aircraft banked steeply before re-aligning over and approximately half-way down the runway. At 1311:35, with less than 1000 feet of runway remaining, the instructor pilot reapplied power before the aircraft touched down and initiated a go-around.

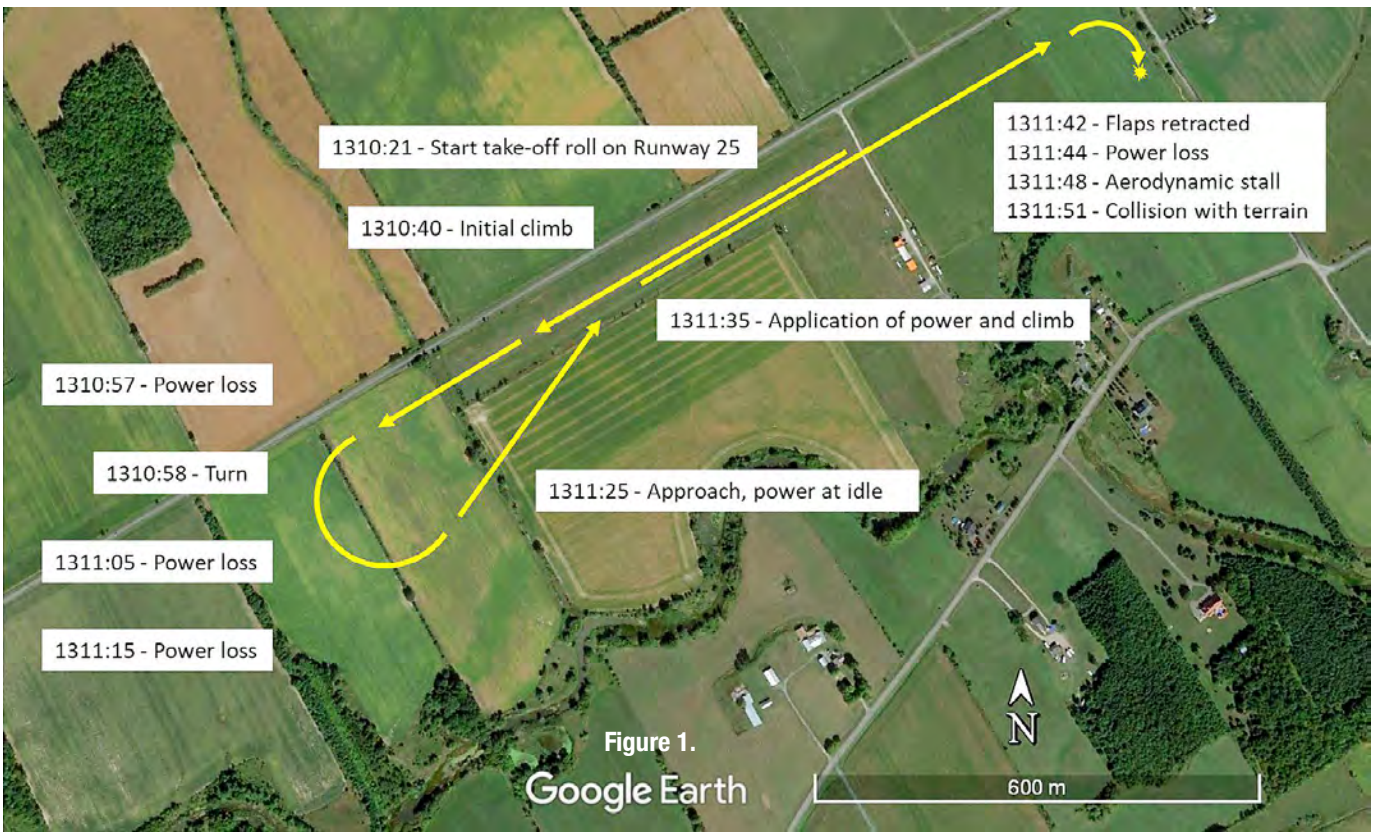


Figure 1.

Above: Sequence of events and estimated flight path at Alexandria Aerodrome. Left: Incident aircraft in flight.

At 1311:42, during the climb, when the aircraft was just below 100 feet AGL and as the airspeed fluctuated between 50 and 60 mph indicated airspeed, the flaps were retracted from the 10° position to the UP position. At 1311:44, the engine rpm decreased from 2450 to 1300 rpm. The instructor pilot began a steep right turn during which the airspeed decreased further and the bank angle increased to about 45°.

At 1311:48, the aircraft entered an aerodynamic stall, continued to roll to the right, descended in a steep nose-down attitude, and collided with terrain (Figure 1, above).

At 1311:48, the aircraft entered an aerodynamic stall, continued to roll to the right, descended in a steep nose-down attitude, and collided with terrain. The instructor pilot was fatally injured. The 2nd pilot was critically injured and was transported to the local hospital.

The aircraft was destroyed; there was no post-impact fire. The aircraft's emergency locator transmitter activated, and the signal was received by Cospas-Sarsat and the Joint Rescue Co-ordination Centre in Trenton, Ontario.

WEATHER INFORMATION

The weather was suitable for the VFR flight. At the time of the accident, and for several hours after the accident, very strong winds with gusts from the west-southwest were observed at CNS4.

PILOT INFORMATION

Both pilots held the appropriate licences and ratings to conduct the occurrence flight in accordance with existing regulations. The instructor pilot held a commercial pilot licence – aeroplane and a valid medical certificate. He also held rat-

Above: Lachute Aerodrome runway. Left: The Cessna 150B aircraft is a 2-seat, single-engine, piston aircraft with a fixed tricycle landing gear.

ings for single- and multi-engine landplanes and seaplanes. He held a Class 3 flight instructor – aeroplane rating and a Class 2 flight instructor – aeroplane – aerobatic rating. He had accumulated about 1120 total flight time hours. He also held a glider pilot licence.

The 2nd pilot held a private pilot licence – aeroplane and a valid medical certificate. He also held ratings for single-engine landplanes. The 2nd pilot had accumulated over 122 total flight time hours and 98.3 hours on the occurrence aircraft type (95.7 of those hours were on aircraft equipped with tricycle landing gear).

ACCIDENT SITE AND WRECKAGE EXAMINATION

The aircraft impacted the ground in a near-vertical, nose-down attitude and was destroyed. The aircraft systems were examined to the degree possible, and no indication of a malfunction was found. The flaps were determined to be in the UP position. There were no signs of a fuel leak or fuel contamination; 2.7 U.S. gallons of fuel remained on the aircraft. The engine was disassembled and examined. There were no signs of a catastrophic engine failure or of mechanical failure of any major engine components.

The aircraft was equipped with 4-point safety belts, each consisting of a lap strap and shoulder harness, which both pilots were wearing. The shoulder harnesses were not equipped with an inertia reel; to tighten the harness, the user had to pull down on the buckle. However, once the harness is tightened, movement of the user's arms can become restricted, and some areas of the cockpit and instrument panel could be out of reach. A video recording of the occurrence flight taken from inside the cockpit showed that the instructor pilot's shoulder harness was attached very loosely over the shoulders throughout the flight.

=Power Off= **STALLING SPEEDS** MPH=TIAS

Gross Weight 1500 lbs. / CONDITION	ANGLE OF BANK 0°	20°	40°	60°
Flaps Up	54	56	62	77
Flaps 10°	53	55	61	75
Flaps 40°	50	52	58	71

Figure 2.

The approach into Lachute Aerodrome.

AIRCRAFT INFORMATION

The Cessna 150B aircraft is a 2-seat, single-engine, piston aircraft with a fixed tricycle landing gear. The occurrence aircraft was manufactured in 1962 and was later converted to a conventional landing gear. A personal video camera was mounted on board and captured the flight from CNV4 to CNS4. The video showed the cockpit instruments and the pilots.

According to the owner's manual, the aircraft's power off stall speed with flaps at 10° is 53 mph. With flaps in the UP position, the stall speed increases to 54 mph with 0° bank, 62 mph with 40° bank, and 77 mph with 60° bank (Figure 2).

The aircraft was equipped with a stall warning system. As described in the owner's manual, [t]he stall warning indicator is an electric horn, controlled by a transmitter unit in the leading edge of the left wing. [...] In straight-ahead and turning flight, the warning horn will sound 5 to 10 MPH ahead of the stall [speed].

In this occurrence, the stall warning horn sounded as the aircraft was approaching Runway 07 at CNS4, after the low-level 180° turn; however, it did not sound before the stall and subsequent collision with terrain. The investigation could not determine why the warning horn did not sound before the accident.

FUEL CONSIDERATIONS

The aircraft owner's manual requires pilots to visually check the fuel quantity in the tanks and to confirm this amount by checking the fuel quantity indicators. More specifically, step 1(b) of the exterior inspection states, "Turn on master switch and check fuel quantity indicators" and step 4(c) states, "Remove fuel tank cap and check fuel level for agreement with gage [sic] reading. Secure cap."

A common practice is to measure the actual amount of fuel by inserting a properly calibrated fuel dip stick in each tank. The aircraft's fuel dip stick had been broken for some time and was no longer available. The investigation determined that pilots operating this aircraft rarely, if ever, used a dip stick to measure the fuel in the tanks. Instead, they either conducted a visual inspection of the fuel levels in the fuel tanks or relied on the fuel quantity indicators.

The total usable fuel for the occurrence aircraft was 22.5 U.S. gallons (11.25 U.S. gallons per tank), and the unusable fuel was 3.5 U.S. gallons (1.75 U.S. gallons per tank). The fuel quantity indicator is marked E for empty, 1/2 for half full, and F for full, with graduation marks at the 1/4 and 3/4 points. The fuel quantity indicator readings from the last flight before the day of the occurrence were estimated at 1/2 tank and slightly

below 1⁄2 tank. If these readings were accurate, this would equate to approximately 5.6 U.S. gallons in one tank and slightly less than 5.6 U.S. gallons in the other tank.

As discussed in a 2-part safety review of the Cessna 150 published in Flying in Ireland, the fuel gauges in this aircraft model have been known to be inaccurate and unreliable. In addition, the TSB has investigated previous occurrences involving inaccurate fuel gauges in aircraft with similar gauges.

In this occurrence, the recorded video from the personal video camera showed that the fuel quantity indicators displayed similar indications at 1236 when the aircraft departed CNV4, and at 1311, just before the accident. For a daytime VFR flight, the Canadian Aviation Regulations require that the aircraft carries sufficient fuel "to fly to the destination aerodrome and then to fly for a period of 30 minutes at normal cruising speed."

The aircraft was not refuelled before the occurrence and had only the remaining fuel from the previous flight on board.

Post-occurrence fuel calculations indicate that, given the weight of the occupants and cargo on board, the aircraft was likely overweight by as much as 69 pounds at the time of departure from CSE4. The estimated fuel at the time of departure from CSE4 likely would not have been sufficient to complete the flights that were conducted, not to mention maintaining a 30-minute reserve.

Typical Cessna 150 cockpit.

AERODYNAMIC STALL IN A TURN

An aerodynamic stall occurs when the wing's angle of attack exceeds the critical angle at which the airflow begins to separate from the wing. The speed at which a stall occurs is related to the load factor of the manoeuvre being performed. The load factor is defined as the ratio of the aerodynamic load acting on the wings to the aircraft's gross weight and represents a measure of the stress (or load) on the structure of the aircraft.

In straight and level flight, lift is equal to weight. In a banked level turn, however, greater lift is required. It can be achieved, in part, by increasing the angle of attack (by pulling back on the stick/elevator control), which increases the load factor. As the load factor increases with bank angle, there is a corresponding increase in the speed at which the stall occurs. A stall from a steep bank angle (greater than 30°) can result in one wing stalling before the other, leading to a spin and the aircraft rapidly losing altitude.

ENGINE FAILURE OR PARTIAL POWER LOSS AFTER TAKEOFF

The 1962 Cessna 150B Owner's Manual did not include an emergency procedures section. In 1970, an emergency procedures section was added to the owner's manual and included a procedure for an Emergency Landing Without Engine Power. In 1975, the section was amended with a procedure for an Engine Failure After Take-Off that stated the following:

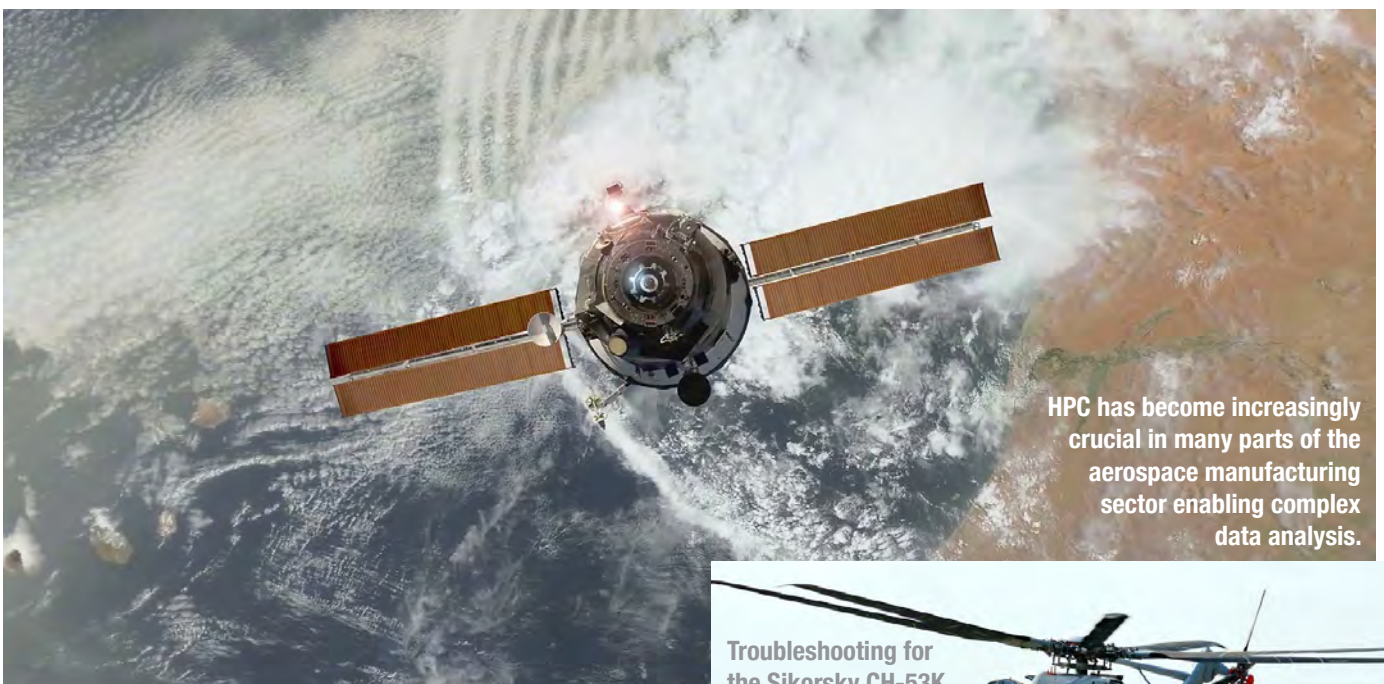
In this occurrence, the instructor pilot increased the angle of bank significantly in the direction of the runway after losing engine power shortly after takeoff. Many fatal accidents have resulted from pilots attempting this manoeuvre, which often leads to a stall or loss of control at low altitude when trying to realign the aircraft with the runway. When faced with an immediate need to land due to a mechanical issue during takeoff, pilots must decide between a forced landing, potentially in an unsuitable location with risks of aircraft damage and personal injury, or attempting a 180° turn back to the departure point.

SAFETY MESSAGES

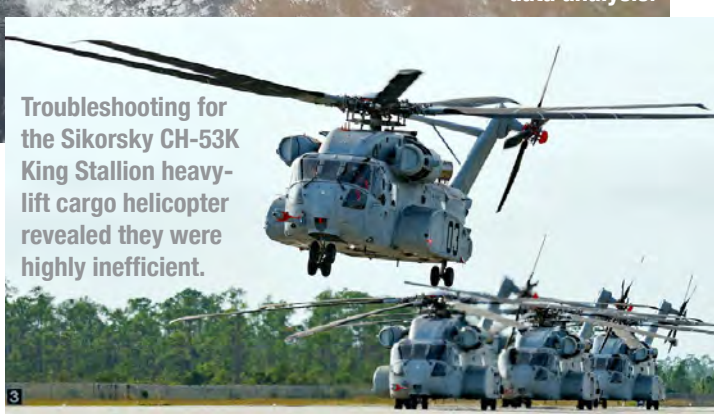
Pilots are reminded to ensure there is sufficient fuel on board, including reserves, for their intended flight, and to continuously monitor fuel levels during the flight. It is important that pilots have pre-departure plans for handling emergencies such as an engine failure during takeoff. These plans should consider factors such as pilot experience, terrain, altitude, glide ratio, wind conditions, and available landing options. ■

(These were excerpts from the Transportation Safety Board of Canada's investigation into this occurrence. The Board authorized the release of this report on 28 February 2024. It was officially released on 06 March 2024.)

On the following pages, four authoritative voices weigh in on a variety of topics now affecting the aerospace industry as a whole



HPC has become increasingly crucial in many parts of the aerospace manufacturing sector enabling complex data analysis.



Troubleshooting for the Sikorsky CH-53K King Stallion heavy-lift cargo helicopter revealed they were highly inefficient.

FAST THINKING

By Owen Thomas

How the aviation sector will continue to innovate as Moore's Law nears an end.

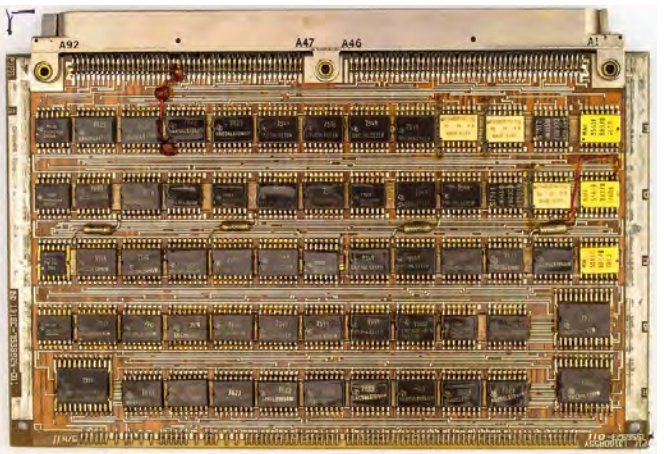
HIGH-PERFORMANCE COMPUTING (HPC), has become increasingly crucial in many parts of the aerospace manufacturing sector, enabling complex data analysis, simulating intricate processes, and optimizing modelling and testing. For example, modelling aerodynamics in aircraft wing design, or innovating with materials in ballistics. While immensely powerful, HPC faces several challenges as it responds to exponential demands for computational power. With the gradual lapsing of Moore's Law, various sectors will continue to thrive as HPC invariably moves to the cloud.

Moore's Law is a theory formulated by Gordon Moore, who in 1965 predicted that the number of transistors placed on a single square inch of an integrated circuit chip would double every two years, leading to exponential increases in computing power. It has had profound implications for the development of HPC and the evolution of cloud computing more generally, reshaping the landscape of modern technology.

It is now well recognized that Moore's Law is nearing its end, because of the physical limits to compressing processing power onto ever smaller chips reaches its limit. Since Moore's Law, there has been about a trillion-fold increase in computing power used in predictive models. To improve these high-performance models further, we need ever greater computing power. But, with increasing costs and shrinking space available for the growing number of semiconductor chips involved in HPC computation, all sectors face a new dilemma.

HPC IN PRACTICE

It's true that HPC, often aligned with AI and machine to machine (M2M) communications has found its way onto the battlefield with ruggedized platforms processing petabytes of data from satellite or unmanned aerial vehicles (UAVs) for geospatial intelligence and mapping large areas. Like-



The rapid evolution of semiconductor technology has spurred innovation in cloud services.

wise, computer on module standard HPC (COM-HPC) can increase the functionality of edge computing in command and control environments and communications. However, it's not just edge computing that's utilizing HPC, it's within engineering and manufacturing that it continues to supply modelling for enhancements in aerospace, at sea, and on-the-ground innovation.

As Dr. Roy Campbell, chief strategist for the US Department of Defense high performance computing modernization program (HPCMP) says, "Removing bad designs and refining good ones early through virtual testing saves an extraordinary amount of time and money." He notes that troubleshooting for the Sikorsky CH-53K King Stallion heavy-lift cargo helicopter revealed they were highly inefficient whenever they flew near the ground, because the helicopters were at low altitudes, engine exhaust was looping back into the engine and straining them. He suggested that the troubleshooting exercise probably saved more than $100M in testing.

HPC enables businesses across aerospace manufacturing industries to capitalize innovation, boost productivity, and maintain competitive advantage. Leveraging advanced technologies like cloud supercomputing, artificial intelligence, machine learning, and big data analysis, companies can craft products and services of greater value. For aerospace, HPC enables complex simulations and modelling, structural mechanics, and fluid dynamics, with detailed analyses of performance, including airflow patterns, stress distribution, and fuel efficiency.

The scalability and cost-effectiveness driven by Moore's Law has significantly influenced the development of cloud computing. The ability to pack more transistors onto a chip has led to more powerful and affordable hardware, making it feasible for cloud service providers to offer robust computing resources at a lower cost whereby cloud computing leverages the principles of virtualization and on-demand resource allocation. The technologies and innovation sitting behind Moore's Law have empowered cloud providers to continually enhance their infrastructure, providing suppliers to the defence sector with the ability to scale up or down as needed.

Meanwhile, the rapid evolution of semiconductor technology has spurred innovation in cloud services. Cloud providers can leverage the latest hardware advancements to offer new and improved services to their users. This continuous cycle of innovation enhances the agility of cloud platforms, allowing them to adapt to changing technological landscapes. While growth of HPC and the Cloud aligns with Moore's predictions, it faces challenges such as physical limitations and the diminishing returns of miniaturization. As transistors approach atomic scales, alternative technologies such as quantum computing may become necessary for sustaining the pace of progress.

THE IMPLICATIONS OF MOORE'S LAW

At one level, we could be forgiven for thinking that we are close to reaching the limits in available computational power. But actually, that's not the case, indeed the Cloud will continue to be the principal catalyst for HPC's growing impact across all sectors, so long as industry works smarter with the tools available to improve efficiencies and outcomes. Much of that will be down to training, and much also down to funding. Crucially, it's about understanding where the true power lies, where petabytes of data are processed in milliseconds. Over time needs will evolve, as does the nature of support required. What is critical, however, is that as the manufacturing sectors evolve with HPC in extracting the maximum benefits. ■

(Owen Thomas is the founder of Red Oak Consulting, a firm that focuses solely on HPC & Cloud services.)

THINKING AHEAD

With its global aviation support business flying high, Artemis Aerospace is expanding stateside. Here's why the company believes it's the right time to go west.

ACCORDING TO THE AIRPORTS COUNCIL INTERNATIONAL, the aviation industry is predicted to recover fully from the effects of COVID-19 in 2024, with passenger traffic estimated to reach 9.4 billion passengers. A report pro-

duced by IATA earlier in the year states that the demand for air travel is expected to double by 2040, growing at an annual average rate of 3.4 percent. It's an impressive show of resilience in an industry which ground to an almost complete halt during the pandemic.

North America has made a strong recovery so far. The International Air Transport Association's June 2023 report 'Global Outlook for Air Transport' says it's the stand-out region in terms of financial performance; it was the first market to return to profitability in 2022. With the demand for air travel remaining high, it's expected, by the end of 2023, to improve on this still further with an estimated net profit of US$11.5 billion.

The aviation industry is a generous contributor to the US economy. A new economic study released earlier this year by the National Association of State Aviation Officials (NASAO), the Alliance for Aviation Across America (AAAA), and the American Association of State and Highway Transportation Officials (AASHTO) found that aviation in the USA supports over 1.1 million jobs and has an economic impact of over $246 billion every year; there are more than 4,800 public airports, 3,383 fixed-base operators, 4,144 repair stations, over 2,200 charter companies and 643 flight training operations.

With this resounding vote of confidence in American aviation and after a great deal of research, UK-based Artemis Aerospace made the decision a few months ago to open two new hubs stateside, one in Miami, Florida, and another in Los Angeles, California. "We were finding that our multi-discipline business, including component supplies, component repairs, lessor support, flight simulation hardware support, consignment stock management and global aircraft logistics was handling a rapidly increasing amount of work in the US, and this seemed a natural extension to our service," said Artemis's managing director Jim Scott, who adds that for his company these hubs work to streamline orders and deliveries, making for faster service, and also enable the establishment of banking facilities for US customers. ■

(Artemis Aerospace consults in all aspects of aviation logistics, import and export control, hazardous goods regulations, and customs procedures.)

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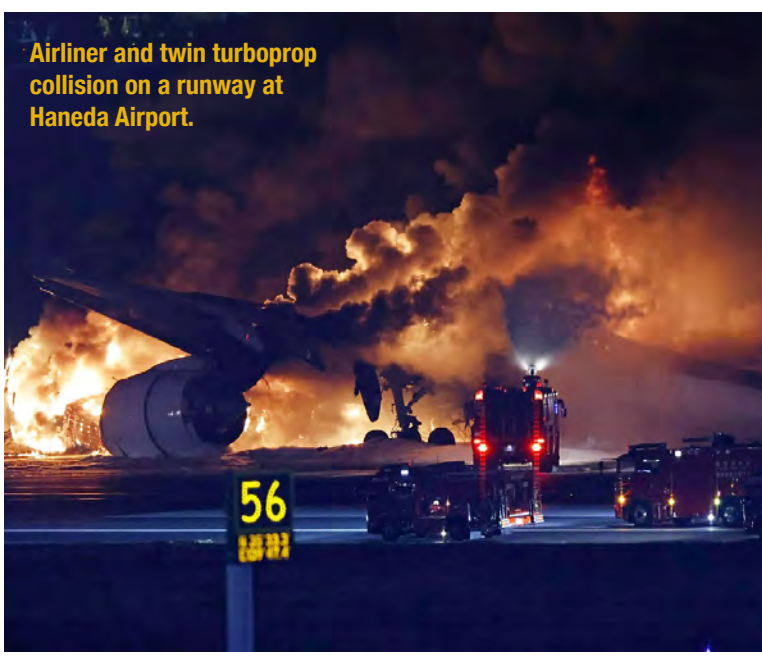

Airliner and twin turboprop collision on a runway at Haneda Airport.

THINKING THROUGH THE NUMBERS

By Global Aerospace Editorial Team

Are aviation safety efforts having an effect? This editorial draws a positive conclusion.

AVIATION AROUND THE WORLD is experiencing a period of unprecedented safety. In the US alone, there has not been a mass-casualty plane crash since 2009. That statistic is even more impressive given that there have been many incidents in

A key aviation safety factor is that time in aircraft type is decreasing for pilots and maintenance crews.

the last 15 years that could have resulted in significant injuries and loss of life. In the first week of January 2024, two potentially catastrophic events occurred.

On January 2, an airliner and a twin turboprop collided on a runway at Haneda Airport in Tokyo.

Tragically, five of the six crew on the turboprop died in the accident. Fortunately, all 367 passengers and 12 crew on the airliner survived, thanks to several factors. One was the rigorous crew training that enabled a rapid, well-coordinated aircraft evacuation. Passengers refrained from panicking, followed instructions to leave their belongings behind and exited in an orderly fashion. Industry insiders are suggesting the aircraft's advanced design and materials, which allowed more time for evacuation, also helped prevent a catastrophe.

Much has been written about the many challenges aviation faces today. One of the more urgent issues is a lack of workforce across the entire aviation system. Hiring and retention struggles are affecting ATC, flight operations, manufacturing output, ground handling, aircraft movement, FBOs, MROs, international service providers, fuel vendors and other specialties.

A "talent vacuum" exists due to the high rate of turnover. "Time in aircraft type" is decreasing for pilots and maintenance crews – many of whom have only been hired in the past five years, meaning much less experienced personnel in general are now handling critical tasks.

Other challenges include, global passenger congestion, supply chain uncertainty, the escalating costs of parts, jet fuel and oil prices, and rapidly evolving airspace restrictions with conflicts like the wars in Ukraine, Sudan, and Israel forcing aircraft operators to rethink and revise flight plans.

What bears consideration is how these growing issues potentially offset advances in safety practices. While airline incidents typically make front-page news, the business aviation sector also faces similar difficulties, such as complacency around safety fundamentals, lack of adherence to Safety Management Software programs, and reduced oversight on vendor and service providers.

AVIATION SAFETY: STAYING AHEAD OF RISING RISKS

Despite the recent incidents and the increased stressors, aviation remains the safest mode of transportation. As International Air Transport Association (IATA) Director General Willie Walsh noted in the organization's March 2023 Airline Safety Performance report: "Accidents are rare in aviation. There were five fatal accidents among 32.2 million flights in 2022. That tells us that flying is among the safest activities in which a person can engage. But even though the risk of flying is exceptionally low, it is not risk-free.

Careful analysis of the trends that are emerging even at these very high levels of safety is what will make flying even safer. This year's report, for example, tells us that we need to make some special efforts on turboprop operations in Africa and Latin America. Safety is aviation's highest priority, and our goal is to have every flight take off and land safely regardless of region or aircraft type."

Are technological innovations and strategies designed to improve safety having an effect? The data supports this conclusion. Aviation stakeholders are continually innovating in countless ways, from new products to enhanced procedures, including:

1. Improved monitoring and warning systems

2. Satellite-based communications systems supporting Air Traffic Management Systems
3. Autonomous technologies
4. Advanced materials, such as lightweight carbon composites
5. Robust crew training and positive safety culture
6. Open exchange of safety data amongst airline and business aviation operators to improve processes

Another driver of increased safety is the work of the Commercial Aviation Safety Team (CAST). It focuses on operations in the U.S. but encourages government and industry partnerships worldwide and works with regional safety teams to improve safety through solutions tailored to region-specific challenges and goals. According to the FAA website: "CAST's work, along with new aircraft, regulations, and other activities, has virtually eliminated the traditional common causes of commercial accidents – controlled flight into terrain, weather, wind shear, and failure to complete checklists. As a result, the fatality risk for commercial aviation in the United States fell 83 percent from 1998 to 2008. CAST aims to reduce the U.S. commercial fatality risk by another 50 percent between 2010 and 2025." ■

(Global Aerospace provides aviation insurance worldwide.)

BRIGHT IDEAS

By John Fogel

Navigating aircraft lighting upgrades with cost-effectiveness in mind.

IN THE WORLD OF AVIATION MAINTENANCE, every decision counts, especially when it comes to upgrading older aircrafts with new lighting. From outfitting older fleets with halogen lights for landing and taxi to the choice of xenon for navigation lights or making the leap to LED, exterior lighting requires aircraft maintenance professionals to prioritize not only efficiency and cost-effectiveness but also adherence to industry standards. They must weigh the benefits against the costs to make informed decisions.

Management often grapples with the dilemma of selecting the most suitable lighting solutions while minimizing downtime and expenses. Keeping fleets up and running with cost effective lighting solutions is a key driver to meeting cost and performance goals. The process involves taking a cost-benefit analysis as well as meticulous research of the diverse options available. Let us delve deeper into the key considerations and options available for selecting safe, reliable aircraft lighting that meets government and industry standards.

One option in the search for quality aircraft lighting is purchasing products through an OEM's Illustrated Parts Catalogue (IPC). The IPC offers the assurance of meeting stringent specifications aligned with the aircraft's original equipment manufacturer (OEM) standards. This guarantees compatibility and reliability, both essential factors in aviation safety. By referring to catalogues such as a Boeing IPC or Airbus IPC, aircraft operators can confidently select lighting products endorsed by the OEM.

While the IPC route provides a stamp of authenticity, it is essential to acknowledge that it may not always be the most cost-effective option. OEM products can come with a price tag that warrants further research into other alternatives for the cost-conscious maintenance professional.

The other viable option for lighting products is with the FAA's Parts Manufacturer Approval (PMA), a compelling alternative. These FAA-approved parts undergo rigorous testing to ensure compliance with industry standards. From halogen to xenon and LED lighting, PMA-certified products provide a spectrum of options catering to diverse aircraft needs. These products are worth serious consideration as they meet the safety criteria as well as can be priced more affordably.

One of the primary advantages of PMA-certified parts lies in their affordability without compromising on quality. Manufacturers adhere to strict guidelines set by the FAA, encompassing design, testing and quality control processes. This entails comprehensive testing, including voltage-wattage assessments, vibration analysis, and photometric evaluations, ensuring optimal performance under varying conditions. Moreover, PMA products undergo other stringent quality control measures, including statistical process control (SPC) tests, to guarantee reliability and consistency. In adhering to established protocols and submitting comprehensive documentation to the FAA, lighting parts manufacturers demonstrate their commitment to quality and safety.

In addition, PMA products may leverage proprietary processes, resulting in enhanced durability, superior quality and extended lamp life. These innovations underscore the commitment of manufacturers to deliver cutting-edge solutions that redefine industry benchmarks. Through harnessing advanced technologies and manufacturing methodologies, PMA products offer a compelling value proposition for aircraft maintenance management professionals seeking optimal performance and longevity. ■

(John Fogel is Product Manager at Amglo, a manufacturer of specialty lamps since 1935.)

Aviation Services

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FAA: Boeing must mature its Safety Management System

The Federal Aviation Administration has halted production expansion of the 737 MAX and given Boeing 90 days to develop some kind of plan.

FAA Administrator, Mike Whitaker

THE FEDERAL AVIATION ADMINISTRATION (FAA)'S SIX-WEEK AUDIT of Boeing and Spirit AeroSystems, prompted by the door plug incident involving a new, Boeing 737-9 MAX aircraft, found multiple instances where the companies allegedly failed to comply with manufacturing quality control requirements. The FAA identified non-compliance issues in Boeing's manufacturing process control, parts handling and storage, and product control. The FAA is providing these details to the public as an update to the agency's ongoing investigation. The audit is one of the immediate oversight actions the FAA took after a left mid-cabin door plug blew out of Alaska Airlines Flight 1282 on January 5 while in flight.

During an all-day safety discussion at FAA Headquarters in late February, FAA Administrator Mike Whitaker informed top Boeing officials that the aircraft manufacturer must develop a comprehensive action plan to address its systemic quality-control issues to meet FAA's non-negotiable safety standards.

"Boeing must commit to real and profound improvements," Whitaker said following the meeting with Boeing Chief Executive Officer and President Dave Calhoun and his senior safety team. "Making foundational change will require a sustained effort from Boeing's leadership, and we are going to hold them accountable every step of the way, with mutually understood milestones and expectations."

Whitaker told Boeing that he expects the company to provide the FAA a comprehensive action plan within 90 days that will incorporate the forthcoming results of the FAA production-line audit and the latest findings from the expert review panel report, which was required by the Aircraft Certification, Safety, and Accountability Act of 2020.

The plan must also include steps Boeing will take to mature its Safety Management System (SMS) program, which it committed to in 2019. Boeing also must integrate its SMS program with a Quality Management System, which will ensure the same level of rigour and oversight is applied to the company's suppliers and create a measurable, systemic shift in manufacturing quality control.

"Boeing must take a fresh look at every aspect of their quality-control process and ensure that safety is the company's guiding principle," Whitaker said.

The plan must also address the findings from the expert review panel report that examined Boeing's safety culture. To hold Boeing accountable for its production quality issues, the FAA has halted production expansion of the Boeing 737 MAX, is exploring the use of a third party to conduct independent reviews of quality systems, and will continue its increased onsite presence at Boeing's facility in Renton, Washington, and Spirit AeroSystems' facility in Wichita, Kansas.

The FAA will thoroughly review all of Boeing's corrective actions to determine if they fully address the FAA's findings. ■

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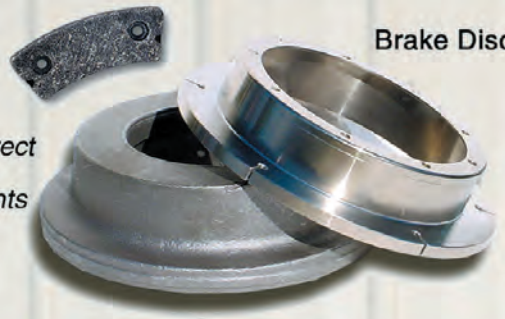

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