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AirMaintenance UPDATE

The Magazine for Aircraft Maintenance Professionals

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INDUSTRY AFFAIRS

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X-Plane development enters next stage

Test operations seek to validate the stability and control of the stop fold vehicle during jet transition.

BELL TEXTRON reported in December 2024 that it has completed wind tunnel testing at the National Institute for Aviation Research at Wichita State University in support of the DARPA Speed and Runway Independent Technology (SPRINT) program. This test phase follows successful evaluation of the Stop/Fold rotor system using the Holloman High Speed Test Track (HHSTT) in New Mexico in 2023.

Building upon the previous folding rotor testing, the wind tunnel program validated the stability and control of the aircraft through the rotor fold and unfold sequence in flight. Together, these two critical risk reduction tests suggest the concept is ready to move ahead into a flight demonstration as part of the DARPA SPRINT program, which is currently in Phase 1B. The scalable Stop/Fold configurations program intends to build experimental aircraft (X-Planes) offering a combination of "aircraft speed and runway independence."

The ability to use available runways for maximum payload and range, along with robust vertical lift, will theoretically result in aircraft that can operate from nearly any location—including environments with limited runways and vast distances. These X-Planes could theoretically provide the essential speed and range to meet numerous mission demands. ■

— John Campbell, Editor

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Features

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Upcoming Events

Charles Taylor Award: "From Tricycles to Turboprops"

StandardAero's **Jim Williams**, (above) an Airframe and Powerplant mechanic with five decades of service, has been named the 2024 recipient of the Federal Aviation Administration's Charles Taylor Master Mechanic Award. This prestigious award recognizes Williams' lifelong dedication to safety and excellence in aviation. A trusted figure at StandardAero's Houston Center of Excellence at George Bush Intercontinental Airport (IAH), his expertise and mentorship have left a lasting impact on his colleagues and the industry.

Williams' aviation journey began early. Inspired by his father, an aircraft mechanic for Trans-Texas Airways, he found himself surrounded by tools, engines, and a curiosity that would shape his career. Williams recalls that he was always mechanically inclined, having grown up playing with his dad's rivet guns, and taking apart and fixing his tricycle just to inspect it.

After graduating from Texas State Technical Institute in 1973, Williams began his career with a passion for hands-on learning, working on Cessna planes and small aircraft at Seaback Aviation. Over time, his skill and dedication drew him to StandardAero, where he found not only a job but a long-standing community. In Williams' words, he knew he was where he belonged as soon as he stepped into the engine shop.

During the award ceremony, Michael Mandelski, Director of Operations at Houston, praised Williams' legacy and skills. Mandelski highlighted Williams' mechanical skills, integrity, and attention to detail, as well as the many mechanics he has trained over the years, including StandardAero Houston's VP/GM Pete VanDolzer.

The journey to the Charles Taylor Master Mechanic Award requires more than skill. Honourees must have an FAA or CAA mechanic certification, 50 years of maintenance experience, and certification in good standing. For Williams, this award is a culmination of a career rich with lessons learned on tricycle repairs and honed on turboprop engines. Through countless responsibilities at StandardAero, he has traveled, mentored, and inspired those around him, even briefly holding a private pilot's license, which he earned to better understand the pilots he assisted. ✪

COMING EVENTS

2025 Buckeye Air Fare
February 14-16, 2025
Buckeye, Arizona
www.buckeyeaz.gov

Verticon
March 11-13, 2025
Dallas, Texas
hwww.verticon.org

Yuma Air Show
March 15, 2025
Yuma, Arizona
www.yumaairshow.com

California Capital Airshow
March 22-23, 2025
Sacramento, California
www.californiacapitalairshow.com

Aeromart Montreal 2025
March 25-27, 2025
Montreal, Quebec
www.theoac.ca

Sun 'n' Fun Aerospace Expo
April 1-6, 2025
Lakeland, Florida
www.flysnf.org

MRO Americas
April 8-10, 2025
Atlanta, Georgia
mroamericas.aviationweek.com

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Carbon props serve outback ops

Hartzell's new, lightweight three-blade Carbon Voyager propellers have received Supplemental Type Certificate approval for the Cessna Skywagon fleet. They are now available for Cessna 180, 182, 185, 206, and T206 single-engine aircraft equipped with Continental 470-50, 520, and 550 engines. Propeller diameters range from 80 to 86 inches, depending on the application. The 54-pound Carbon Voyager is said to be 20.8 pounds lighter than its metal counterpart. The blades are certified for unlimited life and are specifically engineered to withstand the rigours of backcountry, off-airport operations. **www.hartzellaviation.com**

Garmin retrofits for Citation CJ2

Owners of Cessna Citation CJ2s can now update their aircraft with an all Garmin retrofit: the more modern, faster, sharper TXi flight displays. The TXi EIS integrates with your turbofan engines to help reduce pilot workload, while a GFC 600 autopilot adds safety features and fully-coupled vertical navigation (VNAV) capabilities. There's also a state-of-the-art weather radar that automatically adjusts scans to help you better understand weather activity along your route. Garmin says modernizing the aircraft will increase its reliability, reduce avionics maintenance concerns and can extend the life of the airframe. **www.garmin.com**

Handy pliers reach tight places

Vampire Tools says that according to its current sales report one of the tools aircraft mechanics frequently purchase is the company's VamPLIERS VT-001-7LN long nose screw extraction pliers. These multipurpose pliers are designed to remove small-sized stripped, damaged, rusted or stuck screws and stubborn fasteners in hard-to-reach spaces. They are particularly effective on specialty screws, including Security, Dome, Truss, Torx, or Pan head screws, ranging from 0.08 to 0.22 inch (2 to 5.5 mm) in size. The intermeshed teeth are designed to ensure a secure grip on thin plates. **www.vampiretools.com**

Boom light reaches dark spaces

Milwaukee Tool's M18 Magnetic extendable boom light extends light into hard-to-reach places during tight applications. It delivers 2,500 Lumens of TRUEVIEW High-Definition Output and features three modes. It's designed with two articulating arms and three swivel points for 900 degrees of vertical rotation and 890 degrees of horizontal rotation. The light's carrying handle also functions as a release mechanism for the strong magnetic base providing fast and secure adjustments to ferrous surfaces. The light comes with a protective storage boot that consists of 2mm thick, tear resistant and chemical resistant rubber. **www.milwaukeetool.ca**

Tow cart services multiple aircraft

Flightmaster's cowl-thrust reverse tow cart is designed and field tested with input received from flight line mechanics. Its seven-gallon capacity reduces the number of refills required during a shift and allows servicing of multiple aircraft. The tubular steel frame construction is powder coated and there are large pneumatic wheels for easy towing. Appropriate hose end couplers are included for servicing either Boeing or Airbus aircraft. The cowl cart incudes a pre-set pressure relief valve to prevent over-pressurization, and there's an extra large 10 micron filter in a heavy duty filter housing. **www.fluidtran.com**

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

CAE TRAINING CENTRE UP AND RUNNING

During January, aviation training firm CAE inaugurated its first Air Traffic Services Training Centre on its campus in Montreal. CAE trains civil aviation pilots, aircraft maintenance technicians, and cabin crew worldwide. Last October, CAE started partnering in the training of air traffic controllers and flight service specialists with NAV CANADA. The first students began their training at the new facility in October 2024, with CAE aiming to train approximately 500 air traffic professionals by 2028. NAV CANADA will continue to deliver basic training, all specialty courses, and on-the-job training, with the latter part of Air Traffic Services training solely offered by NAV CANADA.

BANYAN AIR EXPANDS PILATUS SERVICE

Florida-based Banyan Air Service has added the PC-24 to its existing Pilatus Satellite Service Center. In addition, Banyan has expanded its Pilatus PC-12 services to the newly established MRO facility at St. Augustine Airport (SGJ) in North Florida. This expansion is highlighted by the successful completion of the first PC-12 annual inspection at the SGJ location. The St. Augustine facility was launched in response to increased demand for Banyan's HondaJet MRO services. The state-of-the-art facility is equipped to handle inspections, modifications, avionics upgrades, and AOG support. This expansion also creates new employment opportunities for aviation professionals in North Florida.

SCANDINAVIAN FLYER DOMINATES ON-TIME RANKINGS

SAS achieved a punctuality rate of 81.4 percent in 2024, ranking as the second most punctual among Europe's major airlines (following Iberia Group) and securing a position in the global top 10 for on-time performance. By minimizing delays, SAS reduces unnecessary fuel consumption, contributing to more efficient and responsible operations. The on-time performance data comes from aviation analytics provider Cirium. As a member of the SkyTeam alliance, SAS shares this achievement alongside its partners, and SkyTeam members dominate the rankings with Aeromexico taking the Number One spot, followed by Saudia and Delta Air Lines in second and third place respectively.

NEW LAB WILL FOCUS ON SAF CONTAMINATION

UK researcher Conidia Bioscience has opened a new laboratory dedicated to fuel contamination testing at Surrey Research Park in England. Work there will focus on the evolving needs of the aviation fuel industry, particularly supporting the deployment of sustainable aviation fuels. As the aviation in-

dustry shifts towards SAF, new challenges arise, particularly in managing microbial contamination. Biofuels have a propensity to attract more water than traditional fossil fuels, providing an ideal environment for microbial growth, which can lead to fuel system blockages, corrosion, and compromised fuel quality. Conidia has invested heavily in people, facilities, equipment, and new product development to address these challenges.

RELAUNCHED CIRRUS APP FEATURES AR

Cirrus announced in January that it has relaunched its Cirrus Approach app, a digital mobile tool for flight training in Cirrus aircraft. The Cirrus Approach app offers mobile access to training courses, student progress tracking and essential flight instruction tools—all optimized for Apple iPad devices. One of the key features of the relaunch is the integration of state-of-the-art Augmented Reality technology for pre-flight training, with which users can master crucial pre-flight procedures and safety checks specific to the SR Series and Vision Jet. This realistic virtual experience is designed to prepare pilots for real-world operations.

GULFSTREAM FACILITY HITS OUT MILESTONE MARK

Gulfstream Aerospace reports it has now manufactured its 1,000th aircraft wing since bringing production to its Savannah-based manufacturing facility in 2012. All wings for the Gulfstream G800, G700, G650ER, G600, G500 and G400 are produced at the company's headquarters in Savannah. The 1,000th wing shipset will be installed on a G600. Gulfstream developed its next generation fleet building on the innovations introduced with the G650 along with purpose-built production facilities. In 2022, Gulfstream announced the expansion of its wing production facility as well as an expansion of G600, G500 and G400 manufacturing.

MTOM BOOST FOR DIAMOND AIRCRAFT

Diamond Aircraft has made what it calls "a significant enhancement to the DA62 MPP" as the maximum takeoff mass (MTOM) of the DA62 MPP has been increased 2.360 kg, marking a major milestone in the aircraft's operational capabilities. This enhancement allows for greater payload capacity, enabling operators to carry more fuel or equipment, thereby improving operational efficiency and profitability. The DA62 MPP offers simple handling, an excellent safety record, Jet-A fueled diesel engines, and a low noise and IR signature due to the on-top exhaust system. The DA62 MPP with the new MTOM is now available for order.

HARBOUR AIR NOW ON WHEELS

Vancouver-based seaplane operator Harbour Air has now debuted its first-ever wheeled flight between Vancouver and Victoria International airports. This new service provides travellers with an additional three daily round-trip flights Monday-Friday, and early morning and late evening flights starting from just $99 one-way. With the addition of wheeled aircraft, Harbour Air is responding to increased market demand from local and business travellers for early morning and late evening flights outside of daylight hours. The airline has converted two 19-seat Twin Otter aircraft to have wheels and de-icing equipment installed, which will enable flying during inclement weather conditions thereby improving reliability. ■

Toward A Quieter Place

This year, Amsterdam's Schiphol Airport will introduce a significant rate hike for noisy aircraft. The implications for the entire industry could be profound. Morningstar DBRS comments.

Amsterdam Airport Schiphol announced it will raise its airport charges by 41 percent in 2025.

ON **OCTOBER 31, 2024,** Amsterdam Airport Schiphol, the third largest European airport by passenger volume in 2023, announced it will raise its airport charges by 41 percent in 2025. The new charges will penalize older, noisier aircrafts and make it significantly more expensive to fly at night. Under this new pricing system, night flights will become approximately three to six times more expensive than a daytime flight, depending on the aircraft type. The airport has a major five-year investment plan of EUR 6 billion, and the incremental revenue earned from the higher fees will presumably supplement much-needed funding for further investment in the Airport's infrastructure.

The airport's largest client, KLM Royal Dutch Airlines—which contributes most of the passenger volumes through AMS—responded on the same day, saying that the hike in fees will make flying to and from AMS more expensive in the coming years, when compared with Paris-Charles de Gaulle and Copenhagen Airports. KLM added that it is unreasonable to place the costs of all setbacks including the coronavirus pandemic entirely on airlines, and it is unwise to undermine AMS's own competitiveness as an international hub. However, from AMS's perspective, while the rate hike is substantial, it has not been pushed to the fullest extent: AMS voluntarily shaved EUR 100 million in additional fees from being passed down to airlines in order to keep charges as low as possible without compromising the airport's operations.

We here at Morningstar DBRS view this rate hike as the culmination of a series of events centered around governmental effort to reduce noise pollution. It also illustrates how tightened environmental regulation could affect the industry and potentially increase the operational rigidity of an airport. Large international hubs, such as AMS, may be relatively well positioned to pass on incremental costs to airlines and thereby play an active role in promoting sustainability.

KLM is Amsterdam Airport Schiphol's largest client.

Turmoil caused by environmental objectives

AMS is located nine kilometres southwest of Amsterdam and is majority-owned by governments, including the Dutch State (69.77 percent), the Municipality of Amsterdam (20.03 percent), and the Municipality of Rotterdam (2.20 percent). Both the Dutch State and the Municipality of Amsterdam are committed to fighting climate change through increased sustainability efforts. They have set out ambitious plans to cut carbon emissions (by around 50 percent in 2030 compared with 1990 levels).

Noise pollution is another major battlefield with local environmentalists. The governments have stated their aim to reduce noise impact near AMS by 20 percent throughout the day and by 15 percent at night, as soon as possible. A passenger cap was introduced at AMS for the summer of 2023, driven by the desire to reduce noise pollution. The maximum number of aircraft movements was set at around 450,000 or 10 percent less than the 2019 levels.

Of note, during H1 2024, AMS registered a total of 258,059 flights, which is already more than half of such cap. And, according to the latest forecast in the May 2024 update by Airports Council International (ACI), total European air passenger volume in 2024 will surpass 2019 levels by 3.2 percent, representing a significant improvement compared with its October 2023 forecast (+1.4 percent). So this artificial cap would likely result in flights being pushed away and the Airport being unable to fully recover its traffic volumes to pre-coronavirus pandemic levels, let alone allowing any future growth.

Airlines and Government battle in Court

Expectedly, this capping policy drew much criticism from airlines, which brought the matter to court. In April 2023, the District Court of Noord-Holland (the district court) found that the Dutch State had not followed the correct EU regulation to take a balanced approach to noise and carbon mitigation. Then, in June 2023, KLM submitted to the Ministry of Infrastructure & Water Management an alternative action plan to achieve the government's noise reduction targets by 2026, focusing on investing EUR 6 billion to EUR 7 billion in cleaner and quieter aircrafts, smarter flight processes, and adjusting flight schedules.

Nevertheless, the state appealed, and the ruling of the district court was overturned by the Amsterdam Appeal Court, in July 2023. In November 2023, facing pressure from the US government threatening retaliation, the Dutch State backed off from its original plan to continue capping the number of flights at AMS for the summer of 2024. This was considered a victory for the airlines; although, the Dutch infrastructure minister's letter to the parliament said the cabinet would continue to pursue such plans.

To further complicate matters in March 2024, the Dutch State lost a lawsuit to a foundation advocating for the right to protection against noise nuisance from air traffic. It was ruled that the Dutch State had not sufficiently protected the interests of people living near AMS in recent years. However, when the new right-wing coalition government was sworn into office in July 2024, the feared capping policy was no longer under consideration. On July 12, 2024, the Supreme Court in the Netherlands upheld the original decision from the district court, stating that the "experimental regulation" to reduce the airport's capacity was not in compliance with the EU regulation to take a balanced approach to noise management and therefore unlawful.

Rate hike to fuel future growth

The new Dutch government seems willing to take a more balanced approach and generally adopt the action plan proposed by KLM. In December 2023, KLM started adding new A320neo aircrafts to its fleet, which is expected to offer a 50 percent

reduction in noise levels as well as a 15 percent reduction in fuel consumption and carbon dioxide emissions. The overall target of KLM's action plan is to lower noise emission at AMS and the surrounding area by at least 48 percent during the day and by 43 percent at night by 2030 compared with 2023 levels.

After so much turmoil in setting regulations, it appears that the runway for future growth of the airport has finally cleared, accompanied with a credible action plan to address environmental issues. Therefore, we are not surprised that the airport's need to accommodate future growth by catching up on any deferred capital program and investing in facility renewal/expansion has taken centre stage once again.

Subject to the dual-till regulation regime, AMS is allowed to set aeronautical tariffs to achieve cost recovery and a regulated return on asset base, but it is not allowed to make a profit on airport charges. The airport has a 60 percent maximum pay-out dividend and recorded a 2.9 percent return on equity in 2023, which is low compared with private airports, suggesting a relative tight economic regulation system and reflecting its public ownership structure. This financial formula naturally translates into the need to increase aeronautical fees to finance major capital programs. By setting out the price differentials that favour quieter and cleaner aircrafts as well as flights during the day, AMS also keeps KLM incentivized to carry out its action plan as proposed.

A formula hard to copy for other airports

Higher aeronautical tariffs will unavoidably make air travel more expensive. Compared with international flights, short-haul flights will be more exposed to demand risks because of the competition from high-speed trains in certain regions. However, while demand risks remain important in credit analysis for the airport sector, the risks of regulation-induced operational rigidity should not be overlooked. The environmental policies can clearly drive cost up and/or create a capacity shortage problem.

Potentially benefitting from its superior connectivity (ranked second in Europe according to the ACI Connectivity Report 2024) and high concentration in the lucrative international segment, we believe AMS is relatively well-positioned to pass costs along to airlines without worrying too much about losing its competitiveness. However, for airports that do not have these competitive characteristics, a tightened environmental regulation, such as the one observed at AMS, could significantly increase operational rigidity, limiting an airport's ability to optimize utilization of its existing facilities and having a material financial impact. ■

(Morningstar DBRS is a global credit ratings business with approximately 700 employees around the world.)

Navigating Change

With the pending exit of Justin Trudeau's Liberal government, the Canadian political landscape has now become filled with uncertainty. Here, Canadian Business Aviation Association CEO Anthony Norejko speaks on the topic.

The CBAA says that now is the time for members to speak up.

CHANGE IS IN THE AIR. As we enter 2025, the CBAA is preparing for the upcoming federal election and a new government. Our team is anticipating the inevitable changes that come with an election, and we are ready to quickly and effectively engage with appointed leaders – including a long-term Minister of Transport – as the strong and united voice of Canadian business aviation.

Luckily, the CBAA is adept at navigating change. A few years ago, we successfully steered through the Covid-19 pandemic by adopting powerful online and app-based communication tools to keep members informed and engaged. Since then, we've worked to continuously improve our member communication channels, delivering the crucial industry information you need to do business better.

✳ *OPINIONS continued ...*

Canadian Business Aviation Association CEO Anthony Norejko, left, says the CBAA is prepping for inevitable changes.

Our team is ready to continue the strong government advocacy and regulatory engagement that has always been the hallmark of this association. But, as I have said before, we cannot do it alone.

We need your input for maximum effectiveness in Ottawa. Perhaps you've been a CBAA member for some time, but have not stepped forward to share your unique perspective. To you and others like you, I simply say that now is the time.

I encourage every association member to be a business aviation champion in 2025. Network at a CBAA chapter meeting near you, take a moment to write your Member of Parliament on behalf of business aviation, or help by sharing our industry's impressive sustainability story. Now is not the time to lay low and continue with business as usual.

To loosely borrow from a saying attributed to Mahatma Gandhi, we now have a "collective opportunity to be the change that we want to see." Canadian business aviation has a good story to tell and 2025 is the year to share it. Thank you for your support! ■

Cleaning up Operations

Parts-supplier AVAir and its journey to being Climate Neutral Certified

AvAir has committed to removing nearly 7,000 tons of carbon dioxide emissions, says its vice president Tyler Botthof. AvAir recently announced it is now officially Climate Neutral Certified.

PHOENIX, ARIZONA-BASED aviation aftermarket parts supplier AvAir recently announced it is now officially Climate Neutral Certified, and that it is the first aviation company to achieve this certification. Climate Neutral Certified is the leading consumer label for climate neutrality. It is earned by organizations that have chosen to be accountable for the greenhouse gas emissions generated in the production, operations, and shipping of goods and services.

"We are extremely proud to receive this certificate and be Climate Neutral Certified," said Tyler Botthof, vice president of operations at AvAir. "As a company, we have committed to removing nearly 7,000 tons of carbon dioxide emissions which is equal to driving 1,500 gas-powered cars for one year and taking steps to continue to reduce carbon dioxide emissions that are a result of the company's and team's actions."

"Climate Neutral Certified companies are demonstrating immediate action on climate change is possible and essential," says Austin Whitman, CEO of Change Climate. "Climate Neutral Certified brands have built a powerful movement that gives companies and consumers meaningful ways to act on climate—today. They are leading the way, taking immediate voluntary action to address their carbon dioxide emissions, and engaging their consumers around this important issue like never before."

Change Climate's certification label builds on internationally recognized standards for carbon measurement and neutrality. All certified brands must measure cradle-to-customer greenhouse gas emissions each year to maintain certification. Then commit to reduction action plans to cut future emis-

sions within a 12-24 month timeline. Finally, certified brands must invest in verified carbon credits to compensate for all of its emissions.

In addition to this comprehensive evaluation and commitment, AvAir is working with the environmental firm WM to invest, improve and build upon its sustainability strategy and endeavor. AvAir is assessing its processes and data to benchmark procurement, waste, water, energy, fuel, transportation and other potential contributors to greenhouse gas emissions.

"AvAir is modeling what companies can do when they lean into environmental commitments," said Eric Dixon, vice president, sustainability & environmental solutions, WM. "WM is thrilled to support AvAir's sustainability agenda, which authentically aligns with our company's sustainability ambitions. For over two years, we've helped AvAir better understand its environmental footprint, from procurement and waste generation to transportation and utilities.

"This certification demonstrates how they go beyond measurement and continue to take action to reduce the company's impacts. On top of these initiatives, AvAir has also supported the WM Phoenix Open's Working for Tomorrow Fund, helping finance water restoration and renewable energy projects on Tribal Nations land in Arizona. We look forward to continuing this collaboration and seeing what's next for AvAir." ■

(AvAir has been named Parts Supplier of the Year for four consecutive years, 2021-2024.)

Help Wanted

Above: Saudi Arabia now requires a raft of qualified personnel for short and long-term contract work.

Left: Andrew Middleton is Zenon owner and CEO.

The Middle East has now become a robust market for qualified aviation personnel, according to at least one recruitment specialist.

THE SURREY, UK-BASED global aviation recruitment specialist Zenon says an influx of start-up companies in the UAE, and especially in Saudi Arabia, now require a raft of qualified personnel for short and long-term contract work. Zenon, which facilitates permanent and contract positions, has seen the number of roles available in the region increase 24 percent since January this year.

"We have been actively recruiting in the Middle East since 2006, initially in business aviation, then widening out to support commercial airlines and aerospace companies," said Zenon owner/CEO Andrew Middleton. "It has become a very employee-driven market, with demand for personnel outweighing supply. We look forward to helping address that balance. We have modified our own platforms and beefed up our digital marketing to react to a widened, cross sector aviation market, which complements our extensive international database."

Trending sectors in the region include helicopter personnel for offshore projects and HEMS; the emerging Advanced Air Mobility Sector, where the Middle East is a key infrastructure and platform investor and an uptick in demand for aviation training and related maintenance personnel. Providers are ramping up operations and adding more simulators.

"We see flight crew transitioning to on-demand aviation, where salaries and perks are typically competitive," says Middleton. "Likewise, Middle East airlines are paying even more and improving benefits to keep good pilots and engineers, stopping them from moving to Asia, especially India. which is gearing up for significant pilot demand."

Zenon has specialized in providing qualified aviation personnel to companies globally, and significantly in the Middle East and Africa, since 2006. Its first business aviation placement in 2006 was from a client in Jeddah which required a Boeing BBJ captain for Arabasco. Zenon supported NetJets when it was active in the region and today works with leading names including Gama Aviation, currently building a new Fixed Base Operations (FBO) terminal at Sharjah Airport, UAE. ■

Freighter Variant Game-Changer?

The Cessna SkyCourier has now earned Canada type certification. Textron says this achievement will bring operational support to remote regions of North America.

TEXTRON AVIATION has announced that its twin-engine, large utility turboprop, the Cessna SkyCourier, has been awarded type certification by Transport Canada Civil Aviation expanding the aircraft's ability to support operational activities in some of the most remote areas of North America. The first SkyCourier in the region – a freighter variant – is expected to be delivered this year to Air Bravo Corporation, a passenger, cargo and air ambulance flight service company based out of Thunder Bay, Sudbury, Barrie and Meaford, Ontario since 2001.

Opposite: Lannie O'Bannion, left, is senior vice president, Global Sales and Flight Operations for Textron.

Above: The Cessna SkyCourier, has been awarded type certification by Transport Canada.

"The SkyCourier's outstanding performance will be a game-changer for our customers across Canada," said Lannie O'Bannion, senior vice president, Global Sales and Flight Operations. "The maximum flexibility and low operating costs of this aircraft make it an excellent choice for a wide range of missions throughout the region."

The SkyCourier is targeted toward air freight, passenger and special missions. With the ability to be operated by a single pilot, the aircraft is highly adaptable and can easily adjust configurations to effectively complete virtually any mission, supporting a significant return on investment. The aircraft also has capabilities to support a wide range of operational activities in remote areas.

The freighter variant features a flat-floor cabin that is sized to handle up to three LD3 shipping containers with a factory-spec 6,000 pounds of payload capability. The aircraft is powered by two wing-mounted Pratt & Whitney Canada PT6A-65SC turboprop engines and features the McCauley Propeller C779, a 110-inch aluminum four-blade propeller, which is full feathering with reversible pitch. The SkyCourier is operated with Garmin G1000 NXi avionics and has a maximum cruise speed of more than 200 ktas and a 900 nautical-mile maximum range. ■

★ TRANSPORT CANADA ★
Reports and Comments

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

Two views of the Aerospatiale AS 350B2 helicopters in flight.

REPORT: AEROSPATIALE AS 350B2

Main Gearbox Oil Filter Gasket

Subject:

During the final two minutes into approach for landing after a maintenance test flight, the main gearbox (MGB) low pressure light came on. The pilot returned immediately to the landing pad at the hangar and advised that the aircraft landed without the MGB oil temperature light coming on. The MGB ran 1 minute 30 seconds in flight with the low pressure light, and 30 seconds on the ground for cool down. During the investigation, maintenance discovered that the gasket from the previous spin on filter had stuck to the housing on the MGB, and the new filter was spun on with it still in place not allowing the new filter to seal properly, and therefore allowing the oil loss.

Maintenance installed a new filter, cleaned the aircraft and added the correct amount of synthetic oil. Maintenance did a 30 minute ground run, loading the MGB to the point just before hovering. There were no chip lights and after shutdown, there were no chips on any magnetic plugs. The aircraft maintenance manual (AMM) 05-50-00, 6-1 indicates the replacement of the MGB, mast bearings and possibly the main rotor shaft, and roughly 500ml of Mobil-jet 254 synthetic fluid was still in the transmission when drained.

The gasket on the filter is of a thick black rubber and loose removal type can potentially be left in situ on the filter housing. Other spin-on filters, which have the gasket swaged onto the top of the filter housing, are not easily removed and come off, and are part of the filter cartridge.

Transport Canada Comments:

The submitter of this service difficulty report (SDR) has identified a physical difference in the gasket seating area of the

Bell Textron 412EP

oil filter even for the same part number (P/N) 7050A3632296 (alternate P/N FA01315A). Specifically, the oil filter gasket seating area could either allow the gasket to be removed freely, or be partially retained by an intentional swage in the filter housing completed during manufacture.

Airbus Helicopters published Information Notice 3631-I-63 to clarify the maintenance of pre and post MOD 077162 MGB oil filters by helicopter configuration. The P/N 7050A3632296 (alternate P/N FA01315A) oil filters are post MOD 077162 and considered to be non-cleanable type filters. They are replaced in accordance with the maintenance instructions published in the master servicing manual. Transport Canada Civil Aviation (TCCA) wishes to make maintainers aware that the gasket that belongs with a removed MGB oil filter, has the potential to remain in place on the MGB filter support during maintenance and should be removed prior to the new filter installation.

REPORT: BELL TEXTRON 412EP

Fractured Transmission Oil Fitting

Subject:

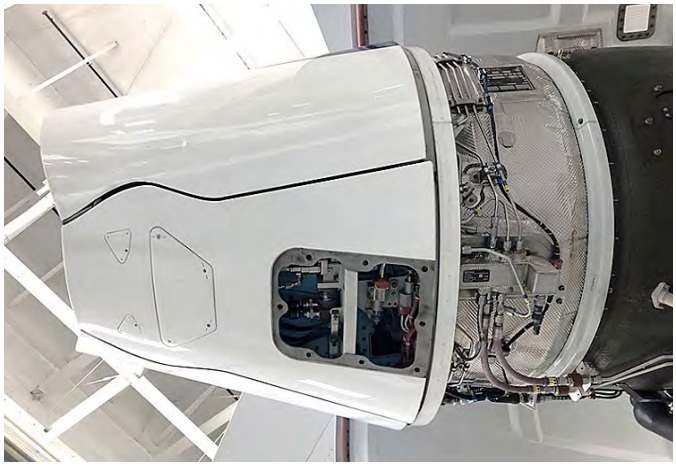
Bell reports: "oil trend" indication followed by loss of transmission oil pressure while performing a target approach over the lake at 50 ft. The aircraft was brought back safely over an adjacent field and landed safely. Transmission oil fitting was fractured and 9 quarts of oil was lost.

Transport Canada Comments:

Bell has received reports of model 412EPX helicopters experiencing loss of main transmission oil pressure. Their investigation revealed that the loss of oil pressure was due to the fracture of some part number (P/N) elbow fittings on the main transmission ring gear case.

Below: The fractured Bell transmission oil fitting.

In some instances, Bell has found that the oil tube assemblies are non-conforming. To mitigate the risk of an elbow fitting fracture and subsequent loss of transmission oil pressure, Bell has published ASB 412-23-193 to inspect and replace certain P/N elbow fittings. The latest revision of ASB 412-23-193 also provides instructions for the correct installation of the hoses and clamps associated with the elbow fitting. TCCA would like to make the owners, operators and maintainers aware of the affected Bell 412 EP helicopters and consider accomplishing the instructions of ASB 412-23-193.



Above: Location and access to affected area.

Left: Lower forward bolt head as seen through the panel

REPORT: DASSAULT FALCON 7X/8X

Thrust Reverser Lower S-hook Bolt Loose/Disengaged

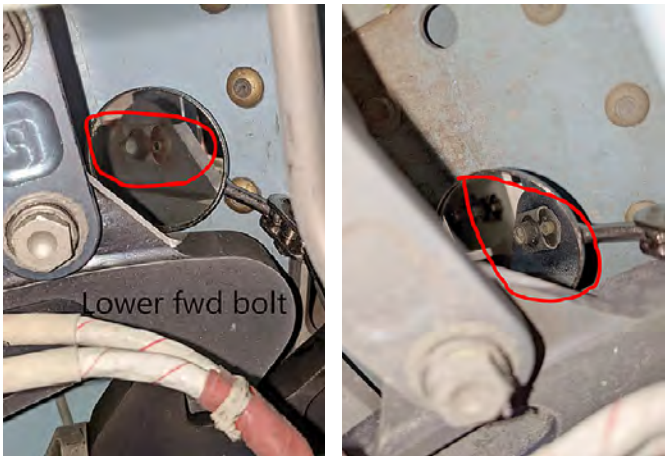
Subject:

During a scheduled inspection, the bolt part number NAS6303A7 that secures the lower thrust reverser hook to the actuator was found loose. The bolt is installed up into an anchor nut with the head down and it can fall out, causing ineffective lower thrust reverser locking. The service centre personnel reported that they believe the grip length of the bolt, specified in the Illustrated Parts Catalogue (IPC), is too short and when correctly torqued, the bolt is not in safety (i.e., nut plate, 1-3 threads).

The service centre personnel advised that this is the fourth aircraft that they have inspected and found with this bolt loose, and they are aware of at least one in-service aircraft where the bolt fell out. They have reported this issue to the Federal Aviation Administration (FAA) and Dassault.

Transport Canada Comments:

Following this event in February 2021, Dassault issued Falcon Service Advisory (FSA) FSA-78-30-032-R00-A – Thrust Reverser S-hook bolt loose. The FSA noted the following, "On the Falcon 7X/8X thrust reverser, there have been instances of the bolt installed on the lower S-hook being found loose or disengaged.



Left: Back of bolt view of anchor nut shown in a mirror. Right: Mirror view of anchor nut shows bolt not in safety.

A Dassault Service Bulletin is under development to replace the bolt with one of a longer grip length, for both the upper and the lower S-hook locations." The FSA also noted that pending the service bulletin's release, if a loose bolt is found during a check of the thrust reverser S-hook, refer to Safran Service Instruction SIF7X-209 Revision A for re-torquing of the bolt.

On 26 March 2021, Dassault Service Bulletin (SB) 7X-574 was issued, applicable to all Falcon 7X and 8X aircraft, to replace the existing screw with one of a longer grip length. This SB recommends incorporating the bolt replacement modification at the first opportunity and no later than at the next 12 months or 800 flight hour inspection. Transport Canada Civil Aviation expects that all operators are aware of this SB and have completed or are planning to incorporate this modification.

Eurocopter EC 120 B: Example of the wear found on the tail rotor output wheel spline.

REPORT: EUROCOPTER EC 120 B

Worn Tail Rotor Drive Splines and Coupling

Subject:

During a transmission removal from the aircraft, it was found that the splines of the transmission output wheel and coupling were excessively worn. The coupling which is part of an Air Comm Corporation (Air Comm) air conditioning kit (Supplemental Type Certificate (STC) SR00491DE) was worn to a point that tail rotor drive shaft failure was inevitable.

Transport Canada Comments:

STC SR00491DE is for installation of an Air Comm air conditioning kit on an Airbus Helicopters model EC120B helicopter. Similar to this Service Difficulty Report (SDR), Air Comm received reports of wear at the spline joint that consists of the air conditioner drive pulley and the tail rotor output wheel. This spline joint is an integral piece of the power

transmission components responsible for the tail rotor drive.

Air Comm published Service Bulletin (SB) EC120-111815 to specify an inspection of the pulley-output wheel interface for wear. The Federal Aviation Administration (FAA) has mandated inspection of affected aircraft with Airworthiness Directive (AD) 2017-06-11. Owners, operators and maintainers should be aware that the corrective action and compliance time specified in the SB and AD are different. In addition, the FAA AD requires the inspection results to be reported to the FAA.

Side view of the Piper PA-23-250 aircraft showing the emergency exit window. Right: Windowless.

REPORT: PIPER PA23-250

Emergency Exit Window Assembly

Subject:

The emergency exit window assembly departed inflight.

Transport Canada Comments:

The occurrence aircraft had undergone maintenance just prior to the incident flight. It was determined that the emergency exit window assembly was not installed correctly, possibly due to a lack of clarity of the instructions in the maintenance manual (MM).

In addition to the above occurrence, there could be a link to an accident in 2019 where the emergency exit window assembly could not be opened. It was impossible to determine the exact cause of this failure, as the assembly was completely destroyed by the post-impact fire.

"A post-impact fire broke out. Given that the fire was burning near the right wing, on the side where the main door

was located, the pilot and the passenger-instructor went to the back of the aircraft with the intention of opening the emergency exit window on the left side, but they could not get it open. They were still able to evacuate the aircraft through this window because the plexiglass had been shattered on impact."

Piper Aircraft completed a thorough review of the MM instructions relevant to the emergency exit window assembly used on the PA-23-250 model. The applicable MM, part number (P/N) 753-564 has been revised, dated 31 July 2021. This latest revision provides clear, detailed instructions for the removal and installation of the emergency exit window assembly.

Transport Canada Civil Aviation (TCCA) strongly suggests owners, operators and maintainers review and adopt the latest publication of Piper Aztec MM P/N 753-564.

REPORT: ROBINSON R44 II

Throttle link

Subject:

During run up, it was noted that the idle was high (around 70% belts engaged). Upon inspection, it was found that the bearing had come out of the part number (P/N) B564-2 link at the servo end.

Post R44 SB-71 throttle link P/N B564-2 having Teflon-lined steel bearing races.

Pre R44 SB-71 throttle link P/N B564-2 having aluminum-bronze bearing races.

Transport Canada Comments:

It should be noted when inspecting or replacing throttle link P/N B564-2 for the R44 and R44 II model helicopters, that the Robinson Helicopter Company has published multiple service bulletins for this service difficulty.

R44 Service Bulletin (SB)-62 identifies a failed throttle link where the bearing separated from the housing. Compliance with this SB involves the installation of a large-diameter washer to prevent loss of control if a bearing fails. The incorporation of the large-diameter washer is also published in the Robinson Illustrated Parts Catalog throttle control installation R44 SB-71 introduces a throttle link with a TeflonTM-lined steel bearing race designed to prevent race separation from the link body. This SB requires replacing the earlier links having aluminum-bronze races while retaining the large-diameter safety washer requirement. ■

PACIFIC

Pacific AME Association

Important to ask questions

As the Pacific AME Association, it is a priority for us to bring the concerns of members directly to Transport Canada. We remind you that as a member, you can send us your questions. Often the answers we get will also help other members. In addition, being affiliated with AMEC/TEAC allows us to see if certain problems are found in other Canadian regions.

PAMEA is the professional association for Aircraft Maintenance Engineers in BC.

We are an active member of AMEs of CANADA AMEC-TEAC (formerly CFAMEA)

2024 Executive Board of Directors
Hannah Duffield, President
Peter Chick, Treasurer
Bob Rorison, (Retired)

Reminder

This is a reminder that 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: **www.amec-teac.ca/pacific**

WESTERN

Western AME Association

www.wamea.com

temporarily email = md@werkasset.com

Various items found on our LinkedIn page

The UK CAA is requiring active electronic Carbon Monoxide detectors in all piston engine aircraft with few exceptions. The detectors need not be certified , however they must have a aural or visible alert. It is common knowledge that the traditional non-electronic detectors are a very poor choice in 2025 given the multitude of affordable electronic units available under $50.

WAMEA has an agreement with the AME Association of Ontario that they will recognize new members joining AMEAO as WAMEA by their Alberta and NWT postal codes. Current AMEC/TEAC members will receive an email with log in information/links. If you do not receive an email from AMEC/TEAC, or have just joined the association as a member, please email 3739casorso@gmail.com for the log in instructions.

TCCA has no regulatory requirements for Canadian AME licence holders (outside an AMO) to obtain recurrent training. The FAA mandates recurrent training for IA's and we as an organization believe that recurrent training is essential for any practicing AME or AME learner.

An international search firm working with a leading global provider of aviation services is searching for an experienced VP of Operations for their Windsor, Ontario facility. This is a growing facility with 300 employees and $40 million annual revenue. Qualifications: PRM, MRO experience/certified, prefer licensed Aircraft Maintenance Engineer.
Interested? Message Mark Vague: vague@fpcportland.com

Website still down

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-Baloon).
www.wamea.com

CENTRAL

Central AME Association

About CAMEA

Exciting news! The 2025 CAMEA Annual Aviation Symposium is back and is scheduled to take place February 20-21, 2025 at the Canada Inns Destination Centre in Winnipeg. Stay tuned for updates on registration—it will be available soon.

PT6 Turbine Maintenance Training Opportunity

We're excited to announce a Special 1-Day Course during the upcoming CAMEA Symposium—a must-attend for Aircraft Maintenance Engineers looking to sharpen their skills and elevate their expertise. This in-depth, classroom-based course focuses on the rigging of PT6 turbine

engines, covering: rigging procedures for precision and performance; troubleshooting techniques to resolve issues effectively; adjustment methods to optimize engine efficiency and reliability

Whether you're an experienced professional or looking to build your expertise, this course provides the tools and knowledge to excel in PT6 turbine maintenance.

Cost: Included with your Symposium registration

Seats: Limited to 20 participants (Pre-registration required)

Thank You to PropWorks Propeller Systems

We are proud to announce PropWork Propeller Systems as the Gold Sponsor for the upcoming CAMEA Annual Aviation Symposium. PropWork's unwavering support plays a vital role in making this event a premier gathering for aviation professionals, innovators, and enthusiasts.

Their dedication to advancing the aviation industry is truly inspiring, and we are grateful for their partnership in bringing this year's symposium to life. Don't Miss Out! Join us for this exciting event and connect with industry leaders, gain valuable insights, and explore the latest in aviation advancements.

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

Who We Are

The Aircraft Maintenance Engineers Association of Ontario is a non-profit organization, run by a volunteer group of AMEs and non-AMEs. The purpose of the association is to maintain and enhance the standards of professionalism of the AME and the aircraft maintenance industry as a whole, and to promote the rights and privileges of the AME.

We have three primary objectives, identified by one Mission statement: "To Represent, Promote and Mentor." We endeavour to:

I) Represent our members with regards to Transport Canada Civil Aviation (TCCA) issues

II) Promote the career path of the Aircraft Maintenance Engineer to those entering the workforce in Ontario (and beyond)

III) Mentor those members who request mentorship, to help them develop professionally to further their career.

Individual member benefits

1. Representation at Transport Canada via Aircraft Maintenance Engineers of Canada meetings
2. Promotion of Aircraft Maintenance as a viable career choice
3. Skills Competitions to bring our industry to the public
4. Mentorship of young AMEs
5. Support, in the form of Bursaries, students registered in Full Time Aviation Programs at AME Association Member Approved Training Organizations ($500 per program, per ATO. $6,000/year is budgeted for this benefit).

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

Mission Statement

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.

In addition, our association will offer many benefits to its members such as group discounts from various vendors, free magazine subscriptions, and discounts for insurance companies offering products designed for AMEs.

Cette association se donne pour mission de représenter tous les TEA au Québec quelle que soit la compagnie ou les contrats sur lesquels ils travaillent. Quel que soit le type d'aéronefs sur lequel le TEA travail, il/elle sera bienvenu. Nous nous reconnaîtrons simplement en tant que titulaire d'une licence de TEA de Transport Canada M1/M2, E ou S et ayant un attachement au Québec.

L'Association deviendra à terme la voix des TEA aux oreilles de Transport Canada et travaillera de concert avec les association de TEA existantes d'un océan à l'autre afin de rendre notre profession plus forte

et en y insufflant une plus grande cohésion. L'un des grand objectifs de notre association est de nous élever au rang de professionnel et d'être reconnu comme tel par les différentes instances gouvernementales fédérales.

L'autre grande mission de notre association sera de mieux faire connaître notre profession au public et de nous impliquer auprès des jeunes pour que ceux-ci sachent en quoi consiste le métier de TEA et qu'ils le considèrent en tant que choix de carrière.

De plus, notre association offrira de nombreux avantages à ses membres tels que des rabais de groupes chez différents fournisseurs, des abonnements à des magazines gratuits ainsi que des rabais pour des compagnies d'assurances offrant des produits conçus pour les TEA..

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

Atlantic AME Association

President's Message — By Bob Pardy

I recently read that the aviation industry will need 5,300 new aircraft maintenance personnel by 2025. Well, 2025 is with us now! In our efforts to try to increase the number of personnel coming into the profession, we are involved in a program in Nova Scotia with the Provincial Trades Council and other industry partners to have the Aircraft Maintenance trade recognized and approved as a skilled trade—making it one of the programs available for funding under the provincial Skilled Trades Program.

We are also working with the College of the North Atlantic to get Newfoundland and Labrador, under their Trades Council, to do the same. The program in NL is not advancing as quickly as efforts in NS, but we are not giving up.

As well as the work we are doing with provincial trades and labour departments, at a recent meeting of AMEC/TEAC and Transport Canada in Ottawa I requested that TCCA provide us with a contact at the Federal Labour Department so we can involve the federal government in our efforts to have the AME Profession designated as a Skilled Trade.

Your AME Association attended the Air Show Atlantic in Greenwood, NS, in August where we shared a display booth with one of our corporate sponsors, AeroTec Engines. This effort was very fruitful, as we had discussions with a number of people about the AME Association, the AME profession and with people interested in talking about what it would take to become an AME.

Jason Crowell and I recently returned from Ottawa where we attended the AGM and Board of Directors meeting of AMEC/TEAC, as well as met with TCCA HQ representatives. During the AGM, elections were held to fill vacant board positions and to elect a new president and vice-president. The new Board of Directors of AMEC/TEAC is:

President: Xavier Pallares (Que)
Vice-President: Louis Anderson (Ont)
Directors:
Peter Chick (Pacific)
Kirk Watson (Western)
Brady McArdle (Central)
Scott Gillis (Central)
Bob Pardy (Atl)

During the TCCA meeting we were given a Civil Aviation Operational Airworthiness update. This presentation is available on our website: Operational Airworthiness Transport Canada Civil Aviation October 28, 2024 – PPT – AME Association (Atlantic) Inc.

CNA Update

By Neil Burt, Quality Assurance, Aircraft Programs

Warm greetings once again from the Gander campus of College of the North Atlantic (CNA), one of 17 campuses located through- out Newfoundland and Labrador. The aircraft programs had a wonderful start in the 2024-2025 academic year, with a total enrollment of 42 new students for both our two-year Aircraft Maintenance Engineering Technician program (AMET) and our one-year Aircraft Structural Repair Technician program (ASRT).

In addition to this, we have 17 second-year AMET students, 12 ASRT students and seven returning students who should graduate in June 2025. We still hold a part 147 European Union Aviation Safety Agency (EASA) training approval for category B1.1 (large turbine engine aircraft) and still offer our 15-week EASA Advanced Diploma Program for any of our students who graduated in 2009 or later.

So far this fall we have been approached by four companies looking to come and speak with our students in the hope of recruiting them—another indicator that the industry is doing well. For those of you who have not considered this option, we are always open to having you visit our campus and students.

Along with the four "civilian" companies, the Royal Canadian Air Force (RCAF) have been very actively visiting our students describing their NCMSTEP program. The NCMSTEP entry plan offers paid education, paid program essentials, and a starting salary of $42,000+, allowing Royal Canadian Air Force (RCAF) college students the time and support necessary to focus on studies to become skilled aviation technicians.

With an AME College diploma and transcripts, the Semi-Skilled entry plan offers a recruitment allowance of up to $10,000, and the opportunity to start employment in the Air Force at pay level 3, with a $63,000+ starting salary.

These entry plans open the door to three different career paths: Avionics Systems Technicians (AVS Tech, equivalent to AME-E); Aviation Systems Technicians (AVN Tech, equivalent to AME-M); and the recently added Aircraft Structures Technician (ACS Tech, equivalent to AME-S). Once accepted, students are guaranteed a job upon graduation, where they will contribute to Air Force operations and hone their technical skills on an assigned aircraft type in the RCAF.

Visit **Forces.ca** to apply.

www.atlanticame.com

SoCal PAMA Chapter

Flight Safety Detectives Episode 253:
Firefighting Aircraft Grounded by Drone

A midair collision between a private drone and an aircraft fighting the Los Angeles area fires caused damage to the plane and an evacuation of all firefighting aircraft from the area. John Goglia and Todd Curtis explore the tragic effect on firefighting as well as the violations of aviation rules.

This event was a major setback in firefighting efforts. The FAA had taken steps to restrict flying around the fire area that were not followed. They expect federal action to be taken against the drone pilot.

The collision with the DJI Mini 4 Pro drone punched a hole in the leading edge of the left wing and grounded the Canadair CL-415 SuperScooper amphibious aircraft for several days. The FBI recovered the drone wreckage from inside the wing and is looking for the pilot.

The Canadair SuperScooper amphibious aircraft is designed to pick up about 1,600 gallons of water from lakes or oceans and drop it on large fires. It was one of the largest aircraft types operating over the fires in California.

Most drone operators have no certification and are unaware of the FAA regulations restricting where and when drones can fly. Todd and John highlight the basics. Drone operators must educate themselves on FAA regulations and follow the rules.

www.socalpama.org

SOCAL

Central Ohio PAMA

COPAMA to cease operations in 2025

After much deliberation, the COPAMA Board came to a unanimous vote concerning the continuation of COPAMA as a Non-Profit organization. Since we have ongoing commitments to a few student awardees till next June 31st, the Board will meet again at that time to finalize the close of operations. The 2 members, Lowell Dowler and Gene Sprang, who were not seeking reelction, will remain on the board through closing.

Our thanks go out to Alex Teffenhardt, Robert Everett, Todd Worthington and Tyler Worthington who were in attendance to contribute to the discussion. The minutes of the meeting will be published once approved by the board.

Our final event will be the 2025 Ohio Aviation Maintenace Symposium. It will be held Monday March 24th at the Eastland Career Center off Hamilton Road near Groveport, Ohio in Southeastern Franklin County.

Doctoral student still needs your input on aviation safety

Whitney Lee, a doctoral candidate in the Graduate Studies in Education department at Southern Nazarene University, is seeking your participation in her study regarding how leadership styles in the aviation industry potentially impact safety.

The purpose of her study is to explore perceptions of aviation safety leaders regarding their supervisors' leadership styles contributing to the organization's safety culture. She is seeking individuals who are aviation safety leaders currently working in aviation with five or more years of industry experience. If you are willing to participate, you will be asked to share your insights in this area.

If you are willing to participate, Whitney would like to send you four questionnaires to fill out. The data collected from the questionnaires will be carefully and respectfully guarded. If you decide to participate in this study, your identity and responses will not be revealed. She will use pseudonyms to protect your identity.

If you would like to participate or have any questions regarding the project, please contact her for further discussion at 405-567-5974 or wlee950@mail.snu.edu.

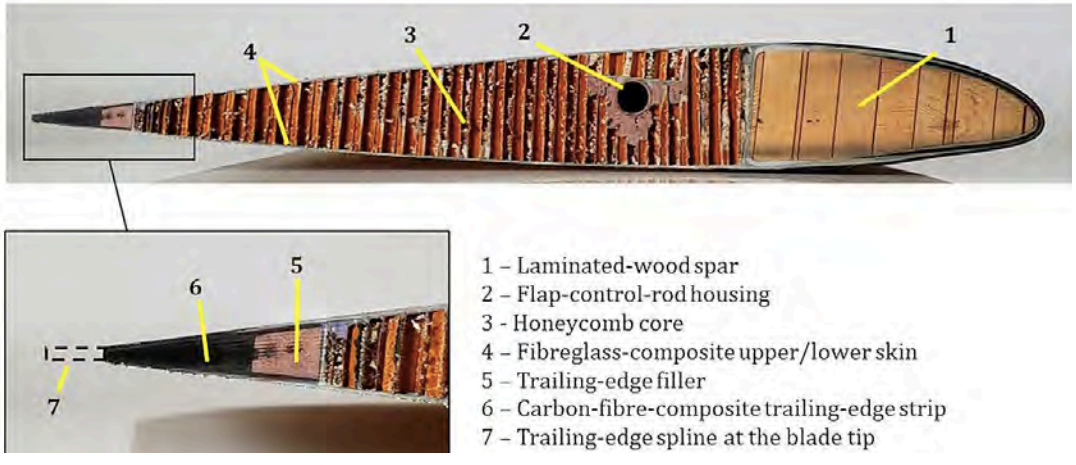
www.copama.org

CENTRAL OHIO

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

THE BREAKABLE BOND

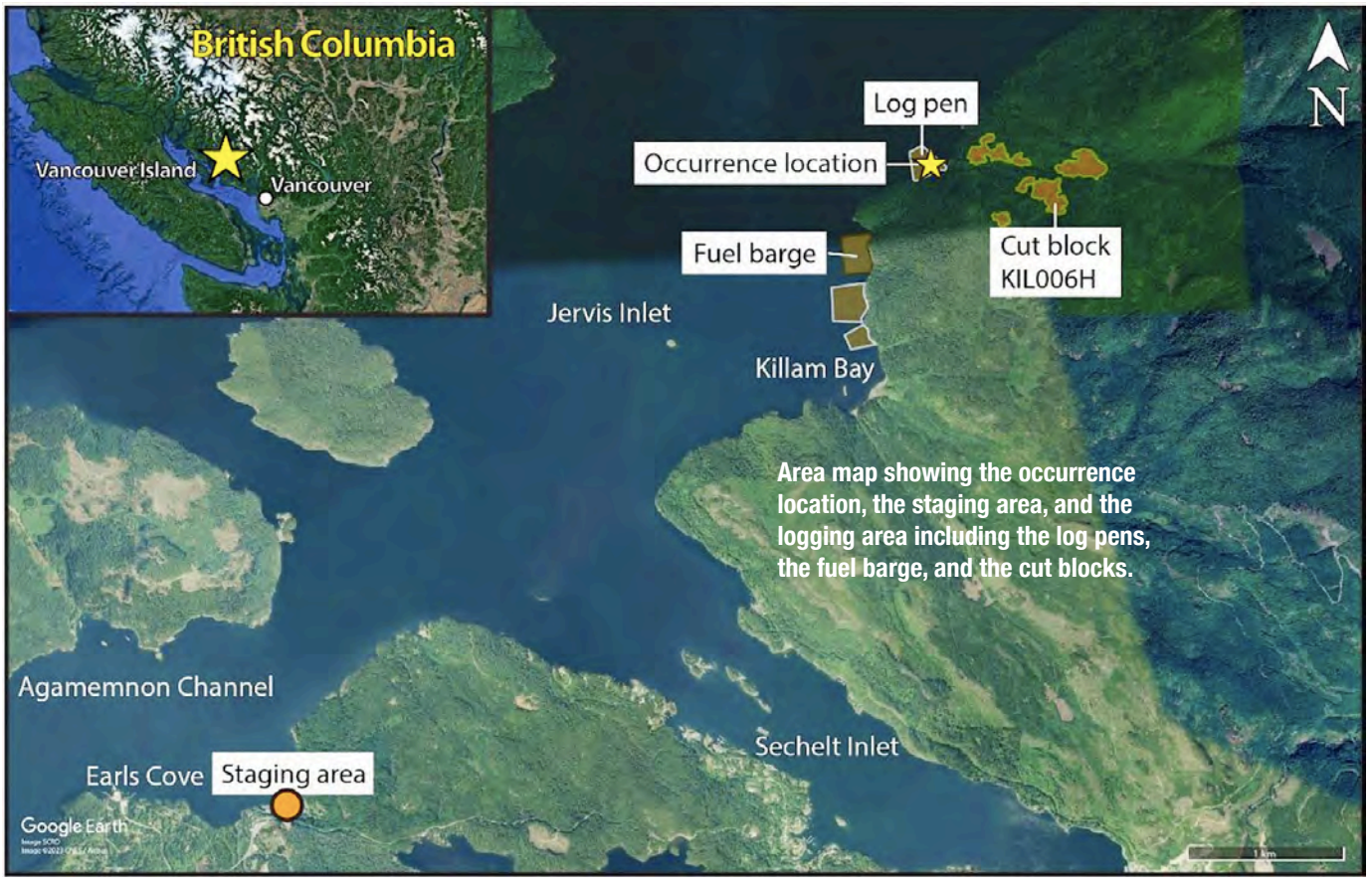
TSB investigators are tasked with putting together the pieces when the in-flight breakup of this helicopter's rotor system results in debris flung far and wide.



1 – Laminated-wood spar
2 – Flap-control-rod housing
3 - Honeycomb core
4 – Fibreglass-composite upper/lower skin
5 – Trailing-edge filler
6 – Carbon-fibre-composite trailing-edge strip
7 – Trailing-edge spline at the blade tip

ON **04 OCTOBER 2021,** the Kaman Aerospace Corporation K-1200 helicopter (registration C-FZVM, serial number A-94-0053) operated by Black Tusk Helicopter Inc. was conducting helicopter logging operations in the vicinity of Killam Bay in Jervis Inlet, British Columbia, with only the pilot on board. Following a mid-day break, the pilot resumed transporting logs from a cut block to an ocean log pen approximately 0.6 nautical miles to the northwest. At 1302:19 Pacific Daylight Time, the helicopter departed the cut block with a load of 3 logs in the grapple.

Approximately 75 seconds later, the helicopter dropped the logs into the log pen, entered a slow 180° turn and initiated a climb to return to the cut block. At 1303:42 Pacific



Area map showing the occurrence location, the staging area, and the logging area including the log pens, the fuel barge, and the cut blocks.

Opposite, top: The occurrence helicopter on the fuel barge at Killam Bay.
Opposite, below: Cross-section of the main rotor blade showing the shape and material composition.

Daylight Time, the helicopter entered a rapid descent and impacted the water within the log pen approximately 4 seconds later and sank. The pilot was fatally injured.

The occurrence helicopter was equipped with a 406 MHz emergency locator transmitter (ELT); however, no signal was received by search and rescue agencies. The company, which had been in regular radio contact with the pilot, initiated an immediate search of the occurrence area and then called emergency services. During the search and rescue operation, portions of all 4 main rotor blades were recovered.

The investigation was unable to locate and recover the entire helicopter. However, based on the debris and damage to the helicopter, the investigation determined that the helicopter experienced an in-flight breakup of the twin rotor system before impacting the water.

WRECKAGE AND IMPACT INFORMATION

During the search and rescue operation, nearby vessels, the RCMP West Coast Marine Detachment, and the Canadian Coast Guard successfully recovered a large section of a main rotor blade from the perimeter of the log pen and additional blade fragments from the ocean surface and near the shoreline.

The helicopter fuselage was located by sonar 8 days after the occurrence and found approximately 400 feet away from the last position recorded by the ADS-B system. An underwater remotely operated vehicle equipped with a camera was deployed. It showed that the longline with the hydraulic grapple was still attached to the belly hook of the helicopter.

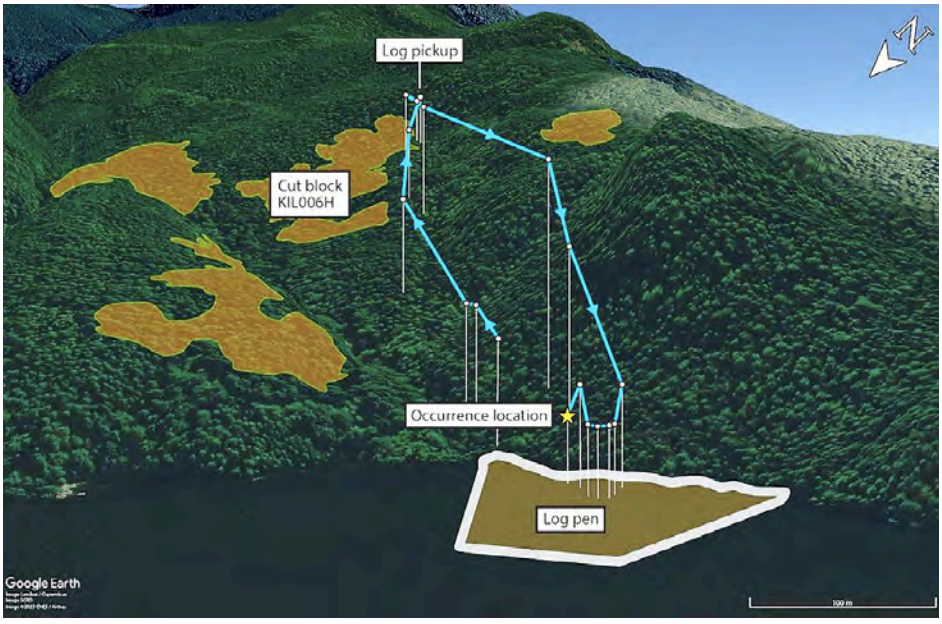
The longline was draped over the underwater cross-cable of the log pen at a depth of approximately 33 m from the surface, with the fuselage on the southwest side of the cable at 96 m deep and the grapple on the northeast side of the cable at 36 m deep. In this condition, the fuselage and grapple were suspended above the ocean floor.

The recovery team raised the grapple to the surface, removed the grapple from the longline and then used the longline to raise the fuselage. Once the wreckage was on the recovery barge deck, investigators tested the cargo-hook manual-release lever located on the collective and noted that the release system operated normally.

Most of the fuselage was intact, with the front of the helicopter having significant deformation and compression damage representative of a nose-down attitude during impact. Because there was also very little damage to the underside and to the sides of the fuselage, investigators determined that the aircraft entered the water nose down at a near 90° angle. According to the rotorcraft flight manual, the attitude limitation with a load is 25° nose up or nose down.

The horizontal stabilizer remained whole with the vertical fins still on each side. However, the stabilizer was twisted

The occurrence helicopter flight track during the 5th turn, and the occurrence location.



downwards on the fuselage, the leading edge of the right vertical fin sustained a significant dent immediately above the stabilizer, and the lower portion of the left vertical fin was crushed.

The tail boom was whole and separated from the fuselage at the tail-boom junction; the rudder-control cable, electrical wiring, and antenna wiring were the only remaining connections of the tail boom to the fuselage. The top forward portion of the aft vertical fin was crushed in a cylindrical pattern and then buckled near the bottom back side. The rudder remained attached to the vertical fin and had limited movement.

The complete engine remained mounted to the airframe with only the front left rubber mount being separated. However, the fuselage structure fractured forward of the front mounts on both sides and resulted in the engine being angled significantly backwards. Additionally, the top of the combustion case was buckled, and the exhaust was crushed from the bottom to the top.

The Kaflex driveshaft was missing, and there was an exit hole in the engine cowling. The driveshaft couplings on each end remained attached to the engine and the transmission, and a rotational score mark was found on the fuselage frame below the transmission coupling.

The lower portion of the main transmission assembly remained attached to the fuselage. The left and right pylons had separated from the transmission at the mounting flanges and then separated from the helicopter, along with the masts, rotor hub assemblies, and supporting struts.

The nose- and right-landing-gear assemblies remained in place. The landing-gear support was severed near the left outboard end, and the left tire and strut assembly remained attached to the support only by the brake line.

The wreckage was transported to the TSB regional facility in Richmond, BC, for further examination.

RADIAL DEBRIS PATTERN

Shortly after the accident, the investigators used photographs, GPS coordinates, and visual observation to reconstruct the debris pattern and the helicopter's possible trajectory after its last known position. Helicopter debris was located over a 228° arc surrounding the last known in-flight position of the helicopter.

The large section of main rotor blade was identified as blade 0517B from the left-rotor system and was located at approximately 335° and 475 feet from the helicopter's last known position. This rotor blade impacted the log perimeter of the log pen and lodged itself in the perimeter, which provided relative certainty as to its trajectory. Two blade fragments were identified as right-rotor blades 0520A and 0520B and were found at approximately 85° and 60° respectively.

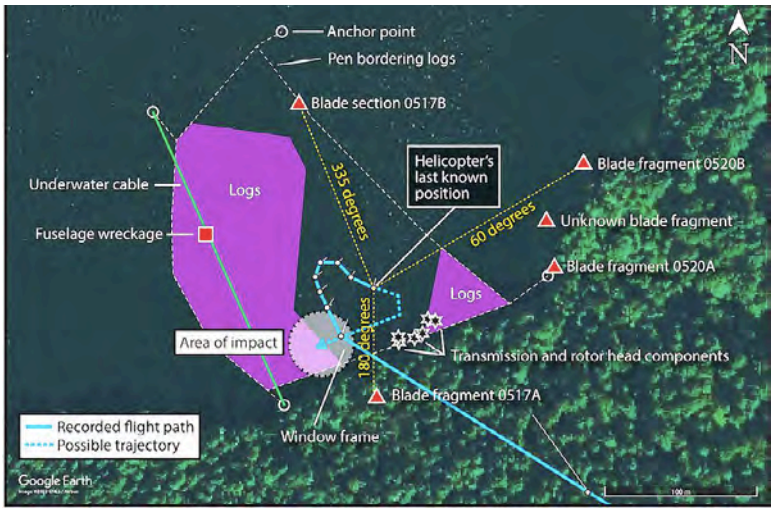
A 3rd fragment was found nearby, but investigators were unable to identify which rotor blade it was from. All 3 fragment locations could only be estimated because of ocean drift. Investigators coordinated with the U.S. National Transportation Safety Board (NTSB) to calculate an area of probability for locating parts of the 4th rotor blade (0517A). As a result, during a 2nd deployment to the site, in January 2022, the tip of rotor blade 0517A was successfully located on the forested hillside at approximately 205° and 750 feet from its paired rotor blade 0517B. The blade tip helped identify another blade fragment that was found on the ocean surface as being part of the lower skin of blade 0517A.

Most of the recovered components associated with the main rotor system and transmission were clumped together underwater between 123° and 160° near the shoreline and approximately 160 to 185 feet away from the helicopter's last known position.

Lastly, a portion of the cockpit window frame from the front windscreen was also located underwater at approximately 203° and 175 feet from the helicopter's last known position and approximately 120 feet from the nearest main rotor system and transmission debris. The cockpit window frame is a structural portion of the forward fuselage. As a result, the investigation determined that the frame location indicated the approximate position of impact within the log pen.

EXAMINATION OF THE ENGINE

A preliminary engine examination was conducted by investigators at the TSB's facility in Richmond, with the assistance of the aircraft and engine manufacturers. The 2 engine control



The log pen showing the helicopter's possible trajectory, the approximate shape of the pen at the time of the occurrence, and the approximate locations of the helicopter debris.

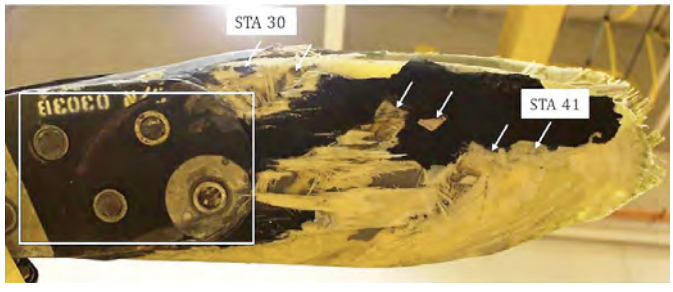
Right-rotor pylon with the hub and blade roots indicating the 2 broken pieces of the pylon and highlighting the compressive buckling on the outboard side.

linkages from the cockpit to the fuel control were determined to be continuous at the time of the occurrence.

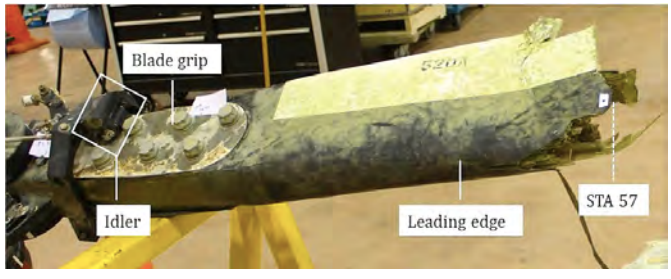
The fractures and separation of the engine control tubes in the fuselage were consistent with overload forces from the impact. Investigators also noted there was fuel present in the engine fuel supply line and the oil filter did not contain any debris. The engine was then shipped to the engine manufacturer's facility, where it was disassembled and examined with representatives of the engine manufacturer, the NTSB, and the FAA present.

All 5 stages of the axial compressor exhibited a combination of blade damage consisting of airfoil impact damage, missing material, and bent airfoils in the direction opposite of rotation. In addition, the compressor rotor blades of the first 3 stages were found separated from the blade root—all 34 from the 1st stage, 7 from the 2nd stage and 1 from the 3rd stage—which is consistent with high-speed engine rotation during water ingestion. All compressor blade failures were due to their overload with no evidence of pre-existing fatigue fractures.

The gas producer turbine nozzles contained minor metallic splatter that is consistent with high temperatures being present in the combustor section when metallic debris entered the airstream. The cumulative engine damage observed during the examination is consistent with the engine operating at the time of impact.



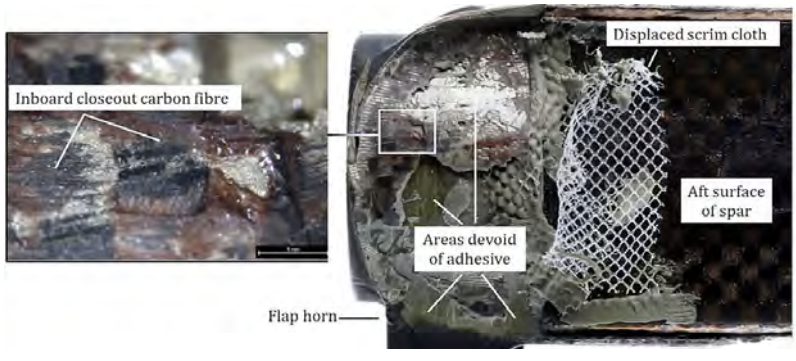
The lower surface and root of main rotor blade 0520B highlighting the sheared bolt ends and the 6 points of impact found between station 30 and station 41.



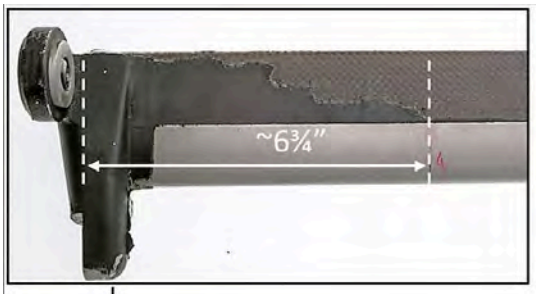
Main rotor blade 0520A showing the connection of the blade root to the blade grip and rotor hub with no evidence of impact damage on the blade until the separation at STA 57.

TSB LAB TESTS

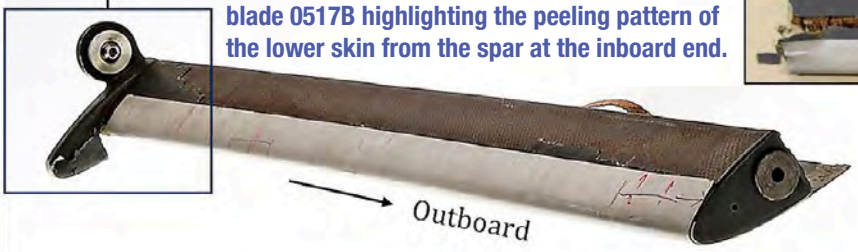
The TSB laboratory conducted various tests on the recovered portions of the main rotor blades and found

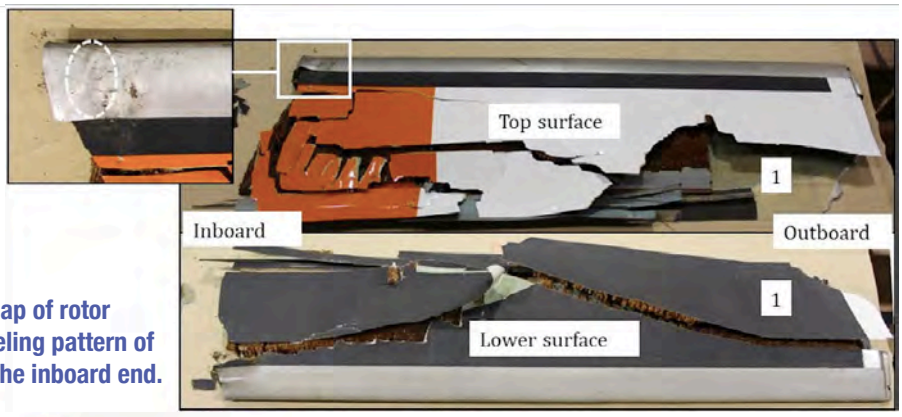


Right: The aft view of the servo flap of rotor blade 0517B showing the bonding surface of the inboard closeout and the convex surface of the flap horn, with the inboard closeout carbon fibre remnants and displaced scrim cloth highlighted.



The lower surface of the servo flap of rotor blade 0517B highlighting the peeling pattern of the lower skin from the spar at the inboard end.





Above: Tip of main rotor blade 0517A and of the lower skin piece that is labelled 1, with leading-edge torsional damage highlighted.

that the departure of the servo flap afterbody on main rotor blade 0517B created an out-of-track condition that caused a cyclic imbalance and a sudden vibration of the left main rotor system, the flutter of the 3 other rotor blades, and the failure of the left-pylon structure. This led to the collision between a blade on the left rotor and a blade on the right rotor that resulted in the in-flight breakup of the rotor system.

The investigation also found that the fracture of the bond joint between the inboard closeout and the servo flap afterbody on main rotor blade 0517B likely initiated a fatigue crack in the servo flap skin, between the D-spar and the afterbody, that progressed until the servo flap afterbody separated in flight. If the quality of the bond joint between the inboard closeout and the servo flap afterbody of Kaman K-1200 main rotor blades is inconsistent, the structural integrity of the servo flap can be compromised, leading to a risk that the servo flap will be unable to withstand normal aerodynamic loads.

THE OCCURRENCE HELICOPTER

The occurrence helicopter was purchased new from the aircraft manufacturer and imported into Canada in March 2021 with 8.4 hours of total airframe time accumulated during production flight testing. The Canadian certificate of airworthiness was issued on 17 May 2021.

The helicopter was maintained on a progressive inspection cycle in accordance with the company maintenance schedule approved by Transport Canada (TC). The progressive inspection cycle divides the 100-hour/annual inspection tasks into 4 zones to encompass related systems or components. One zone is inspected every 25 hours and when all 4 zones have been inspected, all tasks of the 100-hour/annual inspection have been completed, and the cycle repeats.

The inspection task for the servo flap is in Zone 1 and it requires the servo flap to be removed for visual inspection. No cracks are allowed in the flap skins and the flap horn. The last Zone 1 inspection recorded in the journey log was 62.1 flight hours before the occurrence, on 24 September 2021.

In addition, the pre-flight inspection requires that the servo flap be visually inspected in-situ before every flight. The last pre-flight inspection, recorded as a "daily" inspection in the log, was conducted by the AME after the last flight on 03 October 2021. There were no recorded defects outstanding at the time of the occurrence.

The occurrence helicopter was not equipped with a flight data recorder or a cockpit voice recorder, nor was either required by regulation. Although the availability of other sources of data provided significant information for this investigation, the helicopter's exact manoeuvring during the final moments and the time elapsed between the final data point and the actual impact with the surface could not be determined.

MAIN ROTOR SYSTEM

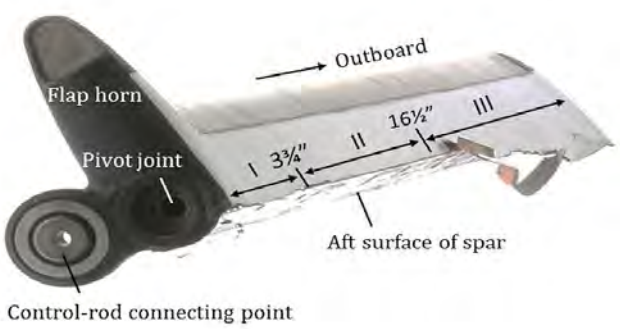
The main rotor system consists of 2 counter-rotating and intermeshing rotor systems, which are mounted side-by-side on top of the helicopter—the left rotor rotates counter-clockwise, and the right rotor rotates clockwise when viewed from above.

The rotors are out of phase by 90° and are tilted outward by 12.5° from the vertical axis to allow each blade to clear the opposing rotor hub. Each rotor consists of 2 blades, and each blade is controlled by an attached servo flap that is deflected by the pilot controls to produce the desired flight manoeuvre.

Each rotor shaft is supported independently by a cone-shaped aluminum-alloy pylon that is supported by 1 fore and 1 aft strut and connected to a common main transmission. According to the manufacturer, the struts are designed to support approximately 85% of the generated lift from the main rotor system. Additionally, the 2 pylons are connected to each other near the top with a tie bar.

MAIN ROTOR BLADES

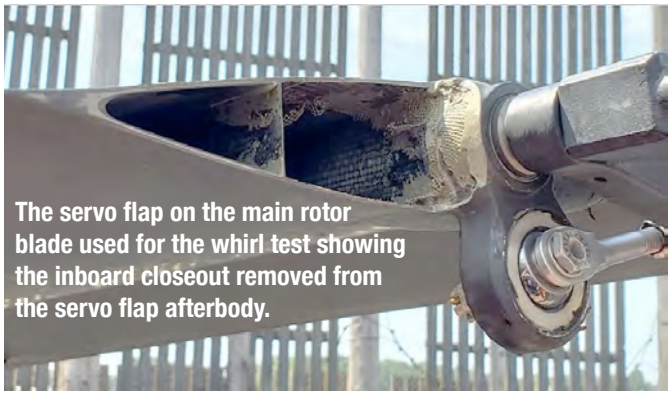
Each main rotor blade is a monocoque cambered airfoil in which the skin of the blade is a critical part of the structural design and bears a significant portion of torsional load during



The servo flap from main-rotor blade 0517B showing the separation of the afterbody and the 3 zones of failure that each presented different fracture characteristics.

the blade's operation. Each rotor blade is constructed of a laminated-Sitka-spruce spar, a honeycomb core, and a carbon-fibre trailing edge and is enveloped with a fibreglass-composite skin. The width of the wood spar varies along the span of the blade. Outboard of the servo flap, the upper and lower skins are extended beyond the trailing edge to form a trailing-edge spline.

Each rotor blade has a span of 289 inches and a stainless-steel erosion guard on the outboard 114 inches of the leading edge. The blade section between rotor station (STA)10 115 and STA 165, inboard of the servo flap, is the elastic working section of the blade and was designed to have relatively lower torsional stiffness. As the pilot's control input deflects the position of the servo flap, a torsional load is imparted on the blade, and this section allows the blade to twist and change the



The servo flap on the main rotor blade used for the whirl test showing the inboard closeout removed from the servo flap afterbody.

angle of attack, which subsequently produces the lift needed for the phase of flight.

All main rotor blades on the occurrence helicopter were installed in new condition at the time of manufacture and had accumulated 949.6 hours of total air time. They were subject to 2 airworthiness directives (AD) issued by the certifying authority, the Federal Aviation Administration (FAA) of the United States (U.S.), and adopted by TC.

WEIGHT AND BALANCE

During the initial certification of the helicopter as a normal-category rotorcraft in August 1994, the aircraft was approved for a maximum take-off weight of 6000 pounds with a maximum external load of 6000 pounds, for a total aircraft weight of 12 000 pounds during lifting operations. In October 1999, the FAA amended the airworthiness standards for normal-category rotorcraft, allowing the maximum take-off weight of the rotorcraft to be increased to a maximum of 7000 pounds if the number of passenger seats was not increased above what was certificated on 18 October 1999.

As a result, in June 2005, the occurrence helicopter was approved for an increased maximum take-off weight of 7000 pounds without external load. The total aircraft weight with external load remained at 12 000 pounds.

At the time of the occurrence, the aircraft was operating with a 200-foot longline with a hydraulically actuated grapple that no longer contained a load of logs. The assembly weighed approximately 750 pounds. The pilot refuelled the aircraft at the barge 21 minutes before the occurrence, but the investigation could not determine the amount of fuel added and the resultant total weight of the aircraft.

ACTIONS TAKEN

Following a fatal accident with no survivors or witnesses, an investigation may never be able to determine the exact causes and contributing factors unless the aircraft is equipped with an on-board recording device. This occurrence demonstrates that if cockpit and flight data recordings are not available to an investigation, there is a risk that safety deficiencies will not be identified to advance transportation safety.

Following this occurrence, Kaman Aerospace Corporation (Kaman) performed tests to verify the airworthiness of the servo flap; however, Kaman plans to further evaluate the flap's fatigue capability.

In addition, the Kaman Model K-1200 K-MAX Maintenance and Servicing Instructions were revised on 01 June 2023. The latest revision provides added instructions for the repair of chordwise paint cracks in the bond line of the servo flap inboard closeout. The instructions note that the flap must be removed from service if the crack extends beyond the paint layer.

On 19 July 2023, the TSB issued an Air Transportation Safety Advisory Letter to Transport Canada (TC) to inform TC that, in at least 2 fatal Kaman K-1200 accidents, a main rotor servo flap experienced fatigue fractures before there was a catastrophic failure and the afterbody of the flap separated from its spar.

The letter also indicated that the timeline for the progression of the flap fractures to a catastrophic failure was unknown, and that the contribution of flight loading from the phase of flight and pilot input needed further examination. TC indicated that it would monitor the industry for any additional servo flap cracking and, pending the corrective action(s) from the FAA, may take interim action if warranted. ■

(These were excerpts from the Transportation Safety Board of Canada's investigation report into this occurrence. The Board authorized the release of its report on 25 September 2024. It was officially released on 30 October 2024.)

The Composite Revolution

Hartzell has been in the prop-manufacturing business basically since there have been aircraft. In a recent White Paper written by Hartzell, the company lauds its past, present, and future.

Above left: An actual bird strike.
Right: The ASC-II Composite Propeller.

WITH A HISTORY dating back to the Wright Brothers, Hartzell Propeller has long been at the forefront of aviation propeller technology. As aircraft have become increasingly more complex — and with the emergence of Advanced Air Mobility (AAM) and electric/hybrid flight — Hartzell has continued to serve the industry with innovative structural composite propeller blades utilizing state-of-the-art materials and cutting-edge engineering and manufacturing processes.

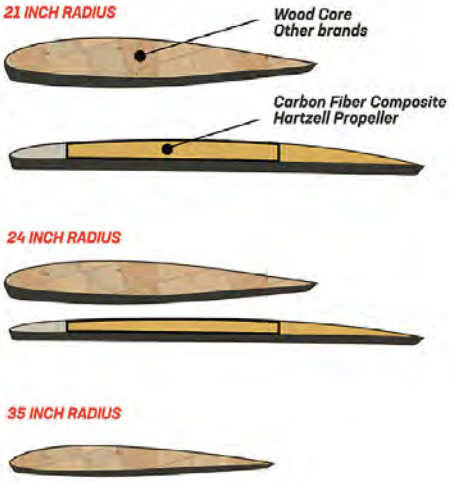
The Evolution of Hartzell's Composite Blades

Hartzell introduced propeller blades made from "Hartzite," a fibre reinforced phenolic composite, in 1944. These propellers were installed on the Republic Seabee, North American Navion, as well as others.

In 1978, Hartzell Propeller produced the first type-certificated primary structure composite propeller blade, a true monocoque design with compression-molded Kevlar/epoxy over a foam core. First certificated on the CASA 212 aircraft, Hartzell's early composite blade technology represented an industry breakthrough that would shape the future of aircraft propulsion.

The CASA 212 blade was the first in what is now referred to as the Hartzell "Legacy" composite blade family. There are 16 different Legacy unique aerodynamic designs, utilized on 24 different type certificated installations, including the Beech 1900C and D, Shorts SD3-60, Dornier Do328, and Pilatus PC-21. The Legacy line is still in production with over 20,000 blades produced. Many of the original CASA 212 blades are still in service with over 50,000 hours TSN.

In the 1990s, carbon/epoxy laminate was introduced into the Legacy family. The addition of carbon increased the capabilities of the design allowing composite blades



Carbon versus wood.

on more demanding installations. The carbon designs are also in production for large hovercraft.

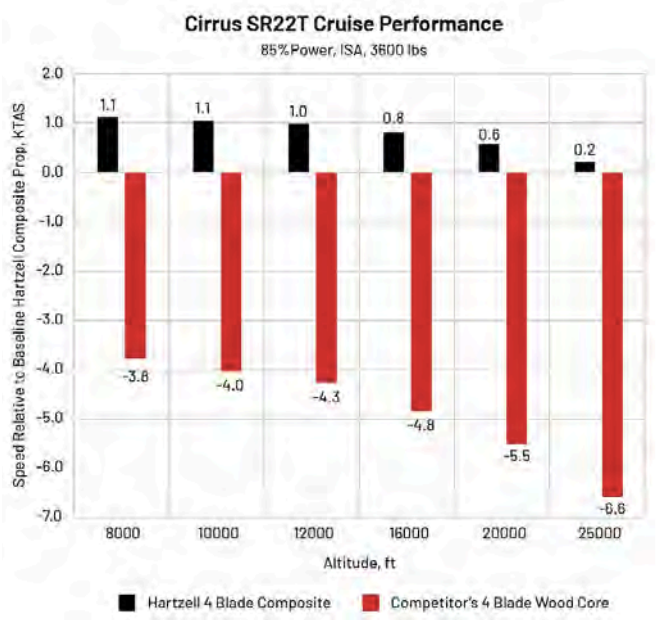
Next-Generation Composite Technology: ASC-II

As early composite propellers were slowly adopted across the aerospace and defence industries, it became apparent that improvements were needed to reduce the high cost of the manufacturing process. Hartzell Propeller's technical team rose to the challenge, refining the materials and manufacturing techniques to produce more cost-effective composite blades.

In 2006, Hartzell introduced the second generation Advanced Structural Composite propeller blade (ASC-II), utilizing a resin transfer molding process and aerospace-grade carbon fibre composite materials. The ASC-II blade consists of a monocoque structure of carbon fibre laminates over a low-density foam core and integrated into a co-molded stainless steel shank.

The leading edge outboard of the de-ice boot is protected with a co-molded electroformed nickel erosion shield to mitigate water and foreign object damage (FOD). In addition to enduring gruelling fatigue loads, the blades are designed and tested to withstand direct lightning effects. Lightning tests are also performed on de-iced propellers to

Bird strike testing with 4-lbs weight.



assure the aircraft system is protected from indirect lightning effects. Each and every new blade design is impact tested to demonstrate the ability to tolerate bird strikes.

Hartzell's ASC-II technology was launched with the Cirrus SR-22T and has since been used on 35 different blade part numbers, 14 different propeller type certificates, and 30 different Aircraft Type Certificates. To date, more than 45,000 (and counting) ASC-II composite propeller blades have been produced using these advanced materials and proprietary manufacturing processes.

Materials Matter: Carbon Fiber Composite vs. Wood Core

Not all composite propeller blades are made the same. Unlike some propellers on the market, Hartzell's composite blades are designed using modern aerospace materials, such as structural carbon fibre over urethane foam cores — not thin environmental layers of composite over a wood core.

Carbon fibre blades are significantly thinner than laminated wood blades, producing less drag as a result. Hartzell's composite materials enable wider, thinner airfoils that can still bear the structural load required for optimum aircraft operations and also allow for popular designs like the swept-tip scimitar blade. In this way, Hartzell's aerodynamic composite blades can yield more thrust and deliver better acceleration and climb performance.

When compared to aluminum propellers, Hartzell's composite props offer superior strength, damage resistance, and significant weight reduction. Due to the lower weight and corresponding lower moment of inertia, composite blade propellers can also enable a higher blade count, which can enhance performance across all flight spectrums, especially for higher-horsepower aircraft.

Hartzell's composite blades are engineered to be strong and impact-resistant, making them ideal for off-airport, backcountry operations. In particular, the wedge retention system and stainless steel shanks are much more durable than the alternative aluminum/ lag bolt design.

Left: The Cirrus SR22T Cruise Performance.
Above: Composite propeller blades don't just look sleek and attractive on the ramp; they also offer a number of performance and efficiency benefits.

Wood core propellers are very susceptible to moisture absorption which can lead to imbalance and a significant reduction in the strength of the wood. This is why some wood core blades are required to be returned to the factory in the event the protective covering is worn or damaged to the point where the wood is exposed.

Adding to the value is the maintenance advantage offered by Hartzell's composite blades. Very often, minor nicks, scratches, and dings on Hartzell composite blades actually meet the criteria for airworthy damage. This allows for continued flight until minor repairs can be accomplished on-wing by an A&P or a repairman in a part 145 shop using commonly-available tools and kits available from Hartzell.

When major repairs or factory-only repairs are required, Hartzell's composite blades can be restored to factory-new condition, enabling a significant increase in usable life over metal or wood core blades. In fact, Hartzell structural com-

Examples of airworthy damage to composite blades.

posite blades are certified for unlimited life and can be repaired in the field or at 30+ overhaul shops globally, including Hartzell's state-of-the-art Service Center in Piqua, Ohio.

Making the Switch

Carbon fibre propellers are the fastest-growing segment of propeller technology today due to the advantages they offer in terms of weight savings, performance benefits, and superior strength and durability. As a result, many aircraft manufacturers now select composite props as standard equipment on their airplanes, and thousands of aircraft owners and operators have elected to upgrade from aluminum propellers to the newest composite blades through Hartzell's Top Prop STC Propeller Conversion Program. Furthermore, several companies that offer engine conversions or modifications collaborate with Hartzell to have a Top Prop propeller approved with their engine modification STC.

The Path to Certification

Hartzell's Quality Management System is FAA-approved and AS9100C certified to maintain high quality and safety standards throughout the design, engineering, manufacturing, and testing processes. Hartzell propellers for type-certificated aircraft meet the rigorous safety, performance, and airworthiness standards set forth by regulatory bodies.

The Pilatus PC-21 was one of the aircraft fitted with Hartzell's seminal Legacy composite blades.

Electric aircraft such as Harbour Air's eBeaver require a lightweight propulsion solution to counter the added weight of batteries.

All certificated propellers have shown compliance to Code of Federal Regulations Title 14, Part 35, "Airworthiness Standards: Propellers." Subsequent foreign certifications are validated by the civil aviation authority of each country.

Inside the Flight Testing Process

With a dedicated team of certification experts and an Organization Designation Authorization (ODA) from the FAA, Hartzell has successfully navigated the meticulous certification process to produce hundreds of airworthy certified propellers. As an example, for a recent four-blade composite STC, Hartzell flight tested three different Cirrus SR22T aircraft for nearly 100 flight hours in total. The testing process compared four different propeller models, including the airplane's stock three-blade Hartzell composite baseline, a new three-blade design prototype, the new 4 blade composite design and a competitor's four-blade wood core STC.

High-voltage lightning strike testing.

The new four-blade outperformed the other propellers in several key areas of flight, including five percent better climb performance, noise reduction of 2 dB(A), and, most significantly, 4 kts faster when compared to other four-blade propeller in cruise speed. By flight testing in real-world conditions, Hartzell ensures its composite propellers are optimized for safety, reliability, and efficiency in every scenario and phase of flight.

Propelling the Future of Flight

With decades of experience in the design and manufacturing of structural composite blades, Hartzell Propeller is still innovating and optimizing its processes, leveraging sophisticated engineering analytics and flight testing capabilities to design better airfoils for next-generation aircraft.

Since 2019, Hartzell has dedicated tens of thousands of engineering and development hours to electric, hybrid, and hydrogen powered aircraft, with several prominent programs underway. Composite propellers have already proven critical for electric/hybrid aircraft such as Eviation's all-electric Alice and Harbour Air's eBeaver, which require a lightweight propulsion solution to counter the added weight of batteries.

This blend of sophisticated engineering analytics, certification skills, and world-class manufacturing technologies continues to make Hartzell Propeller the global leader in propeller design and manufacturing — and an ideal partner for AAM programs seeking custom propulsion solutions. ■

Aviation Services

Aviation Services

Aviation Services

Philippine Mars makes its final journey

A new home for an old warhorse means its legacy will live on.

IT WAS THE END OF ONE ERA on British Coumbia's West Coast and the beginning of a new one in Arizona as Port Alberni, BC-based Coulson Aviation announced in mid-December 2024 that its Philippine Mars aircraft was scheduled to depart from Sproat Lake in Port Alberni and make its final journey to the Pima Air and Space Museum in Tucson where it will be preserved for future generations. The Philippine Mars is one of only two remaining Martin JRM Mars flying boats, the other being the Hawaii Mars, which was sent earlier in December 2024 to the BC Aviation Museum in Sidney, British Columbia.

"Having both of the Martin Mars historically preserved in these museums is our way of honouring the role these aircraft have played in both aviation and firefighting history," said Wayne Coulson, CEO of Coulson Group. "[December 2024] has been an exciting month for both Martin Mars waterbombers. As a fitting tribute to their years of service and years of hard work by many people in BC and the US, we are pleased to see both Mars aircraft landing to rest at world class institutions in 2024."

Scott Marchand, CEO, Pima Air and Space Museum shares Coulson's sentiments. "We are pleased to have the Philippine Mars join our museum where we will preserve this World War II-era aircraft for decades to come," said Marchand.

The aircraft's route included a stop in San Francisco, California for customs clearance and to comply with the requirement to stop before sunset. The Martin JRM Mars aircraft was once based in nearby Alameda, California, where it was originally operated by the US Navy. The plan for the Philippine Mars was to be disassembled at its factory production joints and transported to the Pima Air and Space Museum. The final flight of the Philippine Mars was led by Captains Peter Killin and Todd Davis.

Produced between 1942 and 1947, the Mars fleet flew cargo between Hawaii and the Pacific Islands to support the US Navy during World War II. After the war, they supported the Korean War with medical air transport lifts between Hawaii and California, later transitioning to cargo lift work between Hawaii and California before being decommissioned in 1956.

The surviving fleet of four aircraft were sold in 1958 to a consortium of timber companies in British Columbia, Canada, and converted into the world's largest waterbombers carrying 7,200 US gallons per drop. Coulson purchased two of the aircraft, the Hawaii Mars and the Philippine Mars, in 2007, which marked the beginning of the company's fixed-wing air tanker operations for aerial wildfire support. ■

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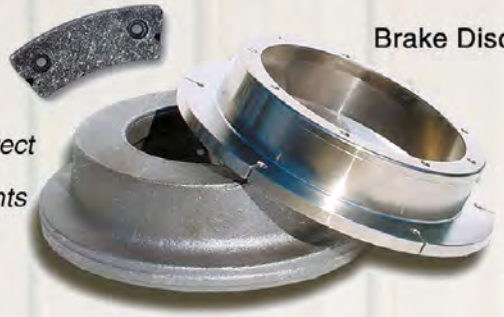

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