

Aviation International News

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DAVID MCGINTOSH

Paris Air Show 2019

The 737 Max program received a huge vote of confidence at the Paris Air Show last month. International Airlines Group (IAG) inked a letter of intent covering 200 Max 8s and Max 10s worth more than \$24 billion at list prices. CFM also signed a significant engine deal—valued at \$20 billion—during the show (see page 6). For more Paris Air Show news, also see pages 8 and 10.

Aircraft

Quest buy expands Daher line. > page 8

Airports

SMO operator bulldozing excess runway. > page 14

Avionics

Universal developing a new FMS style. > page 46

Raytheon, UTC merger to create a ‘giant’

by David Donald

Citing “less than 1 percent overlap” between the two companies, Raytheon International CEO John Harris spoke at the Paris Air Show, dismissing concern expressed by President Donald Trump over the merger of his company and United Technologies Corp. (UTC). Announced on June 9, the all-stock “merger of equals” will create an industrial defense/aerospace giant to be known as Raytheon Technologies. The new entity will bring together Raytheon’s portfolio with those of UTC subsidiaries Pratt & Whitney and Collins Aerospace (itself a product of the 2018 merger of Rockwell Collins and UTC’s Aerospace Systems business unit).

President Trump tweeted that he was a “little concerned” that the union would reduce the number of bidders for defense and other government contracts. “It’s actually quite the opposite,” Harris told CNBC. “I’ve been at this for the better part of 35 years. I can’t remember a time we were ever

competing against [UTC].”

Upon completion of the Raytheon/UTC merger, the company will become the world’s second-largest defense/aerospace company after Boeing, and the second largest U.S. defense contractor behind Lockheed Martin. Revenue will be divided roughly equally between defense and commercial sectors.

Completion of the deal is due for the first half of 2020, following the partition of UTC into three separate companies. UTC’s Otis elevator business and Carrier subsidiary (environmental control and building systems) are being spun off and will not form part of Raytheon Technologies. With Raytheon currently headquartered in Waltham, Massachusetts, and UTC in Farmington, Connecticut, Raytheon Technologies is due to be located within the greater Boston metro area.

UTC shareholders will own approximately 57 percent of the new company, with Raytheon shareholders taking 43 percent. The

combined company value is \$166 billion and, based on 2019 sales, the new company will generate \$74 billion in annual revenue. The company’s first CEO will be Greg Hayes, UTC chairman and CEO, with Raytheon’s CEO, Thomas Kennedy, becoming executive chairman. Hayes is due to become chairman and CEO after two years. The board will

> continues on page 58



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Completions

The industry is experiencing an uptick in demand, thanks to new and preowned transactions and operators’ decision to use avionics installation time to provide a cabin refresh.

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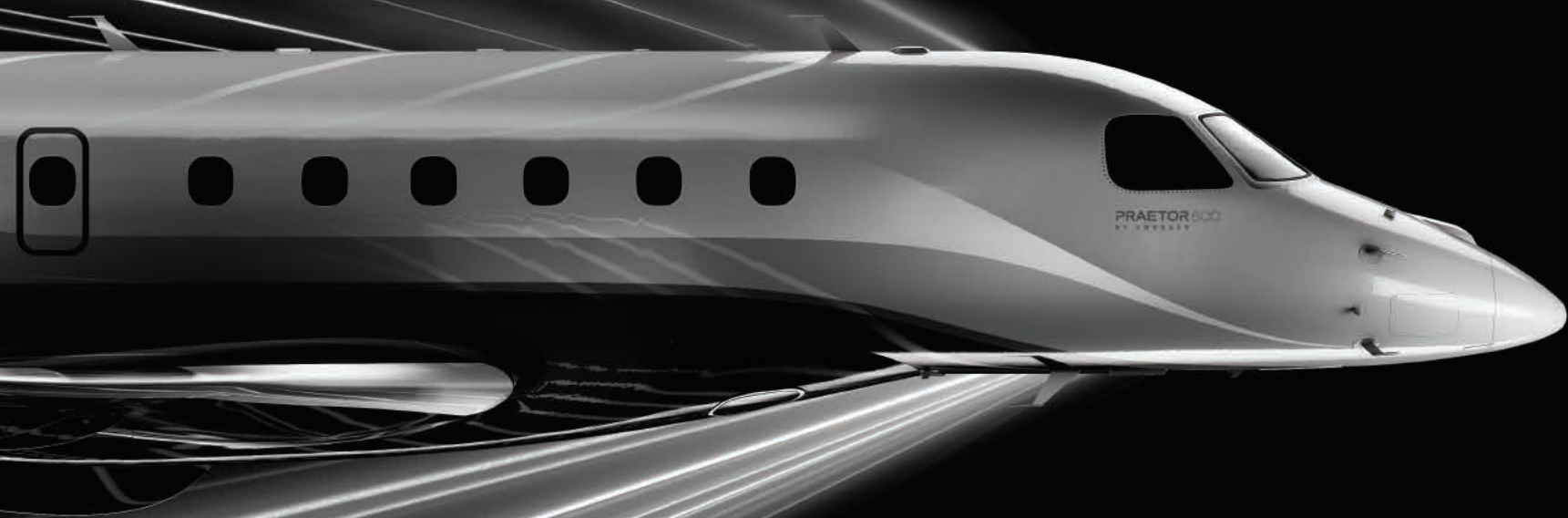


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D-DAY

More than 300 World War II veterans returned to Normandy last month to commemorate the 75 anniversary of the Allied invasion that turned the tide in Europe.

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AIN's Thurber takes top journalism award

AIN editor in chief Matt Thurber has won the 2019 Aerospace Media Award for the Best Safety, Training, & Simulation submission, sponsored by CAE. Thurber's article—Learning to Fly on Simulated Wings—appeared in the March issue of AIN and chronicled the ab initio flight-training experience of Bill Forelli, a marketing manager for an online electronics retailer who soloed in less than 10 hours, leveraging his experience with computer-based programs such as Flight Simulator X and X-Plane. **M.P.**

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ONE AVIATION REQUESTS COURT APPROVAL FOR ASSET SALE

A motion filed June 17 in the ongoing Chapter 11 bankruptcy case of Albuquerque, New Mexico-based One Aviation requests court approval on procedures for the direct sale of the company's assets either to debtor-in-possession (DIP) Citiking International or a higher bidder. The filing establishes Citiking as the "stalking horse" bidder—selected to establish a minimum price for the company and dissuade lower bids—for One Aviation's assets in a proposed Section 363 sale. This development came one week after the U.S. Trustee in the Chapter 11 case moved to dismiss the company's prepackaged reorganization plan, which could have ultimately forced One Aviation, manufacturer of the Eclipse 500/550 light jet, into Chapter 7 liquidation. A 363 sale would stave off outright liquidation, and also allows for higher bids than Citiking's to be submitted for consideration in an auction for the company's assets. The proposed 363 sale has also encountered headwinds from DW Partners LP—representing DWC Pine Investments, a previous investor and current lienholder in One Aviation. The hearing on the 363 sale is currently scheduled for July 1.

GULFSTREAM OBTAINS FURTHER FAA NODS FOR EFVS-TO-LAND

Gulfstream Aerospace has expanded its list of aircraft approved by the FAA to use its enhanced flight vision system (EFVS) for touchdown and rollout without the pilot using natural vision to view the runway. The most recent approvals for the EFVS credit are for the G650/650ER, G550, and G450. With this latest round, all of the Savannah, Georgia manufacturer's certified in-production models, as well as the out-of-production G450, can now use the EFVS for landing.

FAA PUBLISHES CIRRUS VISION JET AD

In response to three recent in-flight incidents that resulted in the grounding of the Cirrus SF50 fleet, the FAA has published a new airworthiness directive for the Cirrus light jet, reinforcing the emergency AD issued in April. To address the instances of engagement of the single-engine jet's stall warning and protection system (SWPS) and/or the electronic stability and protection (ESP), even in cases when sufficient airspeed and proper angle of attack (AOA) existed for normal flight, the AD reiterates the agency's mandated replacement of its AOA sensors with improved AOA sensors. The airframer and AOA sensor manufacturer Aerosonic identified the probable root cause of the problem as an AOA sensor malfunction due to "a quality escape in the assembly of the

AoA sensor [part number 4677-03] at Aerosonic." Cirrus issued a service bulletin with instructions for replacing the suspect sensor. The FAA adopted the new AD without prior opportunity for public comment, but for those wishing to do so, any such comments must be received by August 1.

ROLLS-ROYCE BUYING SIEMENS E-AIRCRAFT BUSINESS

Rolls-Royce is accelerating its shift to more environmentally sustainable aviation transportation with a plan, announced last month at the Paris Air Show, to acquire Siemens's electric and hybrid-electric aerospace propulsion "eAircraft" business. Terms of the agreement were not disclosed, but Rolls-Royce expects the deal to be completed later this year, "following a period of employee consultation." Since 2017, Rolls-Royce and the Siemens eAircraft operation have been working together along with Airbus on the E-Fan-X demonstrator, which is a hybrid-electric propulsion test program for a BAe 146 regional jet—one of the jet's four engines is being replaced with a two-megawatt hybrid-electric powerplant.

JAPAN POLICE ORDERS FIRST SUBARU BELL 412EPX

The Japan National Police Agency (JPNA) placed the first order for the Subaru Bell 412EPX medium twin helicopter last month at the Paris Air Show. Last year, Bell and Subaru announced their collaboration on a commercial enhancement of the helicopter that they co-developed for the Japan Ministry of Defense (JMOD) utility helicopter program. Subaru delivered a prototype aircraft to JMOD for testing this February. The helicopter features a more robust main rotor gearbox dry run capability, an increased internal maximum gross weight to 12,200 pounds, and mast torque output of plus 11 percent at speeds below 60 knots.

MITSUBISHI WORKING WITH PARTNERS ON M100 DEFINITION

Mitsubishi met with prospective new strategic partners at the Paris Air Show to help refine airframe changes to the fuselage of the former MRJ70, now branded M100, to allow it to meet the 86,000-pound weight limit required by U.S. airline scope clauses. Scheduled for certification in 2023, the M100 would fly to a range of 2,000 nm, while seating 76 passengers in a three-class configuration, requiring Mitsubishi to seek advances to the airframe to lower weight—including the addition of new lightweight materials such as composites and different metallic alloys. Engineers have also reduced the M100's cargo volume to gain more space in the aircraft to carry more passengers—the MRJ70 accommodated up to 76.



Daher, Safran, and Airbus will join forces to create EcoPulse, a wing-mounted distributed hybrid-propulsion demonstrator based on Daher's TBM platform. First flight is expected in 2022.

Daher, Airbus, and Safran team up on EcoPulse hybrid

by James Wynbrandt

Daher, Airbus, and Safran announced a collaborative partnership last month at the Paris Air Show to design and develop EcoPulse, a wing-mounted distributed hybrid-propulsion demonstrator based on Daher's TBM platform. First flight is expected in 2022, according to the three French companies.

Kickstarted by the French Civil Aviation Research Council with support from the French Civil Aviation Authority, the project aims to validate technologies designed to reduce emissions and noise pollution and create new uses for air transportation.

Engine manufacturer Safran will develop the distributed hybrid-propulsion system. Airbus has charge of aerodynamic optimization of the propulsion system, installation of high-energy-density batteries, and their use to power the aircraft. Daher will handle component and systems installation, flight testing, regulatory approvals, and construction.

The distributed hybrid propulsion system consists of a turbogenerator, a combined turbine and power generator; an electric power management system; and integrated electric thrusters, also

known as e-Propellers. These thrusters will be integrated into the EcoPulse wing, providing both thrust and aerodynamic gains, the latter including reduced wing surface area and wingtip vortices, thereby lowering drag.

Though the design is in its early stage, the small model displayed at the 2019 Paris Air Show and in animated videos appeared identical to a Daher TBM turboprop but for three small, evenly-spaced electric motors and propellers on the leading edge of each wing.

These electric motors could be used to taxi the aircraft to and from the runway and also during cruise and descent in place of the TBM's Pratt & Whitney Canada PT6. Meanwhile, the turboprop engine would be used for takeoff and other high-power flight phases, charging the hybrid system's batteries at the same time. Expected performance metrics have yet to be released.

"We are determined to make [reduced environmental impact of aircraft] a distinctive feature of the French aircraft industry," said Daher senior v-p of aerospace and defense business, Nicolas Orance. ■

IndiGo opts for CFM Leap-1A in \$20B deal

Indian budget carrier IndiGo placed a \$20 billion order (at list prices) for CFM International Leap-1A engines to power 280 Airbus A320neos and A321neos on the opening day of the Paris Air Show, marking CFM's largest single engine order. The airline will take delivery of its first Leap-1A-powered A320neo in 2020. Its contract also includes spare engines and an overhaul support agreement, as well as a long-term service agreement for the engines.

IndiGo is the largest customer for Pratt

& Whitney GTF (geared turbofan) engines for Airbus 320neos. Following initial issues with the GTF, IndiGo suffered a large number of grounded aircraft, but acknowledged it received compensation from Pratt & Whitney for the AOGs.

The airline presently operates a fleet of 17 A320ceos powered by CFM56-5B engines, part of a total fleet of 215 A320/A321-family aircraft. Fast-growing IndiGo has a fleet of more than 230 aircraft, with around 1,400 daily flights, 54 domestic destinations, and 19 international destinations. **N.M.**



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■ With Quest buy, Daher extends product line

French airframer Daher, manufacturer of the popular TBM line of single-engine turboprops, is expanding its aircraft portfolio with the purchase of U.S.-based Quest Aircraft, the company announced on June 13.

The Sandpoint, Idaho company builds the 10-seat, unpressurized Kodiak 100, with more than 270 in service. The rugged, single-engine, high-wing turboprop is certified in 67 countries and is capable of operating



Daher has acquired Idaho-based Quest Aircraft and its Kodiak 100. The purchase will also give Daher its first industrial presence in the U.S.

on uneven or very short runways.

"As a powerful and maneuverable aircraft, used particularly for humanitarian missions to provide aid to isolated communities, the Kodiak 100 perfectly complements our TBM product range and is fully in line with Daher's long-term vision as a company committed to the future of aviation," explained Patrick Daher, chairman of the family-owned company.

All 240 Quest employees are expected to join Daher, and according to company CEO Didier Kayat, the purchase, which is expected to be completed by the end of the year, also represents a larger, strategic expansion. "The Quest Aircraft Company's acquisition represents an additional step in our development in the United States and an overall strengthening of our aircraft manufacturing business," said Kayat. "In addition to making Daher the world's seventh largest aircraft manufacturer in business aviation, it provides us with our first industrial site in the United States, thereby reinforcing Daher's position as a Tier-1 aerospace equipment and systems manufacturer, as well as a logistics and services provider." **C.E.**

Ex-Im backers step up to push for reauthorization

by Kerry Lynch

A month after the Senate restored full financing capabilities of the U.S. Export-Import Bank with the confirmation of three board members, industry leaders turned their focus to the next battle in the survival of the bank: reauthorization. The bank's current authorization is set to expire at the end of the fiscal year on September 30.

During the last reauthorization cycle, the Ex-Im's Bank's charter was permitted to expire for five months in 2015 as certain key Republican lawmakers believed that it was turning into corporate welfare. This time, however, the bank is facing a more accepting audience. House Financial Services Committee chair Maxine Waters (D-California) said during a hearing last month that the bank "has repeatedly been under attack" but that "failure to reauthorize and strengthen Ex-Im would result in the loss of tens of thousands of jobs, as U.S. exporters suffer declining overseas sales." Waters stressed the importance the bank plays in reinforcing international competitiveness.

Aerospace Industries Association president and CEO Eric Fanning offered his association's strong support for reauthorization in a letter to the committee. Fanning called the June hearing a "first step toward ensuring the bank can continue leveling the playing field for U.S. exporters." The U.S. aerospace industry employs

more than 2.4 million in the U.S. and exported more than \$143 billion in goods in 2017 with an \$85.9 billion trade surplus, he noted. But a functional Ex-Im bank can do more to strengthen the economy, he said, particularly in light of the fact that 95 export credit agencies exist worldwide and international competitors are relying on them to strengthen their own businesses. "This means the U.S. Export-Import Bank is a necessary equalizer in an increasingly competitive global market," Fanning said.

He disputed critics' claims that closing the bank would save taxpayer money. "The bank's financing options are in no way a taxpayer-funded hand-out. Instead, they generate money for the taxpayers." He further disputed contentions that the bank competes with private lenders, saying it is the "lender of last resort" that requires proof that the applicant is unable to secure private funding.

Small Business Effects

As for concerns that the bank only supports large companies, he said noted that 90 percent of transactions supported small businesses in 2016. However, even transactions involving large companies have a ripple effect that supports numerous small businesses in the supply chain. "Whether it's bolts and screws, or hoses and wires, small and medium-size companies make the parts that are critical to build, maintain,

repair, and overhaul airplanes and other large commercial goods. Without small businesses, the aerospace industry wouldn't exist," he said. "The bank's support for aerospace means support for small business. The Export-Import Bank is a cornerstone of American competitiveness in an increasingly fierce global market."

Fanning's appeal was reinforced by the handful of representatives testifying before the committee, including from the National Association of Manufacturers, International Association of Machinists & Aerospace Workers, and Chamber of Commerce and individual businesses, among others.

Ranking member of the committee Patrick McHenry (R-North Carolina), however, is seeking changes that include modernization and diversification of the bank. He stressed the bank should be "a tool of our national interests, and even our national security interests" in light of China's "unparalleled levels of export subsidies for its companies." Ex-Im should focus on "exports of the future" and modern technologies, he said.

And, not everybody is on board with a renewal of the bank's full charter. The Reason Foundation's Reason magazine responded after the hearing recalling that in 2015 "there was widespread agreement in Congress that the Export-Import Bank—the U.S. government's export credit agency—was nothing but a crony bank, mostly serving the greedy interests of Boeing and other large companies," and reiterating its belief that the Ex-Im isn't all about small businesses. Winners of American subsidies, the magazine continued, have been Air China and Pemex. Meanwhile, with Ex-Im's lending ability hampered, exports continued, Reason added. ■

■ Paris Airshow News

Eviation's Alice To Fly This Year

Israel-based Eviation brought a full-scale prototype of Alice to the Paris Air Show and secured a "double-digit" order for the \$4 million airplane from U.S. regional airline Cape Air. Alice is equipped with three 260-kW Siemens electric motors fitted with Hartzell variable-pitch propellers, with one on each wingtip and one fitted to the tail. Alice's lithium-ion batteries weigh 8,200 pounds, which is 60 percent of the airplane's 14,000-pound mtow. Performance of the Alice as a regional airliner includes range, with 45-minute reserve, of 565 nm and 240-knot cruise speed at 10,000 feet. First flight of the Alice is planned by the end of this year.

Aviation Sustainability Assumes New Urgency in Paris

Sustainability played a major role during this year's Paris Air Show as the global aviation market expresses an increasing recognition that new technologies, biofuels, and operational procedures must become more environmentally friendly. "We think it [is] clear the Paris Air Show is displaying something completely new," said analyst Jefferies Financial Group. The firm earlier had identified the environment as a new risk to aircraft deliveries. "We felt something had changed" and wondered whether that would be evident at the Paris Air Show, the firm said. And it began with the opening Airbus press conference with Airbus CEO Guillaume Faury saying, "We must find a way to decarbonize aviation."

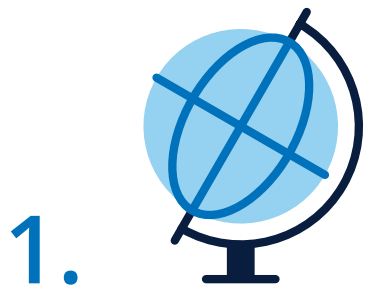
Super Hornet Targets Europe for Sales

Boeing's F/A-18E/F Super Hornet has undergone something of a renaissance in recent times. Deals concluded with the U.S. Navy to build 78 Block III Super Hornets in a multi-year procurement and to retrofit the existing fleet to the new standard have not only underlined the confidence that the Navy has in the type, but also keeps Super Hornet-related production work going until at least 2033. Now becoming the baseline production variant, the Block III brings together a range of new capabilities and upgrades that makes the aircraft a considerable advance over its predecessors, not least of which is an airframe life extension from 6,000 hours to 10,000 hours.

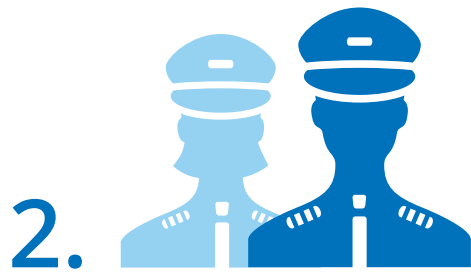
American Airlines Orders 50 A321XLRs

American Airlines is to add 50 Airbus A321XLRs to its fleet, becoming the first U.S. carrier to sign up for the newly launched longer-range A321neo derivative. The purchase agreement includes the conversion of 30 of American's existing A321neo slots to A321XLRs and incremental orders for an additional 20 A321XLRs. American Airlines is scheduled to have 17 A321neos by year-end and 50 by the end of 2021.

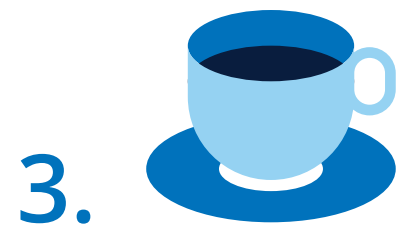
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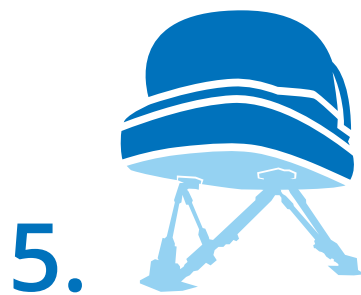
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Operators adjust to new Cuba restrictions

by Kerry Lynch

The U.S.'s decision to abruptly prohibit Part 91 flights to Cuba has left "scores and scores of people in a bind," according to Eric Norber, founder of Cuba Handling, which specializes in facilitating private aircraft travel to and itineraries in Cuba.

New regulations were released and took effect on June 5 that effectively banned both privately operated N-numbered aircraft, U.S. cruise ships, and other U.S. private vessels (such as fishing and sailboats) from traveling to Cuba.

The regulatory changes essentially reinstated a requirement for licensing for private aircraft travel to Cuba but at the same time said a license would not be granted except under rare cases. Licensing requirements for these operations had been eliminated under the Obama Administration. There was no grandfathering provision for pre-arranged private aircraft or cruise ship travel.

Meanwhile, the Trump Administration also eliminated the people-to-people category for travel to Cuba. This was one of a dozen categories under which people were permitted to travel to Cuba, and arguably the most commonly used reason for such travel. However, the U.S. government did grandfather pre-arranged travel for people-to-people purposes.

The Department of Commerce's Bureau of Industry and Security (BIS), the Department of the Treasury's Office of Foreign Assets Control (OFAC), and the Department of State said they were coordinating on the policies to restrict non-family travel "to hold the Cuban regime accountable for its repression of the Cuban people and its support of the Maduro regime in Venezuela," the agencies said.

"Specifically, this rule amends License Exception Aircraft, Vessels and Spacecraft (AVS) in the Export Administration Regulations (EAR) to remove the authorization for the export or re-export to Cuba of most non-commercial aircraft and passenger and recreational vessels on temporary sojourn," the rule said. "Additionally, this rule amends the licensing policy for exports and re-exports to Cuba of aircraft and vessels on temporary sojourn to establish a general policy of denial absent a foreign policy or national security interest as determined by the U.S. Government."

"This is tough to read and understand. Nothing new about that," said OpsGroup in a notice about the changes. But the net result is "you cannot operate an N-reg aircraft privately to Cuba for any reason. This includes Corporate. ...it's a no go."

Universal Weather & Aviation further said that the agency indicates licenses will be issued only in extraordinary circumstances. Typically this would involve the security of the U.S.

"The way the changes were drafted and worded, it seemed to be poorly coordinated across the different types of travel to Cuba,

including the different categories and the different means of travel," added Norber. This has created a quandary, he said, because many people who booked cruises under people-to-people are grandfathered under their reason for the travel but are not able to get there because the cruises were specifically and immediately prohibited.

"It's paradoxical," Norber said. "Unfortunately it's not the first time we've seen confusing or conflicting wording or regulations." Even when the Obama Administration relaxed the regulations by executive order, those orders were in conflict with existing regulations and it took some time to sort out.

Permitted Travel

As for the effective ban on private aircraft, he said his own company had numerous clients who have had trips planned to Cuba. "They've been planning well ahead. In some cases, they have paid ahead for the permits, the handling, and the facilitation of the flight. In the course of 24 hours, their trip was no longer permitted," said Norber. This has left those operators in the lurch, he added.

While private aircraft are essentially banned (there will be exceptions when used for the security of the U.S. or safety of the air transportation system), charter and scheduled airlines continue to be permitted, as do air ambulance operations. Norber advised that those traveling must ensure that they fall under the

11 permitted categories of travel to Cuba. "The changes simply alter how people get to Cuba. It restricts their options," he said.

Regulations banning private aircraft will affect hundreds of operations every year, Norber said. When the rules were first relaxed, Norber's company alone had handled well over 1,000 requests a year for private non-charter flights to Cuba. That initial bubble has deflated a bit over the past 12 to 18 months, but flights were still well into the hundreds, he said. He believes that the threats of the changes may have served as a deterrent in recent months.

As for those who had paid in advance to for what is now impermissible travel, Norber was confident that the Cuban government and businesses would work with operators on refunds. He added, in his experience, Cuba has worked to accommodate such changes and they have viewed the travel from the U.S. generally favorably. The restrictions are U.S.-driven rather than spurred from Cuba, he stressed.

OpsGroup agreed, noting Cuban authorities reiterated: "In our country, there is no regulation in this regard. They can fly over and land [with] registrations of any nationality without any distinction, provided they meet the requirements requested."

"None of the restrictions come from the Cuba side," OpsGroup said. "So everyone continues to be welcome in Havana, it's just the U.S. government that is restricting matters for U.S. operators." ■



Jaunt Air Mobility will partner with Uber to develop an air taxi.

Uber announces another eVTOL partner

Jaunt Air Mobility and Uber will partner to develop an electric vertical takeoff and landing (eVTOL) air taxi, Uber announced on June 11 at the opening of its Uber Elevate Summit 2019 in Washington, D.C. According to Uber, Jaunt has expertise in reduced rotor operating speed (ROSA) aircraft.

"Jaunt Air Mobility has assembled a highly talented team of experienced engineers with a long history of designing and certifying eVTOL vehicles," Uber Elevate director of engineering Mark Moore said.

ROSA will enable an air vehicle design that offers quiet operations, maximum safety, and enhanced ride quality that keeps passengers in a level position from

takeoff to landing, according to Uber. Jaunt's specialized rotor and wing design provides both high hover and cruise flight efficiency, allowing it to meet Uber's mission requirements with an all-electric propulsion system.

In a separate but related announcement, Honeywell Aerospace and Jaunt signed a memorandum of understanding to define avionics, navigation, flight control, and connectivity for Jaunt's eVTOL. The two companies will work to develop the technical requirements and a definitive agreement that will support Jaunt's eVTOL demonstration program by fall 2021, according to Honeywell. **J.S.**

Paris Airshow News

United Airlines Opts for up to 39 Embraer E175s

Embraer captured an order from United Airlines for up to 39 70-seat E175s valued at \$1.9 billion, should all options be exercised, the Brazilian manufacturer announced at the Paris Air Show. United placed a firm order for 20 of the airliners, with deliveries to begin in the second quarter of 2020, and has options on 19 more. United will use the new E175 to replace older 70-seaters currently in service with its regional partners.

IAI, Embraer To Develop Praetor 600-based AEW Model

Israel Aerospace Industries subsidiary Elta Systems and Embraer signed a strategic cooperation agreement to jointly develop an airborne early warning (AEW) variant of the Praetor 600. The P600 AEW is targeting a new segment of the airborne early warning market, namely one for air forces with lower defense budgets that want to be able to operate this type of capability. Under the agreement, Embraer is charged with the aircraft, ground support, and communications provision, while Elta will deliver the S-band active electronically scanned array (AESA) radar, signals intelligence system, and other electronics and associated integration. A prototype will not be built until a customer commits to an acquisition—although IAI has already been flying the system aboard its Boeing 737 testbed.

De Havilland of Canada Ships Its First Dash 8

The newly christened De Havilland of Canada revealed it is delivering its first Dash 8-400 turboprop—to Kazakhstan's Qazaq Air—since parent company Longview Capital took control of the program from Bombardier on June 1. Separately, the company introduced TAG Angola Airlines as the customer for a previously announced order for six of the turboprops. While De Havilland of Canada remains tied to a land lease deal at the Dash 8's production site in Downsview, Canada, until 2023, over the next 12 to 24 months it plans to "explore all options" relating to the location of final assembly.

ATR Eyes Year-end Launch of STOL 42 with 17 Commitments

ATR has secured commitments for 17 of its short takeoff and landing (STOL) variant of the ATR 42-600 and is hoping to launch the program by year-end, CEO Stefano Bortoli said at the Paris Air Show. Turboprop aircraft leasing specialist Elix Aviation Capital signed a letter of intent for 10 of the ATR 42-600S variants, which will be capable of operating from runways as short as 2,650 ft (800 meters). Deliveries of the aircraft would occur between 2022 and 2024. In addition, Air Tahiti ordered two ATR 42-600S STOLs, while an unidentified customer inked a deal for five of the model.



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DEF contamination downs two Citations

by Matt Thurber

On May 9, two Cessna Citation 550s operated by air-ambulance operator Air Trek lost power—in both jets' engines—due to fuel contamination by diesel exhaust fluid (DEF). The pilots were able to land safely.

The jets were both fueled by the FBO at Punta Gorda Airport (PGD) in Florida, which is operated by Charlotte Country Airport Authority. According to a spokeswoman for the airport authority, “The incident was isolated to the operations of one fuel truck, but the fuel itself on the truck had not been (and is not) contaminated. However, the icing-inhibitor injective additive appears to have been cross-contaminated with DEF.”

According to information from AOPA, which was confirmed by the airport authority spokeswoman, one of the Air Trek Citations was flying to Niagara Falls, New York, and landed safely in Savannah, Georgia after the failure of both engines. On its way to Chicago, the other Citation “experienced an engine failure, and landed safely in Louisville, Kentucky,” AOPA said.

In a preliminary accident report on the Citation that landed at Savannah, the NTSB said that the airplane flew to Naples, Florida after being fueled with 480 gallons of jet-A mixed with a fuel system icing inhibitor (FSII) additive. On the flight from Naples to Niagara Falls, at 35,000 feet and one hour, 20 minutes from takeoff, the left engine slowly started to spool down, and attempts to restore engine power proved futile. After requesting a lower altitude and descending, the pilot shut the left engine down after it showed no oil pressure.

At 8,000 feet while flying to Savannah, the right engine began losing power, and after declaring an emergency, the pilot was able to land on Runway 19. According to the NTSB, “The second-in-command noted that the left fuel filter bypass light did not illuminate but that the right fuel filter bypass light did illuminate.”

DEF is required in certain diesel-engine-powered vehicles, typically those built after 2010, including airport fuel trucks. The fluid is indistinguishable from the typical FSII—usually Prist—that turbine engines without fuel preheaters require to prevent fuel icing at high altitudes. DEF is a urea-based solution that lowers nitrogen oxide pollutants in diesel exhaust and is not approved for use in jet fuel. When the two are accidentally mixed, crystals form, causing potentially catastrophic clogs throughout aircraft fuel systems.

Last year, a Falcon 900EX operated by Fair Wind Air Charter suffered failure of two of its three engines after departure from Miami Opa-Locka Airport. Luckily the pilots were able to land back at the airport using the remaining engine.

Fair Wind COO and equity owner Alex Beringer said that the NBAA DEF task force, of which he is a member, was notified of the Punta Gorda event. “The accidental mixing of DEF into the Prist tank is likely what occurred,” he told *AIN*. “DEF is a risk and remains a risk as long as these fluids remain on airport property.”

This is the third recent instance of DEF contamination, with, fortunately, no fatal accidents. Last November, seven turbine-powered aircraft at Omaha's Eppley Airfield were serviced with jet fuel that had accidentally been treated with DEF.

DEF Mitigation Efforts

The task force, which includes the FAA, industry groups, ground service operators, fuel providers, and operators, is working on mitigating the threat of DEF at airports. “My recommendation,” said Beringer, “is to get DEF off the airport property and exempt those on the airport property from

DEF. That's the fix for sure. Look at what happened to those two Citations. Luckily we had three motors and we lost only two of them. It's only a matter of time before something happens and hurts people.”

The problem with DEF stems not only from the requirement that modern diesel-powered trucks require the fluid but that the trucks have to carry DEF tanks and icing-inhibitor tanks. If the fluids get mixed up, it is nearly impossible to tell them apart.

In the case of Fair Wind's Falcon, the FBO had a good system, Beringer said, “but it fell apart.” There was no DEF stored at that facility, to help prevent accidental mis-filling. But the icing-inhibitor tank needed to be repaired, so a mechanic removed and welded the tank, then before reinstalling it back on the truck filled the tank with DEF instead of Prist.

After the incident, Beringer wrote to

› continues on page 30



A new Pilatus PC-12 delivered today is expected to retain 70 percent of its value in 2034, according to Vref's latest annual 15-Year Residual Forecast for in-production aircraft.

Vref analysis: turboprops, Phenom 300E set to hold best residual values by 2034

Turboprop singles such as the Pilatus PC-12 and Cessna Caravan “have remained at an industry-low depreciation rate,” according to Vref's second annual 15-Year Residual Forecast for in-production aircraft. Both of these aircraft are expected to retain 70 percent of their value in 2034, the report says.

Most business jets are forecast to retain between 40 percent to about 50 percent of their value in 15 years, Vref said, but the Embraer Phenom 300E once again outperforms in this category, with 68 percent of its value expected in 2034.

“The data reinforces the latest opinions of Vref management that the market is balanced and showing little if any signs of

slowing regardless of the continued tariffs with China and looming impeachment proceedings ahead of the 2020 election,” said Vref CEO Ken Dufour. “We are still cautiously optimistic about the new deliveries forecasted through 2020 and see no indicators as of yet that the manufacturers will miss their target numbers.”

In addition, he said, “We are seeing many aircraft owners of aging aircraft contemplating parting out versus a further investment of cash to meet 2020 compliance. This segment of the market has been weighing down averages for years and it will be good for the overall fleet values to see many of them leave the airspace for good.” **C.T.**

News Briefs

Embraer Moving Bizjet Production to Gavião Peixoto

With joint venture Boeing Brasil Commercial (BBC) expected to assume its regional jet production facilities in São José dos Campos, Embraer will move production of Legacy 450/500s and Praetor 500/600s to Gavião Peixoto. Completions, final flight-test operations, and delivery of Embraer's midsize business jets will then be consolidated at the company's Melbourne, Florida facility, it added. Phenom subassembly manufacturing will remain in Brazil, with final assembly continuing in Melbourne. The Gavião Peixoto site already houses manufacturing facilities for Embraer's Super Tucano light attack airplane and KC-390 military transport, as well as two paint shops, a business jet cabinet shop, and a service center capable of handling all Embraer products.

Signature To Provide Skyport Infrastructure for Uber

Signature Flight Support was named the first nationwide operations and on-airport infrastructure partner for Uber Elevate. As such, Signature will facilitate ground-based operations and skyport infrastructure for Uber Air, as well as be the ground handler of choice for UberCopter services. Uber Air plans to operate a network of electric air taxis in cities worldwide to enable four-person shared flights in densely populated urban markets, initially in U.S. launch markets Dallas and Los Angeles in 2023.

Flexjet Launches Days-based G650 Frax Program

Flexjet has launched a days-based shared ownership program aimed at high-utilization, large-cabin business jet customers. Available for the Gulfstream G650, it features pricing via a days-based model instead of one based on traditional fractional hours. The new program will start with two home bases: New York City and London, which are each financial capitals and popular business and personal travel destinations. Clay Wilcox has joined Flexjet as v-p of sales and will lead the company's new days-based fractional program.

TBM 940 Awaiting FAA Nod

The newest member of Daher's TBM family has received EASA certification, but still awaited its FAA signoff at press time. Nicolas Chabbert, senior v-p of the OEM's airplane business unit, said the first delivery was scheduled to take place on or about June 3 to a European customer. He acknowledged that the vast majority of the to-date orders for the 940 are from customers in North America. “The next step for us is to get validation from the FAA, and this is a process which is a little bit delayed,” he said. “Customers ... are waiting a little bit longer than we anticipated for this FAA validation but it is coming.”



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Santa Monica forges ahead to bulldoze excess runway

by Kerry Lynch

The city of Santa Monica is moving forward with efforts to permanently destroy excess pavement at each end of the now 3,500-foot runway at Santa Monica Airport (SMO), a step designed to ensure the runway will not return to the previous 5,000 feet. Plans call for tearing up 750 feet of extra pavement at each end and then constructing a 300-foot paved runway safety area at each end to keep the airport in line with federal standards.

While that runway safety area is intended to meet standards for a safety buffer, it is not intended to be as strong as the current structure that is capable of withstanding daily traffic. The remainder of the space will be seeded for grass. Aligning areas of the parallel taxiways will similarly be destroyed.

To be conducted in five phases, the project is to begin on June 16 and expected to continue through September 6. Each phase will involve airport closures, the city said. SMO will close altogether during two separate four-day periods: July 8 to 11 and August 5 to 8. Three other phases (June 16 to July 5, July 14 to August 2, and August 11 to September 6), will involve closures between 9 p.m. and 7 a.m. from Sunday night through Thursday morning. The airport advises checking Notams

concerning the closures or direct questions by email to Brian Ochoa.

“The city has always said it wants to get rid of this pavement. It’s not new at all,” said Alex Gertsen, director of airports and ground infrastructure for NBAA, adding the city wants to ensure pilots do not use that excess pavement. “It’s very unfortunate that the thinking is pilots are going to do rogue things. They want to make sure they do a really good job destroying it and then hydroseed the rest.”

As a result of a Part 13 administrative complaint filed against the airport, the city must use its own funds—at least for now—for the work rather than airport funds. The FAA has frozen the use of airport funds pending its review of the Part 13 complaint. NBAA was unsure when a final determination on that complaint will be issued, but Gertsen pointed out that the city has already shown a willingness to use its own money on the project.

In addition, the city does not believe it must conduct full environmental assessments for the work and as such is moving forward without complete evaluation. Of concern to NBAA, Gertsen said, is that it is taking the step without a wildlife assessment, since green areas might attract

wildlife that could pose a safety threat to aircraft operations. “We are working on the FAA to assess that aspect,” he said.

Separately, NBAA is challenging a January 2017 settlement agreement between the city and the FAA that facilitated the shortening of the runway and, ultimately, the possible closure of the airport in 2028. A U.S. Court of Appeals initially held that it didn’t have jurisdiction in the case, and NBAA subsequently followed with a case before the U.S. District Court for the District of Columbia. That case was briefed on jurisdictional issues last fall, and NBAA is awaiting a decision on whether the case will move forward.

“At this time there is still litigation pending questioning the validity of the settlement agreement,” said Jol Silver-smith, a member of the law firm KMA Zuckert which is representing NBAA in the case. “Speaking practically, one would think the city would be well advised not to proceed with spending any money on pavement removal if there is a risk that the settlement agreement could be thrown out. The city’s obligations, that it believes to be free of, would snap back into existence and effectively, [the city] would be in gross violation of its federal obligations by no longer having a 5,000-foot runway.” ■



Vista Global Holdings has completed its acquisition of U.S.-based per-seat charter brokerage and app developer JetSmarter. The deal gives Vista Global entry into the per-seat charter market, as well as a highly regarded mobile booking platform and tech development team.

Vista Global completes JetSmarter purchase

Vista Global Holdings (VGH) has completed its acquisition of U.S. based per-seat charter brokerage and app developer JetSmarter, the Dubai-based holding company confirmed on June 5. Jet Smarter joins VistaJet, XOJet, and Vista Lease in the VGH portfolio.

The purchase, announced in early April, provides VGH entry to the nascent per-seat charter market and a highly regarded mobile booking platform and

tech development team. It also provides refuge for JetSmarter, recently beset by negative media attention, lawsuits, and reported government investigations. JetSmarter reportedly was in discussions to settle a class-action lawsuit arising from unilateral changes to its membership rules at the time the purchase was announced.

With the deal consummated, “the [JetSmarter] technology will be embedded throughout the Vista Group,” a process

expected to take 20 weeks, VGH founder and chairman Thomas Flohr told **AIN**. That will enhance online offerings, including catering, flight tracking, and concierge services at all VGH companies, he said.

JetSmarter’s signature offering, per-seat charter, is viewed skeptically by many in the charter industry, but Flohr likened the offering’s prospects to Uber’s now popular Pool ridesharing feature, which was also derided when introduced. “I don’t think there’s a reverse gear on the shared economy,” said Flohr. **J.W.**

News Briefs

Aeroméxico Launches Private Jet Partnership

Mexican flag carrier Aeroméxico has launched a private jet division that will cater to passengers in Mexico and the U.S. It has partnered with Mexican private jet operator Aerolíneas Ejecutivas and U.S.-based Delta Executive Jets. The Aeroméxico Jet Card program requires an approximate \$125,000 base purchase, to be used on the company’s fleet of Hawker 400XPs, Learjet 75s, and Challenger 604s at different tier pricing levels. Aeroméxico customers who wish to fly privately can use Aerolíneas Ejecutivas to fly within Mexico and to the U.S., Canada, and Latin and South America. Those wishing to fly between destinations in the U.S. will use Delta Private Jets aircraft and crews to avoid cabotage issues. Helicopter service within Mexico is also available to cardholders.

FAA Administrator Nomination Comes Under Question

Steve Dickson’s nomination to the FAA administrator post apparently has hit a stumbling block. The Senate Commerce Committee is reviewing reports regarding a legal complaint alleging moves Delta Air Lines management retaliated against a pilot whistleblower who brought safety concerns to light. The moves allegedly took place while Dickson was senior v-p of flight operations for Delta. The complaint alleges that a pilot who raised safety questions was subsequently ordered to undergo a psychiatric evaluation that ultimately led to the loss of pilot privileges. Two subsequent evaluations disagreed with the initial evaluations and the pilot returned to duty. The White House announced its intention to nominate Dickson to the post in March, and the nomination initially had received rare support from nearly all corners of the industry.

SmartFly Launches Aggregated Bizav Buying Program

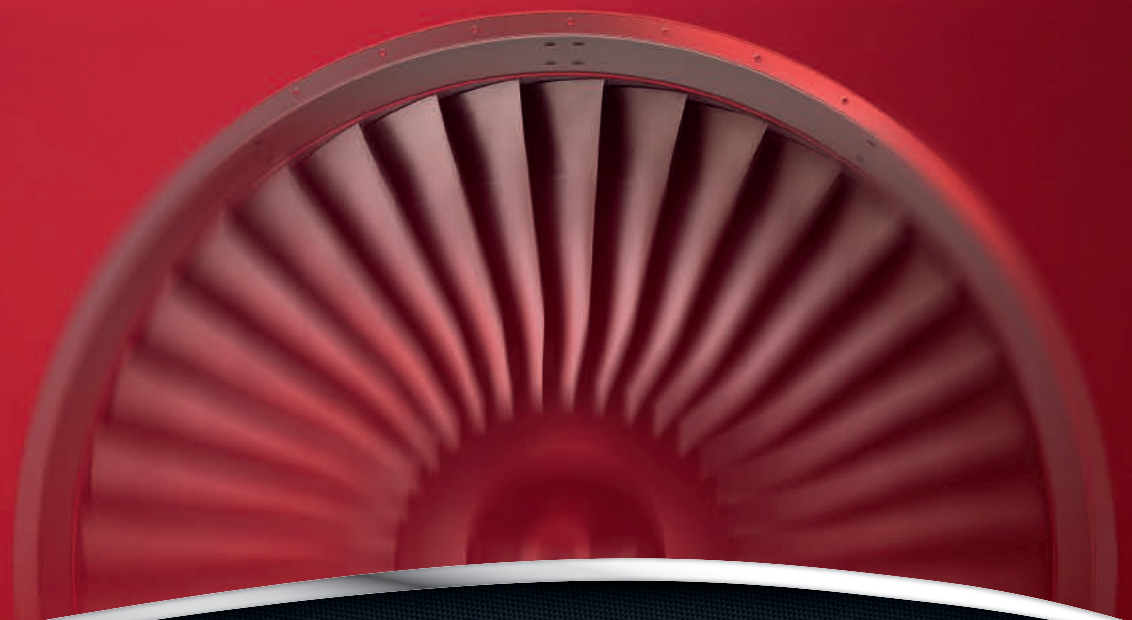
SmartFly, a new “global procurement agency” for the business aviation industry, has launched with the aim of saving operators money via its aggregated buying power. The company started as the outsourced procurement partner for Luxaviation Group and is now being run as an independent business. Thus, it said, SmartFly’s customers have immediate access to high volumes of supply, offering increased buying power and negotiating leverage from a highly experienced team. For aircraft owners, SmartFly offers selected services—including training courses, web data, and fuel—at a “significant” discount, thanks to its bulk purchases of services and commodities. Aircraft operators are also able to use SmartFly to negotiate across all services contracts, it said.

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One Aviation facing potential Chapter 7 liquidation

by Rob Finrock

On June 7, the acting U.S. trustee in the ongoing Chapter 11 bankruptcy case of Albuquerque, New Mexico-based One Aviation motioned to dismiss the company's

prepackaged reorganization plan, a course of action that could potentially force the manufacturer of the Eclipse 500/550 light jet into Chapter 7 liquidation.

A hearing on that motion is scheduled for July 1, and One Aviation CEO Alan Klappmeier told AIN the company intends to proceed under Chapter 11 reorganization. "I'm disappointed with how long the Chapter 11 process has taken...However, we do believe we will still successfully emerge from bankruptcy."

Formed in 2015 through the merger of Eclipse Aerospace—which purchased the assets of Eclipse Aviation out of Chapter

7 liquidation in August 2009—and Kestrel Aircraft, One Aviation filed for Chapter 11 protection in October 2018. At that time, the company aimed for an expedited journey through the process ending with court approval of a prepackaged bankruptcy plan that would leave Citiking International, a U.S.-based entity backed by Chinese investors, as One Aviation's new owner.

Pushed Timetables

That approval hearing, initially set for late November 2018, has been rescheduled multiple times over the past eight months as Citiking examined its options for emergence from Chapter 11 and following an objection filed by the unsecured creditors committee (UCC) in the case last year. In the interim, Citiking has continued funding One Aviation's maintenance and support operations as debtor-in-possession (DIP), and in January proposed a tentative settlement agreement with the UCC, subject to court approval.

However, both the trustee and UCC recently filed objections to Citiking's request for a second motion to extend its timetable for exclusivity in considering options to exit bankruptcy, asking the court to instead hear such proposals directly. The June 10 court filing paints a picture of both parties losing faith in Citiking's ability to successfully take One Aviation through the Chapter 11 process.

"The debtors are operating at a substantial loss, even before factoring in the restructuring fees and expenses, [and] have millions of unpaid post-petition expenses and an apparent inability to pay such expenses," read that filing. "The cases appear administratively insolvent. Both the DIP facility and unpaid administrative expenses continue to increase each month that the debtors remain in bankruptcy."

According to Citiking's monthly operating report (MOR) for the period ending March 31, One Aviation declared incoming funds since the bankruptcy filing of \$5,304,588 against expenditures of \$10,753,678 over the same period, and a remaining cash balance of \$97,786 that the trustee termed "perilously low."

On June 11, One Aviation submitted a MOR for the period ending April 30, showing the company started that month with \$147,786 in cash on hand. Total receipts in April came to \$999,608 with disbursements of \$945,533, resulting in a net cash flow of \$54,075 for the month. Combined with a \$250,000 infusion of debtor-in-possession capital, the company stated it ended April with \$451,861. ■



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Full-throttle opinion from former NTSB member John Goglia

Have aviation labor shortages reached a critical point?

We've all been reading about future pilot and mechanic shortages for a long time. While some people believe that the predictions are hyped by labor unions looking to pay their members higher salaries, others believe that the predictions aren't dire enough and don't fully capture the current hiring situation. I have been concerned about both the forecast shortages and the current ability of many aviation entities to recruit qualified candidates for pilot and maintenance technician openings. I have reviewed applicants for openings at a number of different entities—both airline and corporate—and have concerns about the dearth of applicants, even for well-paying jobs, and the caliber of some of those applications. That's especially true at smaller aviation entities away from aviation centers.

But have these shortages reached a critical point where warning bells should be ringing? Some recent news reports should raise alarm in the industry and prompt much more action to accelerate the pipelines for these jobs.

Worldwide, the latest *Boeing Pilot & Technician Outlook for 2018-2037* projects that in this 20-year period “790,000 new civil aviation pilots, 754,000 new maintenance technicians, and 890,000 new cabin crew will be needed to fly and maintain the world fleet.” For North America, Boeing predicts the need for 206,000 new pilots, 189,000 new technicians, and 174,000 new cabin crew. Boeing attributes the demand to a mix of fleet growth, retirements, and attrition and warns that “meeting the extraordinary demand will require proactive planning and collaboration within the global aviation industry...[and] educational outreach and career pathway programs will be essential to inspiring and recruiting the next generation of personnel.”

A Workforce Stretched Thin

Back to the two recent news reports that caught my attention. One involved a pilot at a major airline's commuter subsidiary who was arrested for a triple homicide. The other involved quality complaints at Boeing's South Carolina plant due in part to an apparent lack of qualified personnel.

The *New York Times* article about the pilot caught my attention for several reasons. Of course, an airline pilot

arrested for a triple homicide is very unusual. But the article also revealed that the pilot had been hired by American Airline's subsidiary, PSA, at the age of 50. While hiring 50-year-old pilots is not terribly unusual in the corporate or air-taxi worlds, it is rather unusual for a Part 121 air carrier, at least in my experience. Most Part 121 airlines don't hire pilots after a certain age, and 50 is usually well beyond that age. But that's just one red flag here.

According to the article, the pilot had been dishonorably discharged from the military. That's certainly another red flag. And, perhaps most startling, the pilot—who had served as a pilot in the U.S. Army—was court marshaled in 2016 and found guilty of simple assault

“Meeting the extraordinary demand will require proactive planning and collaboration within the global aviation industry...[and] educational outreach and career pathway programs will be essential to inspiring and recruiting the next generation of personnel.”

and of mishandling classified information. He reportedly served 90 days in jail.

Is it possible American Airlines or PSA was not aware of this criminal record? According to the carrier, the *Times* noted, “pilots undergo a criminal-background check and are then vetted on a recurring basis; the vetting of [the pilot] had not turned up criminal history that would disqualify him from becoming a commercial pilot.” I don't know for sure what that last line means, but it sounds to me like being court-marshaled and jailed for, among other things, simple assault was not a disqualifying enough criminal record. Alternatively, something is wrong with the way American does its criminal background checks that it missed a jail sentence for assault.

So, while the pilot plans to plead not guilty on the triple homicide charge, his prior record with the military would not seem to make him the most desirable candidate for an airline pilot job, especially at a Part 121 airline. Unless, of course, the airlines are really desperate for pilots and are willing to overlook recent convictions for assault and jail terms. Pretty shocking state of affairs, if that is the case.

The other example that, to me, highlights a potentially critical shortage of experienced aviation personnel was a *New York Times* investigation of “shoddy production” at Boeing's plant in North Charleston, South Carolina. In large part, it appears that the shoddy standards—including multiple examples of debris left inside airplanes that could cause significant safety issues, such as sharp metal fragments on wiring—are due to the difficulty in recruiting qualified workers in the South Carolina area. The report highlights complaints by a number of whistleblowers and past employees but also contains what, for me, is the most glaring signal that a serious problem exists: Qatar Airways stopped accepting Dreamliners manufactured at Boeing's plant in South Carolina. It now will only purchase aircraft made in Boeing's legacy plant in Everett, Washington.

In 2014, factory employees were told to watch a video from the chief executive of Qatar Airways. He chastised the North Charleston workers, saying he was upset that Boeing wasn't being transparent about the length or cause of delays. In several instances, workers had damaged the exterior of planes made for the airline, requiring Boeing to push back delivery to fix the jets.

Ever since, Qatar has bought only Dreamliners built in Everett. I have never heard of an airline or any aircraft purchaser specifying which plant they wanted their aircraft manufactured in.

So are these just two random indicators of aviation personnel recruiting issues? Can we just dismiss a pilot with a criminal past getting through a background check at a major airline as a one-off? Similarly, can we dismiss a major airline like Qatar Airways refusing to buy aircraft manufactured at a South Carolina plant as some kind of foreign idiosyncrasy? Maybe. But then again, what if they're the proverbial canaries in the coal mines? If we ignore them, we do so at our own peril. ■

The opinions expressed in this column are those of the author and not necessarily endorsed by AIN.

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Back-to-back Citation fatalities under investigation

The NTSB is in the early stages of separate investigations into nearly back-to-back, but seemingly unrelated, fatal accidents in May, involving two U.S.-registered Cessna Citations that took the lives of three people. Both aircraft were operating under Part 91 in day VMC at the time of the accidents.

According to the Safety Board's preliminary accident report, a Citation SII went out of control and crashed in an open field located a half mile northeast of the airfield moments after a 12:45 p.m. takeoff from Indianapolis-Regional Airport (MQJ) on May 22. The pilot/aircraft owner and passenger were killed. Radar data shows that shortly after reaching an altitude of about 1,400 feet msl (approx. 538 ft agl), the airplane descended until it disappeared from radar.

A witness on the ground at MQJ reported seeing the airplane in an estimated 90-degree left bank with the nose parallel to the horizon shortly after departure. He observed the nose lower slightly before rising again to a level attitude. At no point did he see the nose rise above the horizon. The nose again lowered and the airplane hit the ground.

Intercepted by Fighters

On May 24, Citation Encore N832R departed St. Louis Regional Airport at about 1:35 p.m. for Fort Lauderdale-Executive Airport (FXE), Florida. According to reports, the twinjet climbed uneventfully to its cruising altitude of FL390, but at some point in the flight, ATC communication with the aircraft was lost. At about 3:55 p.m., the aircraft passed overhead FXE at FL390, continuing on a heading of roughly 080 degrees over the Atlantic Ocean.

The aircraft was intercepted by two F-15s, whose pilots tried to make contact with the Citation pilot before the aircraft entered a dive and crashed into the water at about 4:45 p.m., some 240 miles east of Fort Lauderdale. The sole-pilot on board was presumed killed. Coast Guard search aircraft were launched, but the mission was suspended late on May 25 after finding no signs of the crash. **G.G.**

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Cabin interiors activity heats up

New and preowned aircraft transactions, avionics propel industry action

by James Wynbrandt

Introductions of new business jets and executive airliners, robust preowned transaction activity, and downtime associated with avionics installations are among the factors driving an uptick in demand for cabin completions and after-market upgrades.

“The market for completions and refurbishments is picking up,” said AMAC Aerospace COO Bernd Schramm at Geneva’s EBACE show in May. U.S. MRO Constant Aviation has “never seen as many quotes go out as over the past eight months,” said v-p for interiors Scott McCool, while Lufthansa Technik senior director of sales for VIP and special-mission aircraft Wieland Timm averred, “We think there’s a huge opportunity for the total VIP community.”

Herewith are key developments behind some of the action.

At the Completion Centers

Basel-based VIP airliner specialist AMAC Aerospace has in completion the first Airbus ACJ320neo (with an Alberto Pinto interior design for the UK’s Acropolis Aviation) and a Boeing 747-8. The 19-passenger neo’s master bedroom suite will include a large shower, a de rigueur feature in today’s bizliners. For the 747-8, full-scale Styrofoam mockups of the interior components have been created to provide a sense of scale for refining the widebody’s interior design.

Two BBJ Maxes—AMAC’s first—are inbound for completions: a Max 8 arriving this fall for a “cozy, homey” interior design installation; and a Max 9, with an open, modular cabin conceived by interior designer Gaugain, slated for mid-2020 induction, said Schramm.

Having received Bombardier

authorized service center approval a year ago, the Swiss company has begun construction of Hangar 5, dedicated to Bombardier MRO and refurbishments, at its Basel base, with completion expected in mid-2020. The low-slung, 54,000-sq-ft facility can accommodate up to eight Globals and Challengers simultaneously.

VIP airliner specialist Comlux Completion in May marked delivery of its first VIP widebody completion—an A330—following the March induction of the first of three ACJ320neos slated for completions. Last December a Max 8—the first BBJ Max—arrived for completion, the interior designed by Peter Marino Architect.

Comlux executive chairman and CEO Richard Gaona cited the widebody project as the “perfect example” of synergies within the Swiss company’s divisions, noting in addition to design and completion, they handled all other aspects of the aircraft’s acquisition, subsequent sale and, now, operation via its AOC registry in Aruba. (Comlux also has AOCs from Malta, Switzerland, San Marino, and Kazakhstan; Gaona cited a client confidentiality agreement in declining to provide images of the A330’s interior.)

Gaona said widebody completions are much more challenging than those for

single-aisle models, particularly in meeting certification standards such as cabin decompression requirements. With three times the interior space, widebodies also require some three times the man-hours and twice the lead time of a single-aisle VIP airliner completion.

Under Comlux Completion’s new management team of CEO Daron Dryer and executive v-p Domingo Ureña-Raso, the purpose-built completion center in Indianapolis, Indiana, appears intent on moving aggressively into competition for next-generation VIP widebodies, including the ACJ350 XWB and BBJ777X.

Germany’s Lufthansa Technik (LHT) this year introduced two new VIP airliner interior concepts: the first, “Nature’s Touch,” an East-meets-West theme created with China’s Ameco for the ACJ320 or BBJ; and the second, “Sky Retreat,” in anticipation of a yet-to-be-offered ACJ220.

Nature’s Touch, unveiled at Shanghai’s ABACE show in April, employs traditional Chinese colors, complementing bamboo and other natural materials including marble, leather, wool, and silk. Interior features include a gourmet galley and cinema with a 75-inch roll-up/down screen.

LHT offered a sneak peak of SkyRetreat,



its VIP A220 concept, at EBACE in May. The stripped down, “unconventional design” resembles the cabin of a yacht more than that of a VIP airliner, and incorporates cutting-edge technologies such as a voice-controlled CMS and “smart touch” surfaces. A dining table “looks normal but can transform into a chessboard, or a monitor for PowerPoint presentations, or a dining table,” said Timm, adding that the A220 “provides an incredible amount of space for breathtaking VIP interiors.” A “totally unique” Observation Lounge awaits Sky-Retreat’s full reveal at the Monaco Yacht Show in September.

The two single-aisle VIP cabin concepts follow LHT’s Welcome Home cabin concept for the forthcoming jumbo ACJ350 XWB, unveiled at the last year’s NBAA Convention, and reflects an increase in completions demand. “We have signed several contracts for new narrow-body and as well as widebody aircraft,” the latter including the ACJ350 XWB, A330neo, and BBJ 787 and 777X, said Timm, who projects the coming VIP completion market to grow to about four wide- and eight narrow-body green completions annually.

Switzerland’s Jet Aviation and ACA Advanced Computer Art created for Boeing Business Jets (BBJ) a 3D video of the Swiss company’s Shaheen VIP cabin concept for the new BBJ 777X, unveiled in December in concert with the aircraft’s introduction at MEBA. BBJ debuted the video, along with a virtual reality display of the interior at EBACE in May, enabling guests to get an inside experience of the cabin.

Taking advantage of the BBJ 777X’s size, the Shaheen cabin features lounges, a game and cinema area, stately office, private workspaces, three guest bedrooms, and a master suite. Weight and space savings are optimized through fiber optics and technology-integrated furniture, as well as intelligent LED and OLED lighting and Smart Glass technology. Jet Aviation’s last five projects were, on average, 9 percent lighter than requirements, said Jeremie Caillet, v-p of VIP completion programs. “Lighter interiors allow customers to either reduce their carbon footprint for a set mission or increase their payload or additional range,” he noted.

The Basel-based company’s large-aircraft team is currently performing an extensive refurbishment on a VIP widebody and recently re-delivered a new VVIP-configured aircraft, both models and customers undisclosed.

Citadel Completions, having launched in March 2018, is “positioning [itself] to be ready for the market when an upswing comes,” said managing director Joe Bonita, and the company anticipates that uptick “in the next two to three years.”

Based at Louisiana’s Chennault International Airport, Citadel’s facilities include two hangars totaling some 260,000 sq ft, one able to house two 747s simultaneously, Bonita said. At MEBA last December Citadel showcased by invitation a VIP ACJ340-500 that displays the company’s interior design, completions and refurbishment capabilities, the cabin featuring expansive open areas and some seven private sleeping areas. The aircraft owner, casino magnate Sheldon Adelson and the Adelson family, who commissioned the refurbishment from the facility under its previous owners, subsequently bought the completion complex.

Citadel owns the STCs developed for the A340’s refurbishment and “if [buyers] like that floor plan, a completion could be done in the same plan very quickly,” Bonita said, noting Airbus is due to receive several A340s back from lease that will be available for VIP retrofits. The platform boasts globe-girdling range combined with excellent runway performance. “Studies we did show there are very few airports this airplane can’t get into that BBJs or other executive airliners can get into,” Bonita said.

Boeing widebody completion specialist Greenpoint Technologies has introduced the Lotus interior, a Boeing-commissioned head-of-state interior design concept for

the BBJ 777X. Inspired by the flower that holds special spiritual significance in the East, Lotus incorporates celestial and organic elements from Asia-Pacific cultures to create “a contemporary, functional design featuring the luxuries of a world class hotel.” Features include a grand, circular entry way, elevated lounge, sunken media area, backlit bar, a library with an OLED screen fireplace, and a layered ceiling with adjustable LED starry night scene. The en suite bath in the master suite has heated black marble flooring, towel warmers, and black marble vanity with imbedded monitor. Materials and fabrics include American walnut, Calcutta Gold marble, chrome, white embossed leather, and silk and Italian woven wool carpeting.

Aeria Luxury Interiors has two B737s in house, one for a head-of-state completion and one undergoing a full executive refurbishment, with interiors both developed by the San Antonio, Texas company’s in-house design team in consultation with the owners. The head-of-state project, for a customer in Central Asia, has a VIP stateroom and full-shower lav, along with office/meeting room, staff seating, and separate crew and passenger galleys and lavs. Luxury touches include gold plating, ornate detailing, fine wood and luxurious fabrics. Elements of the new Boeing Sky peripheral system are

incorporated, as is the latest version of the Astronics CCC CMS/ IFE system. Inducted in May 2018, delivery is scheduled for December, but Aeria expects to deliver the aircraft “much earlier,” said v-p and GM Ron Soret.

Meanwhile, the cabin refurbishment, performed for a Los Angeles-based charter operator, incorporates a range of enhancements including all new wood surfaces, seat and interior panel re-upholstery, faux wood flooring, new carpets, and a partial reconfiguration of the aft cabin. At press time, delivery was scheduled in June.

Aloft AeroArchitects ended 2018 with the delivery to a private company in Asia of a new BBJ2 with an Edése Doret-designed interior incorporating an Astronics CMS and Honeywell Ka-Band connectivity. The Delaware-based company is now refurbishing a BBJ on which it installed the existing interior 12 years ago. The new cabin, by Warja Borges of Germany’s Unique Aircraft, is being installed in conjunction with the exeliner’s 12-year check and landing gear overhaul.

OEM Interiors

Boeing Business Jets introduced at MEBA 2018 the newest member of its family, the BBJ 777X. Able to fly more than halfway around the world, the widebody BBJ “redefines ultra-long-range VIP travel,” said Greg Laxton, head of BBJ.

The BBJ 777X will be available in two models: The BBJ 777-8 and BBJ 777-9 and features the tallest and widest executive airliner cabin. It incorporates the Smooth Ride technology developed for the 787, which takes pressure readings from the pitot and static ports to determine turbulence levels and adjusts the fly-by-wire flight controls to dampen oscillations.

BBJ also unveiled interior concepts from completion specialists Greenpoint Technologies and Jet Aviation, and from German design firm Unique Aircraft Design, illustrating how the BBJ 777X “can be transformed to meet the tastes of any VIP customer,” BBJ said.

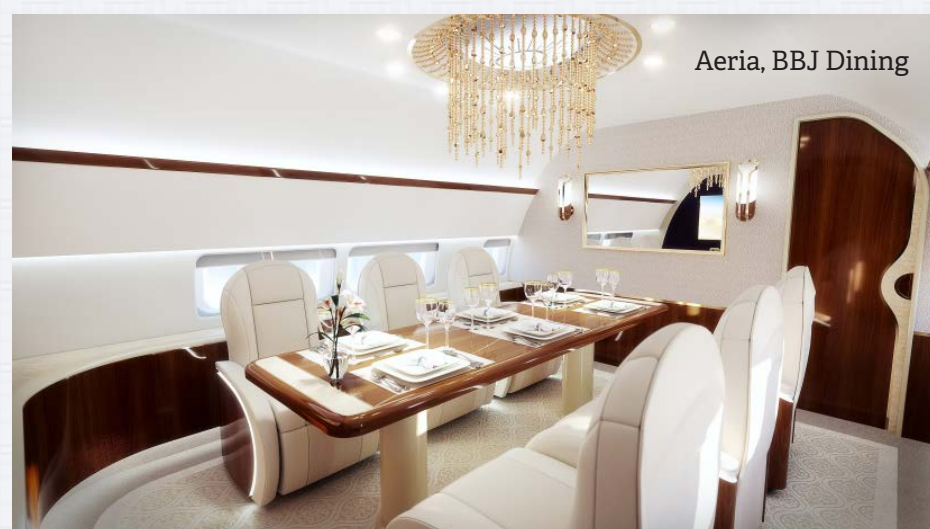
Jet Aviation’s concept Shaheen, which means royal white falcon, is designed to accommodate 43 passengers plus a crew of 11.

Greenpoint’s design, named Lotus, features an open floor plan, with monuments attached only to the floor.

No launch customer for the BBJ 777X, available in Q1 2021, has yet appeared, Laxton said at its launch. Meanwhile, as the world at large discusses the grounding of the B737 Max, effects on the BBJ Max program have gone largely unmentioned. As of last year’s NBAA Convention, BBJ reported logging orders for 20 BBJ Max



Nature’s Touch by Lufthansa Technik



Aeria, BBJ Dining

7/8/9 airframes. **AIN** asked Boeing if any BBJ Max orders have been canceled as a result of customer concerns or whether deliveries have been affected, but received no response before press time. Bernd Schramm, COO at AMAC Aerospace, which has two Maxes slated for induction, said the grounding and recertification issues were “slowing down a little bit the BBJ Max completion” activity, but “the customers we have are committed to the aircraft. We just need to know exactly when” the issues will be resolved, said Schramm.

Airbus Corporate Jets (ACJ), on the verge of delivering its first ACJ319neo, is seeing strong demand across both its single-aisle and widebody VIP platforms. The first of the new neos goes to German charter operator K5 Aviation, with cabin outfitting by the Netherlands’ Fokker Technik. With eight passengers, the ACJ319 neo can reach its maximum 6,749-nm range, holding a 6,400-foot cabin altitude.

The Four Seasons Hotels and Resorts has ordered an A321LR to replace the Boeing 757 the luxury lodging and tour package provider currently uses for its deluxe air tours. The 4,000-nm A321LR will be outfitted with a spacious lounge, 48 lie-flat seats with ottomans, and two large lavs. EASA and the FAA granted certification last fall.

Airbus has also sold four of its flagship-to-be ACJ350 XWBs this year: Three -900 variants will be configured for a mix of government, troop transport, and medical evacuation roles for Germany, the first government customer. First delivery comes in 2020.

The fourth order came from a private customer, and all four ACJ350s will be delivered with ACJ’s Easyfit pre-installed cabin outfitting attachments, simplifying interior component installations in the composite airframe.

Bombardier Business Aircraft introduced for its flagship Global 7500 a circadian rhythm-based cabin lighting system designed to combat the effects of jet lag. The Soleil (French for sun) Dynamic Lighting System uses changing combinations of red and blue light wavelengths that studies have shown stimulate or suppress melatonin—a hormone that helps regulate sleep. It’s engineered to help align passengers’ circadian rhythms to their travel, said Bombardier Business Aircraft (BBA) manager, industrial design, Tim Fagan, adding, “I think we’re just scratching the surface on how we can better take care of our passengers onboard the aircraft in terms of wellness.”

Fully integrated with the aircraft’s flight management system through the Global 7500’s Lufthansa Technik nice Touch CMS, Soleil uses information in the active flight plan and proprietary algorithms to



Clay Lacy Aviation’s new maintenance shop at Van Nuys also provides plenty of room for completions operations.

calculate the appropriate circadian-based lighting changes for the flight.

With the Global 5500 and 6500 on track to enter service this year, Bombardier has unveiled a new interior feature for the ultra-long-range twinjets: the Nuage (French for “cloud”) chaise, a lounge chair that converts to a flat surface.

Cousin to the Nuage seat, the Nuage chaise features an ergonomically perfected lounge position, adjustable via a simple pneumatic lever, allowing the chaise to be used for meetings, banquet style dining, and sleeping when laid flat, “broadening the utility of the whole cabin,” Bombardier said. The sleek minimalist style, devoid of visible support struts, complements the cabin’s open, spacious ambiance; moving parts of the pneumatically operated system are concealed.

Bombardier also unveiled at EBACE in May an updated Challenger 350, whose cabin now incorporates an enhanced soundproofing package, reducing the

already low sound level by 1 to 2 dB SIL, and up to 4-5 dB SIL lower than previous CL300 models, said BBA director of product strategy and design Mathieu Noel.

Embraer introduced at the NBAA Convention last October the Praetor 500 and 600; upgraded, extended-range versions of the Legacy 450 and 500 respectively, which for now remain in production. The restyled interior is named Bossa Nova, translating to “new trend,” and in the Praetors’ case, a cabin that delights in displaying intricacies mimicking high-end watches and automobiles without exposing the underlying technology. It “treats the owner to a love of details,” said v-p interior design Jay Beever. The cabin’s upper tech panel, for example, adapted from the Phenom 300, hosts passive electronic switches that appear only when needed.

Bossa Nova’s appointments include a reinvented diamond stitching on the seats inspired by Rio’s beachfront promenade;

carbon-fiber finishes on tables; and an optional three-seat divan with “a perfect 105-degree seating angle,” said Beever. “Most divans are like a park bench, with straight-up backs. Nobody wants to sit in them.”

MROs/Refurbishment Providers

After providing maintenance at its Provo, Utah facility for more than a decade, Duncan Aviation has added refurbishment to the location’s services menu. Duncan launched a phased service entry of the new 275,000-sq-ft space, which includes two maintenance and completion hangars and a paint facility. Full-service back shops and offices, the last phase, are slated for an early 2020 opening. The paint facility completed its first project in May, a complex metallic black-to-charcoal fade applied on a Global 5000. That capped a year of innovations from its cabinetry/finish shop including creating removable table inserts, allowing customers “to customize the flight experience for the different seasons, highlight different designs, showcase logos, or celebrate special events or game days,” said Nate Klenke, Duncan’s manager for completions service sales.

Hydrographic finishing for a multitude of interior components offers a variety of different looks including wood grain, stone, metals and custom designs, without weight restraints or engineering requirements. Duncan also offers complementary spectra chrome graphics, providing “a variety of custom design possibilities” when deployed in tandem, Klenke said. The Provo facility also recently added a new 3D patterning software and a stitching machine for



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creating additional custom seat design options including perforation, quilting, and decorative stitching.

The name Clay Lacy Aviation doesn't leap to mind among refurbishment providers, but the full-service charter management company aims to change that with its new 70,000-sq-ft maintenance facility at its Van Nuys headquarters. "Our focus has always been to provide a one-stop shop experience for managed clients," said Clay Lacy v-p of maintenance Ed Mirzakhanian. "But with our new dedicated [maintenance] space we're transitioning to serving non-managed clients."

The facility includes 10,000 sq ft of interiors back shops. Bringing wood finishing in-house has been a challenge due to California's process for issuing permits, but the company anticipates approval for a spray booth. A 700-sq-ft design showroom is stocked with sample fabrics, carpeting, seat leathers, sidewall and panel materials, woods and finishes, in a multitude of color palettes.

With a full avionics shop, Clay Lacy has begun leveraging FANS-1A and ADS-B upgrades developed in house for its managed Gulfstream GIV, GV, and Challenger 601 fleets.

"Once ADS-B demand slows," Mirzakhanian said, which he suspects will be sometime after the January 1, 2020 mandate takes effect in the U.S., "we'll refocus on connectivity and cabin management."

Phenom 100/300 operators needing refurbishes—and service—can take advantage of Clay Lacy's Embraer Phenom service center authorization, while third-party Falcon operators can access the services it already offers to its own growing managed fleet of more than 20 of the French jets.

Elliott Aviation is expanding from MRO to OEM, having introduced from sister company Elliott Technologies its in-house designed and built Prizm LED cabin lighting system, and electronically dimmable

window Smart Vision Shades, to be available in the aftermarket through Part 145 repair stations. STCs for the lighting and shade systems were granted late last year and PMA approval for parts manufacture came in March. The Prizm system provides both white and full spectrum RGB, or "mood" lighting, for the price that competing systems charge for white alone, said v-p of avionics programs and operational logistics Mark Wilken. Having used the systems for its own refurbishment clients, the company is now establishing manufacturing capability and a dealer/installer network.

Meanwhile, refurbishment business is brisk, with clients falling into three basic categories: aircraft brokers refurbishing an aircraft for sale; management companies ensuring client interiors and upgrades are economical and charter-friendly; and owners—often new—seeking to personalize their jets, said Elliott's director of paint and interior sales Meghan Welch. That last category gives Elliott's design team creative license. "We're bringing their personality into their airplane and making it their home," said Welch. "Everything they want to accomplish in flight, we're able to provide in that aircraft."

A current Citation Encore+ refurbishment features an additional galley installed in the aft cabin to ensure owners have quick access to all the in-flight refreshments desired, along with customized storage racks for rocks glasses.

Demand for paint is also strong, and the facility at Elliott's Moline, Illinois headquarters can accommodate aircraft as large as the Falcon 900 and 2000 series. Pearl finishes are popular: "A lot of two-tones, with darker color on the tail and engines more than in the past," said Welch, adding, "You've got to be careful with metallic paint on the radome, and understand the aircraft's 'cans' and 'can't-dos.'"

Bombardier completion, refurbishment, and MRO specialist Flying Colours heads

into its 30th year in the midst of infrastructure expansions at its St. Louis, Missouri and Peterborough, Ontario (Canada) headquarters facilities. The HQ location is getting additional paint capacity and space for completions and heavy refurbishments, expected to be operational by year-end. St. Louis's new hangar and shop space will help support the company's growing Gulfstream and Falcon business in addition to Global and Challenger projects.

Some of the workflow at both locations is expected to come from Europe.

"We're trying to get a little more international and bring more European clients to North America," said executive v-p Eric Gillespie. "We haven't been knocking on doors." The company recently hired a sales manager for Europe and believes the expanded facilities, turn times, and pricing "will make it a good value proposition for heavy inspections and modifications," Gillespie said.

Meanwhile, its Asia-Pacific business is active. In May Bombardier renewed the refurbishment services agreement with Flying Colours at the MRO's recently expanded and co-located facility at Singapore's Seletar Airport, where four full and three partial refurbishments on Challengers and Globals have been completed to date. Most recently, the facility performed a full refurb on a 14-passenger Global XRS in conjunction with extensive maintenance, following its purchase by a China-based customer.

Gillespie was among aftermarket providers who noted, "Connectivity is becoming a key part of any refurbishment" as owners "want to emulate the [Wi-Fi] ground experience in the air." Flying Colours has seen strong demand for Ka-band as well as ADS-B installs, and expects demand for the latter to persist beyond the U.S. January 1, 2020 compliance date.

Stevens Aerospace and Defense Systems—the former Stevens Aviation—in

March relocated its large-cabin business jet services from its Greenville, North Carolina HQ to Macon's Middle Georgia Regional Airport, taking over a 48,000-sq-ft hangar Bombardier previously vacated at the city-owned airport. Stevens hopes to add a paint shop. Owners of out-of-warranty Gulfstreams seeking an alternative to factory service are one focus. "For older Gulfstreams, we can provide more flexible options," said operations manager Rick Screen, a former Gulfstream general manager. "The factory wants to do everything to factory-new standards, and sometimes that's not the most practical solution." The facility is less than 130 miles west of Gulfstream's Savannah, Georgia home.

Michigan's Pentastar Aviation has completed cabin refurbishments on two Gulfstreams (a G450 and G550) and a Bombardier Global Express, all "very large in scale," said Pentastar director of interiors Gordon Ross, adding, "That's our specialty." Both Gulfstreams were recently purchased and the new owners "wanted to personalize" and update the cabins, he said. Work included soft-goods replacement, refinished veneers, LED lighting and new Wi-Fi connectivity systems.

Ross also reported Pentastar, after researching fabrics, is now using hand-woven textiles and carpets rather than mass-produced materials for covering divans and floors in large-cabin refurbishes. Hand-woven fabrics have a "thicker type of consistency, provide a lot of comfort," and also allow more personalization. Upgraded sound insulation packages and wood refurb are also getting more attention. "We spend a lot of time doing R&D on wood finishes and techniques," Ross said of the latter. "We like to hone those skills and our knowledge base."

The move to a larger airframe can present interior design challenges to an upgrading owner, as a just-completed West Star Aviation refurbishment of a



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Gulfstream GIV illustrated. Moving up from a mid-size Citation, the owner didn't fully understand the design possibilities and processes, said Veta Traxler, paint and interior lead designer at the Alton, Illinois-based MRO. "He came to our design center in Grand Junction [Colorado] with his residential designer," and in addition to viewing sample materials, with owners' permissions he was able to see real examples of interior possibilities in the Gulfstreams on hand, Traxler said. Yet perhaps most helpful were the 3D renderings the team prepared that "really give the customer the idea of what it's going to look like, instead of just putting material in front of them." One result: the density of the carpet pattern was dialed down. With the cost of producing such renderings shrinking, West Star is using the technology for more projects, and with 3D walk-throughs of homes for sale and similar applications becoming common, "People are asking for it more and more," Traxler said.

Meanwhile, the GIV's color palette went from beige to gray and black, with metal fixtures plated in satin ultra-black, and new LED lighting, electrically dimmable window shades, leather inlays in the tables, and seats reupholstered with two-tone perforated square quilting in the center. West Star did the paint, too, at its Grand Junction, Colorado paint facility.

Quilted seats "have been really hot," Traxler noted, with requests for them growing, but cautioned "a big cost factor comes into play," as among other costs, the seats require an additional fire block.

Most current interior refurbishment demand at Cleveland-based Constant Aviation is driven by Constant's Challenger 604XT Pro Line Fusion program, with customers for the flight deck upgrade using the downtime for cabin refreshments. New carpet, upholstery, refinishing, and even cabin reconfigurations are often part of the work scope, along with FANS-1A and new CMS installs.

In addition to Challenger upgrades, over the past year, Constant, which is the refurbishment division of Directional Aviation Capital, has also redesigned, reconfigured, and refurbished two Bombardier Global 6000s and three Gulfstreams (a G650 and two G450s). Constant reconfigured the G650 cabin to halve the galley and create a crew rest area so the customer "could fly to Europe without issues," McCool said.

Cabin Systems and Materials

In November, Honeywell International completed in November "the largest single aircraft update within the business jet space," on a Bombardier Global Express

the avionics and flight systems OEM said, announcing plans to offer similar branded renovations to the aftermarket.

"We have the ability to manage these complex retrofit programs completely with best-in-class partners," said Honeywell regional leader, EMEA & APAC, retrofits, modifications and upgrades Arnaud Renard at EBACE, where the program was launched.

The tip-to-tail interior Global Express upgrade, planned with and performed by German MRO ACC Columbia Jet Service, incorporated Honeywell's latest cockpit, cabin, and connectivity systems. The result created "the equivalent of a new aircraft at 10 percent of the cost," according to Honeywell. Honeywell and ACC Columbia will continue to collaborate on Global Express upgrades, with SmartView Synthetic Vision system retrofits, expected to be available later this year, a specific focus.

The Global Express project was an outgrowth of work at Honeywell's Retrofits, Modifications & Upgrades Center of Excellence, established three years ago in Phoenix, Arizona, with the goal of expanding the company's aftermarket offerings. Honeywell is working with its network of authorized service centers to identify potential program partners for the makeovers on the MRO and completion center side.

A year after then Rockwell Collins announced partnering with Comlux to bring its cabin products to the latter's VIP airliner completion and refurbishment programs, full or partial Collins Aerospace cabin systems have been selected for three projects: an A320neo and BBJ completion, and a BBJ refurbishment. The Collins completions/refurbishment products portfolio includes avionics, CMS, and IFE options, seating, lighting and galley products, in addition to honeycomb panels and ArincDirect connectivity and flight services.



Elliott's recently certified Prizm system provides both white and mood lighting.



Recently launched Citadel Aviation is looking to make a name for itself in the widebody market, anticipating an uptick in demand.

Using one vendor for a full range of products like these allows for "optimized completion cycles and a streamlined design process for our VIP cabins," said Comlux Completion CEO Daron Dryer.

Collins has also enhanced its Stage on-demand business aircraft IFE offering to include both wireless and wired options, installed in-factory on a new aircraft for the first time: a recently delivered Dassault Falcon. Collins director of cabin systems Jon Kunkel said offering both wired and non-wired options "simplifies access to inflight entertainment while providing customers with more flexibility." The new wired option integrates easily with Venue Cabin Management service to play content on bulkhead monitors and individual seat displays. Content is accessible wirelessly via smart devices including phones and tablets.

VIP rotorcraft interior specialist Mecaer Aviation Group delivered the first Bell 505 Jet Ranger X in North America outfitted with Mecaer's "Magnificent" interior. The Magnificent interior includes all interior panels; seats (built up from standard frames) and leather upholstery; low-pile carpeting; and a rear passenger service unit with adjustable reading and mood lights, gaspers, and air conditioning outlets. It's available in color palettes of soft whites, creams, blues, or grays. It borrows elements from the MAG VIP interiors created for the Bell 429 GlobalRanger light twin and forthcoming 525 Relentless, but "doing a smaller helicopter was a challenge," said Maximo Pugnali, president of the Italian company. More sporty than plush, the installation brings panache to what is often an owner-flown platform. And weighing less than 70 pounds, the option "will be a no-brainer" for VIP buyers, Pugnali said. The kits are produced at MAG's Cabin Comfort Systems headquarters in Montepandone, Italy, and

installations are performed at the company's U.S. facility in Philadelphia.

About 20 to 30 percent of Bell 505 buyers are opting for the Magnificent interior, according to MAG.

Customer Helite Aviation will use the Bell 505 for VIP transport from its downtown Montreal heliport.

Cabin interior materials distributor OmnAvia has introduced new leather and fabric lines amid an expansion of offerings for its MRO and interiors shop customers. The additions include BluSky Armor, a clear coat for veneer cabinetry that, used in combination with proprietary low-cost and safe LED UV lighting, can cure in two minutes, said OmnAvia managing partner Robin Butler, calling the product "disruptive technology."

Another new offering, leather alternative Izit Platinum FR, from Willow, Texas, is an inherently flame resistant, knit polyester backing that's easy to fit on seats and offers a 20 percent price advantage over popular woven fabrics, Butler said. For customers looking for genuine leather, the Winston-Salem North Carolina materials specialist is now the exclusive U.S. distributor for Austrian leather company Wollsdorf Leder.

Reflecting the growing complexity of cabin systems, training provider FlightSafety International (FSI) in May added a Master Technician Cabin Systems program to its master tech training portfolio. The five courses in the cabin curriculum are Avionics Standard Practices; aeroIT; Cabin Connectivity; Integrated Cabin Management Systems; and Cabin Systems Operational Maintenance Program.

Master technician programs aim "to help technicians develop a higher level of skill and increase their problem-solving ability" and "enhance their contributions to the safety, reliability and operating efficiency of the aircraft," said FSI. ■



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Honda plans N.C. expansion

by Kerry Lynch

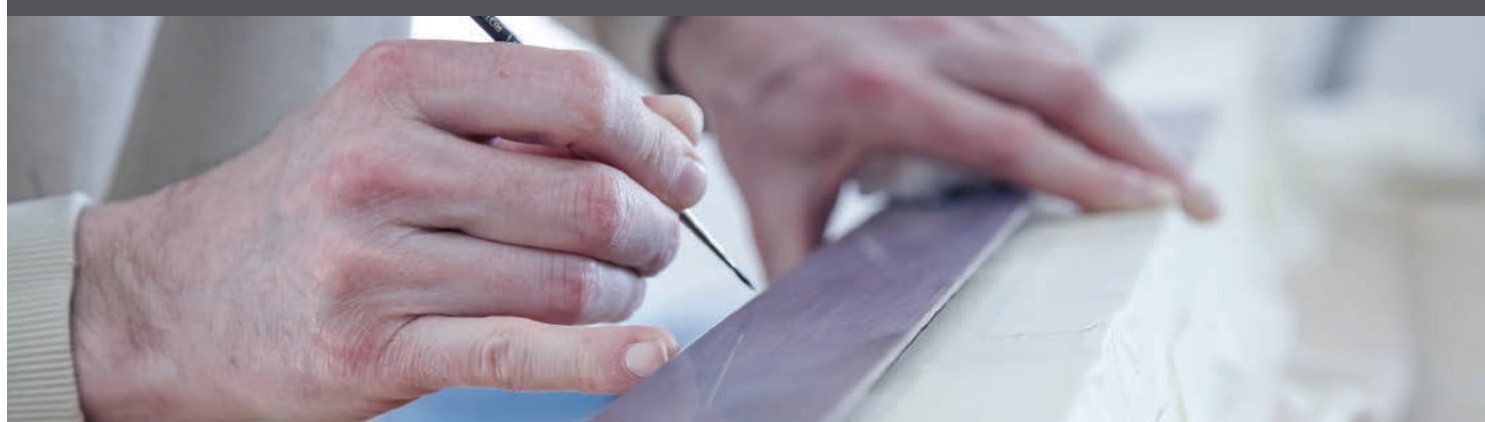
With 123 HondaJet and HondaJet Elites now in service, Honda Aircraft is embarking on another expansion of its Greensboro, North Carolina facility to accommodate production ramp-up and parts demand for those

aircraft. Honda Aircraft is investing \$15.5 million in an 82,000-sq-ft building that will be used for wing assembly for the HondaJet Elite, capacity that the company said will make the production process more efficient.



A rendering of the expansion of Honda Aircraft's Greensboro, North Carolina facility.

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Michimasa Fujino, president and CEO of Honda Aircraft, said the company is looking at automation technologies that will be incorporated into the new facility. In addition, the facility will house parts storage. Ground-breaking is scheduled for this month.

To open in July 2020, the facility is part of an overall \$245 million investment Honda Aircraft has made in production, training, MRO, and other facilities on its 133-acre campus in Greensboro. "As the HondaJet's popularity and presence continue to increase around the world, it is necessary for our facility to meet our production and service needs while operating at the highest level of efficiency," Fujino said.

In addition, Honda Aircraft is expanding its training capacity for the HondaJet Elite with plans to add a second simulator. Fujino said the simulator would likely be housed in Europe "because of the strong customer demand" there.

The additional support and production capacity comes as Honda Aircraft builds up its fleet. The company has increased its sales and service footprint to cover North America, Europe, Latin, and South America, Southeast Asia, China, the Middle East, India, and Japan. Thirty-seven HondaJets and the successor HondaJet Elite were delivered last year.

Honda Aircraft began delivery of the HondaJet Elite last summer and has since expanded its market with certifications from India, Brazil, Japan, and Canada. These came in addition to earlier certifications from the U.S. FAA and EASA. The most recent delivery was to charter operator Wing Spirit in Hawaii.

Fujino credited the sales to an effort of Honda Aircraft to expand the business aviation market and develop new models. To that end, he estimated that nearly one-quarter of Honda Aircraft sales are to new customers. As far as new models, he pointed to the alliance Honda Aircraft formed with All Nippon Airways, which has an agreement to use two HondaJets that can provide connecting travel for ANA passengers in Los Angeles and Chicago. ANA expects to expand this service to Europe, Fujino added. ■

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Aviation industry task force issues report on DEF hazard

by Curt Epstein

In response to several recent incidents involving jet aircraft being damaged and/or disabled after fuel system contamination from diesel exhaust fluid (DEF), an industry task force has issued a report with recommendations on how to mitigate this serious, recurring hazard. The group is made up of stakeholders including the FAA, NATA, NBAA, AOPA, and GAMA, along with fuel providers and FBO chains,

DEF is a colorless liquid used in diesel-powered ground vehicles to meet EPA emission control standards. In three incidents, it was confused with fuel system icing inhibitor (FSII), another colorless liquid. DEF is soluble in FSII, but when it comes into contact with jet fuel, it crystallizes and can clog fuel systems, leading to engine failure.

The 40-page document examines each of the recent events and describes the contamination vector and effects on the aircraft involved. The authors conducted a safety analysis and established a list of short-term and long-term

recommendations for industry businesses, concluding: “the risk of another inadvertent DEF contamination event is too great to not take a concerted, aggressive, and multi-pronged, coordinated approach to prevent another occurrence.”

“We are committed to working with our members and other industry stakeholders to eliminate the hazard of [DEF] contamination of aircraft fuel,” said NATA COO and general counsel Timothy Obitts. “NATA encourages all of our members, including aircraft operators, FBOs, and fuel suppliers to read this report and implement the recommendations as soon as practicable.” Among the advice for FBOs, is to take advantage of free training offered by NATA as part of its Safety 1st curriculum to educate all staff members on the importance of proper identification and use of DEF and FSII, including labeling and handling, as well as the consequences of contamination, with such training documented in each employee’s file.

While the report added that DEF and



A newly released report by an industry working group contains recommendations for aircraft operators, FBOs, and fuel suppliers on how to prevent diesel exhaust fluid (DEF) from dangerously contaminating jet fuel.

FSII should be stored in different locations to prevent accidental contamination with access restricted to authorized, trained individuals, AOPA president and CEO Mark Baker urged even stronger action. “I applaud the industry for

working together to promote steps to address this serious risk to pilots, but I strongly believe that DEF needs to be permanently removed from airports,” he stated. “We don’t need to lose any lives over this.” ■

► continued from page 12

DEF contamination downs two Citations

the Environmental Protection Agency, senators, members of Congress, the FAA, and the Department of Transportation. The bottom line is that states regulate the requirement for DEF, he explained. Lacking an effort to convince every U.S. state to exempt airport vehicles from the DEF requirement, a national regulation would be helpful, he said. “Until then FBOs have to get on top of their DEF policies. Until airport service vehicles are DEF-exempt and the DEF systems are not installed [on airport fuel trucks], there is a risk that requires mitigation, training, and auditing. The pilot is the last line of defense. It’s a big deal. I cannot stress how much of a problem this is.”

Beringer recommends that pilots who fly airplanes requiring icing inhibitor verify what is in the tank that is being mixed with their fuel, how that tank was serviced, and what safety precautions were taken to ensure that the proper fluid is added.

“We keep getting lucky with these events,” he said, “and we haven’t killed anybody, yet. It’s just a matter of time.”

For its part, the Charlotte Country Airport Authority can’t provide details of how the two Air Trek Citations were contaminated, due to “an ongoing FAA

investigation,” according to the spokeswoman. However, she told AIN, “The Charlotte County Airport Authority is working cooperatively with the FAA to ensure it has all the support and information they need. We have brought in a third party to review our procedures and make further recommendations.”

The airport authority’s fueling operation uses NATA’s Safety 1st training program; supervisors have all completed the supervisor-level training, while staff members all undergo Safety 1st PLST. The operation is also ACE certified by fuel supplier Eastern Aviation Fuels, with four supervisors certified in the ACE fuel quality control training program. As of now, the Airport Authority does not participate in a safety management system.

The airport authority’s fuel truck fleet includes two 1999 models that don’t need DEF and three trucks (one 2015 and one 2018) that require DEF. “Absolutely we support [exempting airport fuel trucks from the DEF mandate],” the spokeswoman said.

Although it can’t comment in detail about how the DEF incident happened, she added, “We have isolated the issue, however, we’re reviewing all procedures to provide a comprehensive fix.”

The NTSB’s report on the Air Trek Citation that landed in Savannah included these details about how the fuel was contaminated:

“According to a lineman who worked

for the fixed based operator at PGD, the evening before the incident, he noticed that the FSII was low on a fuel truck and he intended to refill it. He went to a shed where the FSII was located and noted that the FSII bottle was partially filled, and that there was another bottle next to it that was partially filled. He combined the two bottles and then refilled the fuel truck FSII reservoir. Several days after the incident, the lineman realized that he had inadvertently combined a 5-gallon FSII bucket and a 2.5-gallon diesel exhaust fluid (DEF) container instead of two partially-empty containers of FSII.

“Fuel samples, fuel system filters, and fuel screens from the airplane were obtained and sent for laboratory testing. Analysis of the fuel contaminants indicated the presence of urea, the primary chemical found in DEF.”

According to NATA president Gary Dempsey, “DEF contamination is a serious safety concern. NATA is monitoring the issue and assisting with initiatives like participating in a working group comprised of government and industry stakeholders tasked with developing resources to mitigate DEF contamination incidents at airports.”

Air Trek released a statement about the engine-failures in its two Citations:

“Air Trek is extremely proud of the extraordinary professionalism of our pilots and medical team. Air Trek’s pilots are heroes of the day,” said Dana Carr, v-p and director of operations. “Air Trek has

worked closely with [Punta Gorda] staff for 41 years. The [Punta Gorda] fueling meets standards of the NATA Safety 1st program and [the airport authority] is confident this is an isolated incident. Air Trek defers commenting on details related to the incident due to the ongoing investigation.” ■

NEWS note

Los Angeles World Airports’ (LAWA) Van Nuys Airport (VNY) in California recognized 36 general aviation companies on June 13 with its Friendly Flyer Awards for outstanding compliance with established noise abatement regulations and achieving at least 99 percent compliance with the airport’s voluntary noise abatement programs during calendar year 2018.

In 2012, LAWA created the Friendly Flyer Award to validate operators that not only complied with all noise abatement policies and procedures, but also adhered to the voluntary No Early Turn, Fly Friendly and Quiet Departure programs.

Among the recipients were eight Friendly Flyer Legacy honorees. Legacy winners have received Friendly Flyer awards since the program’s inception. The 2018 Legacy honorees were Clay Lacy Aviation, Dreamline Aviation, Flexjet, Flight Options, JetSuite, NetJets, Tutor-Saliba Corp., and XOJet. ■

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A GE Aviation Catalyst turboprop engine with McCauley propeller on the test stand at the company's CVUT facility in Prague.

GE just starting bizav engine development

by Jerry Siebenmark

With a new turbofan entering service late last year and two other engines in development, it might seem like GE Aviation's plan to expand into the business aviation market beginning a decade ago is now well underway. But that's not how the executive leading that charge views it. "We are on a journey, and we are really at the start of that journey," GE Aviation v-p and general manager of business, general aviation, and integrated systems Brad Mottier told *AIN*.

That journey began to some degree with the jointly developed GE Honda HF120 engine powering the Honda Jet and the CF34-3B on the Bombardier Challenger 650, but more recently with the 18,000-pound-thrust Passport that entered service with Bombardier's Global 7500 ultra-long-range business jet last December. With two Global 7500s already delivered, the Passport is meeting or exceeding key performance parameters such as specific fuel consumption, weight, emissions, and noise, Passport product manager Laurence Vigeant-Langlois told *AIN*. "We've validated it in the field with those two aircraft flying now," she added.

Featuring a high-performance core similar to the CFM Leap, 52-inch fan "blisk"—fan blades and disk fashioned from a single piece of titanium—and a compressor with a high-pressure ratio of 23:1, the engine is bearing out its reputation within the company as a sort of environmental teetotaler, Mottier said. "Jokingly, some of our people here say that it's really a marvel because it doesn't have a drinking problem, it doesn't have a smoking problem, and it's not overweight." GE continues to have discussions with OEMs about adding the Passport to other airframes, he added.

At the same time the engine has rolled out, so, too, has a team of GE people well-versed in the powerplant, GE Aviation services product manager Jim Stoker told *AIN*. "We've got a pretty extensive service and support network today," he explained.

"We support nearly 3,000 business jet engines that are out flying with our concierge level of service [called OnPoint], but we're expanding the coverage particularly in the critical areas where we think the Global 7500s are going to go." These areas include Asia, the Middle East, and Australia, Stoker said, as well as the U.S. and Europe. And those service support people already have a great deal of experience, having been with the Passport from the beginning. "I think, at the end, it was somewhere in the mid-20,000 hours of support experience all across the engine [development] and flight test programs," Stoker said. "That's part of the seamless entry into service that we have been working around," added Mottier.

Catalyst Development

Concurrent with the entry into service of Passport, GE is well into the development of the Catalyst, its first clean-sheet turboprop engine that will power Textron Aviation's Cessna Denali single-engine turboprop. GE Aviation general manager of turboprops Paul Corkery told *AIN* the company has done more than 1,000 hours of testing on three engines and 300 hours

in an iron bird on the engine's Fadec in the Czech Republic and Canada. More than 670 engine starts have been made in cold and hot environments ranging from -60 to 125 degrees F. And it just wrapped up altitude testing, up to 41,000 feet, in Canada.

GE's goal for the up-to-1,600-shp engine is to have 15 percent better fuel burn across the flight profile and more than 10 percent more power at altitude. "What we've learned thus far is...all that is meeting and exceeding our expectations," Corkery noted. Testing is underway at three test cells with a fourth coming online. By the fourth quarter of this year GE expects to be testing the Catalyst on a King Air flying testbed, he added.

"I love this engine and this program because it is modernizing a cockpit and a flight control like no other engine has done in this marketplace," said Mottier, himself the pilot of a Pratt & Whitney Canada PT6A-powered Cessna Caravan. "And when we say that we have exercised the prop through its full range of pitch from beta, to fine pitch, coarse pitch, feather—plus the engine—that's all integrated into the Fadec. All of those schedules have been validated for steady state



GE Aviation showcased its Passport engine at EBACE in May.

and transient operability in the altitude chamber and now...the prop cell. So a huge amount has been accomplished."

Corkery added that GE is "on alignment" with Textron's schedule for the Denali and is meeting its milestones. Textron Inc. CEO Scott Donnelly said on the company's first quarter 2019 earnings call that the Denali is expected to make its first flight this year.

Still early in development at GE is its most recently announced new engine, the Affinity, which will be the powerplant of Aerion's AS2 supersonic business jet. Affinity's configuration, engine architecture, size, and preliminary design is complete and calls for two fan blisks, a low-pressure system wrapped around GE's most popular narrowbody engine core and a proprietary exhaust system, said Stoker, who also oversees the Affinity program. "Ideally, you want those double fans, low bypass ratios for supersonic flight," Stoker explained. "The challenge with us here is we've also got to meet commercial aircraft requirements for noise and emissions. Think about this as a blending of our experience on military engines, our commercial engines as well as our bizjet engines, and being able to take that and find the right balance such that we're able to meet that supersonic performance while still being able to meet subsonic requirements like Stage 5 subsonic noise." A major design review in 2020 between GE, Boeing, and Aerion is the next milestone in that development program, he added. Aerion has slated first flight of the AS2 for 2023.

Even with three new engines at different stages, Mottier insists this is just the beginning. There is plenty of work and new engines ahead for GE Aviation. "We're on the path," he said. "And I think you will see even more engines in the future." ■

NEWS note

London Stansted Airport-based Inflight The Jet Centre has become a Rolls-Royce authorized service center, allowing it to offer maintenance for the AE3007 engines that power Embraer's Legacy 600 and 650. Inflight will provide operators signed up to R-R CorporateCare and CorporateCare Enhanced MRO programs with engine support.

CorporateCare is Rolls-Royce's fixed-cost engine maintenance management program, "protecting operators against unforeseen costs and unscheduled events anywhere in the world," said Inflight. The MRO company said that it has already started to invest in parts and training in support of the contract and will add personnel, with the first four technicians having started in May.

"We are looking forward to working closely with Rolls-Royce and their customers as we continue to evolve our business," said Inflight head of customer service Alan Barnes. ■



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Sustainable fuel powers flights to bizav show

by Matt Thurber

On May 18, the business aviation world came together as it headed for EBACE in Geneva, demonstrating the benefits of sustainable aviation fuel (SAF) during flights to participate in the show's static display. Thirteen business aircraft fueled up with sustainable aviation fuel at TAG Farnborough Airport in the UK, while others took on SAF supplied by Avfuel in the U.S. at Republic Airport near New York City, and Air BP at Caen-Carpiquet Airport in France and Arlanda Airport in Stockholm. World Fuel Services supplied 75,000 liters of sustainable aviation fuel for the Farnborough event, but the biofuel made by Gevo and that was mixed with the jet fuel had to be shipped to the UK from the U.S.

Aircraft flying in from Farnborough included a Gulfstream G550, Bombardier Global 6000 and Challenger 350, Embraer Praetor 600 and Phenom 300, Cessna Citation Latitude, Piaggio Avanti, Cirrus Vision Jet, TBM 910, and others. Dassault's Falcon 900LX picked up a load of sustainable aviation fuel from the Sheltair FBO at Republic Airport, and its Falcon 2000S filled up at Caen. More than half the airplanes on

the EBACE static display burned sustainable aviation fuel flying into Geneva.

UK Member of Parliament Grant Shapps offered the enthusiastic support of the General Aviation-All Party Parliament Group, the largest such group in Parliament, with 221 members who want general aviation in the UK to grow and succeed. "If we don't start greening up this sector, it won't have a future," he said.



Twenty-three of the aircraft on static display at EBACE arrived powered by sustainable aviation fuel (SAF). The industry is uniting in support of developing and promoting 'green' fuel, with expectations of increasing demand and lowering prices.

While at Farnborough, OEMs, industry associations, fuel companies, and Eurocontrol director general Eamonn Brennan participated in an event to highlight the benefits of SAF, "Fueling the Future, The Sustainable Alternative Jet Fuel Initiative: Emissions Reduction through Investment, Innovation."

Forming part of the EU Sustainable Energy Week, the event was staged by the

sustainable aviation fuel coalition, which includes aviation organizations EBAA, NBAA, NATA, GAMA, and IBAC, and was sponsored by the OEMs, World Fuel Services, and TAG Farnborough Airport.

Industry Buy-in Required

The goal of this effort is to encourage business aviation pilots and operators to ask for sustainable aviation fuel and thus stimulate demand for the new fuel. Participants at the event helped spread the word about the safety, improved performance, and environmental benefits of running sustainable aviation fuel in turbine business aircraft.

Ten years ago, the "Business Aviation Commitment to Climate Change" initiative set three goals: a 2 percent improvement in fuel efficiency from 2010 through 2020; carbon-neutral growth from 2020; and, relative to 2005, a 50 percent reduction in carbon emissions by 2050. "We need SAF" to meet those goals, said EBAA secretary-general Athar Husain Khan. "It's great to see the sustainable aviation fuel availability today at many airports. Uplifting this fuel is no easy task, and market availability leaves much to be desired. The cost is higher [than jet-A] but decreasing. We need dedicated regulation for sustainable aviation fuel and fiscal incentives. We stand ready to help."

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carbon neutrality, but airport CEO Brandon O'Reilly wants to do more by promoting more widespread use of SAF. "People are asking for it, and the day we can offer it efficiently and cost effectively will come."

Eurocontrol's Brennan also wants sustainable aviation fuel to succeed, but he said, "Just at the moment, it's fantasy. It's difficult to get on a day-to-day basis. Policymakers need to incentivize [SAF]. We have to make it cheaper and more available." At the same time, Brennan warned that meeting the environmental goals for aviation is difficult given the constraints of the 41 separate Eurocontrol member-states, the lack of capacity in the European air traffic system, and frequent strikes that shut down airspace. He cited one recent example where a French ATC strike forced a TAP Air Portugal flight to route all the way around France to reach its destination, more than doubling the time and fuel needed. "Tell me how that benefits the environment," he said.

Challenges Ahead

David Coleal, president of Bombardier Aviation and chairman of the GAMA environmental committee, is both encouraged by the sustainable aviation fuel efforts but well aware of the challenges to produce and distribute the new fuel. The GAMA committee has been working on sustainability issues since 1996, and last year the sustainable aviation fuel Coalition published the "Business Aviation Guide to the Use of SAF." "The chemistry is fascinating," Coleal said. "sustainable aviation fuel is viable and safe. This will be a long journey, but this is change that will have a real-time positive impact."

Other speakers affirmed their commitment to the initiative. "We're here today to raise the awareness of SAF," said NBAA president and CEO Ed Bolen. "We want to [fly] more sustainably than anyone can imagine." NATA president Gary Dempsey noted, "The focus now needs to be on making it easier for companies to produce sustainable aviation fuel to meet the demands of business jet owners."

"I'm extremely encouraged," said Embraer Executive Jets CEO Michael Amalfitano. Sustainability, he added, "is a big part of Embraer's DNA." Brazil has long invested in alternative fuels, with significant capacity for manufacturing ethanol for automobiles. Embraer's piston-powered Ipanema agricultural airplane is

ethanol-powered, and the company spends 10 percent of annual revenue on research and development and innovation, which includes sustainable alternative fuels.

All of Embraer's jets brought to EBACE carried SAF, including the Praetor 600 that flew from Teterboro to Farnborough with 3,000 pounds of SAF. (AIN editor-in-chief Matt Thurber joined Embraer for the Teterboro-Farnborough leg.) Likewise,

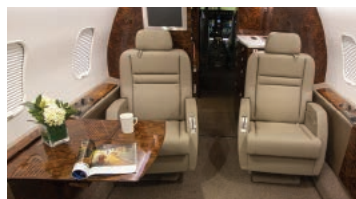
Gulfstream's full line of aircraft at the EBACE static display flew to Geneva with sustainable aviation fuel in their fuel tanks. Manufacturers invited members of the media to fly on some of their SAJF-fueled aircraft from Farnborough to Geneva, including Bombardier (Global 6000), Gulfstream (G550), and Textron Aviation (Citation Latitude).

"We were all very disappointed that we couldn't get fuel from the European

continent," said EBAA communication manager Róman Kok. "This situation is part of the realities that we face, especially in business aviation, when it comes to sustainable alternative jet fuel and it is especially the reason we're organizing these events, not only to educate, but also to bring to light to regulators and fuel providers that our industry is ready to jump on this fuel, but availability is still a huge problem." ■

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Citing ADs, Tamarack Aero files for Chapter 11 reorg

by Rob Finrock

Sandpoint, Idaho-based Tamarack Aerospace announced June 7 that it voluntarily filed for Chapter 11 bankruptcy protection earlier in the month, a decision the company termed “a direct result” of recent Airworthiness Directives from the FAA and European Union Aviation Safety Agency (EASA) that have “effectively grounded” Cessna CitationJets, CJ1s, CJ2s, and CJ3s equipped with its active load-alleviation system (Atlas) winglets.

“The decision to enter Chapter 11 [reorganization] allows Tamarack to continue to operate and focus all activities on supporting the Atlas winglet customers and to support EASA and FAA as they consider the proposal for lifting the restrictions imposed by the ADs,” the company stated, adding it expects bankruptcy to be “a temporary state.”

EASA issued an emergency AD in late April, stating “occurrences have been reported in which Atlas appears to have malfunctioned, causing upset events where, in some cases, the pilots had difficulty to recover the aeroplane to safe flight.” The FAA followed suit May 24 and, unlike the EASA directive that included a mitigation path for continued flying of Atlas-equipped 525-series jets—using “speed tape” to secure the Tamarack Active Camber Surfaces (TACS) in neutral position—the U.S. agency prohibited further operation of 76 Atlas-equipped CJs in the U.S., outside of approved ferry flights, until a better alternative is identified.

“Use of speed tape was never a Tamarack solution, and in the course of harmonizing to the EASA directive, the FAA noted its use wasn’t acceptable,” said Paul Hathaway, Tamarack’s vice president of marketing, in May. “However, we have over the past year issued two service bulletins at company expense to address potential TACS

asymmetry, and those modifications have been submitted to both aviation authorities as an alternate means of compliance [AMOC] to resolve the directives.”

Those upgrades involve replacement of a screw inside the TACS control unit (TCU) that could work free of its fastening structure and drive TACS movement, and installation of aerodynamic centering strips on those surfaces. The TCU repair bulletin was mandatory, with parts costs covered by Tamarack, while the centering-strip bulletin was optional; Tamarack has since made both bulletins mandatory and available at no charge.

According to the company, 73 percent of the installed fleet has been fitted with these upgrades. “Tamarack is committed to the safety of our fleet and our customers,” then-company v-p and chief engineer Jacob Klingensmith told *AIN* in early June. “We feel we’ve been proactive in reaching out to make sure our customers have the latest, best, and safest product and we’ll continue to work closely with authorities to lift the restrictions on the fleet.”

Klingensmith also confirmed that Hathaway was laid off in early June as a cost-saving measure related to the Chapter 11 filing, along with company president Brian Cox (see sidebar for staff update).

TACS Role in European, U.S. Incidents Questioned

In one incident cited by EASA involving a CJ1+, pilot René Klumpes told *AIN* that while climbing through 3,000 feet, the Atlas failed and the jet “[entered] a steep turn to 90 degrees left bank angle and nose down with increasing speed.”

Data downloaded from the incident showed that the bank reached 75 degrees in 18 seconds, and g load during the recovery was 2.6, according to information



Tamarack Aerospace filed for Chapter 11 reorganization last month as a result of FAA and EASA Airworthiness Directives that have “effectively grounded” Cessna CitationJets/CJs equipped with its active load-alleviation system (Atlas) winglets.

provided by Klumpes. Tamarack countered that his jet had not received the service bulletin improvements, adding “there have been no reported incidents in those aircraft with the latest upgrades.” After disassembly, the TCU in Klumpes’s CJ1+ was found to have the loose screw problem, according to Tamarack.

The FAA directive noted five control-loss incidents involving Atlas-equipped aircraft reported to the agency and EASA. In one of those incidents, however, Atlas appears not to have been involved. A December 2018 incident was documented in a NASA Aviation Safety Reporting System (ASRS) narrative, in which the submitter responded to a callback from NASA. In the ASRS report, NASA wrote in the callback section, “On the reporter’s aircraft, maintenance found the aileron trim actuator was out of tolerance. Once the actuator was replaced, the problem has not returned.”

The agency also cited the ongoing NTSB investigation into a November 2018 fatal accident in Indiana that involved an Atlas-equipped CJ2+ (N525EG) that had complied with the mandatory TCU service bulletin. Aircraft manufacturer Textron Aviation and engine OEM Williams International are listed as parties to that investigation, but Tamarack Aerospace is not.

“The NTSB investigation focuses on the role the Atlas may have played in the accident,” the FAA noted in its reasoning for the AD. *AIN* asked the FAA whether it was specifically told that the NTSB’s investigation is focusing on Atlas, but the agency had not responded by the time this was published.

In April, an NTSB spokesperson told *AIN* the N525EG accident investigation “is still ongoing at this time. Only preliminary information is available.” In a subsequent interview, Hathaway stated the Board has not contacted the company regarding the accident.

“We’ve offered our input and have been told it is not needed,” he told *AIN* in May. “I can’t definitively say the Board has ruled out Atlas [as causal to the accident] but we’ve been told by other agencies it would be highly unusual to have not been contacted if they believed the system was relevant to the investigation.”

Textron Aviation, manufacturer of the Cessna Model 525 series Citations, told *AIN* the company “has been notified of the FAA’s airworthiness directive concerning light jets fitted with Tamarack Aerospace’s supplemental type certificate for active load-alleviation system [Atlas] winglets.

“Textron Aviation understands that Tamarack Aerospace is working with the FAA to determine an approved engineering solution,” the company continued. “Safe operations of its aircraft are of the utmost importance to Textron Aviation, which will continue to closely monitor the situation to encourage a swift resolution and understanding of the impact this AD will have on a select number of owners and operators.”

Textron Aviation was an installation center for Atlas winglets, although the company is no longer listed as such on the Tamarack website. Textron Aviation would not comment to *AIN* when the company stopped installing Atlas winglets. ■

Tamarack looks toward new product lines as company reshuffles its leadership

Tamarack Aerospace announced on June 12 that former chief engineer Jacob Klingensmith has been named the company’s president and Nick Guida, Tamarack founder and inventor of the active load-alleviation system (Atlas) winglet, will serve as CEO. The move is “part of a strategic reorganization meant to ensure the [company’s] continued strength and viability.”

Tamarack filed for Chapter 11 bankruptcy protection earlier in the month (see *accompanying article*).

Klingensmith acknowledged Tamarack has “some significant short-term challenges

to overcome” in the current environment, but he also expressed confidence that the FAA and EASA will ultimately sign off on two previously issued company service bulletins as resolutions to the ADs and return Atlas-equipped Citations to service.

“We will continue to work closely with authorities to lift the restrictions on the fleet,” he continued. “We see Chapter 11 as a temporary situation, and we look forward to continuing to support and grow our customer base.”

That includes exploring new potential

Atlas applications for other aircraft types even as the company works to resolve its current regulatory hurdles. “Our commitment to our customers to quickly resolve this imposed hurdle is our main priority each day,” said Guida. “[H]owever, looking beyond the current situation, there is much to be optimistic about.

“The outstanding performance and benefits of the active winglet technology has been proven on the Cessna Citation 525 series and we made a healthy profit last year,” he continued. “We have already started implementing the new business plan which capitalizes on these strengths and we have identified many more aircraft that will benefit greatly from this transformative technology.”

R.F.

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JMI opens at London Oxford with focus on two models

by David Donald

In May, a start-up company began operations at London Oxford Airport. Jet Maintenance International (JMI) is initially concentrating on MRO services for popular Citation and Falcon jets but plans to broaden its offering to cover additional types.

Established by experienced business aviation MRO managers Ed Griffith and Neil Plumb, JMI moved into the recently completed Hangar 14, Bay 4 facility at Oxford, which offers 18,000 sq ft (1,500 sq m) of hangar space, along with offices and external parking. There, the two intend to create a business that not only offers high levels of maintenance quality, but also with the accent on customer service.

“The OEMs are increasingly bringing MRO in house,” Griffith told *AIN*. “Independent Part 145 operators are disappearing and customers have reduced options.”

JMI has been established to address this growing shortfall in MRO services that continue to offer the personal touch. The team sees an “ever-growing demand for high-quality and personalized customer service.” The new company has also perceived that, in the UK and Europe market, “demand for quality technical support is beginning to exceed capacity.”

JMI's EASA-accredited operation will initially focus on providing base maintenance for the Cessna 510 (Mustang), 525 (CJ series), and 560 (Excel/XLS), as well as Dassault Falcon's 900 and 2000. Line maintenance capability covers the Cessna 680 (Sovereign), Hawker 750/850/900, and Falcon 900/2000. The company will also provide a mobile service unit for AOG support and line maintenance on a worldwide basis. ■



Jersey Airport's remote tower has demonstrated capability to handle up to 32 movements per hour.

JER adds a remote tower

by Matt Thurber

The Channel Islands' Jersey Airport (JER) has been approved for operational use of a remote control tower system developed by Frequentis. The remote tower is a “contingency” facility for times when the airport's control tower is unavailable, such as an emergency situation or security issue.

The approval follows trials conducted last November, during which traffic levels of 32 movements per hour were achieved. This marks the first EASA approval for a remote tower to be used for active control of commercial aircraft movements at a British airport, according to Frequentis.

At Jersey Airport, 13 cameras provide a 240-degree field of view for remotely located controllers in a nearby contingency facility. Systems Interface Ltd. was the project specialist and managed the installation and integration using Frequentis's remote tower technology.

Traffic at Jersey Airport averages 23,000 air transport movements per

year and another 22,000 business and general aviation flights.

Frequentis has developed three other remote tower systems that are in operational use, according to a spokeswoman. These include “Austria's Vienna airport for vision enhancement, a system in Iceland testing remote tower abilities in extreme weather, and the most significant at Germany's Saarbrücken airport, which is providing tower services from an actual remote location 450 km away (this is also currently the largest operational remote tower, managing 15,000 flight movements per year).”

The reason for bolstering Jersey Airport's tower with the contingency remote tower is so that operations at Jersey can continue during an emergency affecting the tower. “Jersey Airport is a critical part of the regional transport infrastructure,” according to Frequentis, “and therefore its continuous air traffic services are essential, especially in the event of a technical failure or evacuation.” ■



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Brazilian anti-drone conference highlights need for creative mitigation techniques

by Richard Pedicini

Brazilian airspace control organization DECEA kicked off its “First Antidrone Technology Symposium” May 13, with DECEA director Lt. General Jeferson Domingues de Freitas calling for “powerful and intelligent solutions to problems caused by malice or neglect.” Regarding the drone threat, he identified the need to “detect, identify, [and] mitigate, preferably in single application.” A range of local and foreign experts agreed that there is no “magic bullet” against drone incursions anywhere, that electronics-intensive airports pose special challenges, and evolving drone technology requires evolving countermeasures. Drones can be detected with the right mix of sensors for the situation, but responses such as jamming are limited by the need to affect only the drone, and by existing legislation that predates the drone threat.

Pilots of drones invading protected airspace are “clueless, careless, and malicious,” according to Joshua Holtzman, FAA director, Office of National Security Programs and Incident Response. Countermeasures proposed against the first two categories included “electronic fences” to warn off pilots or even turn away or deactivate drones. More active measures would include jamming or “kinetic” responses including lasers.

The three-day conference took place in São Paulo at Anhembi-Morumbi University. The meeting attracted more than 280 participants, 40 percent in air force uniforms. The second day opened with presentations on currently implemented solutions, such as Israel’s “Iron Dome.” Crisis coordinator Cesar Augusto Borges Tuna described the challenges drones pose for Guarulhos Airport.

A collision with a drone will cause more damage than one with a bird of similar size, Matteo Sensini of Italian supplier IDS explained, speculating on the effects of a collision that’s not accidental, with drones carrying explosive devices, even home-manufactured ones. His firm handled counter-measures for a G7 summit in Italy, among other events and locations

where malice was a real threat.

Several speakers brought up prisons, both as examples of places where jamming is specifically permitted by law and sometimes implemented, and as places where bad actors use drones to deliver contraband. While there’s no special need to fear malice against Guarulhos Airport, aircraft are especially vulnerable to unintended collisions with drones, and there is a prison near the airport, where there has been illicit drone activity.

The last day of the conference was devoted to legislative and legal measures to allow more active responses to drones, including both “soft” responses such as taking control of the drone or forcing it to land, and “hard” responses such as lasers and guns, which have evolved over the last few years from a Ghostbusters-style backpack to a handgun with a soccer-ball sized bulge.

The event included two live demonstrations of detection systems set up on the university’s roof. The systems showed a mix of strengths and limitations, with scanners automatically triangulating on an approaching threat and focusing a camera on the drone, as well as capturing its make, model, and serial number. A real-time map tracked not only the drone’s flights but also the launch point and the pilot’s position. However, engaging the jammer of one system tripped a circuit breaker; the other’s scanners were confused by a jammer being placed close by.

The São José dos Campos aerodrome will be testing anti-drone systems in June and July, which should allow for a more fair and thorough evaluation.

A Different Public

“The drone piloting public isn’t composed of aviation people. They don’t know what an FIR is, and requests for permission to use airspace had to be submitted by fax,” said DECEA systems analyst João Ximenes, describing the challenges faced in producing the new SARPAS system for submitting and processing requests to use airspace.



DECEA director Lt. General Domingues de Freitas opened the event and was a constant presence.

“We are focused on compliant navigation,” is how Holtzman described the FAA’s approach, “A rule is being written” for a system in which manufacturers must put a serial number on each UAV, and the UAV must transmit the number and other data. Such an approach would be dependent on the cooperation of the many manufacturers to create a library, similar



Bruce De Bies of Hensoldt (formerly Airbus Security)

“Sensor mix is critical. The purpose is to give advance warning of a threat to the asset you’re protecting.”

Airport drone incidents spur C-UAS efforts

Recent incidents have shined a spotlight on the need for counter-unmanned aerial systems (C-UAS) in the airport market, and manufacturers are developing systems to meet these requirements.

In December, UAS sightings at Gatwick Airport led to the cancellation of hundreds of flights, followed weeks later by similar disruptions at Heathrow Airport and at Newark Airport in New Jersey.

Such incidents show that “this certainly isn’t a manufactured crisis,” with similar problems to be expected in the future, said Michael Hofle, high energy laser (HEL) product line lead at Raytheon. “Clearly, the community recognizes the hazards and the threats that drones represent. This is a market that’s here to stay.”

Raytheon sees the airport sector as a major target for its Windshear C-UAS. Windshear is a command, control, and communications system that uses multiple sensors and deploys both kinetic and non-kinetic effects.

Hensoldt’s Xpeller family of C-UAS products includes Xpeller Guard, designed to protect fixed sites. The system combines sensors and effectors to protect infrastructure against small UAVs, according to the

to that used by anti-viruses, to identify drones and issue appropriate responses.

But drones can be modified or home-assembled to ignore countermanding orders. While jamming Wi-Fi, RF, or GPS signals would confuse most drones, those relying on internal navigation using photo-reconnaissance or other techniques would be unaffected by jamming. Major Rafael Paes of the Air Force’s Institute for Advanced Studies described how “massive data processing” can determine position far more precisely than GPS when using reference images from previously known positions.

Holistic Perspective

Bruce De Bies of Hensoldt (formerly Airbus Security), said, “Sensor mix is critical. The purpose is to give advance warning of a threat to the asset you’re protecting.” Radar can detect a target far away, while sound can detect one close in. “The key question is, ‘What are you trying to protect, and where are you trying to protect it?’” A refinery or a prison requires different protection than an airport, but the right solution is specific to the site, and “not something that comes out of a box.” A downtown airport and one beyond the suburbs have different needs in sensors.

De Bies said that on countermeasures “we’re learning as we go,” showing man-portable systems and vehicle-mounted systems that can respond to threats and fixed systems to cover an entire site. “The key is scalability to move between solutions, and solutions need to be ‘future-proof’” to meet changing threats. ■

company, aiming to detect the potential threat, identify it as a threat with the lowest possible false alarm rate, and act on it by raising the alarm or engaging with a countermeasure.

There are many recorded incidents involving UAV sightings at airports every year, with the number growing exponentially, said a spokesman for Thales. “It is becoming obvious to airport operators that the threats posed by UAVs are now a real and immediate issue.”

On the airport side, its major focus is work on Hologarde, a C-UAS developed in collaboration with France’s air traffic control body and Groupe Aéroports de Paris. This system deploys the 3D holographic radar developed by the Thales-owned Aveillant, which provides 3D identification and tracking of UAVs up to 7 km, RF detection to monitor communications, as well as long-range infrared cameras for identification.

Hologarde is currently being tested at Paris’s Charles de Gaulle airport. The first operational deployment was due to take place by mid-June, with Thales expecting the system to be qualified for operations next year. **G.C.**

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TAC Air officials expect to open the company's new FBO in Dallas next month. It's part of a more than \$100 million redevelopment of the former Braniff International Airways headquarters, operations, and maintenance base that TAC Air and its development partners are calling the Braniff Centre at Dallas Love Field.

TAC Air nears debut of its newest FBO

by Jerry Siebenmark

If all goes as planned, TAC Air will open its 15th FBO next month in a more than \$100 million redevelopment of the former Braniff Airlines Operations and Maintenance Base and Braniff International Airways headquarters. Built by the flamboyant and now defunct Texas-based airline and opened in 1958 at Dallas Love Field (DAL), the maintenance hangars and offices have been undergoing a conversion to the Braniff Centre, whose tenants in addition to TAC will include Flexjet; Dallas Cowboys owner Jerry Jones's company, Blue Star Land, a Jones Family company; and Reed Enterprises and its auto dealership Planet Lincoln, the latter two of which are converting a multi-level parking garage adjacent to the center into offices and a luxury automobile dealership.

Another feature of the center is 100,000 sq ft for uses that are currently expected to include restaurants, retail shops, and offices. "We really had to get thoughtful in the design of the center," Greg Arnold, chairman and CEO of The Arnold Companies, TAC Air's parent, told *AIN*.

It's an ambitious, 19-month-long project between developers that include Arnold's companies, the Jones company, and Lincoln Property Company that's meant working closely with the Texas Historical Commission to preserve the mid-century modern architecture of the hangars and offices originally designed by architects William Pereira and Charles Luckman. "It took three partners with very creative ideas and being in a top market like this" to pull off the project, TAC Air

v-p and chief operating officer Christian Sasfai told *AIN*. One of the major changes to the 26-acre site included razing a Braniff office and maintenance shops nestled between the two large hangars—which combined could hold six Boeing 707 jetliners—and replacing it with a gated, private courtyard and parking spaces for TAC Air and Flexjet customers.

Flexjet will occupy one of the two large hangars with a Red Label by Flexjet private terminal and 60,000 sq ft of maintenance space occupied by its maintenance operations staff who were previously located in Addison, Texas. Elsewhere at the Braniff Centre, it will occupy 32,000 sq ft of office space for its staff who are relocating there from Flexjet's Richardson, Texas office. "By moving our Dallas operations to the same campus as our newest private terminal at Dallas Love Field, our employees will have the opportunity to deepen relationships with our owners, in person, as they pass through for their flights," Flexjet CEO Michael Silvestro added.

Booming FBO Market

TAC Air will occupy the other large hangar with an executive terminal and individual hangars that feature secured entries from the courtyard as well as office suites and shop space. Inside the TAC Air terminal, a replica 1/25th-scale Braniff Boeing 727 will be suspended from the two-story ceiling as a nod to the building's heritage. On the second floor of the executive terminal will be an event venue with a bar and catering space and the capability to hold up to 50

people. It can also be divided into smaller spaces for meetings. The venue also boasts one of the best views of the downtown Dallas skyline, The Arnold Companies v-p of marketing Tad Perryman told *AIN*. Amenities at the FBO will include valet car service with private parking, fuel service, and auto detailing, and "elite" trained staff and concierge offering top-notch customer service and safety. Arnold said TAC Air will pay above market to get quality employees at DAL. "It's what we can do to differentiate ourselves on this field," he added. Love Field's other FBO tenants include Signature Flight Support, Business Jet Center, and Jet Aviation.

Planning for a second phase of the project, which will include construction of more hangar space at the south end of the Braniff Centre, is under way.

Opening an FBO in Dallas in an iconic building was the logical next step for The Arnold Companies, Arnold said. It is a robust market in a pro-business environment that is the home of his companies and headquarters for more than 100 publicly traded corporations including AT&T, Exxon Mobil, JC Penney, and Kimberly-Clark. Love Field in particular is among the FAA's top 10 airports for domestic business jet operations, ranking No. 2 in the April 2019 Business Jet Report with 61,546 movements. "It's about something that's going to have solid earnings," Arnold explained. To that end, he expects TAC Air-DAL will be among the company's top three FBOs in earnings. Investment wise, however, it's "at the top of the heap." ■

Jetex calls for new term for FBOs

A Middle East FBO specialist has issued a call to the business aviation industry to create a new name for the FBO, suggesting the existing term has become outmoded after 100 years of use. In an open letter to the global industry, Adel Martini, president and CEO of Dubai-based Jetex Flight Support, said, "We're challenging the history of aviation to not just redefine, but reinvent, the term 'fixed base operator' (FBO)," Martini wrote. "We are initiating an opportunity for aviation experts and passengers alike to ask themselves what the term 'FBO' means to them and to share what it means [with] us."

Martini argues that towards the end of World War I, civil aviation was virtually unregulated and consisted mainly of transient pilots, operating military surplus aircraft that landed wherever they could. This prompted them to set up temporary camps offering aircraft maintenance and flight training, which by 1926, when aviation regulations were put in place, became what we now know as FBOs, he wrote.

"The description of an FBO labels it as a gas station for planes, but since its origin in 1918, it has progressed to mean a relaxed and stress-free setting for busy travelers."

Jetex has committed to set up more than 50 FBOs around the world by 2020. More than 25 are understood to be operational today.

"Since the launch of FBOs, the need to travel for business has increased dramatically and the demand for high standards even more so," Martini wrote.

Signature Flight Support attempted to introduce the expression 'flight support operation,' or FSO, as early as 2004. Although perhaps not meant to refer to individual facilities, it did not catch on. In a master plan update for the St. Petersburg, Florida-based Clearwater International Airport, published in 2004, Signature claimed to be "the world's largest flight support operation (FSO) and distribution network for business and commercial aviation services, and provides fixed base operator (FBO), charter operations, and ground handling services."

Martini does not suggest a new term himself but challenges the industry to come up with one. "I ask you to question whether you agree that the evolution of FBOs prompts a chance to rename them in order to fully celebrate the extent of what they now offer," he said. "Change is inevitable and we believe that 100 years is enough. What would the natural evolution of the FBO as a name be?"

P.S.-S.



Bye Aerospace flew its eFlyer 2 earlier this year as it strives to be the first to bring an all-electric Part 23-certified aircraft to the flight training market.

BlackBird signs on for Bye electric airplanes

by Matt Thurber

Bye Aerospace has signed a deal with charter broker BlackBird Air for the purchase of 110 eFlyer electric airplanes. BlackBird plans to provide the airplanes to its charter operator and commercial pilot partners to use for BlackBird-sourced flights.

Bye is developing two eFlyer versions, the two-seat eFlyer 2 (formerly the SunFlyer) and the four-seat eFlyer 4. After FAA certification, the two-seater could start deliveries in 2021, according to Bye Aerospace senior vice president Diane Simard, followed a year later by the eFlyer 4. The base price for the two-seater is \$349,000 and the four-seater \$449,000. The standard-equipped versions will include an airframe parachute, air-conditioning, VFR avionics, and an angle-of-attack indicator. Premium options that will be offered include IFR avionics, autopilot, and interior and exterior upgrades.

The eFlyer 2 will be powered by a Siemens electric motor capable of delivering 70 kW continuous or 90 kW peak power. With a top speed of 138 knots, it will be capable of flying for three hours with a VFR day reserve (30 minutes) or 210 nm (with reserve). Payload is 450 pounds, mtow 2,000 pounds, and take-off roll 1,100 feet. Bye Aerospace has applied for FAA Part 23 certification for the eFlyer 2, which made its first flight April 10, 2018.

The four-seat eFlyer 4 will carry a payload of 850 pounds and fly for 4.2 hours or 350 nm with VFR reserve, also powered by a Siemens motor (90 kW continuous, 105 kW peak power). With a mtow of 3,400 pounds, it will be able to fly up to 165 knots at lower altitude and 190 kts at

higher altitudes. Both airplanes will feature Garmin G3X avionics.

Bye Aerospace projects a recharging time for the eFlyer's batteries of about 30 minutes to reach 85 to 90 percent of a full charge, using a "supercharger" charging system.

BlackBird connects travelers with Part 135-certified charter operators and also pairs customers, who "rent a plane and hire a commercial pilot to fly," according to BlackBird Air founder and CEO Rudd Davis. He explained that BlackBird isn't facilitating the type of flight-sharing where private pilots invite people to fly and share expenses. "Only commercial pilots are allowed to use the BlackBird platform. [This] follows the approach businesses have used for decades, they rent planes and hire pilots to fly them."

When the eFlyers become available, Rudd explained, "BlackBird will be placing the electric aircraft with our primary operational partners (Part 135) in every region of the U.S. We're focused on providing our customers with all the options that meet their needs, from low-cost small aircraft to large, more expensive options. We're always looking for ways to lower prices because we want to make general aviation accessible to a much larger customer base. This is where electric aircraft come in."

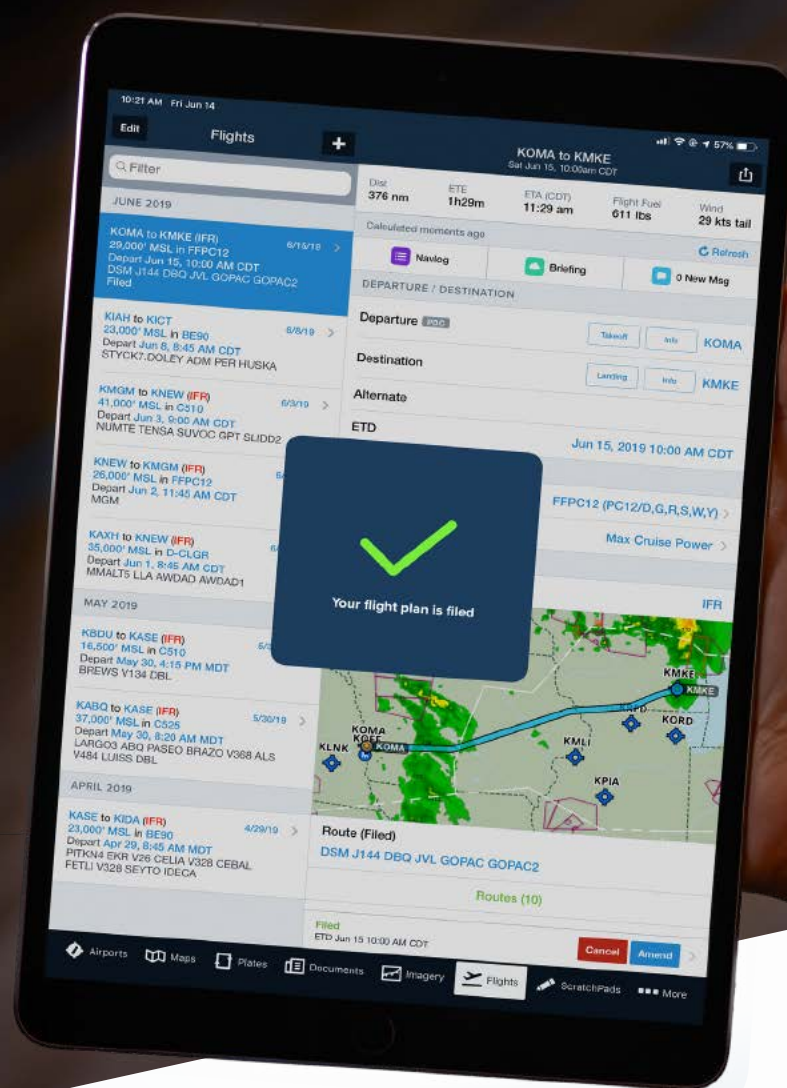
The trips in the eFlyers, he said, will be "initially on shorter flights but as the power density improves in later generations, so too will range. At less than \$50 an hour to operate, the eFlyer 4 is the future of aviation."

Neither Bye Aerospace nor BlackBird revealed any details of the financial arrangements between the two companies. ■



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ForeFlight app calculates landing and takeoff data

by Matt Thurber

Pilots flying with the ForeFlight Integrated Flight App can now calculate detailed takeoff and landing runway performance. The new feature is available in ForeFlight version 11.4, and it works on Apple iOS devices (iPhone and iPad) and is available for subscribers to the Performance subscription plans.

The new runway performance feature is available for about 200 single- and multi-engine piston airplanes and single-engine turboprops including the TBM series and Pilatus PC-12. ForeFlight is planning to support business jets in a future version.

Data to support the runway performance capability is sourced from manufacturers' pilot operating handbooks. For takeoff and landing distance calculations, ForeFlight incorporates weather from current sources such as Metars or if airborne, ADS-B In or satellite weather. For flights planned in the future, ForeFlight uses the TAF or MOS forecast information. Pilots can override this information by plugging in current weather from ATIS broadcasts or gameplan future flights using projected weather information.

To make the runway performance calculations more accurate, ForeFlight also takes into account takeoff and landing weights, based on user inputs in the Flights view.

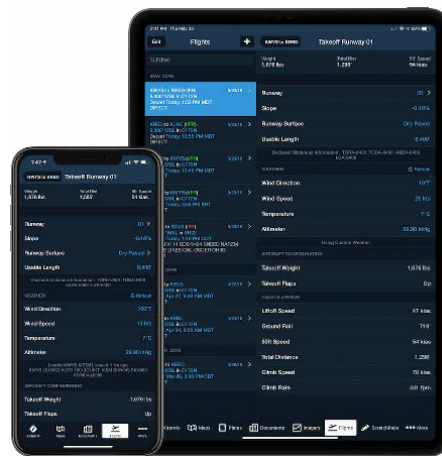
The new performance feature is

accessed from the Flights view, and once the departure and destination airport are selected and an airplane that is one of those on the ForeFlight list of 200 or so that have performance data, then the user can view takeoff and landing performance.

If the airplane is on the list, then a "Takeoff" and "Landing" button will appear on the Departure and Destination line in the Flights view. Tapping the Takeoff button opens a list of data, starting with the runway selection. After selecting the runway from a list showing the wind effects based on the current or forecast weather, the data fields show all the runway performance information, including aircraft configuration (takeoff weight, flap setting), rotation speed, ground roll, 50-foot speed, total takeoff distance, climb speed, and climb rate.

For landing, it works the same, except after choosing the runway, the data fields list landing weight and flaps, approach speed, total distance, and ground roll, for a single-engine piston airplane. When flying a multi-engine airplane such as a Beech Baron, much more information is available. For takeoff, the Baron has many more fields filled out, including accelerate-stop distance, climb gradient, and eight different one-engine-out data fields.

If the inputted information causes some parameter to exceed a limitation, ForeFlight



ForeFlight's new runway performance feature can improve safety by helping pilots calculate takeoff and landing performance much faster than trying to interpret complicated charts in their flight manuals.

shows a warning banner to alert the pilot.

It is not necessary to have an internet connection to use the runway performance features in ForeFlight. All the calculations can be done offline, and the pilot can input fresh weather information provided by ATIS or other sources.

ForeFlight will continue adding airplane models to the list of those for which runway performance features are available. Also on tap are airplanes with modifications that require new runway performance numbers.

Along with the runway performance features, the ForeFlight 11.4 update added new flight-sharing features, automatic addition of flight photos and screenshots to a logbook entry, night-vision goggles currency tracking, and an enhanced navlog with airport diagrams, a signature row, and average fuel flow per hour. ■

Avionics Update

JetSupport Tapped for First Euro G5000 Excel Upgrade

Amsterdam-based MRO JetSupport was selected to provide the first Garmin G5000 cockpit retrofit for a European-registered Cessna Citation Excel. The fully integrated suite, which will provide compliance with all current and anticipated mandates, features 14-inch flight displays with touchscreen controllers, the GIA 64E GPS/NAV/COM, SiriusXM datalink weather, TAWS A, and dual GTX 3000 ADS-B transponders.

Elliott Aviation Reaches Milestone G5000 Retrofit

Elliott Aviation has signed an agreement for its 50th Garmin G5000 avionics retrofit. Elliott was the first company to perform a G5000 installation and since has retrofitted more than 30 of the systems in Beechjet400A/Hawker 400XP twinjets.

The milestone installation is in a 2000 Cessna Citation Excel. The retrofit for the Excel and XLS replaces Honeywell Primus 1000 avionics, including the flight director system and autopilot, and offers ADS-B Out, WAAS/LPV, dual-channel digital flight control system, integrated engine indication and crew alerting system (EICAS), all in a lighter-weight package, while swapping the obsolescent CRT screens for LCD displays.

Hilton Software Updates EFB App to Version 9

The latest version of Hilton Software's WingX app brings new features and a new name for the company's moving-map and charting app. Now called WingX (no longer WingX Pro7), the new version is available for iOS devices (Version 9 for iOS 11 and later) and also on Android devices (Version 3 for Android 5.0 and later). New features include a new moving map, download of regional charts and maps, faster weather graphics and smoother animation, improved delivery of cycle data, real-time weather updates, and support for the Stratus 3 ADS-B In/AHRS portable receiver.

Garmin G500H TXi Receives EASA Nod

EASA has approved Garmin's G500H TXi touchscreen display for helicopters. The display is available in 10.6-inch in landscape orientation and 7-inch sizes in portrait or landscape. The G500H TXi adds new safety features, including five-color helicopter terrain awareness and warning system (H-TAWS), WireAware wire-strike avoidance, and synthetic vision. Other features include multiple video input options, NVG compatibility, and graphical map overlay on the HSI. H-TAWS is available when the TXi is paired with a GTN or GNS navigator. The WireAware technology uses the expanded helicopter-specific obstacle database, which has more than 200,000 additional low-altitude obstacles and 700,000 miles of power lines.

Astronautics secures TSOA for new drop-in EFI

Astronautics has received FAA Technical Standard Order Authorization (TSOA) for its AFI4700 RoadRunner drop-in electronic flight instrument (EFI), available for retrofit on helicopters and airplanes.

FAA supplemental type certificate (STC) approval is expected and product shipments will begin immediately thereafter.

RoadRunner is a primary flight display replacement for older EFIS or

electromechanical attitude director and horizontal situation instruments that can be linked with modern navigation equipment, thus enabling capabilities like localizer performance with vertical guidance (LPV) approaches. The EFI is readable in all lighting conditions and requires minimal installation time. It reduces operating and maintenance costs and is upgradeable with new software to meet customer-specific mission requirements.

"RoadRunner offers operators an easy and affordable upgrade to modern electronic flight instruments on their aircraft with enhanced safety features," said Astronautics president Chad Cundiff. "Receiving TSOA approval is a big step in bringing RoadRunner to the rotary- and fixed-wing markets." Astronautics manufactures avionics for military and commercial aircraft. Its product line includes electronic primary flight and engine displays, connected aircraft and cyber solutions, electronic flight bags, and certified servers for airborne applications. **M.H.**



Astronautics will soon begin shipping its AFI4700 RoadRunner drop-in EFI, which enables operators to replace expensive and hard-to-repair mechanical instruments.



The ClearVision Interactive system is designed to work with both Universal products and with OEM-designed interfaces.

@ Paris Airshow 19

Elbit's Universal Avionics presents a new way to FMS

by Matt Thurber

Universal Avionics, a subsidiary of Elbit Systems, is nearing the final stages of developing a new type of flight management system (FMS), one that is embodied in software and can run inside a variety of hardware types.

The new FMS is called ClearVision Interactive or iFMS, and although it is designed to work closely with other Universal Avionics products such as its InSight Integrated Flight Deck and ClearVision head-up display (HUD) and iSVS (interactive synthetic vision system), the FMS will also be available to aircraft OEMs that want to design their own avionics interfaces for their aircraft. In the Universal Avionics version, this "software-based FMS," under development for the past five years, will provide pilots a new and far simpler way to interface with FMSs, instead of having to look head-down and type on keypads and interpret arcane pages of information and symbols.

"This is a step in the roadmap to make avionics more simplified and semi-autonomous," said Dror Yahav, CEO of Universal Avionics.

To understand what he means, it's necessary to look back a few years. The concept of a software-based FMS isn't suddenly new. After all, technically some avionics manufacturers completely bypassed the standalone FMS box and designed their own FMS software that lives inside their GPS navigators, for example, Garmin and Avidyne. A pilot flying with modern avionics by those manufacturers might not think they are using an FMS, but they are.

Years before Elbit bought Universal Avionics, which was a pioneer in the development of the FMS, "We wanted to buy a software-based FMS from our

competitors," said Yahav. But while there were plenty of avionics manufacturers building FMSs, none could figure out a way to cost-effectively separate the FMS box from the software that ran in it. Years of FMS development resulted in a product that, while sophisticated, was unalterably suitable only for a particular use.

Now, as owner of Universal Avionics, Elbit's and Universal's avionics engineers and software developers are nearing the goal of delivering a software-based FMS. "Originally we were aiming to do another federated FMS box with a touchscreen," he said. "But we decided to switch into a pure software open-architecture system."

Of course, this meant completely rewriting the software that runs the FMS, as well as the human-machine interface (HMI). "We had legacy code back 20 to 30 years," he said, "and additional stuff and components added. At [this] point, it's hard for us to add new things. A lot of the system is relying on very old code and hardware. We said if we want to move to the future, we need to completely design from scratch. We have the know-how, the formulas, and the design capability, and [the new system won't] carry all the burden of the legacy product."

The result is a software-based FMS that can run on a variety of hardware systems, including commercial and military platforms, as well as on integrated modular avionics-type products (avionics that live on easily replaceable circuit boards) that most modern aircraft employ.

Customizable Design

Just designing a new FMS, even software-based, wasn't the only goal, however. "We realized that [aircraft] OEMs would

like to distinguish their product and put their look and feel [in the flight deck]," he explained. The underlying FMS software, therefore, is a proprietary Universal Avionics design that isn't accessible or changeable by the OEM. However, the HMI design is completely customizable by the OEM using application programming interfaces (APIs). "We'll allow customers to design their own human-machine interface to give a particular look and feel associated with their product," Yahav said. "We allow the customer to adapt the product to their flight decks and platforms." This means not just picking the colors, he added, "but we allow them to design their own logic, like two clicks and a gesture. Or two fingers and one button, and new data information presentations. We open up the HMI and tell them, 'Go do

whatever you want.'"

On a deeper level, the FMS portion is separated into two functions, a core that does the computations and the HMI that can easily be changed. The core functions run on an Arinc 653 operating system that can be split into different applications running in separate partitions at varying design assurance levels (DAL). For example, one partition could run the primary flight display, a Level A DAL, while another runs a lower DAL maintenance function, and yet another a moving map.

"We separated the FMS and HMI, and allow the OEM to touch the HMI," Yahav said. "The impact is not so high on the software because we don't change the core software. We do not provide the source code from the core software. But the HMIs are APIs, and the HMI is flexible for the [OEM] to change."

Over many years of FMS design, Universal Avionics has developed a large bank of interfaces with sensors and equipment in many aircraft types. "We collected interfaces and the software models to interact with those," he explained. "This provides us the ability to adapt to different platforms, backward and forward."

Essentially, an OEM can still select which avionics hardware it prefers to install but then will also be able to play a much bigger role in designing the look and feel of the avionics. They won't be hampered by restrictions imposed by the avionics manufacturer; currently, while there is some latitude in HMI design, a Garmin

» continues on next page

Garmin co-founder Burrell passes

Avionics and electronics manufacturer Garmin announced last month that co-founder and chairman emeritus Gary Burrell died at 81, leaving behind principles of innovation, vertical integration, faith in values, and devotion to superior products and services that have been the keys to Garmin's success, according to the company. Burrell retired in 2002 but continued serving as chairman until 2004, when he was named chairman emeritus.

"His vision, values, engineering skills and commitment to serving our customers have been the foundation for the growth of our company," Garmin co-founder Dr. Min Kao said. "It has been both a great privilege and a blessing to have known this amazing man, and I know his legacy will live on."

Kao and Burrell founded the Olathe, Kansas-based company in 1989 to create products around Global Positioning System (GPS) technology with a handful of engineers that has since grown to more than 13,000 employees in 60 offices around the world. Burrell is credited by the company with leading the vision and development of a range of products that are industry



Gary Burrell co-founded Garmin in 1989.

staples including the G1000 integrated flight deck.

Also, Burrell is credited with creating a culture in Garmin of sincerity, humanity, religious spirit and servant attitude. "While Gary will be remembered by many as one of the great entrepreneurs of our age, I will remember the unusual way in which he led our company, something he called servant leadership," Garmin president and CEO Cliff Pemble said. "Whether it was about creating the best product or his behavior as a leader, Gary always considered the impact to others before himself. His example not only inspired my contribution to Garmin, it also positively influenced me as a husband and father." J.S.

Nav Canada sticks by ADS-B antenna mandate

by Gordon Gilbert

Despite objections by U.S. and Canadian general and business aviation user and avionics associations, Nav Canada is not budging on its requirement for ADS-B diversity antenna configurations, meaning antennas mounted on the top and the bottom of aircraft. The mandate is effective beginning Jan. 1, 2021.

Nav Canada, the company that operates the nation's ATC system, claims these antenna configurations are needed to improve ADS-B reception and performance, as well as support five-nm aircraft separation using ADS-B. However, in a letter to Nav Canada, AEA, AOPA, CBAA, GAMA, NBAA, Garmin and four other organizations contend that the cost to equip small aircraft with diversity is "significant and installations of this type of system are rare."

Nav Canada noted that it is not implementing the requirement below 12,500

feet. Furthermore, the mandate will provide "our affected customers with the efficiency and safety benefits to justify the expense they will incur to upgrade their avionics to meet the performance requirements," Nav Canada said, adding that the requirement "will harmonize with U.S. and European ADS-B Out mandates."

The requirement to be equipped with diversity antenna systems will be implemented in two phases. Phase 1 starts Jan. 1, 2021, in Class A airspace between FL180 and FL600, and in Class E Airspace above FL600; Phase 2 starts on Jan. 1, 2022, in Class B airspace between 12,500 feet and FL180.

Nav Canada is also considering broadening the mandate to Class C and D airspace around specific airports. Such a proposal would not be implemented before January 2023. □

› continued from preceding page

Universal offers a new way to FMS

G3000 flight deck looks and feels pretty much the same in a Citation M2 or Honda Jet. The same is true of a Collins Pro Line Fusion flight deck, where a Gulfstream G280 looks fairly similar to a Bombardier Global 6000, or a Honeywell Epic-based system in a Falcon shares many common features with the avionics in a Gulfstream.

The work that Universal Avionics is doing with its iFMS shows some of the unique opportunities that the system offers, and this was demonstrated at the company's Paris Air Show exhibit.

As Yahav explained, "We wanted to tackle the main challenge for FMS operation, the need to propose changes to the flight plan during a critical phase of flight: takeoff and landing." Most pilots who fly in FMS-based flight decks have had to struggle with "hand-jamming" a new arrival and approach into the FMS during the busiest phase of flight while flying into a major metropolitan airport. The problem isn't just that manipulating an FMS can be complicated, but that one of the pilots (or the lone pilot in a single-pilot jet) has to shift attention to the FMS exclusively, then seek verification of critical settings from the pilot flying, who is supposed to be concentrating on flying the airplane. Some might agree that more modern software-based systems like Garmin's are simpler, but it still can be a lot of effort during a critical time.

Universal's approach, thanks to the

close relationship to parent Elbit, is to marry the Elbit-designed ClearVision wearable head-up display (HUD) with the new iFMS, allowing pilots to manipulate the FMS by sight.

This is a revolutionary HMI, at least for aviation. The reason is that the iFMS takes advantage of a key characteristic of the ClearVision HUD, which is that it effectively has an unlimited field of view (FOV). Traditional HUDs require the pilot's head to be positioned precisely to look through the fixed-in-place combiner glass, and the FOV is typically 30 to 40 degrees, basically looking in front of the airplane through the windshield.

Because pilots wear the ClearVision HUD on their head, the FOV is wherever they happen to be looking: forward, up, down, to the side. The HUD imagery that the pilot can see will be wherever he or she is looking. That means looking in any direction while viewing ClearVision's enhanced vision system (EVS), synthetic vision system (SVS), or combined vision system (CVS, a simultaneous overlay of EVS and SVS). In other words, the view of EVS or SVS imagery isn't limited to just 40 degrees through the windshield, but rather is available in any direction.

The same holds true of flight and navigation symbology superimposed on the HUD imagery. If you want to view and manipulate a waypoint that is somewhere off your left shoulder, just look to the left, move a cursor over the waypoint by positioning your head to line the cursor up with the waypoint, then click a select button (it could be on the yoke or a hands-on-throttle in a military aircraft, but somewhere within convenient reach).

This is exactly the same as using a

Avidyne IFD update allows interface with Collins Pro Line 21 panel

The new R10.2.3.1 software update for Avidyne's IFD series navigator allows the units to interface with Collins Pro Line 21 avionics, including flight director and autopilot coupling for LPV approaches. Installing an IFD system in legacy turbine aircraft eliminates "the need for more costly OEM display hardware and software upgrades," according to Avidyne.

The Avidyne IFD's GPS Legacy Avionics Support (GLAS) also provides synthetic vision, electronic charts, ADS-B, and wireless connectivity to Stratus ADS-B receivers, ForeFlight's EFB app, and other Wi-Fi devices. Other features include ADS-B In weather and traffic integration with ForeFlight, support for L3's Lynx NGT-9000 ADS-B transponder, support for Garmin's G5 HSI and GDL 69A SiriusXM weather datalink, and a host of display and other capabilities.

Pilots can practice using the new features with Avidyne's iPad IFD Trainer

app. While the software update is a free upgrade for IFD owners (installation labor not included), the GLAS enablement costs \$24,999 per aircraft.

"With our popular IFD series gaining wider adoption throughout the GA market," said Avidyne CEO Dan Schwinn, "Avidyne is now actively targeting legacy turbine-class aircraft, starting with the Citation and King Air fleets, where there are a significant number of aircraft operators who are looking for more affordable safety and performance enhancements like GPS-based SBAS/LPV approaches, synthetic vision, electronic charts, ADS-B, and wireless connectivity. We have worked closely with several key installation partner-dealers to put together a turnkey package that delivers cost-effective, reduced downtime solutions that will dramatically improve their ability to fly in today's airspace and keep these aircraft flying safely and efficiently for a long time to come." **M.T.**



A CitationJet equipped with Avidyne's IFD550 and IFD540 navigators.

cursor-control device (CCD) to click on a waypoint on a moving map or even tapping the waypoint on a touchscreen, except that you don't have to look inside at a display. Your eyes are outside where they belong when flying an airplane.

That isn't to say, however, that Universal Avionics designers think the only way to interact with avionics is via a wearable HUD. On the ground or in cruise flight, it makes perfect sense to use a CCD or touchscreen or even an old-fashioned FMS. But when things get busy, Yahav said, "we wanted all of it artificially augmented into the real environment."

At the beginning, the iFMS and ClearVision HUD combination will offer pilots a familiar transition into manipulating waypoints and making ordinary commands, bringing up menus, deciding where to go, selecting a new waypoint, etc. Further developments will see more integration between the pilot and the HMI and controlling functions by sight.

"We call it flight by sight," he said. With the autopilot coupled to the iFMS, "you can guide the airplane and fly without touching anything inside, by looking and clicking."

At its Paris Air Show exhibit, Universal Avionics demonstrated how the iFMS software can run on different hardware and the interactivity of the HMI. Universal also showed the software to aircraft manufacturers, "and the level of interest is very high," Yahav said. "In business aviation, the [OEMs] would like to see more competition [in avionics]. This is a way to have more alternatives." Another advantage of iFMS is that an OEM will be able to speed up redesign of the HMI, instead of waiting for the avionics manufacturer to deliver software upgrades. Military customers are also interested, he said, because it will make it easier to design a hybrid commercial-military avionics system that integrates well with civil air traffic control environments. "It allows them to design their own HMI without the need to contract us," he said. "And they can put in their own features and military look and feel, which is very important to them."

Universal Avionics expects to certify the first version of iFMS in about a year. "This is a step in the roadmap to make avionics more simplified and semi-autonomous," said Yahav. "This is where the world is going." ■

Airlines await repatriation of \$413M from African nations

by Kaleyesus Bekele

Five African countries have blocked from repatriation more than \$413 million of international airlines' revenues as of March 31, 2019, creating a continued threat of reductions or total loss of air service. According to the International Air Transport Association (IATA), Zimbabwe holds \$192 million, Sudan \$84 million, Algeria \$80 million, Eritrea \$73 million, and Angola \$7 million.

Briefing reporters in Seoul early last month, Muhammad Ali Albakri, IATA's regional vice president Africa and the Middle East, reported that the association has established a special task force consisting of member airlines to address

the issue. "We directly engage with governments, central banks, and ministers of finance in those countries," Albakri said. "The director general himself travels to these countries to speak to the highest authority. This month he will travel to Zimbabwe to meet the president and specifically discuss the issue of blocked funds."

According to Albakri, last year IATA managed to get more than \$500 million dollars released from Angola. Egypt and Nigeria have also cleared a huge sum of blocked funds. However, the issue has emerged in new markets, creating a sort of revolving door. "We put out

the fire in some places and it flares up in another place," he said. "It seems a never-ending issue. We will continue working with governments, central banks and ministry of finance and we will continue lobbying.

"Cash flow is a lifeline to the airlines," Albakri continued. "If these problems persist airlines will reduce their flight frequencies to these countries and may even pull out. This would eventually impact air connectivity in Africa."

Presenting a report to IATA's annual general meeting, director general Alexandre de Juniac said that excluding Venezuela, the backlog of funds awaiting repatriation declined by 11 percent. "Clearing \$620 million in Angola and \$251 million in Nigeria were major contributors to that achievement," said de Juniac.

Worldwide, by the end of 2018 total blocked funds stood at \$4.36 billion, \$3.8 billion of which remains held by politically unstable Venezuela. ■



An Air New Zealand Boeing 787-9 taxis at Adelaide International Airport.

FLICKR CREATIVE COMMONS/BEV BROWN

we support customers is how we will be remembered."

The official went to pains to emphasize that the blade-deterioration resulted from a design issue specific to the Trent 1000 at the "component level" and does not apply to other Trent-family variants. "We haven't seen these issues on earlier models [because it] comes down to detail design of this product," he explained.

Intermediate-pressure turbine issues have resulted from a sulfidation attack at the root of the blade, according to Horwood. Typically, a small "coating" or mark can cause local turbulence of the air and temperature around the blade.

Such situations can result, for example, from the atmosphere in regions where an engine has flown, knowledge of which can help a manufacturer understand how failures happen. Investigation of the issue has accelerated Rolls's understanding, but Horwood stressed a need for early detection. "The question is how to find such issues on the test bench, how to make the engine think it has been operating for years in, [say], Asia," he said.

Rolls-Royce civil aerospace marketing vice president Richard Goodhead characterized the endeavor as a good example of "contextual awareness"—a key part of the manufacturer's "three Cs" philosophy alongside the need to be "connected" and "comprehending."

Horwood said the manufacturer, which claims good progress in introducing technical fixes, never stops learning. The lessons reside very much in detail design of components and an understanding of what can cause deterioration in service. "Once we have done that, then it is easy to apply on new engines," he explained. "[This is] not about mistakes, but about applying lessons. [We are] already applying that learning in the UltraFan future-technology program." ■

News Update

Airbus Hikes A220 Mtow

While holding back—for now—on developing a stretch version of the A220, Airbus has decided to increase the maximum takeoff weight (mtow) of the type by an additional 2.3 tonnes (5,000 pounds). The new mtow will increase the respective maximum range capabilities to 3,350 nm for the A220-300 and 3,400 nm for the smaller A220-100, some 450 nm more than currently advertised.

Airbus achieved the performance increase by taking credit of existing structural and systems margins as well as existing fuel volume capacity. The current basic mtow stands at 60.8 tonnes for the A220-100 and 67.6 tonnes for the A220-300. With the new mtow increase, the respective aircraft's mtow will total 63.1 tonnes for the A220-100 and 69.9 tonnes for the A220-300. Airbus will offer the higher-mtow A220 from the second half of 2020.

Airbus holds orders for 536 A220s from 21 customers and estimates a market of 7,000 aircraft in the 100- to 150-seat category over the next 20 years. Sixty-eight A220s now fly with five operators—Swiss International, AirBaltic, Korean Air, Delta Air Lines, and Air Tanzania. It delivered 11 examples in the first four months of the year.

Longview Completes Dash 8 Acquisition

Viking Air parent company Longview Aviation Capital last month completed the acquisition of Bombardier Dash 8 aircraft business and named its new subsidiary De Havilland Aircraft of Canada Limited. The Dash 8 joins Longview's Twin Otter program and the DHC-1 through DHC-7 series, as well as the former Canadair CL-215, CL-215T, and CL-415 waterbomber aircraft.

De Havilland Aircraft of Canada Limited will continue to produce, service, and support Dash 8s and Q400s from the Downsview site in Toronto under land lease agreements that extend until 2023.

Garuda To Slash Operations

Garuda Indonesia will scale down its operations over the next three months as part of its plan to reduce operating cost, according to the airline's director of commerce, Pikri Ilham Kurniansyah. Plans call for cuts of unprofitable routes and reduction of frequencies on those with low passenger loads.

The Jakarta-based flag carrier already has axed its daily Belitung-Singapore flight. It will halve the frequency of its six-times-weekly Jakarta-Amsterdam service using Boeing 777-300ER jetliners effective September 1 and drop its six-times-weekly Amsterdam-London flights.

On its domestic network, the airline plans to cut frequencies to Morotai in North Maluku, Bima in West Nusa Tenggara, and Maumere in East Nusa Tenggara.

Trent 1000 fix ranks as top priority for Rolls-Royce

by Ian Goold

Addressing premature blade deterioration of Trent 1000s ranks as Rolls-Royce's "single most important issue," acknowledges the aero engine company, which professes "deep regret" for the disruption to customer operations and the resulting groundings that cost the UK manufacturer some £430 million (about \$540 million) last year.

Dominic Horwood, the company's civil-aerospace chief customer officer, called the "significant" disruption to customers "absolutely unacceptable to them and to us"

and stressed the importance of providing support by returning engines to operators. Rolls-Royce added it has become "more responsive in turning engines around" and hopes to see single-digit numbers of aircraft on the ground (AOG) by the end of 2019.

Horwood said the company "respects" Air New Zealand's decision to choose General Electric GENx powerplants for a new batch of Boeing 787-10s over the incumbent Trent 1000s that power its 787-9 fleet. "They are still an important customer to us," he remarked. "The way

Embraer exec sees no Max effect on Boeing link-up

by Cathy Buyck

The events surrounding the Boeing 737 Max will not influence “in any way, shape or form” Boeing’s commitment and resources to close the transaction with Embraer on the joint venture for the commercial aviation business, according to Embraer commercial aviation president and CEO John Slattery. “The creation of the new company is an enormous body of work and requires significant resources from both sides,” Slattery told *AIN* just before the start of the Paris Air Show. “The resources that were originally identified by Boeing to lead on their side of the closing of the transaction were in place well before the current situation with the Max materialized, and those resources have not been influenced at all.”

Embraer shareholders in February approved the strategic partnership with Boeing. Under the terms of the deal, first announced in July 2018, Boeing will hold 80 percent in the new company—named Boeing Brazil-Commercial—and Embraer 20 percent. The sides signed definitive transaction documents in December.

Embraer remains equally committed to the JV, he stressed. “We are celebrating our 50th anniversary this year; the Boeing Company is 100 years old. We recognize this is a very challenging moment for them, but our respect for the Boeing Company and our colleagues at Boeing runs very

deep,” said Slattery. “We have full faith and confidence they will work through this jointly with their customers and all other stakeholders involved.” Slattery, who will lead the Boeing-Embraer commercial aviation and services joint-venture, said he shared the views of IATA director-general and CEO Alexandre de Juniac that an expeditious, global regulatory approval to re-certify the aircraft and return it to service as quickly as possible serves everybody’s best interest. “Confidence of the flying public in our aircraft is the oxygen from which we breathe,” he asserted.

His focus for the balance of the year,

Slattery maintained, centers on closing the transaction by the end of 2019 and securing the necessary antitrust approvals. The deal requires the approval of about 10 antitrust authorities, and while most of the smaller jurisdictions have cleared the venture, all major competition watchdogs—including the EU—continue to scrutinize the tie-up. “In those conversations, we are reminding regulators that there is no overlap between the E-Jet family, the E2 family, and the Boeing 737 family from a competitive dynamic,” said Slattery. “When we look at our campaign data around the

world, we don’t find incidences where we are competing against Boeing. The Max 7 is 17- to 18 percent bigger [in passenger seats] than my biggest aircraft, the E195-E2, and it flies 48-percent longer. Of course, there was overlap between the Airbus A320 and Bombardier’s C Series, particularly the A319 and the CS300. We don’t have that experience,” he said.

Airbus acquired a controlling stake in the C Series program in July 2018, and rebranded the twinjet A220 and the company Airbus Canada Limited Partnership.

Whether Boeing will follow suit and give the Embraer regional jets a Boeing moniker remains undecided, according to Slattery, while pointing out that the E-Jet brand is much better established than that of the C Series. The decision, nonetheless, will have to happen before the formal closing of the transaction.

For Slattery, operating under the Boeing umbrella opens opportunities to present the E-Jet to a broader universe of customers around the world. Customers—airlines and lessors—“universally and uniformly” perceive the Embraer-Boeing combination competitively beneficial to them, he asserted. Therefore, Slattery added, some airlines have decided to postpone placing orders until the transaction’s completion. “I believe that there are campaigns that are on hold because airlines feel they will have better negotiating flexibility and more options in their discussion with both Airbus and Boeing [after] the transaction,” he explained.

The vast majority of E-jet customers also operate Boeing 737s or Airbus A320s, Slattery said. “We positioned the E-Jet initially and the E2 later on to be complementary aircraft and work in tandem with the larger narrowbodies,” he noted. “Our whole mantra at Embraer is rightsizing.” ■

“We have full faith and confidence they will work through this jointly with their customers and all other stakeholders involved.”



Embraer Commercial Aircraft CEO John Slattery

Airbus A321XLR adds range, reduces carbon emissions

Airbus unveiled the longer-legged A321XLR on the opening day of last month’s Paris Air Show, ending months of speculation. Backed by a firm order from MEA Middle East Airlines and an MoU from of Air Lease Corporation (ALC), the A321XLR boasts a range of 4,700 nm (in a two-class configuration seating 180 to 220 passengers), up from the A321LR’s 4,000-nm. Deliveries are set to start in 2023.

According to Airbus COO Christian Scherer, the A321XLR is the next “evolutionary step” from the A321LR and the “lowest risk aircraft” for thinner routes of 4,700 nm, a segment currently served by the Boeing 757. He vowed that the

A321XLR will have a “whopping 30 percent reduction in fuel burn and thus CO₂ emissions per seat compared to the 757.”

The XLR, he pointed out, will be able to fly nonstop from Beirut to Cape Town; Dublin to Recife or Nairobi; Japan to deep in Australia; deep in Europe to deep in North America; and vice versa. To accommodate its long-range missions, the A321XLR’s new “Airspace” cabin will offer seats in all classes with the same high-comfort as on long-haul widebody aircraft, including full-flat beds for premium passengers.

The A321XLR will have a maximum take-off weight (mtow) of 101 tonnes versus 97

tonnes for the A321LR. Airbus said it needs to introduce only “minimal” changes to give the aircraft the longer range.

These changes include a new permanent rear center tank (RCT); a modified landing gear to account for the increased mtow; and an optimized wing trailing-edge flap configuration to preserve the same takeoff performance and engine thrust requirements as today’s A321neo. The new optimized RCT holds more fuel than the several optional additional center tanks (ACTs) on the A321LR and weighs the same as just one of the removable tanks.

This new arrangement also takes up much less space in the cargo hold and therefore frees up underfloor volume for additional cargo and baggage on long-range routes.

Scherer declined to disclose to *AIN* how many commitments or firm orders had been needed before the Airbus board signed off on the derivative XLR, saying only that it “is launched today.” He confirmed MEA was the first to commit to the

XLR, with an order for four, and described the ALC memorandum of understanding indicated as a “true vote of confidence” as the lessors is a reference for many airlines in their fleet decisions.

ALC executive chairman Steve Udvar-Hazy said the U.S. lessor worked intensively with Airbus to ensure the aircraft would be fit for flights of up to nine hours with, for instance, bigger water tanks and larger waste capacity. He called ALC’s commitment for 27 XLRs a “natural progression from the tremendous success we have with the A320neo family.” Meanwhile, ALC CEO John Plueger said he sees “a potential for 50 or so customers” coming on board to take on the aircraft in the next five years.

ALC’s commitment is part of a much larger MoU for a total of 100 Airbus single-aisle aircraft. The lessor is also buying—for the first time—50 A220-300s and an additional 23 A321neos, which can be substituted for LRs. This is this latest order takes ALC’s cumulative orders to 387 Airbus aircraft, making it Airbus’ third largest lessor customer. **C.B.**

Sikorsky receives go-ahead for Marine One production

by David Donald

On June 10, Sikorsky announced a \$542 million contract to build six VH-92A helicopters for the U.S. Presidential transport mission, following the program's passing of Milestone C at the end of May. The Lockheed Martin-owned company will also supply spares and support equipment as part of the deal. The contracting agency for the program is Naval Air Systems Command through its PMA-274 program office.

The VH-92A is a standard S-92 adapted and modified for the Presidential role at Sikorsky's Stratford, Connecticut plant and at Lockheed Martin's Owego facility in New York. The focus is on reliability, survivability, and the installation of the communications necessary for the President to conduct his/her role as the commander-in-chief,

head of state, and chief executive.

The U.S. Navy awarded Sikorsky an initial \$1.24 billion fixed-price incentive Engineering and Manufacturing Development (EMD) contract on May 7, 2014. That contract included two test aircraft, the first of which—Engineering Development Model 1 (EDM-1)—made its first flight on July 28, 2017. It and EDM-2 have conducted more than 520 hours of flight testing to date.

The latest contract covers six Lot 1 low-rate initial production aircraft to be delivered between 2021 and April 2022. Initial Operational Test and Evaluation (IOT&E) is expected to be performed in mid-2020, with Initial Operational Capability (IOC) with the EDM aircraft planned for later that year. Additional trials continue in the

meantime. The program of record is for 21 production aircraft in addition to the two EDMs, with all to be in place by 2023.

In service, the VH-92As will replace the aging Sikorsky VH-3D and VH-60N helicopters of the Executive Flight Detachment of Marine squadron HMX-1, whose aircraft traditionally use the "Marine One" call sign when carrying the President.

"The Presidential lift mission is a no-fail mission for the Marine Corps," said Lieutenant General Steven Rudder, deputy commandant for Marine Corps aviation. "We deliver helicopter and MV-22 transportation across the globe to support the requirements of the Presidency. The authorization to move forward with procurement of the VH-92A will allow the Marine Corps to deliver the next generation of Presidential Helicopter support."

The VH-92As will be used to transport the President, Vice President, and other government officials. They will be supported by HMX-1's fleet of MV-22B Ospreys, which are used to transport security and White House staff, media contingents, and other personnel associated with Presidential duties.

VXX, or the Presidential Helicopter Replacement Program was initiated with an RFP issued in December 2003. In January 2005 the AgustaWestland (now Leonardo) US101 was selected in preference to the VH-92. Nine were built as VH-71 Kestrels before the contract was terminated by the Obama Administration on cost grounds. The aircraft were subsequently sold to Canada. Most of them are due to be upgraded for service with the Royal Canadian Air Force role.

In the meantime, a new RFI relaunched the VXX program in March 2010. By mid-2013 AgustaWestland (AW101), Bell (V-22 Osprey), and Boeing (CH-47 derivative) had withdrawn from the contest, leaving Sikorsky as the sole bidder. ■



A VH-92A conducts landing trials on the White House's South Lawn in September 2018.

U.S. MARINE CORPS

DJI installing ADS-B in consumer drones

The world's largest maker of recreational drones will install ADS-B In receivers in all of its models weighing more than 0.55 pounds by 2020. China-owned DJI said it will install AirSense ADS-B technology in all of those models. AirSense can detect manned aircraft well beyond visual line of sight and display the potential traffic conflict on the drone pilot's control display. The system has been available on some of DJI's professional models.

"DJI was the first company to offer geofencing, automatic altitude limits, return-to-home technology, and other safety features to the world's growing community of personal and professional drone pilots. We believe our efforts have helped drones attain their enviable safety record, and we expect our new agenda will further improve safety even as more drones take to the skies," said Brendan Schulman, DJI vice

president for policy and legal affairs.

Installing AirSense in recreational drones is part of DJI's new 10-point "Elevating Safety" plan that includes developing a new automatic warning for drone pilots flying extended distances, establishing an internal safety standards group, and encouraging the implementation of safety policies including; incident reporting standards; mandatory geofencing, remote identification, and drone pilot knowledge tests; clear designation of restricted areas; increased enforcement against unsafe operators; and empowering local authorities to respond against drone threats.

DJI's Schulman said most drone safety data is misleading and sensationalized. "When the public, media, and regulators focus on outrageous incidents that did not occur, it draws attention away from risks

that are less sensational but more prevalent," he said. "There has never been a confirmed collision between a drone and an airplane, but drones have struck low-flying helicopters at least twice. This led us to focus on AirSense as the next opportunity to make drones safer and to embrace the challenge of adding ADS-B receivers to consumer drone models that are already in development."

DJI's ADS-B decision drew praise from a variety of aviation organizations including NBAA, AOPA, and the American Association of Airport Executives (AAAE). "AAAE is pleased with DJI's decision to equip nearly all of its drones with ADS-B In capabilities," said Justin Barkowski, the organization's staff vice president, regulatory affairs. "Providing users with better situational awareness of nearby air traffic will only increase safety in the national airspace, particularly around airports where these measures are needed most." **M.H.**

News Update

FAA OKs Chute-equipped Drone for Flight over People

The FAA has issued its first Part 107 waiver to allow operation of a parachute-equipped drone over people. It was issued to Hensel Phelps Construction of Greeley, Colorado, which plans to operate a parachute-equipped DJI Phantom 4 light drone to track construction projects and for building maintenance inspections, among other tasks. This waiver is the first time the FAA has worked with industry in developing a publicly available standard, worked with an applicant to ensure the testing and data collected acceptably met the standard, and issued a waiver using an industry standard as a basis to determine that a proposed sUAS (small unmanned aircraft system) operation can be safely conducted under the terms and conditions of a waiver under Part 107.

Air Canada Cargo Entering the Drone Delivery Market

Regularly scheduled commercial drone delivery just nudged closer to reality in Canada, with Air Canada Cargo now planning to market and sell Drone Delivery Canada Corp. (DDC) drone delivery services. Subject to regulatory approval, DDC will build and operate up to 150,000 drone delivery routes in Canada that include timetables, flight schedules, payload capacities, type of drones to be deployed, and payment terms.

DRF Modifies Another Helo for Arctic Research Ship

DRF Luftrettung recently modified a third helicopter to be used aboard the Arctic research ice breaker Polarstern. The Airbus BK117C1 received 28 separate modifications that included modernizing the cockpit and installing emergency floats. Since 2016, DRF has been providing maintenance and modification services for helicopters operated by HeliService that are assigned to the vessel. The helicopters assigned to the Polarstern are used for reconnaissance missions across the ice, observing wildlife, collecting supplies, and transporting personnel.

French Military Advances Airbus H160M Program

The launch of the Joint Light Helicopter (Hélicoptère Interarmées Léger; HIL) program has been brought forward by one year, to 2021, announced French minister of the armed forces, Florence Parly. Launching the program earlier will enable delivery of the first Airbus H160Ms to the French armed forces in 2026 rather than the original target date of 2028. HIL is intended to replace seven different helicopter types used by France's navy and air force to perform a variety of missions, including light attack, armed escort and reconnaissance, interdiction, patrol, and search-and-rescue. The French military anticipates taking 169 H160Ms in total.

@ Paris Airshow 19

Safran moving ahead with five new engine programs

by Mark Huber

Safran Helicopter Engines remains on track to certify five new engine programs this year: the Arrano 1A for the Airbus H160, the Aneto 1k for the Leonardo AW189, the Ardiden 1U for India's light utility helicopter (LUH) program, and the WZ16 for the Avicopter (China) AC352. "Our ambition is to be the preferred helicopter engine supplier," said Bruno Ballenger, executive vice president of programs for Safran Helicopter Engines. "We have 37 percent market share, a gain of four percent from 2017," he said. The company plans to hold deliveries steady at 820 engines or more in 2019, comparable to 2018 results, he added.

Ballenger said the company is moving into new areas including the development of a new turboprop engine (Tech TP) in cooperation with the European Union's (EU) Clean Sky 2 joint undertaking and working with Bell on its Nexus urban air mobility (UAM) vehicle. Ballenger said the powerplant for the latter would probably be based either on the company's existing Arriel or Arrius engines but "optimized" for the vehicle. He said using existing engine architecture would enable Safran to meet Bell's "schedule target and conduct a flight demonstration as soon as possible." Ballenger said testing on the Aneto 1K engine is largely complete and that endurance testing on the engine would start before the end of the month. With regard to the

Tech TP program, he said that Safran was discussing, but had yet to select an airframe that will serve as a flying testbed.

Safran made the first ground run of its Tech TP turboprop technology demonstrator engine on June 12 at its facility in Tarnos, France. The Tech TP is based on the Ardiden 3 turboshaft and developed as part of the EU Horizon 2020 research and innovation program. Tech TP aims to validate new technologies to deliver an engine that is 15 percent more fuel efficient and has lower CO₂ emissions than current engines while producing between 1,700 and 2,000 shp. It builds on the design of the already EASA-certified Ardiden 3C and 3G engines, which have completed over 10,000 hours of testing. The 3G powers the Russian Kamov Ka-62 while the 3C/WZ16 powers the Chinese Avicopter AC352. More than 250 Ardiden 1 engines are already in service and have flown more than 200,000 hours in Indian airframes including the HAL Dhruv, Light Combat Helicopter, and Light Utility Helicopter.

The Tech TP will validate engine performance. Testing will include integrating the gas generator, nacelle, air intake, and propeller. It will also be used to evaluate the case for more electric technologies, including the accessory gearbox and propeller-controller components. Tech TP is slated to eventually be matured to the new "European Turboprop Engine." The new engine will offer "increased performance,

competitive operating costs, and low environmental footprint," according to Didier Nicoud, Safran Helicopter Engines executive vice president for engineering. In addition, the company received EASA type certification for its new Arrano 1A engine that is powering Airbus Helicopters' new H160 medium twin. The Arrano is a new generation engine designed to power four- to six-tonne helicopters and produce between 1,100 and 1,300 shp. Engine features include new-generation digital controls and an efficient two-stage compressor with new variable inlet guide vanes (IGV).

The components improve engine thermal efficiency and yield a fuel burn that is up to 15 percent lower than comparable in-service engines, Safran said. The gyrotory combustion chamber uses fuel

injectors manufactured using additive manufacturing techniques (3D printing). The Arrano 1A was designed to be more easily serviced, and maintenance time required is half of that of previous generation engines according to Safran. The company offers operators complimentary services with the engine, including its electronic engine logbook (BOOST) and health monitoring.

Arrano program director Cyrille Ressejac-Duparc said the new engine "features low operational and support costs, easy maintenance, and a lower environmental footprint. After a test campaign of 10,000 hours, including 2,000 in flight, we are now ready to support H160 entry-in-to-service." The Arrano first flew on the H160 in 2016. ■

EmbraerX unveils new-concept eVTOL

Melbourne, Florida-based EmbraerX unveiled its revised concept urban air mobility vehicle at last month's Uber Elevate Summit in Washington, D.C. The vehicle features a pair of aft ducted fans and eight lift rotors. The disruptive technology arm of Embraer said the new concept vehicle resulted from a "broad range of tests and simulations, aiming at operational optimization for the urban environment" with high reliability, low operating costs, and low noise signature. The vehicle is fully electric and "progressively autonomous."

"Embraer's team focused on the customer experience with its latest vehicle concept, using built-in redundant systems to achieve

optimal safety," said Uber Aviation engineering director Mark Moore. Besides working on concept eVTOL designs, EmbraerX said it is working on other aspects of the eVTOL ecosystem, including air space design and air traffic control.

EmbraerX is part of the Uber Elevate Network that is fashioning an integrated, on-demand urban air mobility system. Embraer calls EmbraerX a "market accelerator." In addition to its Melbourne facility, EmbraerX has "outposts" in California's Silicon Valley and in Boston and also coordinates its activities with Embraer's engineering resources in Brazil. **M.H.**

Turkey's Kaan Air takes three Ka-32A11BCs

Russian Helicopters has completed shipments under last year's contract with Kaan Air on three Ka-32A11BC helicopters, the company announced at HeliRussia'2019, making Kaan Air the first local operator of Kamov rotorcraft. Registered TC-HLE, TC-HLF, and TC-HLG, these arrived between February and April and were configured for firefighting missions.

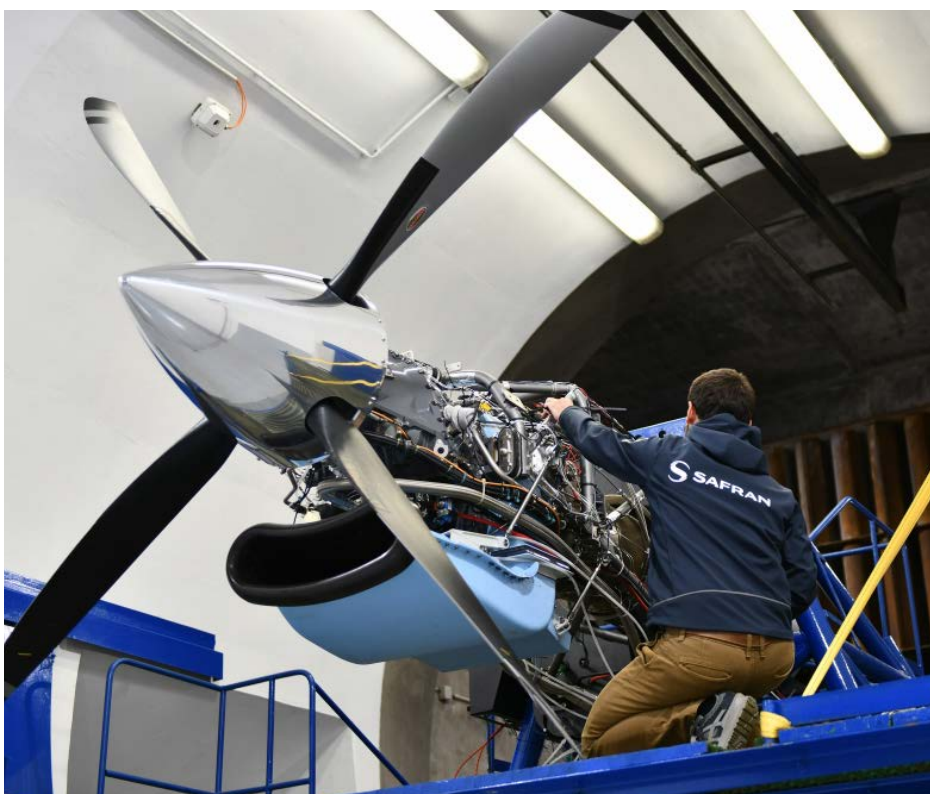
Russian Helicopters CEO Andrei Boginsky said the companies are in talks for five additional Ka-32s and that the Turks are also considering the Ansat. Turkish governmental and commercial structures operate more than 20 Mil Mi-17s.

A civilian version of the Kamov Ka-27/28/29/31 naval helicopter line, the Ka-32A features the design bureau's characteristic coaxial rotor layout. Apart from search and rescue, cargo transportation, medical evacuation, and firefighting, the current production Ka-32A11BC can also be employed on sea border patrol missions and in support of special forces operations.

Later this year, Russian Helicopters

will deliver five Ka-32A11BCs to China's United Helicopters. These will bring the Ka-32 production run to 170, most of which have been exported, including to the Republic of Korea, Canada, Spain, and Portugal, among others.

Speaking to journalists at HeliRussia'2019, Ka-32 chief designer Shamil Suleimanov attributes the demand for the type to the high efficiency of the helicopter's coaxial rotor system. "Historically, helicopters with coaxial rotor system have been in use on ships, for they are compact when stored and enable takeoff and landing operation in the conditions of strong winds. Later, we figured out that the same rotor layout could be used successfully in medical aviation and firefighting. When it comes to extinguishing fires in the urban or hilly environments, compact helicopters with coaxial rotors have an advantage over those of classic layout." Better handling qualities and stability in flight makes the Ka-32 a better choice for the construction industry, he added. **V.K.**



The Tech TP engine is part of a Europe-wide research and innovation program. It is based on Safran's Ardiden 3 turboshaft that drives the Avicopter AC352 and Kamov Ka-62.

AW109 crashes atop NYC skyscraper in rain and fog

by Mark Huber

Weather could play into the likely causes of the June 10 fatal crash of a 2000 model year Agusta A109E, N200BK, onto the roof of a Manhattan skyscraper. Pilot Timothy J. McCormack, 58, the sole occupant, was killed when the light twin helicopter made what was characterized as a “hard landing” atop the 54-story AXA Equitable Center on West 51st Street and burst into flames.

The building’s rooftop, with an altitude estimated at 752 feet agl, did not contain a helipad. Firefighters extinguished the blaze and mitigated the resulting fuel spill within an hour and no one either inside the building or on the ground below was injured. Weather at the time of the accident, just after 1:43 p.m. local time, was reported as one-half-mile visibility with rain and fog, ceiling at 500 feet overcast, and a temperature/dewpoint split of 17/16C.

Amateur video shot just before the crash shows the helicopter flying in and out of clouds, at times erratically. The 11-minute flight originated at New York City’s 34th Street heliport. The helicopter was based in Linden, New Jersey (KLDJ) and was used primarily to transport Manhattan real estate executive Daniele Bodini, founder of the American Continental Properties Group, and the former ambassador of the Republic of San Marino to the United Nations.

Pilot McCormack was reportedly in contact with La Guardia Tower shortly

before the crash. He held a commercial rotorcraft license and a second-class medical with restrictions for eyeglasses for near vision. He did not have an instrument rating. McCormack was characterized by New York Mayor Bill De Blasio as “someone who’s been doing this work for a while.” De Blasio said the helicopter should not have been flying in the area where it crashed due to airspace restrictions around Trump Tower, the New York City residence of the President. The FBI, FAA, and NTSB are all investigating.

Longtime helicopter critic U.S. Senator Chuck Schumer (D-NY) called for mandatory flight data recorders (FDRs) in all rotorcraft in the wake of the crash. The light helicopter was not equipped with either an FDR or a cockpit voice recorder (CVR).

Schumer, the Senate minority leader, said, “To know that the NTSB has been trying for years, without success, to compel the FAA to take action as it relates to making helicopters more valuable to safety by installing flight data recorders is cause for serious concern. If we are going to have helicopters in the air, even highly regulated in terms of when and where they can fly, they should still have black boxes, if, god forbid, a crash occurs. We do this for commercial planes, so it makes all the sense in the world for choppers, too.”

New York’s junior U.S. senator and current presidential candidate Kirsten Gillibrand (D) echoed those sentiments. ■

Safety concerns challenge budding U.S. eVTOL industry

The U.S. urban eVTOL market could exceed \$17 billion by 2040, but the vast majority of potential passengers still consider the vehicles unsafe, according to consulting firm Deloitte Global.

“Considerable strides [have been] made in the advancement of elevated mobility, particularly in the last two years,” said Robin Lineberger, Deloitte Global’s aerospace and defense leader. “While the public may focus on the viability of eVTOLs in human transportation, the movement of cargo... will likely drive early adoption of these aircraft. However, eVTOLs pose a significant risk to traditional helicopter manufacturers; if they are to successfully traverse this disruption, they should consider reexamining product mixes, business models, or even shifting their focus to evolving markets,” said Lineberger.

However, Deloitte pointed out that

considerable regulatory, technology, and public acceptance obstacles remain before eVTOLs can be deployed in a meaningful way. The firm recently surveyed 10,000 potential autonomous eVTOL users and found that 80 percent believe these vehicles “will not be safe” or are uncertain about their safety. The firm noted that enabling technologies still need to mature. Specifically, it said that advancements in onboard collision avoidance systems, battery management, and ground infrastructure are still needed.

Financing the latter will be particularly challenging, as Deloitte noted, “Significant capital will be required to build vertiports and other infrastructure components. To secure adequate funding, extending current public/private partnerships or establishing new models will be necessary.”

M.H.



Having completed low-speed agility key performance parameter flight testing for the U.S. Army, Bell’s tiltrotor completed maneuvers to the service’s highest agility standards.

Bell completes agility tests on V-280 Valor tiltrotor

The Bell V-280 Valor tiltrotor completed the low-speed agility key performance parameter flight testing for the U.S. Army’s Joint Multi-Role Technology Demonstrator (JMR TD) program ahead of schedule, Bell announced. In so doing, the V-280 completed maneuvers to meet the Army’s Level 1 handling qualities requirements, its highest agility standard.

Bell said the V-280’s design and digital fly-by-wire flight controls combine to provide a high level of agility, reduce pilot workload, and enhance flight safety in all weather conditions and visibilities. The

company said it will continue to expand the aircraft’s flight envelope and demonstrate new capabilities to prove out its key technologies and reduce the risk for future vertical lift programs.

Other performance milestones demonstrated by the V-280 to date include forward flight at over 300 knots true airspeed, more than 110 hours of flight and 225 rotor turn hours, 50-degree bank turns, 4,500 fpm climbs, sustained flight at 11,500 feet, single ferry flight of over 370 miles, and in-flight transitions between cruise mode and vertical takeoff and landing.

M.H.



JERRY SIEBENMARK

A scale model of Boeing’s PAV was on display at last month’s Uber Elevate. The prototype crashed June 4 on its fifth unmanned flight.

Boeing PAV’s fifth test flight ends badly

Boeing and its subsidiary Aurora Flight Science’s unmanned passenger air vehicle (PAV) prototype crashed June 4 during its fifth test flight in Manassas, Virginia, Aurora spokeswoman Luisa Guerra confirmed to **AIN** last month at the Uber Elevate Summit in Washington, D.C. Guerra said the crash is under investigation and a determination of cause is pending.

The vehicle previously had four successful test flights, Guerra noted, and it crashed in a closed area. “We are operating in a safe, confined space,” she said. “We follow

strict protocols during flight testing.”

Guerra declined to disclose further details of the crash. The 30-foot-long, 28-foot-wide electric-powered vehicle completed its first flight on January 22. It is expected to have a range of up to 50 miles and operate autonomously from takeoff to landing.

The air-taxi concept demonstrator completed a controlled takeoff, hover, and landing during its first flight, with later tests focusing on forward, wing-borne flight and the transition between hover and forward flight.

J.S.



Artist's rendering depicts the new Gulfstream MRO underway at Farnborough

Gulfstream's Construction Frenzy Extends To Farnborough

Gulfstream Aerospace kicked off construction on its new major MRO facility at Farnborough, UK, in May, part of more than 780,000 sq ft (72,464 sq m) the company is adding throughout its services network over the next 15 months as it prepares to ramp up to support its growing large-cabin fleet.

"It is really, for us, an unprecedented expansion in that narrow scope of time," said Derek Zimmerman, president of Gulfstream customer support, pointing to projects also under way at Gulfstream's headquarters in Savannah, Georgia, as well as in Appleton, Wisconsin; West Palm Beach, Florida; and Van Nuys, California.

The U.S. expansions are all slated to open within the next three quarters, while the Farnborough facility, which will become Gulfstream's major European maintenance hub, is to open in summer 2020.

Once complete, the Farnborough center will span 225,000 sq ft, making it Gulfstream's largest maintenance facility outside of its Savannah MRO.

Clay Lacy's OXC Site Gets Part 145 Approval

Clay Lacy's newest MRO—at Waterbury-Oxford Airport (OXC) Oxford, Connecticut—has secured FAA Part 145 certification. The approval gives Clay Lacy its third FAA Part 145 repair station, joining others at Van Nuys Airport and McClellan-Palomar Airport, both in California.

This approval comes a little more than a year after the West Coast-headquartered Clay Lacy opened the OXC location, expanding its reach into the maintenance market and giving it an MRO anchor in the Northeast. Its OXC site spans 65,000 sq ft and houses factory-trained technicians and capabilities to provide service on Gulfstream, Bombardier, Dassault, Cessna, Embraer, and Hawker airframes.

"Clients can rely on a highly skilled and trusted local resource for AOG support, line maintenance, avionics troubleshooting, and repairs, and interior updates and reconditioning," said Chris Hand, senior v-p for Clay Lacy.

Piaggio Aerospace Announces Two New Service Centers

Italian aircraft OEM Piaggio Aerospace signed two agreements for new authorized service centers: Paris Le Bourget-based DV Technik and Asia Aero Engineering (AAE) in Kuala Lumpur. With these additions, Piaggio now has five strategically located authorized service centers for its customers in Europe, which also includes Genoa, Italy; Mönchengladbach, Germany; Rotterdam, The Netherlands; and Lugano, Switzerland.

Bombardier Partners With Jetex for Dubai Line Mx

Bombardier has agreed to establish a new line maintenance station in Dubai with FBO operator Jetex. Its ninth line maintenance station will initially provide unscheduled maintenance but work toward offering scheduled maintenance in the coming months. Supporting the Dubai station are technicians certified for all of Bombardier's Challenger and Global business jets, including its newest Global 7500.

"This expansion is an integral part of our overall mission to enhance OEM support for our operators in the Middle East—and we are very pleased to be working with highly respected business aviation leader Jetex in the development of this project," said Bombardier

Business Aircraft v-p and general manager of customer experience Jean-Christophe Gallagher. Jetex president and CEO Adel Mardini added that the service expansion in Dubai is a "significant boon" for his company's customers that use its FBO network around the globe.

Newcomer Archein Pursues Quick-turn HUD/EVS Installs

Archein Aerospace received its Part 145 repair station certificate for avionics maintenance and installations, with a focus on head-up display/enhanced vision system (HUD/EVS), ADS-B, and other advanced systems for air transport, cargo, and business aircraft.

Co-located with MRO provider and interiors specialist Robinson Aerospace at Alliance Airport in Fort Worth, Texas, the company aims to be a center of excellence in advanced avionics using what chairman Jim Wisdom told AIN is a "hyper-maintenance" model for quick-turn service with an emphasis on HUD/EVS installations.

"We're trying to fill a niche," Wisdom said, with a HUD/EVS program that aims to have such systems installed and up and running within six days compared with the typical 18 to 20 days. "If someone wants this done, they don't want their airplane down for three weeks," added Wisdom.

Gemini Adds Aircraft, Avionics to MRO Approvals

Gemini Air Group is increasing its Part 145 repair station capabilities with the addition of approved aircraft models and avionics and instrument ratings. Along with its Cessna Citation, Hawker, and Turbo Commander authorizations, Gemini Air Group is now approved for Cessna Caravan and Conquest 441, Cirrus aircraft, and related engines.

According to Gemini, it added the avionics and instrument approvals to support customer needs for ADS-B

Out requirements. In concert, Gemini is expanding its technician group.

Cirrus Opening Dallas-area Service and Training Center

Cirrus Aircraft will open a new maintenance and training facility at the McKinney (Texas) National Airport in August and plans to expand it in 2020 to offer flight training, maintenance, and aircraft management. The facility is part of the Cirrus Services group launched in 2018. Cirrus Services also encompasses the company's Vision Center in Knoxville, Tennessee, and provides access to a network of authorized service and training partners worldwide.

Construction on a dedicated new facility there will begin in early 2020 and it will eventually employ approximately 30, the company said.

Constant Completes 15th Challenger 300 Mid-life Check

Constant Aviation has completed its fifteenth 7,500-cycle inspection event on a Bombardier Challenger 300. To date, only 18 such inspections have been completed worldwide, it said.

This maintenance check is the most comprehensive inspection on the Challenger 300 airframe, requiring extensive dismantling, significant non-destructive testing, ground service equipment tooling, and expert training, it said. Inspections of this magnitude are still rare in the industry. Introduced in 2004, the Challenger 300 fleet is just beginning to reach this "mid-life inspection" milestone, it added.

WinAir Revamps Parts Sales Program

Canadian aviation management software specialist WinAir has revamped and enhanced the Parts Sales module for its WinAir Version 7 program, the company said. The updated module improves functionality for managing the entire sales process, from quoting and creating sales orders to shipping and invoices. The module is available for WinAir's Operator, Heliops, and MRO packages and also can be included in custom packages.

Parts Sales is fully integrated with the WinAir Version 7's Maintenance and Inventory modules, and WinAir has designed a "sequential workflow" that enables all information to be housed within one system. For instance, users can request parts through Parts Sales and that information will automatically be processed through to Inventory, based on an existing master part required part workflow.

All affected departments will have instant access to these sales-related activities, WinAir said. This can help expedite the order fulfillment timeline. ■



The Archein Aerospace booth at the 2019 NBAA Maintenance Conference in Fort Worth, Texas, where the advanced avionics installation company made its debut.

Program aims to build successful leaders

by Jerry Siebenmark

Business aviation is a maturing industry that's kept pace with technological advances, ensuring its people maintain their proficiency with those advances. But, argues ServiceElements president Bob Hobbi, the industry hasn't necessarily kept up with developing the people in it. And it's why Hobbi's organizational and people-development firm is partnering with FlightSafety International on a new program called Leadership Bootcamp. The goal is to equip people in the industry with the knowledge they need to advance within their organizations and effectively lead them.

The path to leadership in business aviation has traditionally been to promote technically capable people within corporate flight departments, FBOs, and related organizations, Hobbi told *AIN*. The assumption was if you have a good pilot, then she'll probably make a good chief pilot. Or that skilled mechanic should be good at serving as a lead, supervisor, or director of maintenance. "The path of growth was purely based on technical capabilities," Hobbi explained. "And what we saw was a deficiency, through numerous examples, where we would promote highly, technically

qualified individuals in our industry to roles of leadership without giving them any kind of leadership tools or skills, or abilities, and then watch them flounder."

The three-day bootcamp aims to help those workers on the path to promotion in the industry succeed as leaders. Its curriculum aims to instruct attendees on how to help the people they lead grow in their careers and be accountable and empowered. Communication, managing conflict, and understanding generational differences are among the topics covered in the bootcamp, Hobbi added. "It's highly focused on people leadership and people issues rather than tactical issues."

Organizations that send their leaders and potential leaders to the bootcamp also stand to benefit. "What makes a difference, and what leaders of today's business and general aviation organizations have the opportunity to do, is to enhance the value of their services to their customers through people, and by advancing people's abilities to further serve their enterprises...they can bring additional value to their customers," Hobbi noted. "Ultimately, it's people who truly add

value. So that's why we're focused on, in a three-day bootcamp, talking about opportunities where you can lead your team into a more cohesive group of people who have a common goal, who have a common direction."

A director of maintenance for a Fortune 50 flight department based in Dallas who attended the bootcamp told *AIN* he thinks he has become a better leader after attending the program and benefitted hearing from other maintenance managers how they run their departments and the challenges they've faced as leaders. "Both of my [potential] successors, I had them go through his class as well," he said. "That's how much I believe in what Bob's doing in this program."

So far, FlightSafety and ServiceElements have conducted five bootcamps since starting the program in last year's second half. There are three bootcamps planned for the remainder of this year: July 16-18 at FlightSafety's Long Beach (California) Learning Center; September 17-19 at its Teterboro (New Jersey) Learning Center; and November 5-7 at its Dallas North Learning Center. ■



EBACE19

R-R delivers Pearl 15 engines

Rolls-Royce is ramping up production of its new Pearl 15 engine and the first sets of production-standard powerplants have been delivered to Bombardier for installation on the launch platforms, the Bombardier Global 5500 and 6500, the engine OEM announced at EBACE 2019. The Pearl 15, first in a new line of powerplants from the UK-based engine manufacturer, was designed and optimized in partnership with Bombardier.

Pearl 15s have been fitted to the first Global 6500, which is undergoing completion at the Bombardier Global Completion Centre in Dorval, Quebec.

The Pearl combines innovations derived from Rolls-Royce's Advance2 technology demonstrator programs with proven features from the BR700 family but is more powerful, better specific fuel consumption, lowers NO2 emissions, and is two decibels cumulatively quieter, Rolls-Royce said. **J.W.**

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The planned \$13 million Chantilly Air FBO at D.C.-area Manassas Regional Airport will bring the company to 110,000 sq ft of hangar space and 30,000 sq ft of offices, in addition to an 11,000-sq-ft terminal offering the latest amenities.

Chantilly Air Breaks Ground on New D.C.-area FBO

Virginia-based aircraft charter and maintenance provider Chantilly Air broke ground in May on a new FBO at Manassas Regional Airport (KHEF), the state's busiest general aviation airport. The nine-acre complex, which is in addition to the company's current 4.5-acre leasehold, will feature 60,000 sq ft of new hangars, more than doubling the company's existing aircraft storage space, as well as an 11,000-sq-ft terminal with a passenger lounge, fitness center, conference rooms, and crew planning area. There will also be another 19,000 sq ft of offices available for the company and tenants.

Chantilly Air, which has had a presence at the airport since 1990, currently provides fueling services for its managed aircraft and hangar tenants, and after the \$13 million facility opens in the first quarter of 2020, it will expand that service to transient aircraft.

"The Chantilly Air team looks forward to growing general aviation activity at the Manassas Regional Airport by providing comprehensive aviation services," said COO Tim Sullivan. "Our goal is to create a memorable experience for passengers and crew. Superior customer service is at the core of who we are, and our expanded facilities will allow us to provide this to anyone flying into the airport."

After 49 Years, Dulles Aviation Calls It Quits

In other news at Manassas Regional Airport, Dulles Aviation closed its doors permanently at the end of May. A fixture at the airport for nearly half

a century, the family-owned, full-service provider allowed its current short-term lease to expire after being unable to reach acceptable terms on a long-term renewal with the airport, according to company executive Tom Gardner, leaving APP Jet Center the sole FBO at KHEF until Chantilly Air opens. Gardner noted Dulles's Manassas flight school has relocated to nearby Leesburg Executive Airport, where it will partner with existing training provider Av-Ed. An airport spokesperson said it is exploring other aviation uses for the Dulles Aviation facility, aside from FBO operations.

Belgian Airport Advances Plans To Develop Bizav

The Belgian regional airport of Liege (LGG), Europe's eighth largest in cargo throughput, has teamed with ASL Group to expand its footprint in the business aviation market. ASL will construct and operate a 22,650-sq-ft hangar and a 2,700-sq-ft dedicated bizav terminal that will have direct access to the apron and aircraft parking areas. The contract provides the possibility for ASL to build more hangars to accommodate more aircraft.

The company—which currently has 35 aircraft in its fleet and offers FBO services at various airports in Belgium and the Netherlands—will invest €3 million (\$3.372 million) in the LGG facilities. Société Wallonne des Aéroports, the public body that owns LGG, will invest €3.5 million in the bizav project and build a new apron on the north side of the airfield. The facility is expected to be operational in the summer of 2020.



Dulles Aviation, which served business aviation traffic in the nation's capital region for nearly five decades, closed its hangar doors at Manassas Regional Airport for the last time on May 31.

Gainesville, Florida Airport Breaks Ground on FBO

Florida's Keystone Heights Airport has broken ground on a new terminal for its municipally owned FBO. Funded entirely by the state department of transportation, the \$1.2 million project at the Gainesville-area airfield will include a 3,684-sq-ft building with a pilot lounge, flight planning area, snooze room, shower facilities, and 30-seat conference room, along with 767 sq ft of covered porches. Upon its completion in spring 2020, it will replace the existing 1970s-era, 1,500-sq-ft terminal, which was last renovated nearly two decades ago. That building will be retained for aeronautical business use. A former World War II U.S. Army airfield, Keystone features a 5,050-foot main runway and sees approximately 100 operations a day.

New Private Terminal Opens at Belgian Airport

North Sea Aviation Center (NSAC), the new business aviation terminal at Belgium's Ostend-Bruges Flanders International Airport (EBOS), opened in late May.



Global Trek has established its second FBO, at Wales's Cardiff International Airport.

The \$2.9 million facility features a three-story, 9,225-sq-ft terminal, with in-house customs and border control, a VIP lounge, concierge service, pilot lounge with snooze rooms and shower facilities, a 20-seat conference room, tenant office space, and a rooftop bar/terrace offering views of the airport. The complex also includes nearly 50,000 sq ft of hangar space. NSAC was created as a result of increasing private jet traffic at the airport, which currently accounts for 6 percent of its movements. According to general manager Erik Vermeersch, EBOS, which features a 10,500-foot runway, is a 15-minute flight to London, making it an affordable alternate for remote aircraft parking. "The intention is to bring more, larger private jets to the airport," said Vermeersch.

I.A.M. Jet Centre FBO Landing at St. Lucia Airport

Caribbean aviation services provider I.A.M. Jet Centre Group has been selected by the St. Lucia Air and

Seaports Authority (SLASPA) to establish the first FBO at Hewanorra International Airport (HIA). "Construction of the new facility is part of a 30-year master plan that will create several opportunities for St. Lucia," noted Daren Cenac, SLASPA's acting general manager.

"This is particularly true for the tourism and travel industries, specifically providing a unique experience for premium class passengers." I.A.M.—which operates IS-BAH Stage 2-registered facilities at Barbados, Jamaica, Grenada, and Tortola—currently coordinates private aircraft handling and fuel services through the HIA commercial terminal.

Groundbreaking for I.A.M. St. Lucia took place last month, with targeted completion by year-end. The facility will consist of a 7,000-sq-ft terminal with dedicated in-house customs and immigration processing, premium lounge spaces, meeting room, crew rest area, and security screening. "Our intention is for our presence at HIA to accentuate the island as a prime destination," said I.A.M. chairman Paul Worrell. "We are particularly pleased that our timing coincides with the commencement of works towards a new, modern commercial terminal facility."

Global Trek Debuts Wales FBO

Global Trek Aviation, which opened an FBO at Northern Ireland's Belfast International Airport in 2015, has expanded its operations with a new facility at Cardiff International Airport in Wales. The modern facility on the south side of the airport welcomed its first aircraft, a Jetstream 31, on May 14. It offers a dedicated VIP lounge, private offices, crew briefing center, flight operations facilities, and a fully integrated security screening suite. With VIP handling and its own refueling service, the FBO is a suitable location for tech stops.

"We are delighted to be opening the all-new facility at Cardiff International Airport as it offers tremendous potential with its ideal strategic location," said CEO David McColm. The airport, which features a 7,850-foot runway, is operational 24 hours a day with no nighttime curfews or slot requirements, and immigration and customs services are available 24 hours a day. ■

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by David Jack Kenny

PRELIMINARY REPORTS**Taquan Suffers Two Fatal Accidents in One Week**

DE HAVILLAND DHC-3 OTTER AND DE HAVILLAND DHC-2 BEAVER, MAY 13, 2019, KETCHIKAN, ALASKA; AND DE HAVILLAND DHC-2 BEAVER, MAY 20, 2019, METLAKATLA, ALASKA

Ketchikan-based air tour, charter, and commuter operator Taquan Air was staggered by fatal accidents on two successive Mondays, resulting in the deaths of one of its pilots and two passengers. Nine passengers on the first flight suffered serious injuries in a mid-air collision that killed all five on board a DHC-2 Beaver operated by Mountain Air Service, also based in Ketchikan. Taquan voluntarily suspended all flight operations after the second accident. Scheduled commuter flights resumed 10 days later after an internal safety audit, and sightseeing flights resumed on June 3.

On May 13, Taquan's Otter collided with Mountain Air's Beaver over the west side of George Inlet as both airplanes were returning from sightseeing flights through the Misty Fjords National Monument. The accident occurred at an altitude of 3,350 feet as the Otter's pilot was maneuvering to show his passengers a waterfall near Mahoney Lake. He did not observe any conflicting traffic on the airplane's ADS-B display but did see "a flash" on his left side just before impact. He maintained partial control of the aircraft and was able to flare to cushion its descent; bystanders helped the occupants reach shore.

The airplane subsequently sank in 80 feet of water about 400 feet offshore. The Beaver broke up in flight, scattering wreckage over a debris field measuring about 2,000 by 1,000 feet. The right wing showed a number of progressively deeper cuts "consistent with impacts from propeller blades." Skies were reported to be clear with 10 miles' visibility.

On May 20, a scheduled commuter flight carrying one passenger, cargo, and mail cartwheeled and sank during a water landing in Metlakatla Harbor, about 16 miles southeast of Ketchikan. The pilot and passenger were both killed. Weather was fair, with clear skies, 10 miles' visibility, and 10-knot winds from the southeast. Witnesses described the DHC-2 Beaver making a normal approach on a westerly heading, with some wing rock prior to touchdown. One reported seeing the right wingtip strike the water, while a second said that the tip of the right float dug in. Two boats responded to the scene, followed by EMTs on a Metlakatla police vessel. The occupants were extracted but pronounced dead on arrival at the Annette Island Health Center.

The company described the Beaver's pilot as a "new seasonal hire." He held a commercial pilot certificate with single-engine land, single-engine sea, and instrument airplane ratings, but at the time of his hiring, only five of his 1,606 hours were in floatplanes. Since then, however, he had completed company Part 135.293 and 135.299 checkrides, and subsequently fulfilled the initial operating experience requirements of Part 135.244.

Citation Pilot Lost Consciousness Before Ditching

CESSNA 560, MAY 24, 2019, 310 MILES EAST OF FORT LAUDERDALE, FLORIDA

U.S. Air Force pilots dispatched to intercept the jet after it overflew its destination observed the pilot "unconscious and slumped over the controls." The interceptors continued to track the errant aircraft until it descended into the Atlantic Ocean some 310 miles out to sea. Neither the pilot, who is presumed to have been killed, nor the airplane has been recovered.

The airplane had been sold two days earlier. Following a progressive inspection completed on May 22, the new owner engaged a contract pilot to fly it to Fort Lauderdale Executive Airport (FXE) for avionics work. The pilot checked in with the Atlanta Air Route Traffic Control Center (ARTCC), reporting that he was in level flight in smooth conditions at Flight Level 390, but did not respond to a subsequent handoff to the Jacksonville ARTCC.

Jacksonville continued to monitor the flight by radar as it passed through first its and then Miami's airspace. The jet overflew FXE at FL390 and continued eastbound until it descended.

The 9,000-hour ATP held "numerous type ratings," including single-pilot certification for the Cessna 560. The Coast Guard initiated a search but suspended it the following day.

Pilot Only Casualty of Manhattan Helicopter Crash

AGUSTA A109E, JUNE 10, 2019, NEW YORK, NEW YORK

The solo pilot was killed and the aircraft largely consumed by fire after a helicopter crashed onto the roof of a 54-story building in midtown Manhattan. Weather was reported to include low clouds, with visibility of a mile and a quarter and heavy rain reported in Central Park. La Guardia International reported overcast ceilings at 700 feet, barely higher than the elevation of the accident site. The 58-year-old pilot had held a commercial helicopter rating since 2004 and was also

a rotorcraft flight instructor but did not hold an instrument rating, and an FAA spokesman has stated that he was not in contact with air traffic control.

The pilot took off from the East 34th Street heliport at about 1:32 p.m. Unconfirmed reports suggest that his destination was Linden Airport in New Jersey. Heliport staff told police that he subsequently radioed that he needed to return, but was unsure of his location. Tracking data show that he flew around Battery Park at the southern tip of Manhattan and then up the island's west side before turning in toward midtown, an area subject to a TFR due to its proximity to Trump Tower. The accident site on Seventh Avenue was less than half a mile from that building, well inside the TFR.

The pilot had flown for the aircraft's operator for five years and was described by colleagues as "deeply familiar" with the area. At press time, the NTSB's preliminary report had not been released.

FINAL REPORTS**Runaway Trim, Inoperative Warning Circuits Implicated in Destruction of Brazilian Citation**

CESSNA 650, OCTOBER 10, 2015, CHAPADÃO FARM, MATO GROSSO, BRAZIL

A pitch trim runaway that led to the airplane's uncontrolled descent was attributed to a combination of an unresolved squawk in the physical flight-control system, failure of the instrument panel annunciator, and poor checklist discipline on the part of the pilots, who neglected to verify operation of the primary and secondary trim systems before takeoff. Two pilots and two passengers were killed when their airplane made an abrupt descent from FL380 at rates that eventually surpassed 30,000 feet per minute.

Cockpit voice recordings suggested that the crew was using checklists that had not been updated to include required tests of the Stabilizer Trim Backdrive Monitor. The CVR also recorded sounds consistent with the crew's activating the secondary trim control, normally reserved as an emergency back-up, before takeoff. The recording further suggests that the pilots were unable to trigger the PRI TRIM FAIL and SEC FAULT annunciators using the standard test procedure, but chose to board passengers and take off anyway. Further conversations suggested that the primary pitch trim system remained inoperative, taking the autopilot off line as well. The flight proceeded uneventfully for 21 minutes, until the pilots attempted to re-engage the primary pitch trim system. A series of clacker noises indicating uncommanded

movement of the horizontal stabilizer followed. The crew reduced power and attempted to re-engage the secondary trim circuit, but no further sounds indicating movement of the horizontal stabilizer were recorded afterward.

Multiple Irregularities Cited in Fox Glacier Crash

AIRBUS HELICOPTERS AS350BA, NOVEMBER 21, 2015, FOX GLACIER, NEW ZEALAND

The Transportation Accident Investigation Commission's final report identified several irregularities in the operator's organization and procedures that the investigators viewed as conducive to fostering an inadequate safety culture. Six passengers and their pilot were killed when the aircraft crashed onto Fox Glacier shortly after landing on Chancellor Shelf, a landing zone and popular photo platform about 800 feet above the accident site. Rapidly changing weather on the morning of the accident had already forced cancellation of three sightseeing flights, but after transporting a group of glacier guides to a lower location in the Fox Glacier valley, the pilot concluded that conditions had improved enough to allow sightseeing flights.

Photographs downloaded from passengers' cameras and cell phones retrieved from the debris field show the helicopter on the ground at Chancellor Shelf. At least one appears to show falling snow and minimal visibility. Examination of the wreckage showed that the helicopter struck the glacier at a high rate of forward speed with the engine and main rotor system developing power, suggesting that the pilot may have flown too close to the surface while proceeding down the valley in flat light.

The report also notes that thanks in part to their operations manual's lack of any formal criteria for that qualification, the operator had promoted the pilot to "A" category—considered a senior pilot with authorization to fly unsupervised to any landing site—despite relatively low make-and-model and mountain flying experience and ambiguities in his training record. More seasoned pilots flying in the vicinity acknowledged feeling surprised that he chose to go farther up the valley given that morning's rapidly changing weather conditions.

The report noted that the use of standardized passenger weights in place of physical weighing led to the helicopter taking off at least 65 kg (145 pounds) above its maximum gross weight. It was still 47 kg (97 pounds) above maximum gross when it lifted from the Chancellor Shelf, and its tail rotor servo had been operated for 38 hours past a maintenance deadline that had already been extended. Investigators listed neither as a contributing factor. ■

The material on this page is based on reports by the official agencies of the countries having the responsibility for aircraft accident and incident investigations. It is not intended to judge or evaluate the ability of any person, living or dead, and is presented here for informational purposes.



Fourteen World War II vets traveled to the Airborn Musuem sponsored by Forever Young Senior Veterans of Tennessee.

Vets help commemorate 75th anniversary of D-Day

by Kim Rosenlof

In the early hours of June 6, 1944, U.S. Army Air Corps pilot David Hamilton flew a C-47 Dakota filled with British Pathfinder paratroopers over Normandy, France, on his first combat mission. U.S. Navy signalman Vincent Unger was sailing toward Utah Beach on LCI 525, a landing craft carrying about 200 infantry troops on the first wave of the invasion. Royal Air Force driver David Teacher of the 103rd Beach Unit was in the seat of his three-ton wagon on a landing craft waiting to be delivered to Juno Beach. And U.S. Army infantryman Gerald Anderson would soon land on Omaha's "Easy Red" beach with the second wave of the 1st Infantry Division.

All of these veterans, young lads at the time but now in their nineties, returned to Normandy for the 75th anniversary of the pivotal Allied invasion that turned the tide of World War II in Nazi-occupied Europe. More than 300 WWII veterans, including about 65 U.S. veterans of the Normandy campaign, attended a series of ceremonies on June 5 and 6 that included paratrooper drops, aircraft flyovers, and remarks by dignitaries.

The Veterans

During the 75th anniversary week, World War II veterans were hailed as celebrities wherever they appeared with cheering, standing ovations, and requests for photos and autographs. Forever Young Senior Veterans, a Tennessee-based non-profit, sponsored 14 U.S. D-Day veterans on their first return to Normandy in 75 years, including Unger, who helped deliver troops to three different beaches until his landing craft was hit on June 8, 1944.

"I was only 18 years old," said Unger,

now 96. "My duties included weatherman, signalman, and quartermaster. We were the first wave on Utah, and it was terrible with the sound from all the canons. We landed troops at Utah, Juno, and Sword beaches. After we got hit, we had to go to Belfast for repair. I was deaf for five days."

The Aircraft

Fifteen twin-engine C-47/C-53 cargo or DC-3 passenger planes (generically called Dakotas in this article, after the British designation for that airframe) journeyed from the United States to Europe to participate in the 75th anniversary festivities. Organized by the non-profit D-Day Squadron, the Dakotas participated in anniversary activities in the U.S. before crossing the North Atlantic in small groups beginning May 10.

While the individual aircraft owners were responsible for their own costs, more than two dozen companies including Atlantic Aviation, Clay Lacy, Hertz, Satcom Direct, and Aeronautical Data Systems provided donations, goods, or services to assist with the effort. Signature Flight Support provided discount fuel and waived ramp and handling fees at several locations. Approximately \$3.5 million in donations and sponsorships was raised for the overall D-Day Squadron effort.

Once in England, the D-Day Squadron joined up with eight European-based Daks Over Normandy-sponsored planes at Duxford Aerodrome about 50 miles north of London. Duxford served as the base for the Dakotas that participated in flyovers at Prestwick, Scotland on May 24, and for public events on June 4-5.

Included in the American contingent

was That's All, Brother, the plane that led the main airborne invasion of 800 C-47s dropping 13,000 paratroopers behind enemy lines just after midnight on D-Day. Now fully restored and owned by the Texas Wing of the Commemorative Air Force (CAF), Brother was scheduled to be converted into a turboprop cargo plane before historians found it in 2015. Brother was one of seven D-Day veteran Dakotas participating in the 75th anniversary events and was flown by veteran CAF pilot Doug Rosendaal.

"Flying over the Channel with the other C-47s all bearing D-Day stripes was awe-inspiring," said a passenger on That's All Brother after an early morning flight of five C-47s from Duxford to Cherbourg, France, on June 5. "That's All Brother was configured with the same paratrooper seating as it had been on D-Day. The weather was perfect, not like on D-Day, but with the noise of the round engines and the cool temps of an unpressurized cabin, it still gave a good perspective of what the flight itself was like—without the flak or anticipation of dropping into combat."

Daks Over Normandy coordinated several parachute drops and flyovers during the week. On June 5, the group dropped nearly 200 parachutists in WWII gear and modified round parachutes near Carentan, commemorating the U.S. Army 101st and 82nd Airborne Divisions paratroop drop behind enemy lines in the early hours of June 6, 1944. 101st Airborne vet Tom Rice, aged 97, recreated his D-Day jump by jumping tandem out of a C-47. As reported by Associated Press, Rice said, "it went perfect, perfect jump. I feel great. I'd go up and do it all again."

Later that day in a combined military and civilian operation, another 250 parachutists dropped from C-130, C-160 and C-47 aircraft in fields near Caen, including D-Day veterans Harry Read and John Hutton, aged 95 and 94 respectively, who completed tandem jumps with the British Army's Red Devil parachute team.

"It's great to be back. I'm very pleased to be back firmly in my legs again," said Hutton after his tandem jump. Hutton was one of the British paratroopers who secured Pegasus Bridge. On June 9, the Dakotas joined another joint commemorative parachute drop as more than 900 paratroopers and 110 civilian parachutists from seven countries dropped near Saint-Mere-Eglise.

The Ceremonies

June 6 saw several anniversary ceremonies conducted across Normandy, including at Gold, Sword and Juno beaches; the new British memorial at Vers-sur-Mer; the Commonwealth War Graves Cemetery in Bayeux; and the American Cemetery overlooking Omaha Beach. The American ceremony included a welcome from American Battle Monuments Commission secretary William Katz, remarks by French and American presidents, and flyovers of aircraft from several nations.

French president Emmanuel Macron's remarks addressed the sacrifices Americans made for the French and other European people. "The USA is never greater than when it is fighting for the freedom of others," Macron said in French. "You freed a land with no other compass than a cause that was greater than yourselves, the cause of liberty." Addressing the 170 WWII veterans on stage, Macron said in English, "We know what we owe to you veterans: our freedom. On behalf of my country, I just want to say, thank you." Macron presented the Legion of Honor medal, France's highest order of merit to five D-Day vets—Vincent Hynes, Stanley Friday, Charles Juroe, Harold Terens, and Paul Wirth. "Stanley Friday was wounded twice, took part in liberating concentration camps...maybe then you understood what you were fighting for," Macron said.

U.S. president Donald Trump also included the stories of D-Day veterans in his remarks at the American Cemetery, including that of two brothers, Ray and Bill Lambert, who had fought in Sicily together and landed on Omaha Beach in the early hours of D-Day.

"The two brothers stood together in the Higgins boats," Trump said. "Of 31 men in Ray's landing craft, only Ray and six others made it onto the beach called Easy Red. Ray ran back into the water and dragged wounded men out onto the beach one after another. He was shot, leg torn by shrapnel, back broken, and had been on the beach for hours when he finally lost consciousness. He woke up on a cot the next day, looked over and saw his brother Bill, who didn't make it. At age 98, Ray is here with us... Ray, the world salutes you!"

Trump honored the 9,388 fallen Americans buried in the cemetery saying, "They had a job to do and they were going to get it done without hesitation or complaint... To those boys who rest in the fields before me, your example will never grow old. Your legend will never die. Your spirit will never die." ■



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Raytheon Technologies aims to maintain a platform-agnostic approach. As an example of the new company's contribution to major defense programs, the F-15 fighter has radar and missiles from Raytheon and engines from Pratt & Whitney, with Collins Aerospace providing ejection seats and many aircraft and cockpit systems.

» continued from page 1

Raytheon UTC merger

comprise eight UTC directors and seven—including the lead—from Raytheon.

"The combination of United Technologies and Raytheon will define the future of aerospace and defense," said Hayes. "Our two companies have iconic brands that share a long history of innovation, customer focus, and proven execution. By joining forces, we will have unsurpassed technology and expanded R&D capabilities that will allow us to invest through business cycles and address our customers' highest priorities. Merging our portfolios will also deliver cost and revenue synergies that will create long-term value for our customers and shareowners."

"Today is an exciting and transformational day for our companies, and one that brings with it tremendous opportunity for our future success," remarked Kennedy on the occasion of the announcement. "Raytheon Technologies will continue a legacy of innovation with an expanded aerospace

and defense portfolio supported by the world's most dedicated workforce."

Unlikely to meet any opposition from antitrust regulators, the merger brings together two mostly complementary businesses with little product crossover but significant potential for joint R&D programs. It will be organized with four business units. Raytheon is primarily a defense contractor specializing in radars and missiles and will rationalize its current four business units into two (Intelligence, Space & Airborne Systems, and Integrated Defense & Missile Systems) ahead of the merger, while the two UTC elements comprise engine-maker Pratt & Whitney and Collins Aerospace, the latter active in a wide variety of aerospace sectors, notably avionics, ejection seats, and sensors.

Combined R&D expenditure is projected to be more than \$8 billion in current dollars, spread across seven centers of excellence. Raytheon Technologies will be well placed to rapidly advance technology in many key fields, such as hypersonic and directed-energy weapons, ISR systems, next-generation connected airspace, artificial intelligence, advanced analytics, and cyber protection. ■

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Wheels Up acquires charter operator TMC

Wheels Up on June 3 announced that it acquired Travel Management Company (TMC), an Elkhart, Indiana-based wholesale jet charter operator with a fleet of 26 Hawker 400XPs. According to the New York City-based membership-based private aviation company, the move strengthens its light jet offering and growing Charter Marketplace offering, which allows members to book charter flights from safety-vetted and verified charter operators.

TMC's Hawker 400XPs will complement Wheels Up's 93 airplanes (72 King Air 350is, 15 Citation Excel/XLSs, and six Citation Xs), bringing its all-Textron Aviation fleet to 119 aircraft. Further, Wheels Up founder and CEO Kenny Dichter stressed that the acquisition will not alter

Gama Aviation's role in operating Wheels Up's fleet. "We love our relationship with Gama," he told **AIN**.

According to Dichter, TMC will operate as a separate subsidiary of Wheels Up and continue to provide the same service to its existing wholesale channel partners. TMC will also continue to be led by its existing leadership team, including CEO Phil Dodyk.

"This acquisition is a foundational piece in our continued brand evolution and mission to provide our members with a total private aviation solution," said Dichter. "TMC and its light jet fleet are a perfect complement to our anchor partner, Gama Aviation, which will continue to operate the aircraft in our Wheels Up fleet." **C.T.**

**Within 6 Months**

July 17, 2019

EASA: SMS for Parts and Maintenance

A notice of proposed amendment from the European Union Aviation Safety Agency (EASA) would require that safety management systems (SMSs) be applied to EASA Part 145 maintenance organizations for non-general aviation aircraft and to EASA Part 21 aircraft parts and component manufacturers. Currently, SMS programs are required for commercial flight operators in Europe. Comments are due by July 17, 2019.

Aug. 6, 2019 **NEW****Canada: User Fee Increase**

Nav Canada released for consultation a proposal to revise customer service charges to recover the costs of ADS-B surveillance data services. Proposed base rate service charge revisions, effective September 1, will average 0.8 percent increase. Charges related to ADS-B surveillance are proposed to begin Jan. 1, 2020. Three options are suggested: a flat service charge per flight of \$155.03, and two others that include aircraft weight and distance flown as potential components.

Within 12 Months**Jan. 1, 2020 Deadline Approaching U.S./Taiwan: ADS-B Out Mandate**

ADS-B Out equipment must be operational starting Jan. 1, 2020, in aircraft that fly in the U.S. under IFR and where transponders are currently required, and in Taiwan IFR airspace above FL290.

Jan. 1, 2020

Aircraft CO₂ Emissions

The first international standards for carbon dioxide (CO₂) aircraft emissions have been enacted by ICAO and initially apply to large subsonic jets, including business jets, for which the application for a type certificate was submitted on or after Jan. 1, 2020.

June 7, 2020 11 Months to Deadline Europe: ADS-B Out Mandate

The ADS-B Out retrofit requirement in Europe takes effect June 7, 2020. This mandate applies only to aircraft with a mtow exceeding 5,700 kg (12,566 pounds) or having a maximum cruising speed greater than 250 knots, and received its individual certificate of airworthiness on or after June 8, 2016.

Jan. 30, 2020

Datalink Com in North Atlantic

Phase 2 of the North Atlantic datalink mandate began in February 2015, at which time flights within the North Atlantic Tracks between FL350 and FL390 were required to be equipped with FANS-1/A controller-pilot datalink communications and ADS-C. The program expanded to these altitudes in the entire ICAO NAT region on Dec. 7, 2017, and will apply to all flights in this region above FL290 on Jan. 30, 2020.

Feb. 18, 2020

EASA: Halon Banned

Under new EASA rules, operators of large airplanes and large helicopters for which the first individual certificate of airworthiness is issued on or after May 18, 2019, shall ensure that built-in lavatory extinguishers on aircraft newly certified on or after Feb. 18, 2020 do not use Halon as the extinguishing agent. The goal is to gradually mitigate the environmental impact that Halon extinguishing agents in firefighting equipment have on the ozone and climate. The requirement applied to portable extinguishers starting last May.

Beyond 12 Months

Aug. 14, 2020

EU: Pilot Mental Fitness

The European Union has published revised air operations safety rules to incorporate provisions to better identify, assess, and treat the psychological fitness of air crew. The rules, applicable to commercial air transport operators, go into effect Aug. 14, 2020. The requirements include mandatory alcohol testing of flight crews during ramp checks.

Aug. 22, 2020 **NEW****Australia: Airport Certification**

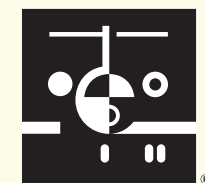
Revised Australian airport certification regulations (CASR Part 139) and an accompanying revised manual of standards (MOS) start on Aug. 22, 2020. There will be a transition period up to two years for registered airports, due to the requirements to develop an airport operations manual. Certified airports are expected to largely be compliant with the new MOS at commencement.

Jan. 1, 2021

U.S.: Stage 5 Noise Rules

Effective Jan. 1, 2021 more stringent noise certification rules apply for new type certificates for airplanes less than 121,254 pounds. The new rule is intended only for newly designed airplanes and is not aimed at phasing out existing noise standards that apply to the production or operation of current models. ■

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JULIE BLACK



NATE DARLINGTON



DAVID BEST



MARK WITHROW



GUS TAYLOR

BACA-The Air Charter Association appointed **Julie Black** deputy chair, working alongside chairman Nick Weston. Currently executive aviation manager for the charter services firm Hunt & Palmer, Black also has worked at London Biggin Hill Airport and Chapman Freeborn.

Coptersafety appointed **Erkka Suvikumpu** CEO. Suvikumpu joins Coptersafety from Saf-era Oy, where he was CEO and co-owner, and also has served with Finnair. He steps in for **Christer Niemi**, who had been interim CEO since December.

Jessica Naor was promoted to chief operating officer for Maryland-based private jet charter provider *GrandView Aviation*. Naor previously was chief marketing officer.

Jet Aviation appointed **David Best** senior v-p and general manager, regional operations U.S. He succeeds **David Paddock**, who was promoted to president of the Jet Aviation Group. Most recently senior v-p strategic global growth, Best joined Jet Aviation in January 2017 and has played an integral role in the acquisition and integration of Hawker Pacific and the recent stake in Scottsdale Jet Center.

FlightSafety International promoted **Patria Arundell-Lampe** to senior v-p and CFO. A former audit manager for Price Waterhouse and CFO of Chyron Corp., Arundell-Lampe joined FlightSafety in 2000 as a financial manager and since has served as chief financial director, as well as treasurer.

Flying Colours expanded its international team with the naming of **Paul Dunford** to the newly created role of managing director, international operations and **Andrew Pearce** as European sales manager. Dunford, who joined Flying Colours in 2014, launched the company's Singapore operation and served as general manager of Flying Colours Corp. Asia PTE Ltd. Pearce has 35 years of international experience in MRO, completions and aircraft sales, previously serving with Canadian, Middle Eastern, and European business aviation entities and having experience with the Bombardier aircraft family.

Safran Helicopter Engines appointed **Bernard Barussaud** executive v-p operations. Barussaud is a 27-year company veteran, joining the Snecma engineering department in 1992 and later becoming head of services for the cost estimates department, director of Snecma manufacturing excellence center for compressor blades, and most recently executive v-p of manufacturing at Safran Transmissions Systems.

Donna Chase joined *TurbineAero* as v-p of sales and marketing. Chase has 32 years of aviation/aerospace experience, including 26 with Honeywell where she ran the \$500 million global Business Aviation Aftermarket business.

Professional Aircraft Accessories named **Jonathan Clarke** v-p and general manager. Clarke joins Professional Aircraft Accessories after spending 30 years with Delta Air Lines, where he most recently was v-p and general manager for landing gear, engine operations, and APUs.

Uniflight Global named **Raymond Weiser** v-p of sales. Weiser brings 42 years of experience in rotary- and fixed-wing operations to his new role, serving with companies including Turbomeca, Rolls-Royce, Vector Aerospace, and Jet Support Services Inc. (JSSI).

Ray Kuliavas joined *Levaero Aviation* as vice president with a focus on business development as the Pilatus authorized sales and service center begins deliveries of the PC-24 in Canada. Kuliavas has more than 40 years of aviation experience, including a background with aircraft sales, marketing and brand growth, business development, and services development.

Richard Mumford has joined the London-based commercial law firm *REN Legal* as a partner. Mumford, who recently completed a three-year term as chairman of BACA—The Air Charter Association, formerly served as head of commercial litigation and head of aviation Stevens & Bolton.

Gulfstream Aerospace named **Mark Bates** general manager of its Palm Beach International Airport site in Florida. Most recently having served as Gulfstream's service manager focused on large-cabin aircraft in Savannah, Bates brings more than 40 years of aviation experience to his new role, including management positions with BAE Systems.

Mark Withrow was appointed plant leader for *GE Aviation's* Strother facility in Crowley County, Kansas. Withrow, who has more than three decades of aerospace industry experience, formerly was v-p and general manager of U.S. composites for Kaman Corporation.

Milestone Aviation Group named **Sebastien Moulin** head of Europe and Americas and **Michael York** head of emerging markets. Moulin will lead Milestone's OEM relationships with Airbus Helicopters and Leonardo. York will be responsible for the Sikorsky and Bell Flight OEM relationships.

Duncan Aviation appointed **Nate Darlington** director of modifications at its facility in Battle Creek, Michigan. Darlington, who will continue as manager of the Battle Creek paint department, joined Duncan's interior shop when he was 19, later moving into supervisory and sales roles before taking his most recent role as manager of the paint department in 2017.

Sundance Helicopters promoted **Ricardo Dowdy** to director of maintenance. Most recently maintenance manager, Dowdy has served with Sundance since 2011.

C&L Aviation Group named **Gus Taylor** recruiting manager.

David Carter, previously with L-3 Aviation, has joined *Universal Avionics* as regional sales manager for the Northwestern U.S. and will support the company's authorized dealers and integrators in Washington, Oregon, Nevada, Idaho, Utah, Montana, Wyoming, Colorado, and New Mexico.

Cadence Aerospace appointed **Jacob Haynes** group controller for its Washington State operations. Most recently controller at Cadence Aerospace Precision Machine Works in Tacoma, Washington, Haynes expands his chief accountant responsibilities to also include the company's Giddens operation in Everett, Washington.

Duncan Aviation has named lifelong Calgary, Alberta resident **Trevor Yuschyshyn** as its regional manager representative for Canada. Previously a director of maintenance at an aircraft management company and a member of Duncan's customer advisory board, Yuschyshyn brings more than 23 years of aviation experience and knowledge to his new role. The company also promoted **Jeff Schipper**, most recently a project manager at its Provo, Utah facility, to manager of modifications at the full-service location.

The Av8 Group hired **Karen Winterrowd** as sales director. Winterrowd has more than 20 years of experience, serving with companies including Garrett Aviation, Arnoni Aviation, and most recently as CFO of Ship It AOG.

Aircraft Specialties Inc. increased the role of **Gene Portela** to include oversight of the purchasing and marketing departments. Portela will additionally retain his duties as director of sales for the Omaha, Nebraska-based company.

Cutter Aviation promoted **Taylor Butterfield** to flight department manager for its charter and flight management department based in Phoenix. Butterfield joined Cutter in early 2016 as a pilot serving on its HondaJet and King Air teams and before that, held numerous roles with General Atomics.

Midwest Corporate Aviation (MCA) promoted **Andy Arnold** to general manager and **Steffen Blevins** to fuel/line service director. Arnold, who joined MCA in 2017 and has served as director of operations and chief pilot, previously was a captain for Lyon Aviation, Ameriflight, and Tradewind Aviation. Blevins has served with MCA since January 2012, beginning as a line service technician and most recently as a line service manager.

West Star Aviation named **John Lowe** satellite manager at the company's location in Chicago. Lowe brings 36 years of aviation experience to his new role, including as industry crew chief, director of maintenance, chief inspector and accounts manager. ■

FINAL FLIGHTS

Johnny Gantt, the long-time aircraft broker and co-founder of the *National Aircraft Resale Association*—now the International Aircraft Dealers Association (IADA)—died on May 14. He was 83.

Gantt founded *Gantt Aviation* in Georgetown, Texas, in 1971, building the business into a well-known international business jet and turboprop brokerage. He also helped found the National Aircraft Resale Association in 1991 to pursue a code of ethics in the business of acquiring, selling, and trading aircraft.

Born May 2, 1936, in Sweetwater, Texas, Gantt became interested in aviation after a pilot visited his high school to discuss flight careers, according to local obituary information. Soon after, he took flight lessons and bought a Piper J3 Cub with money he earned working nights at a cotton gin. After graduation, he became a flight instructor in San Marcos, Texas, and eventually teamed with a local FBO owner, James Miller, to co-own Miller Flying Service in Plainview, Texas.

About 15 years later Gantt sold his share back to Miller, moved his family to Austin, and established his brokerage firm. While selling airplanes, he continued to fly them, amassing more than 25,000 flight hours.

NBAA recently marked the passing of its former vice president of operations and retired U.S. Navy Cmdr. **Robert Cooke**, who died on March 10 in St. Petersburg, Florida. Cooke served with NBAA from 1973 to 1987, providing analysis and representing members on flight safety issues and federal aviation regulations.

Born in Schenectady, New York, he graduated from the U.S. Naval Academy in 1952 and became a naval aviator and navigator of the attack aircraft carrier USS Constellation in 1970 to 1971. After retiring from the Navy, he joined NBAA, where he worked on safety issues with the FAA, lawmakers, airport management organizations, and other entities on behalf of members. Cooke concluded his career as a consultant to the Flight Safety Foundation. ■


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MARK WAGNER

JULY

FLIGHT SAFETY FOUNDATION ANNUAL NETWORKING DINNER AND SILENT AUCTION... July 10, Washington, D.C. Info: flightsafety.org/events.

ASA ANNUAL CONFERENCE... July 14-16, Hotel OMNI Mont-Royal, Montreal, Quebec. Info: aviationsuppliers.org/annual-conference.

EAA AIRVENTURE... July 22-28, Wittman Regional Airport, Oshkosh, WI. Info: eaa.org/en/airventure.

AUGUST

LATIN AMERICAN BUSINESS AVIATION CONVENTION & EXHIBITION... August 13-15, São Paulo, Brazil. Info: labace.com.br.

SEPTEMBER

CITATION JET PILOTS CONVENTION... September 4-8, Colorado Springs, CO. Info: citationjetpilots.com.

INTERNATIONAL BRAZIL AIR SHOW... September 11-13, GRU Airport-São Paulo International Airport, Guarulhos, São Paulo, Brazil. Info: +55 11 97664-7750; ibas@sators.com.br; internationalbrazilairshow.com.br/en/.

MASSACHUSETTS BUSINESS AVIATION ASSOCIATION ANNUAL SCHOLARSHIP GOLF TOURNAMENT... September 12, The International, Bolton, MA. Info: massbizav.org.

IS-BAO WORKSHOP: MARRAKECH, MOROCCO... September 23, Marrakech Menara Airport, Morocco. Info: mebaa.com.

MEBAA SHOW MOROCCO... September 25-26, Marrakech Menara Airport, Morocco. Info: mebaamorocco.aero.

OCTOBER

REDBIRD MIGRATION FLIGHT TRAINING CONFERENCE... October 15-17, Wings Over the Rockies Blue Sky Aviation Gallery, Englewood, CO. Info: migration.redbirdflight.com.

NBAA TAX REGULATORY & RISK MANAGEMENT... October 20-21, Las Vegas, NV. Info: nbaa.org.

NBAA-BACE BUSINESS AVIATION CONVENTION & EXHIBITION... October 22-24, Las Vegas Convention Center, Las Vegas NV. Info: (202) 783-9000; nbaa.org/events/bace/2019/.

NOVEMBER

FLIGHT SAFETY FOUNDATION INTERNATIONAL AIR SAFETY SUMMIT... November 4-6, Taipei. Info: flightsafety.org/events.

BOMBARDIER SAFETY STANDDOWN... November 12-14, Omni Fort Worth Hotel, Fort Worth, Texas. Info: safetystanddown.com.

IBERIAN PENINSULA BUSINESS AVIATION CONFERENCE... November 14, Madrid, Spain. Info: ipbace.com.

DUBAI AIRSHOW... November 17-21, Airport Expo, Dubai, UAE. Info: +97 1 4286 7755; dubaiairshow.aero.

AFRICAN AIR EXPO... November 27-29, King Shaka International Airport, Durban, South Africa. Info: africanairexpo.com.

DECEMBER

MASSACHUSETTS BUSINESS AVIATION ASSOCIATION SAFETY DAY... December 4, Marriott Burlington. Info: massbizav.org.

JANUARY 2020

HAI HELI-EXPO... January 27-30, Anaheim, CA. Info: rotor.org.

FEBRUARY 2020

SINGAPORE AIRSHOW... February 11-16, Changi Exhibition Center. Info: singaporeairshow.com.

MARCH 2020

AIR CHARTER SAFETY SYMPOSIUM... March 3-4, Ashburn, VA. Info: acsf.aero.

INTERNATIONAL WOMEN IN AVIATION CONFERENCE... March 5-7, Disney's Coronado Springs Resort, Lake Buena Vista, FL. Info: wai.org/conference.

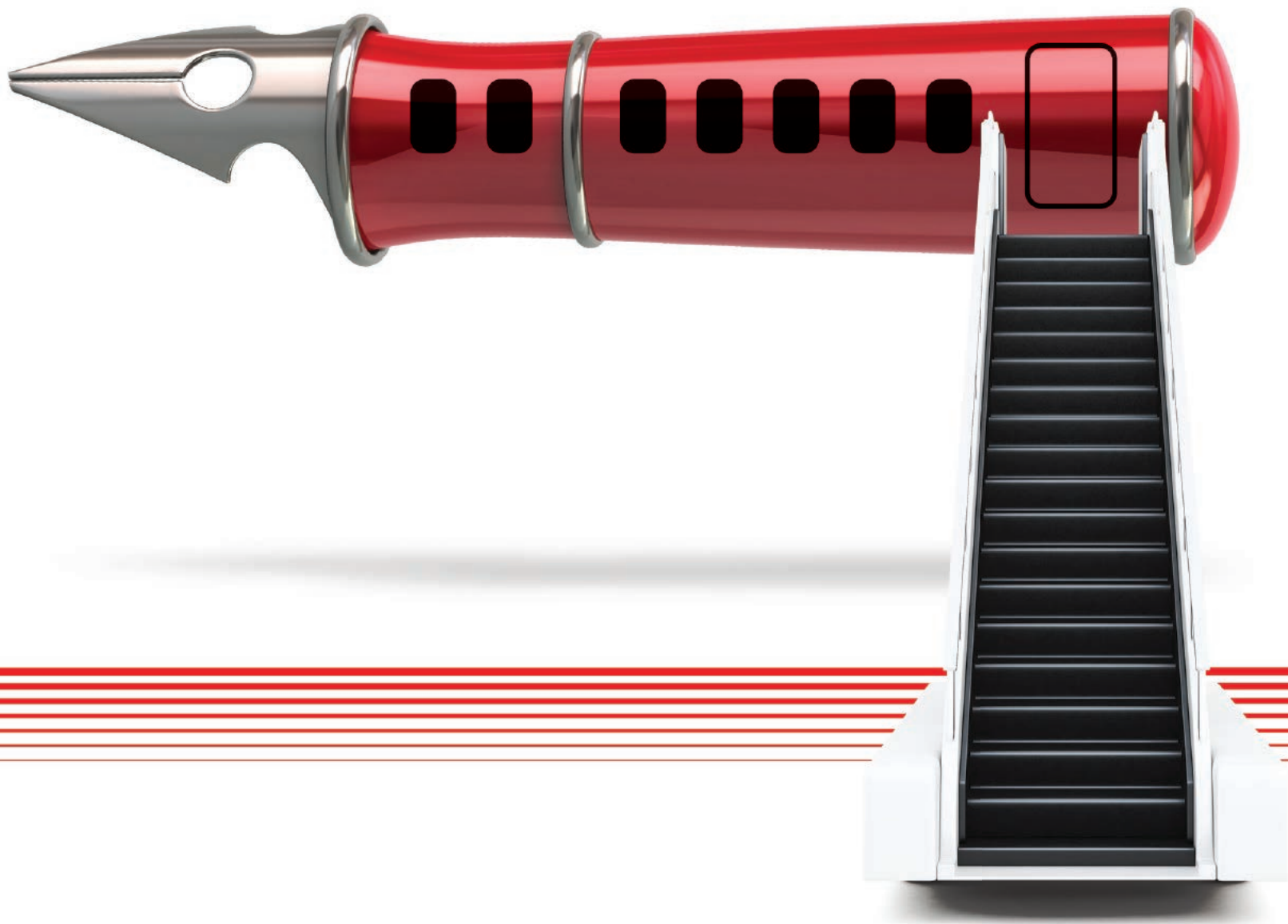
AIRCRAFT ELECTRONICS ASSOCIATION INTERNATIONAL CONVENTION AND TRADE SHOW... March 24-27, Nashville, TN. Info: aea.net.

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