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Dassault reveals Falcon 6X

by Mark Phelps

On February 28, Dassault held a day-long briefing, releasing details on its newest business jet, the Falcon 6X. The latest model is a replacement for the 5X, a project canceled due to multiple delays in the development of its proposed Snecma Silvercrest engines.

Olivier Villa, Dassault's senior v-p of civil aircraft, told **AIN** the 6X's Pratt & Whitney Canada PW812D engines are not the only change. The new twinjet will have a 20-inch-larger cabin, enabling either a larger aft lounge area or a choice of larger forward galley or a crew rest area. The 6X will also have a 300-nm range increase over the 5X (to 5,500 nm) and first deliveries are scheduled for 2022. As for commonality with the 5X, Villa said, "Much of the systems architecture will be retained—the fly-by-wire system is one step beyond that of the 8X—and there will be some commonality in the cockpit and the empennage. But otherwise, it is a thorough redesign."

For example, he said, though the aerodynamics of the wing remain, heavier loads required significant changes. "There are no common parts," Villa said. He also added that the extra fuel required for the additional range caused Dassault to switch to a nitrogen-based fuel pressurization system. "We were first to have a pressurized fuel system, which is safer for crossfeeding. And our experience with military aircraft led us to add a nitrogen system for the 6X. It's a first for a business jet, and the ultimate in fuel system safety," he said.

"It wasn't something we wished," said Villa of the 6X program, "but we're excited by the capability, and customers have responded enthusiastically." Check **AINonline** for further details from the briefing. ■

Read Our **SAFETY FEATURE**

LTE Avoidance

A series of recent accidents shines a light on loss of tail rotor effectiveness. While part of the danger is inherent in helicopter design, lack of effective training to prevent it or recover from it presents another challenge.

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Bizav deliveries up last year, trend likely to continue in '18

by Kerry Lynch

Business and general aviation manufacturers finished 2017 on an upswing, pushing up global shipments on the year 2.5 percent, to 2,324 units, and providing momentum into 2018, according to the General Aviation Manufacturers Association (GAMA). At the same time, the rotorcraft market underwent a turnaround, with total shipments jumping by almost 7.5 percent in 2017.

"The news is good this year," said GAMA president and CEO Pete Bunce, adding,

› continues on page 44

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SPECIAL REPORT

Future of Ab Initio Training

A pinch is coming, as the airlines, military and corporate operators staff their cockpits to meet increasing demand. **AIN** looks at how those pilots will be trained from the beginning.

Aviation International News

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LEAD DEVELOPER – Michael Giaimo
DEVELOPERS – Nathan Douglas, Ryan Koch
VIDEO PRODUCER – Ian Whelan

GROUP PUBLISHER – David M. Leach
ASSOCIATE PUBLISHER – Nancy O'Brien
ADVERTISING SALES
Georges France – Western Europe, +33 6 80 21 17 93
Melissa Murphy – Midwestern U.S., +1 (830) 608-9888
Nancy O'Brien – Western U.S./Western Canada/Asia Pacific, +1 (530) 241-3534
Anthony T. Romano – Northeastern U.S./Eastern Canada/Mexico/Brazil
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Diana Scogna – Italy/Northern Europe/Middle East, +33 6 62 52 25 47
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U.S. HEADQUARTERS
214 Franklin Ave., Midland Park, NJ 07432
+1 (201) 444-5075
Advertising Inquiries: +1 (201) 345-0085
adsales@ainonline.com
Circulation Inquiries: +1 (201) 345-0085
subscriptions@ainonline.com
WASHINGTON, D.C. EDITORIAL OFFICE:
Kerry Lynch (business aviation)
klynch@ainonline.com
Tel: +1 (703) 969-9195
EUROPEAN EDITORIAL OFFICE:
Ian Sheppard; isheppard@ainonline.com
Hangar 9, Redhill Aerodrome, Surrey RH1 5JY, UK
Tel: +44 1737 821409, Mobile: +44 7759 455770

THE CONVENTION NEWS COMPANY, INC.
AIN PUBLICATIONS EXECUTIVE TEAM
Wilson Leach
Matt Thurber
Michele Hubert
Jennifer Leach English
Dave Leach
Nancy O'Brien

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As We Go To Press

BIZJETS, HELOS LAG IN ADS-B INSTALLATIONS

More than 50,000 of the anticipated 100,000 aircraft in the U.S. that will need to comply with the Jan. 1, 2020 ADS-B equipage mandate have now installed systems, but shop availability has already begun to tighten for the remaining aircraft. Of those equipping in the business and general aviation segment, pistons and turboprops are leading the way with nearly half already equipped, while business jets are still only in the 20 percent range, according to data from GAMA. The rotorcraft segment is lagging even further behind, with only 10 to 15 percent equipped. Wipaire president Chuck Wiplinger noted that ADS-B installs in his shop tripled in 2016 and picked up by another two-thirds last year, but have flattened going into 2018. Constraints on the availability of skilled workers, not demand, are the reason work has plateaued, he said.

NEXTANT, COLLINS AWARDED T-1A AVIONICS UPGRADE CONTRACT

Field Aviation and subcontracors Nextant Aerospace, Rockwell Collins, and FlightSafety International have won a U.S. Air Force contract to modernize the Collins Pro Line 2/4 avionics on the USAF's entire T-1A (Beechjet 400A) fleet. As part of the award, Nextant Aerospace will share the responsibility for modernizing the USAF's fleet of 178 T-1A training aircraft, 16 flight simulators, and 14 part-task ground trainers with Collins Pro Line 21 avionics systems. The contract also calls for building several new simulators, as well as developing training aids and courseware. Under phase one, Field has been awarded $18.5 million for prototyping and low-rate initial production.

ORIENS OPENS BIGGIN HILL PC-12 SERVICE CENTER

Two months after acquiring the former Avalon Aero business aviation MRO at London Biggin Hill Airport, Oriens Aviation on February 15 formally relaunched the facility—Oriens Maintenance Services—as an authorized Pilatus Aircraft service center. The move follows what the UK and Ireland Pilatus sales distributor calls an "excellent" 2017, in which fresh customers took delivery of five new aircraft, the PC-12 company demonstrator was sold, and a first new-build PC-12 delivery position was secured for this year.

GULFSTREAM ANNOUNCES APPLETON MRO EXPANSION

Gulfstream Aerospace is undertaking a $40 million, 180,000-sq-ft expansion of its Appleton (Wisconsin) International Airport (KATW) maintenance and completion center that is expected to add 50 percent more capacity, create 200 new jobs, and push total employment at the location to more than 1,000. Construction is expected to start in May, with operations beginning in the second quarter of 2019. The new facility will be located northeast of the airport and include a hangar, offices, back shops, and support space. Gulfstream has operated at Appleton since 1998 as part of its then-$250 million acquisition of K-C Aviation.

BELL REBRANDS AS 'FLIGHT' COMPANY

Bell Helicopter is rebranding itself simply as "Bell" and incorporating the dragonfly into its red shield logo to accompany a new slogan, "above and beyond flight," the company announced on February 22. Bell CEO and president Mitch Snyder said the company is making the changes to reflect its more diversified approach to flight. The brand change coupled with Bell's foray into new vehicle types such as urban air taxis does not preclude development of new helicopter models, Snyder added.

AEROCOR DEVELOPS 'CERTIFIED' ECLIPSE PROGRAM

Very light jet sales specialist Aerocor has rolled out a new certified preowned program for Eclipse 500s and 550s that covers inspections and first-year scheduled maintenance, as well as operational support. To qualify under its program, an aircraft must have complete logs, be on an engine service plan, and be equipped with PPG windshields and Tamagawa landing gear actuators, Aerocor said. A 24-month inspection is due within the first 12 months and 300 flight hours of ownership. The program includes a credit for the first six-month battery capacity checks and aileron gap checks. It further provides post-sale support, including type-rating training.

U.S., CANADA BIZAV FLYING OFF TO ROARING START IN 2018

Utilization metrics for business aircraft flying in the U.S. and Canada continued to improve, with activity up 4 percent year-over-year in January, according to TraqPak data from Argus International. Part 135 activity soared by 8 percent year-over-year, while fractional and Part 91 reported upticks of 2.2 percent and 1.5 percent, respectively. By aircraft category, turboprops led the pack, rising 5.5 percent from a year ago, followed by large-cabin jets, up 4 percent; midsize jets, up 3.1 percent; and light jets, up 2.8 percent. Weekday flying was up 2.8 percent from a year ago, while weekend activity jumped 8.5 percent. By U.S. region, the Southeast dominates with 58,234 departures, eclipsing the next busiest—the central West Coast—by more than 23,000 movements.

French air-taxi firm Wijet has signed an MoU for 16 HondaJets, in a deal worth approximately $80 million. The aircraft will replace its 15 Cessna Citation Mustangs.

16-aircraft MoU from Wijet marks largest yet for Honda

by Chen Chuanren

Honda Aircraft signed a memorandum of understanding with French air taxi firm Wijet for 16 HA-420 HondaJets last month at the Singapore Airshow. The deal is worth approximately $80 million at list prices, making it the biggest aircraft contract yet for the aircraft manufacturer.

Wijet currently flies 15 Cessna Citation Mustangs and is Air France's exclusive partner for business aviation. Honda Aircraft will begin deliveries this quarter and the aircraft will eventually replace the Cessna Citations over the next 18 months. Wijet said it hopes to expand operations from 1,200 to 1,500 airports across Europe and North Africa with the HondaJet.

"There is no comparison to the HondaJet in its category," said Wijet CEO Patrick Hersent. "For our customers, we offer the best-of-the-best in terms of products and experience, while providing our partners with a safe and superior product at an affordable rate. The HondaJet does all of these things."

According to Honda Aircraft CEO Michimasa Fujino, his company delivered 23 aircraft in 2016 and 43 last year, and the HondaJet was the best-selling aircraft in its category in the first half of 2017. "We are producing four aircraft monthly in a steady state now, and are studying how to increase that to five," he told **AIN**. ■

White House infrastructure proposal aims to spur shift in airport investments

The White House on February 12 unveiled an infrastructure plan that shifts an emphasis from federal investment to state, local, and private funding for major infrastructure projects, including for airports. The plan does not focus on air traffic control functions, but seeks to incre ase non-federal investment in and/or privatization of more U.S. airports. It also seeks to curb the FAA's activities in approval and management of certain airport projects.

A key to the plan is an infrastructure incentive program, backed by government grants, that would encourage state, local, and private investment. Such a program would apply to a range of infrastructure, from surface transportation and rail to waterways and airports. In addition, the plan seeks to widen availability of federal credit facilities and bond options, including for airports. Also on the funding front, the plan calls for streamlining and reducing the paperwork required for passenger facility charges at small hub airports.

The plan would enable the divestiture of certain federal infrastructure—including Ronald Reagan Washington National and Dulles International Airports—to state, local and/or private entities. Also, the plan would remove certain constraints on privatization of airports, including a limit on the number and size of airports that can participate in the current pilot program.

As for the FAA's involvement, the plan states that the current review process for projects burdens the FAA and slows project delivery. **K.L.**

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PlaneSense took delivery of one PC-24 and awaits the handover of five more.

With first PC-24 delivery, PlaneSense fleet tops 40

by Gordon Gilbert

The arrival last month of the first customer production Pilatus PC-24 light jet to PlaneSense bumped up the fractional provider's fleet to 41 aircraft and introduced its first offerings for shares in the new jet. In addition to the PC-24, the Portsmouth, New Hampshire company operates 36 Pilatus PC-12 single-turboprops and four Nextant 400XTIs. PlaneSense, which said it already has sold shares in the PC-24, expressed the desire to receive the other five it's ordered "as quickly as possible." The company expects to receive at least two more within the next 12 months and two more next year.

"We've been eagerly working toward this moment since the conception of this innovative new jet a decade ago," said Pilatus CEO Markus Bucher at the PlaneSense delivery ceremony "on behalf of the 2,000 Pilatus employees in Switzerland who successfully designed, built, and certified the best business aircraft in our 80-year company history."

Pilatus initially conceived designing its first business jet in 2007 after asking its PC-12 customers what they would like in a next-generation aircraft. The responses were concise and consistent: they wanted an aircraft that was "roomier, faster, and longer range, with short-field performance." The Swiss company originally considered a single-engine jet but soon concluded that only a twin could meet those performance goals.

Performance and Timing: as Promised

In 2013, Pilatus announced that the PC-24 would be ready in 2017, and in December it received both FAA and EASA certifications. In addition, the company declared that all performance data promised to customers had been achieved or even exceeded. For example, Pilatus said the PC-24 delivers a maximum speed of 440 knots true airspeed compared to the contractually promised 425 knots.

Pilatus asserts the PC-24 is designed to operate from short, paved, and even unpaved surfaces, "giving pilots access to more than 20,000 airports worldwide." The company supports these claims with the following specifications: an ISA BFL at max weight, sea level and on dry paved runway of 2,810 feet; landing distance over a 50-foot obstacle, max landing weight, sea level and paved runway of 2,355 feet; max rate of climb 4,151 fpm; four-passenger range at LRC setting and NBAA IFR reserves of 2,035 nm; and a stall speed at MLW in landing configuration of 81 kias.

When the order book for the PC-24 was

PlaneSense CEO George Antoniadis, left, and Pilatus CEO Markus Bucher at the handover

opened in 2013, two years before the first flight, Pilatus said it sold the first 84 units in less than an hour, after which the order book was closed.

Because those orders would represent more than two years of production, Pilatus chose to temporarily stop sales because it did not want customers to have to wait more than two years to take possession of their aircraft. As it is, with 23 deliveries to customers around the world planned throughout this year, the order book may need to stay closed a little while longer.

The twinjet airplane arrived at the PlaneSense headquarters with its new FAA registration: N124AF, representing the first PC-24 and following the pattern set when the company received its first PC-12 in 1995: N112AF. Today, N112AF is on a 2013 PC-12. As older airplanes are replaced with newer versions PlaneSense N numbers are transferred accordingly. To date, PlaneSense has taken delivery of more than 60 new PC-12s. George Antoniadis, founder, owner and CEO of PlaneSense, declined to reveal exactly how many shareowners the company has, saying instead that "it's many hundreds."

PlaneSense's Tribute to Alpha Flying

As new aircraft receive an N number with the AF suffix, aircraft sold are re-registered to remove the AF, and are also refurbished to replace all other PlaneSense interior and exterior distinctions. In a sentimental gesture, the AF designation on all PlaneSense aircraft is Antoniadis' tribute to Alpha Flying—the aircraft management company he owned before it morphed into PlaneSense. Antoniadis is clearly proud of his former company and the use of AF on every airplane is a way to ensure its constant link to PlaneSense.

Each PlaneSense PC-12 logs some 1,000 hours annually, said Anoniadis, which equates to nearly 350,000 hours annually for the fleet as a whole. Antoniadis noted that last year, the fleet flew 9 million miles, used 840 different airports in 47 states; and carried 3,000-plus passengers, as well as a few wolves and turtles on occasion. More than 95 percent of PlaneSense flights are flown under Part 91K with less than 5 percent operated under Part 135 by sister company Cobalt Air.

After completing FAA requirements for the PC-24 to be added to the fractional fleet, PlaneSense will fly the aircraft on a four-week tour of U.S. and international locations to highlight its capabilities for current and potential fractional aircraft share owners. The aircraft will also be on an "operational" exercise during the tour.

According to Antoniadis, the jet's takeoff and landing performance permits it to use runways less than 3,000 feet, such as those at Chatham on Massachusetts's Cape Cod and Stowe in Vermont, for example. However, there are many small airports whose runway length and width are adequate, but they might not have the ramp or turnaround space required for a PC-24-size aircraft. Hence, the operational side of the tour will provide PlaneSense pilots with necessary data for future flight planning.

"The PC-24 will also demonstrate its versatile short field capability at high altitude airports, such as Telluride in Colorado," Antoniadis said. He maintains "There will be times when the PC-24 is the only jet that can operate out of some runways."

Meanwhile, the company's Nextant 400XTi light jets remain primarily core aircraft for supplemental lift, eventually to be replaced as more of the single-turboprops and PC-24s are acquired and join the PlaneSense fleet. ■

News Briefs

Victor Raises $18M for Charter Industry Venture

Online private jet charter marketplace Victor early last month received an $18 million co-investment from BBA Aviation, BP Ventures and existing shareholders to form the newly created Alyssum Group. To be led by Victor founder and CEO Clive Jackson, the new entity is a long-term initiative to create an ecosystem enabling business aviation industry stakeholders to boost efficiency and profitability by sharing data and business intelligence. A week after forming the new venture, it acquired aviation flight-planning, fuel, and concierge services company RocketRoute, saying the move is "part of its long-term strategy to transform the entire private aviation industry."

NetJets' QS Partners Acquires Cerretani Group

QS Partners, the whole-aircraft brokerage arm of NetJets, has acquired Boulder, Colorado-based Cerretani Aviation Group, more than doubling its business aircraft sales and acquisition services. Cerretani has served as a primary broker partner for NetJets since 2013, before QS Partners was launched in 2016 to cover aircraft sales and purchases in house. Cerratani founder Nick Cerretani is now a partner at QS Partners, which has retained all seven of his employees. QS Partners, which has offices in Columbus, Ohio; Boulder; and London, is also the exclusive reseller of NetJets certified pre-owned aircraft.

Bombardier Chief Bullish on Business Jet Market

While Bombardier's business jet delivery guidance for 2018 is flat at 135 units, company president and CEO Alain Bellemare is optimistic about the segment and is prepared to increase production volumes "if the market supports it." He described the business jet market sentiment as "positive," with the company seeing increased sales in the fourth quarter—a trend he said has continued thus far this year. This year "will be a pivotal year for Bombardier," Bellemare said. "We are moving out of our investment cycle and into a strong growth cycle," citing the expected service entry of the Global 7000 later this year.

Tac Air To Open Dallas Location

Tac Air will be expanding its services to its hometown Dallas metroplex, establishing a new location at Dallas Love Field. It will transform the former Braniff Airlines operations and maintenance base (known now as the DalFort Aerospace Building) into the Braniff Centre, which will encompass more than 200,000 sq ft of FBO and hangar space on the east side of the airport. When the FBO opens in the summer of 2019 along with the associated complex, it will be the company's 15th location.

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BOMBARDIER

Final aircraft rounds out Global 7000 test fleet

by Kerry Lynch

Bombardier's fifth Global 7000 (FTV5) completed its first flight on January 30, rounding out the full complement of flight-test vehicles for the program. The initial flight, from Bombardier's Toronto facility, lasted 4.6 hours. Dubbed "The Masterpiece," FTV5 incorporates a slightly lighter wing and will be used to validate tests completed to date. The aircraft will complete the type-certification campaign, paving the way for entry-into-service later this year, Bombardier said.

Since the first Global 7000 flew on Nov. 4, 2016, the test fleet has accrued more than 1,300 flight hours. "It's an exciting time for the program and the team as we enter the certification phase and get closer to the aircraft's entry into service in the second half," said Michel Ouellette, senior v-p for the Global 7000 and 8000 programs.

The program continues to check off key milestones, including testing in cross-winds at high-elevation airfields and in all-weather conditions. "The results speak to the aircraft's maturity, reliability, and strong performance," said François Caza, v-p of product development and chief engineer. "In addition to flight testing, we continue to progress our ground-test program and have now met the full air-frame fatigue test milestone as required by authorities for entry into service."

Once certified, the four-zone, $75 million Global 7000 will become Bombardier's flagship business jet, flying 7,400 nm and achieving speeds of up to Mach 0.925. ■

Pictured celebrating the deal for RFDS to purchase two additional King Airs are, l to r: Jessica Pruss, president, Asia Pacific sales and marketing, Textron Aviation; David Carlton, general manager aviation and strategic development, RFDS (SE Section); Scott Ernest, president and CEO, Textron Aviation; Kate Hamilton, regional sales director, Textron Aviation.

Royal Flying Doctor Service signs on for two King Airs

by Ian Sheppard

Australia's Royal Flying Doctor Service (South Eastern Section) placed an order at the Singapore Airshow for two modified cargo Beechcraft King Air 350 aircraft. Both are set for delivery in the third quarter of 2018.

The RFDS currently operates more than 35 Textron Aviation aircraft, including 18 King Air turboprops in the South Eastern Section.

The aircraft will be delivered with an 11-passenger high-density seating configuration, but they can be reconfigured for use as air ambulances.

An added cargo door allows for easier patient loading and offloading, while the landing gear is also being modified to support higher maximum takeoff weights. They will be able to operate with full fuel and a maximum payload of more than 1,100 kg (2,425 lb) over ranges of 2,500 km (1,350 nautical miles). ■

AsBAA sets 2018 priorities

Clear and transparent industry regulations and reasonable infrastructure service charges in China remain top priorities for the Asian Business Aviation Association's (AsBAA) China chapter. Led by AsBAA mainland China Committee and Textron v-p of government affairs Rocky Zhang, the chapter recently met to review 2017 events and discuss priorities for this year.

Chapter members agreed that large business aircraft remain a preference in the Chinese markets. Obstacles such as scheduling and fee charges need to be resolved to encourage the introduction of more short- and medium-range aircraft, the chapter further agreed. Industry leaders in the region are pushing for a regulatory approach that would enable China to have an "open for business" reputation, the association said.

"The vision for AsBAA in 2018 is to improve the regulatory environment and create opportunities for sustainable development," said AsBAA chairman Jenny Lau, who is also president of Sino Jet Management. "We will also continue to host meetings in which our members can access expert legal and professional advice."

The chapter discussed collaborating with the other industry groups to present a united front and strategized ways to work with the various government agencies as they press for a fair environment.

AsBAA is also working to bring new people into the industry, hosting seminars at Chinese universities to promote business aviation careers. **K.L.**

News Briefs

Gulfstream G500 on Final Approach for Certification

The Gulfstream G500 has entered the final stage of its flight-test and certification program, while the larger G600 recently completed field performance testing. As of early last month, five flight-test G500s had accumulated more than 4,250 flight hours over some 1,200 flights. The fourth flight-test G500, dubbed T4, also began function and reliability (F&R) testing. Over the FAA-mandated 300 flight hours of F&R testing, T4 will be used to evaluate how the aircraft behaves in conditions representative of normal in-flight operations, including hot, cold, and humid environments. G500 certification is expected in the coming months, with G600 service entry to follow later this year.

U.S. Bizav Flights Top 3M

Business aviation flights in the U.S. and Canada topped three million last year, reaching that mark for the first time since 2008, according to a 2017 Business Aircraft Activity Review from Argus International. Overall, business aviation flights increased 3.9 percent overall and flight hours jumped 5.5 percent over 2016, according to the review. Year-over-year gains were posted in every month of 2017, Argus said. Part 135 operations enjoyed the greatest gains, rising 9.2 percent last year. Fractional flights ended the year up 4.7 percent, while Part 91 flights inched up 0.1 percent in 2017. Flights across the board have consistently increased since 2014, rising from 2.80 million that year to 3.06 million last year—a 9.4 percent improvement.

Swisshelicopter Rebrands as Kopter

Marenco Swisshelicopter is now known as Kopter under a rebranding effort announced last month at its newly completed corporate/engineering facility just outside of Zurich. This is a "decisive step that places the business as a potential leader in the marketplace," said the company, which is developing the all-composite SH09. A second production-conforming SH09 (P3) slated to soon enter the flight-test program and pre-series aircraft PS04 will jointly serve to obtain EASA and FAA approvals. Deliveries of the SH09 are expected to begin next year.

Airbus Helo Rolling Out Air-taxi Booking Service

Airbus Helicopters is incorporating helicopter booking platform Voom as part of its urban mobility strategy. Developed by Airbus A3 in Silicon Valley and initially deployed commercially in April 2017 in São Paulo, Brazil, Voom has been used to fly thousands of passengers by helicopter over the past 10 months. "We are expanding into additional cities, beginning with Mexico City early this year," said Voom CEO Uma Subramanian.

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ATC debate rages on, opponents ready for fight

by Kerry Lynch

The White House signaled last month that it is going to continue its push to carve the U.S. air traffic control organization out of the FAA, including a renewed call for privatization in its Fiscal Year 2019 budget proposal. Released in February, the budget proposal reiterated the administration's desire to create a "non-governmental, independent air traffic services cooperative" and maintained, "[Our] goal is to create a system that can respond to changing air travel demand by deploying cutting-edge technology and giving airlines, general aviation users, and passengers a system that is a good steward of their financial resources." The White House added that this system would be "similar to successful efforts in many other developed countries."

Not surprisingly, the renewed call immediately drew jeers from opponents to the proposal, including general aviation, business aviation, helicopter and rural groups, among others.

"The Administration and a few members of Congress continue to offer proposals that would take the management of air traffic control operations from the FAA, which places the public interest as its top priority, and give that management to a private entity that would be responsible only to a small, insular board," said General Aviation Manufacturers Association president and CEO Pete Bunce. "The proposals remain a bad idea that lack industry and political consensus, particularly at a time when new industries like commercial space, unmanned aerial vehicles, and urban mobility air vehicles will share the nation's airspace."

"The idea of handing over the nation's ATC system to what amounts to an airline cartel...[is] bad policy, which would have a devastating impact on small communities and rural areas, which could see their access to airports and airspace threatened," agreed NBAA president and CEO Ed Bolen.

And, National Air Transportation Association president Martin Hiller vowed to continue "to fight this existential threat to general aviation and the businesses that support this vital community—supporting more than one million jobs nationwide."

Uncertain Fate

And the fate of that proposal this year remains uncertain, at best, as the FAA's authorization is set to expire at the end of March. House Transportation and Infrastructure (T&I) Committee chairman Bill Shuster (R-Pennsylvania) is ramping up a major push for an infrastructure proposal. While he told reporters that he first has to get an FAA bill completed, some have quietly questioned whether he is simply going to push for another extension and, instead, turn his attention to infrastructure. Others, though, believe he may try to make one last major push to bring his comprehensive bill—which includes the controversial ATC measure—to the floor in the first couple of weeks of March.

Regardless, there is no indication that such a proposal would win any support in the Senate. The Senate still must act on its FAA bill, which stalled over a measure designed to ease the 1,500-hour ATP requirement for commercial pilots. Senate Commerce Committee chairman John Thune (R-South Dakota), however, has indicated a willingness to compromise on the ATP measure to get his bill to the floor.

If the House and Senate remain at odds over the ATC measure, lawmakers likely will come to an agreement on an extension; a two-year extension is being floated as a possibility to carry the reauthorization cycle well beyond the elections.

While the ATC measure may hit a wall, at least for this year, proponents of the independent ATC proposal show no sign of backing down. The House T&I Committee continued to push ATC reform, including promoting a *Wall Street Journal* editorial that calls the concept of a separate ATC organization a good idea.

The committee sent an email distributing the February 14 *WSJ* editorial that takes aim at the "lobbyists for the paupers known as the corporate jet lobby." The editorial called NBAA's Bolen a ringleader running a "misinformation campaign," and also cited the Aircraft Owners and Pilots Association in the effort.

The paper disputes arguments of ATC privatization opponents that the airlines would ultimately run the system, saying the proposal would only permit limited airline seats on the board that would run an independent ATC system, and other groups would have seats. The editorial also rehashes arguments of proponents that GA is exempt from user fees and dismissed as a "canard" concerns about small community access. "If business jets try to tank the bill no matter the details, then Republicans ought to subject them to fees, same as commercial flights," the *WSJ* suggests, arguments long made by the airline community that has tried to shift its cost burdens to other users of the system.

Bolen responded that the editorial is inaccurate and fails to recognize the much broader opposition to the proposal, which includes 200 general aviation groups, along with mayors of every state and business leaders.

"In attacking NBAA, the editorial recycles inaccurate airline talking points that have proven to be false, and obscures the fact that airlines themselves are responsible for most flight delays," Bolen said.

The appearance of the editorial as the FAA authorization deadline loomed, along with the return of the ATC proposal in the White House proposal gives a clear sign that whatever happens this year, the proposal is not going away. ■

Epic Aircraft flies second prototype

Epic Aircraft flew the second conforming prototype of the E1000 all-composite turboprop single on January 22 from its headquarters at Bend Municipal Airport in Oregon. Dubbed FT2 and registered as N332FT, the airplane will be used to evaluate the interior and environmental system, in addition to the avionics, fuel, and hydraulic systems, Epic director of sales and marketing Mike Schrader told **AIN**.

FT2 is equipped with Garmin G1000NXi avionics and a full interior, both of which are production standard. The first conforming E1000 has logged more than 500 hours since its maiden flight in December 2015.

Certification, which previously had been expected by the end of last year, is now planned for this summer. Schrader said the FAA approval process is taking longer than planned due to paperwork and minor supplier issues.

The company currently holds orders for more than 80 of the $3.25 million turboprop singles. According to Schrader, Epic plans to deliver the last two Epic LTs, the kit-built version of the E1000, this year and will then switch to certified aircraft production only. **C.T.**

News Briefs

Analyst: Bizjet Delivery Totals Might Be New Normal

With airframers awaiting signs of a major rebound in new business jet sales, industry analyst Brian Foley believes the pattern seen since 2011, an average of 692 deliveries a year with a standard deviation of just 25, might not be easy to break. "Statistically, there's a pretty good chance that 2017 results will also fall within that narrow band, as will 2018's," he noted. "This trend has not been random, but rather a symphony of equal and opposite market forces holding deliveries in tight equilibrium." He asserts that rather than a benchmark, the peak of 1,317 deliveries in 2008 should be considered an anomaly, and one not likely to be reached again under the current normalized and sustainable market conditions.

Bryan Moss Joins Aerion

Aerion is continuing to expand its lineup of seasoned business aviation executives, adding former Gulfstream president Bryan Moss to its board of directors in late January. Moss brings a long background in the development and production of high-end business jets, spending 13 years with Gulfstream in senior roles and before that serving as president of Bombardier Business Aircraft. He also has held roles with Lockheed-Georgia Company, selling various aircraft, including the Lockheed JetStar.

Collins Deal Closure On Track

The United Technologies acquisition of Rockwell Collins remains on track to close around midyear, according to UTC president and CEO Greg Hayes. He added, "We're working through the second request with the [Department of Justice] right now." Hayes said that discussions with aircraft manufacturers continue as UTC seeks to allay concerns that the deal will not benefit the supply chain's top tier.

AOPA Cancels Chicagoland Airport Complaint

The Aircraft Owners and Pilots Association (AOPA) has withdrawn its official FAA complaint against Waukegan National Airport following what it describes as efforts taken to make it "more accessible and friendlier to pilots." AOPA alleged that Signature Flight Support, the lone FBO on the field, was forcing operators to buy "unreasonably priced fuel and pay for services that were not required." In December, the airport announced it would offer free tie-downs for transient aircraft and a pedestrian gate to access the ramp, so passengers were not forced to transit the FBO. In dropping its FAA complaint, AOPA cited the airport management's "concerted and transparent actions to improve the accessibility of the airport to transient users." Signature also reduced the price of its self-service avgas facility by more than a dollar per gallon at the airport.

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Singapore Airshow debutants

by AIN Staff

This year's Singapore Airshow, held last month, featured the regional debuts of three business jets: the Gulfstream G500/G600 and the Citation Longitude. Both the **G500 and G600** are on track for FAA type certification and service entry this year—the former in the first quarter and the latter in the second half. In October, Gulfstream announced performance enhancements for both aircraft, including a range increase in the G500 to 5,200 nm/9,630 km, while the G600's range has been upped to 6,500 nm/12,038 km. Each has a maximum operating Mach number of 0.925.

In addition, **Textron Aviation**'s Citation Longitude made its Asia-Pacific debut with a fully outfitted interior at the Singapore Airshow. As the aircraft was prepping to head to Singapore, Textron Aviation was in the final throes of certification for the model with approval expected "early this year," the company said. The twinjet will be the company's largest to reach market—at least until its large-cabin Hemisphere follows.

In addition, other manufacturers brought their aircraft to the Singapore show for the first time. **Dassault**'s flagship Falcon 8X made its Singapore Airshow debut. Dassault has high hopes for the region. It has already placed one Falcon 8X into service in China and is in negotiations to sell one into Australia.

Dassault is seeing a slow recovery in the business jet slump of the last few years, with both its 7X and 8X selling steadily. The Asia-Pacific region is helping with the recovery, especially as China's economy improves. Not only does China represent 50 percent of the regional market, but it also significantly affects other nations in Asia-Pacific.

Finally, **Honda Aircraft** was in Singapore trying to change the attitude of business jet buyers in the Asia-Pacific region, but especially in China, hoping to convince potential owners that the light HondaJet is an ideal fit.

Interest in business jets in Asia tends to favor large-cabin jets. "We're looking to penetrate this market by introducing a very efficient jet," said Honda Aircraft president and CEO Michimasa Fujino. To that end, Honda Aircraft brought two HondaJets to Singapore, one for display at the Singapore Airshow and another for customer demonstrations.

Honsan General Aviation, a new HondaJet dealer in the region, will take its first HondaJet in the first quarter of 2019. Honda Aircraft expects Chinese CAAC certification in early 2019. ■


Falcon 8X


Gulfstream G500


HondaJet

Citation Longitude

PHOTOS: MARK WAGNER

News Briefs

Even To Lead Airbus Helicopters

Airbus Helicopters has tapped Safran Helicopter Engines chief Bruno Even as its new CEO. Even will replace Guillaume Faury, effective this month. Faury is leaving Airbus Helicopters to run Airbus's commercial aircraft division. Even, 49, ran Safran's helicopter engine division since 2015. Before that, he was CEO of Safran's electronics and defense business, formerly known as Sagem.

Bill Would Alter Foreign Ownership Caps

Rep. Dave Brat (R-Virginia) introduced the Free to Fly Act (H.R.5000), which would reduce the mandatory U.S. ownership requirement for U.S. air carriers, which includes Part 135 charter operators, from 75 percent to 51 percent. The bill further would alter the requirements of the makeup of an air carrier board from two-thirds U.S. citizens to 51 percent. The National Air Transportation Association is reviewing the bill, noting it "would be a significant change in current law and presents some concerns over risks to aviation safety and security." The foreign ownership limitations became an issue for the air charter industry in 2007, when the FAA revoked the Part 135 certificate of AMI Jet Charter dba TAG Aviation USA because Switzerland-based TAG owned 49 percent of AMI.

FlightSafety Begins PC-24 Pilot, Mx Training

FlightSafety International has started Pilatus PC-24 pilot and maintenance training at its Dallas learning center. The Pilatus PC-24 flight simulator at the facility was recently approved for training by EASA, following similar qualification by the FAA in December.

Huerta Becomes Macquarie Advisor

Former FAA administrator Michael Huerta has joined infrastructure financial advisor Macquarie Capital as a senior advisor. The announcement of the appointment came just a few weeks after Huerta's five-year term at the helm of the FAA ended in January. In his new role, he will provide insight on existing transportation initiatives, as well as guidance on new opportunities.

HNA General Aviation To Invest in GA

HNA General Aviation Investment Group in China is outlining plans to broaden its investment in general aviation, including building industrial hubs and general aviation airports in rural provinces in China and expanding training and tourism. HNA estimates general aviation will contribute more than RMB$1 trillion ($150 billion) to the Chinese economy by 2020. It has signed partnerships with local governments in Xinjiang, Anhui, and Gansu, among others, for the development of infrastructure and general aviation resources.

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Full-throttle opinion from former NTSB member John Goglia

MU-2 crash shows challenges of eliminating loss-of-control accidents

The FAA and NTSB have done commendable jobs focusing on the prevention of loss of control in general aviation flights. Both agencies have engaged general aviation alphabet groups and pilots themselves in a sustained effort to decrease GA crashes, in particular fatal crashes caused by loss of control in flight (LOC). According to the NTSB, nearly half of all GA accidents are caused by loss of control in flight. LOC remains the biggest killer in GA accidents, according to the NTSB's data of accidents from 2008 to 2014.

The FAA's data shows similar results regarding the impact of LOC on GA fatalities. In-flight loss of control—mainly stalls—accounts for the largest number of fatal GA accidents. While fatal GA accidents are trending down, there were still 209 fatal accidents in Fiscal Year 2017 that resulted in the deaths of 347 people.

"LOC remains the biggest killer in GA accidents, according to the NTSB's data of accidents from 2008 to 2014."

Part of the FAA's focus on preventing loss of control in flight has been a focus on emphasizing to GA pilots the importance of establishing and maintaining a stabilized approach and landing. In addition, the FAA has emphasized the importance of a go-around if factors for a stabilized approach are not met. These factors are worth repeating:

- *maintain a specified descent rate*
- *maintain a specified airspeed*
- *complete all briefings and checklists*
- *configure aircraft for landing (gear, flaps, etc) be stabilized by 1,000 feet for IMC; 500 feet for VMC, and*
- *ensure only small changes in heading/pitch are necessary to maintain the correct flight path.*

The FAA warns that if these factors are not met, a go-around should be initiated or "you risk landing too high, too fast, out of alignment with the runway centerline, or otherwise being unprepared for landing." In short, you risk losing control of the aircraft.

I'm thinking of all this as I'm reading an accident report prepared by the Transportation Safety Board (TSB) of Canada, the equivalent of the U.S.'s NTSB, on the crash of an N-registered Mitsubishi MU-2B-60 en route to a remote island in the Gulf of St. Lawrence in Quebec, Canada. (*See* **AIN**, *February, page 19.*) The crash garnered a lot of media attention in Canada because a former Canadian cabinet minister was killed in the crash along with four members of his family. The pilot and a "pilot passenger" were also killed.

The pilot held both a U.S. private pilot certificate and a Canadian airline transport pilot certificate. He had fulfilled all special FAA requirements for flying an MU-2 as pilot-in-command. Although the aircraft is certified for single-pilot operations, it was this pilot's practice to fly with an additional pilot referred to as a "pilot passenger." The "pilot passenger" held both U.S. and Canadian commercial pilot certificates with multi-engine IFR ratings.

FDR Yields Useful Data

This accident investigation is notable for a tool available to investigators that is not usually available in general aviation accidents. While there was no flight data recorder (FDR) or cockpit voice recorder—and none were required by law—the aircraft was equipped with a General Aviation Safety Network Wi-Flight FDR system. According to the accident report, "The Wi-Flight GTA02 FDR is based on a smartphone, with extensive software customization options. Although this system was not designed or marketed to meet the requirements of [Canadian aviation regulations], it does record cockpit ambient sound, complete cockpit voice audio from the radio microphones, GPS information, and acceleration data. The system can automatically generate alerts after the flight, when certain parameters of the recorded flight are exceeded by either pilot inputs or unsafe flight conditions." Investigators successfully extracted data from the Wi-Flight system.

Because of this equipment, investigators had a unique insight into what exactly happened in the aircraft in the minutes leading up to the accident. (Under Canada's privacy laws, the cockpit voice recorder data can be used for accident investigations but not released to the public.)

The TSB did find that the pilot's lack of experience in the MU-2B likely had an effect on his inappropriate reaction to the aircraft speed falling within a few knots of the stall speed. But I believe the series of events that led to the crash can be viewed separately from the type of aircraft flown. In other words, I believe that the pilot's decision-making and the failure to do a go-around when the approach became unstable is applicable to pilots of any aircraft. And it is for this reason that I'm writing about this.

This is a summary of the sequence of events minutes before the crash according to the accident report:

- *At 1227:14, the aircraft crossed* DAVAK *on a heading of 114 degrees M [magnetic] at 4,500 feet asl [above sea level]—1,500 feet higher than the published procedure crossing altitude. The aircraft was descending at 1,600 fpm and at an airspeed of 238 knots—about 100 knots above the recommended approach speed of 140 kias. This resulted in the aircraft deviating significantly from the inbound course of 072 degrees and subsequently proceeding on a meandering flight path.*
- *At this point, the pilot's workload had increased significantly. There was no time available during the approach to carry out the approach checklist or the before-landing checklist.*

Individuals tend to continue their original plan of action even when changing circumstances require a new plan.

- *At 1227:36, the airspeed was 226 knots—about 85 knots above the recommended approach speed of 140 kias. The power levers were then reduced to idle, causing the gear warning horn to activate. The pilot then cancelled the gear warning horn.*
- *At about 7 nm from the runway, as the aircraft descended from 3,600 feet asl to 2,800 feet asl, the wind shifted from a southerly wind component to a headwind component of approximately 20 to 25 knots.*
- *At 1228:23, at 5.8 nm from the runway, the aircraft reached about 3,000 feet asl, and the pilot advised the passenger-pilot that, because the aircraft was very high, the rate of descent would have to be increased.*
- *At 1228:45, the pilot indicated he was going to slow down to reach the flap and gear extension speed; otherwise, the aircraft would not be able to land. The pilot also commented that the aircraft was too high.*
- *Almost immediately afterwards, the aircraft crossed* IMOPA*—the final approach waypoint, 4.2 nm from the runway—at 2,200 feet asl, which is 790 feet above the published crossing altitude of 1,410 feet asl. The aircraft was descending at 1,900 fpm, the speed was 188 knots—about 50 knots above the recommended approach speed of 140 kias—and the power levers remained at idle.*
- *At 1229:22, when the aircraft was 2.7 nm from the runway, the airspeed had decreased to 175 knots—35 knots above the recommended approach speed of 140 kias—and the descent rate had been reduced to 1,200 fpm. At this time, the landing gear was lowered and the flaps were set to 5 degrees. The aircraft continued to descend, and the airspeed continued to slow.*
- *At 1229:34, the aircraft was at 1,250 feet asl; six seconds later, it was at 1,000 feet asl. The pilot indicated that the rate of descent had to be further reduced and noted that the aircraft radio altimeter was set at 600 feet agl.*
- *At 1229:58, when the aircraft was 1.6 nm from the runway at approximately 600 feet agl, the passenger-pilot indicated he could see the ground on the right side of the aircraft.*

Although the pilot acknowledged this, he did not indicate that he had visual contact with the runway environment. Four seconds later, the pilot stated that he would continue the approach and fly the aircraft manually.

It was at this point that the pilot disconnected the autopilot, 500 feet above the ground and at an airspeed close to the stall speed of the aircraft. He applied power and the aircraft experienced an upset which the pilot was not able to recover from.

According to the report, during the approach the pilot never discussed the possibility of executing a go-around.

What I would like to leave you with, especially the pilots, are a few questions to consider. Have you ever found yourselves too high, too fast or in an otherwise unstable approach and continued the landing anyway? Do you see any point during these two minutes and 44 seconds when you would have made a different decision than this particular pilot did?

Most of all, I would like to hear your recommendations for how to get pilots to stop this sequence of events. The accident report discusses different cognitive biases that affect pilot decision-making. Plan continuation bias—"the deep-rooted tendency of individuals to continue their original plan of action even when changing circumstances require a new plan"—is one that I have seen as a factor in many accident investigations and I believe is frequently a factor in the decision not to go around even when the approach is clearly unstable. ■

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

John Goglia is a safety consultant.
He welcomes your e-mails at:
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FAA and EASA sign off on Tamarack CJ3/3+ winglets

by Kerry Lynch

Tamarack Aerospace Group obtained U.S. FAA and European Aviation Safety Agency approvals for installation of its Atlas Active Winglets on the Cessna C525B CitationJet series. The approvals for the CJ3 and CJ3+ follow supplemental type certifications for installation of the winglets on the C525, which includes the CitationJet, CJ1, CJ1+, and M2. Tamarack secured the first nod from EASA in late 2015 and from the FAA a year later, but has since been expanding applications and added certifications. Along with the CJ3, certification for the CJ2 is anticipated to follow next month and work has begun on a program for installation on the Citation Excel, among others.

"Regulatory approval of our latest STC amendment for the Citation CJ3 and CJ3+ proves what our existing CJ owners have known since their installs," said Tamarack Aerospace founder and CEO Nick Guida. "Active winglets on the C525, and now on the C525B, dramatically enhance the performance of the aircraft."

Noting that the company flew a CJ3 with active winglets installed from Paris, Texas, to Paris, France, with one stop, Guida added, "With Atlas you can climb faster, fly farther, and burn less fuel." Priced at $289,000 for the CJ3 and $319,000 for the CJ3+, the winglets boost range to 2,100 nm at maximum continuous thrust with IFR reserve, provide a maximum zero fuel weight increase of 400 pounds, enable direct climb to FL450 in 30 minutes or less, increase climb gradients, improve stability, and provide for higher maximum takeoff weight, Tamarack said.

As the company extends its portfolio, it is also expanding its capacity at its Sandpoint, Idaho facility. The expansion enables the company to offer a one-week installation (plus paint time) at the factory.

The Atlas winglets use a built-in load-alleviation device called Tacs (Tamarack Active Camber Surface), along with a wing extension and winglet to improve aerodynamics without the need for structural reinforcement. In addition to the winglets, the installation includes upgraded LED navigation and anti-collision lighting. ■

Innova Aerospace shut its doors in 2017

Innova Aerospace, which created a multi-faceted group of aviation businesses over the past four years through the acquisitions of companies such as Sabreliner Aviation and Sierra Industries, quietly shut its doors late last year, apparently halting all work except for government and military contracts, several industry sources have confirmed.

Multiple calls to Innova at its San Antonio, Texas headquarters were not returned, with a voicemail referring callers to Skyway Aviation Group. But an employee reached at Sabreliner said the military and government work is ongoing.

The privately held firm has not yet filed for bankruptcy. Competing maintenance, repair, and overhaul shops, however, have been hiring affected Innova maintenance technicians and craftsmen, and have even taken on stalled aircraft projects removed from the company's properties, industry sources told **AIN**. Those sources also noted that the company has left numerous vendors unpaid, as it has begun auctioning off its assets.

Innova's operations had spanned from MRO, upgrade, engineering, and a range of other aircraft support and manufacturing services. The group began to assemble with the acquisition of Sabreliner in January 2014 by Innovative Capital Holdings of Naples, Florida. Sabreliner provided support and airframe life-extension programs for aging Sabreliner business jets along with a range of other civil and military fixed- and rotary-wing aircraft.

In 2015, Innova added Uvalde, Texas-based Sierra Industries, which has worked on a number of aircraft upgrade programs and was involved in test-flying Safran's Silvercrest engine. Also joining the growing group that year were Skyway Aviation Group and Composite Helicopters. **K.L.**

MN FBOs score with Super Bowl traffic

by Dale Smith

Super Bowl Sunday dawned cold—3 degrees F (-16 degreesC)—at the airports surrounding Minneapolis, Minnesota. And the area FBOs were ready, not just for the cold, but also for the thousands of business and general aviation aircraft that were scheduled to arrive and depart within a 24-hour window surrounding Super Bowl LII.

As a group, all of the FBOs serving the surrounding airports had everything—including additonal staff and extra deicing equipment—on hand to handle both the super-cold temperatures and the thousands of Super Bowl-ready VIP passengers.

"We had monthly calls with the FAA and weekly meetings with our staff and other FBOs here at Flying Cloud Airport [FCM]," stated Darren Hall, vice president of marketing with Premier Jet Center, one of three service providers at the dedicated GA airport. "We were prepared for everything we could prepare for. We had extra de-icing trucks, snow removal equipment, fuel trucks, tugs, APUs, and a lot of extra staff."

"With highs projected to be in the teens most of the week, the extra staff was critical so we could rotate personnel and no one had to stay too long in the cold," he said. "We had extra service carts to drain the lavatories on the aircraft so they didn't freeze. We also had boxes for the crews to offload any beverages so they didn't freeze inside the airplanes."

Big Game 'Gamble' Pays Off

Bringing on all that extra equipment and personnel for Super Bowl week is really a gamble for area FBOs. It's a huge expense and nobody knows where or how many airplanes are going to arrive for the game or how long they will stay.

At the end of the weekend, nearly 1,700 business and general aviation aircraft, most arriving on Saturday or Sunday and leaving right after the Eagles upset the Patriots Sunday evening, had partaken in the hospitality offered by the various FBOs around Minneapolis.

"We had to put our faith in past experience in other cities and what the NFL was telling us," Hall told **AIN**. "It's a very expensive gamble, but fortunately, it paid off for us this year. We had everything in place to give our visitors a great experience." ■

Premier Jet Center, one of three FBOs at Minneapolis's Flying Cloud Airport, saw just over 400 aircraft movements during the big-game rush, from January 31 through February 6.

The future of ab initio professional flight training

by Amy Laboda

Can we meet the demand, and how?

There are 365 days in a year. If CAE group president for civil aviation training solutions Nick Leontidis's math is correct, he estimates that moving forward the industry must hire 70 new pilots a day to meet staffing needs. That's just to accommodate airlines. The world of corporate aviation and even the military will feel the pinch, too, as airlines compete for every qualified pilot willing and available to fly.

How To Grow a Pilot

It takes roughly two to three years of intensive classroom, simulation, and flight training to grow a fully qualified jet pilot from scratch. The industry has a lot of recruiting, training, and harvesting to do to come up with a couple hundred thousand of those in the next two decades.

When it comes to ab initio (from the beginning) flight training for professional pilots, the landscape is changing, and fast. What was once a simple choice for a fledgling of "shall I learn my skills in an 'academy' or 'mom and pop' (small independent flight school) environment?" now feels more like selecting from a menu of training possibilities. Those options come with a host of fine print that, if not carefully perused, could trip up a promising career from the start. Even more critical, this education comes at significant cost, but that cost can also vary. So, how does one fathom value in flight training?

Someone who wants to be a pilot today has to ask not just, "Where do I train?" but also, "How do I most efficiently learn and perfect the skills I need?" Airline pilot-style training by a flight training academy has often been considered the gold standard because of its inherent standardization and the rigorousness of most programs worldwide, but even the structure and syllabi by which future pilots train and are certified at academies has changed with the times.

In some venues, such as the U.S., the minimum experience requirements for transitioning to the right seat of a commercial airliner or left seat of a corporate jet have changed. Elsewhere, new ICAO and EASA ratings make it a quicker ride to the right seat, while new airline transport pilot (ATP) regulations in the U.S. are credited with creating taller hurdles for pilots to jump over, slowing the process significantly.

Only one aspect of professional flight training remains the same: it is still expensive to learn to fly and gather enough flight experience to qualify for a first officer position on a corporate jet or for an airline anywhere in the world. And more now than ever, that cost burden is borne by the student and his or her family. That too, however, may be changing.

The Way It Was

Before 2012, how you started a career as a professional pilot was a matter of choosing how you wanted to spend your money, if you had any money to spend. You could just go out to your local airport flight training facility, most likely operating under Part 61 of the FAA regulations, and start your

training, accumulating the private, instrument, and commercial ratings as rapidly as you could afford. There was always the chance you could earn employment on the airport grounds to help you finance the endeavor, and many flight schools hire those they train as dispatchers, ground school instructors, and flight instructors.

If speed-to-first-job was your goal, you might enroll in a Part 141 academy-type program that could get you to a commercial certificate in only 190 hours of flight experience (the Part 61 program takes 250 hours). Veterans with benefits gravitated to Part 141 programs, but financing was often a stumbling block for the average candidate, who needed to come up with a lump sum to begin training, and several more lumps of cash to keep going to graduation.

A less speedy—but smart—pathway choice was to enroll in a college or university flight program. A college degree could come in handy at some point, perhaps even spawning an alternative career. Many wannabe pilots focused on degrees in airport management or meteorology or even aviation maintenance management or manufacturing, engineering, and design. The thought was that if they couldn't find a flying job after college, at least they could stay in aviation. Often enrolling in a university program opened up alternative methods of funding, including government loans and scholarships.

And if you had no money at all to spend on learning to fly? There was always the military. The Air Force, Marines, Army, Navy, and Coast Guard—yes, even the National Oceanic and Atmospheric Administration trains its own pilots. Ranging further afield, the U.S. Forest Service, Drug Enforcement Administration and local police have also been known to "grow" their own pilots, and potential for flying turbine-powered aircraft exists in every one of these public-service and defense divisions.

No matter which path you took, with a commercial certificate and some persistence, you could get a job flying, usually flying skydivers, pipeline patrol, towing banners along the beachfront, or once having logged enough flight time, flying charter aircraft for your FBO or a private owner or hauling documents for banks or cargo at night. At that point, you probably had amassed a few hundred hours, perhaps just over 1,000, of flight experience, and maybe, if you were flush with cash, a multiengine rating. Many commercial pilots earned a flight instructor rating next, because teaching can be one of the quickest ways to earn a living flying and amass more flight experience at the same time. It is not, however, one of the easiest ways to rack up flight hours.

Many, though, were hired into the right seat of commuter airlines and freight haulers, because back then they could hire freshly licensed commercial pilots as first officers. Some pilots were also hired onto the right seat of private corporate aircraft, and a few lucky, well-connected individuals actually made it onto an airline flight deck with just a commercial certificate, multiengine rating, and a few hundred hours of flight experience.

A few airlines handpicked "cadets" right out of year 12 of secondary school, mostly in Europe, India, and Asia, and hired them, trained them, and put them on the flight deck. And every now and again a corporate flight department or government/public service entity would choose a worthy employee with the desire to fly and train them. (Boeing takes engineers and makes them into test pilots, for example; many police and the forestry service also train their own).

Contrary to what many believe, airline ab initio programs dwindled to a few by the 2000s, when the unit seat-mile profit margins narrowed precipitously, and one after another, airlines used bankruptcy as a means to restructure and satisfy stockholders' demands for profit.

The Law of Unintended Consequences

The series of events that set our current pilot shortage into motion goes back to nearly the turn of the century. In 2001,

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If Not Now, When? Aviation Industry Forecast for Pilots

Boeing says we need nearly 250,000 more professional pilots just to fill airline cockpits by 2036. Flight training giant CAE's first-ever forecast at last summer's Paris Air Show concurs.

Yet the U.S. Bureau of Labor Statistics (BLS) currently shows the need for pilots in the U.S. growing by only 4 percent by 2026. David Ison, president of the University Aviation Association (UAA), chuckled upon hearing that. "I think there is an important distinction between replacing pilots and growth. North America is not the large growth area for pilots or for airlines. That major growth is outside the U.S.," he explained. "We are, however, seeing a replacement pilot shortage now in the U.S."

Nick Leontidis, CAE group president for civil aviation training solutions, told **AIN**, "Boeing and Airbus project delivering 1,600 aircraft a year, and most of those are supporting growth in the industry. Large portions of these aircraft are going to economically emerging countries. The U.S. has constraints: JetBlue's Gateway program, for instance, has a minimum three-year training cycle to get someone in the right seat from the day they decide to hire them."

UAA's Ison said that one major issue with university flight training (programs that are aligned with some early-hire and tuition reimbursement plans in place at various airlines) is staffing flight instructors. "The big topic of discussion at UAA is CFI retention. We can't keep them long enough and can't fill the slots they leave behind. Embry-Riddle, where I work, is immersed in aviation, and I don't think it pulled back much during the downturn, but even it is having trouble keeping up with today's demand for flight training."

Jon Hay, CEO of Hillsboro Aero Academy, pointed out that the regional airlines' desire to abolish or lower the 1,500-hour rule would exacerbate the CFI problem. "Lowering that number lowers the experience of those who are doing the training—and a few years down the line, safety will be compromised. CFIs become very valuable in the 800- to 1,200-hour range because they have great experience by then, and we need them at that point training our next group up," Hay told **AIN**. Everyone interviewed for this story praised those U.S. airlines that sponsor some sort of training, including SkyWest, Horizon, PSA Airlines, and JetBlue, among others.

John Bingham, CEO and president of Phoenix East Aviation, a 45-year-old flight school that has seen double-digit growth in its student population over the course of just one year, said, "I think we are in the Rip Van Winkle awaking from his sleep phase in what is a cyclical industry. We are beginning to pull new students in because of the demand for pilots alone. Our job is helping them accomplish their dream, because being a professional pilot is a great career." **A.L.**

Professional Aviators Are a Diverse Lot

Here's a contrarian view: I maintain that on a worldwide basis we do not have a diversity problem in aviation. In the roughly 100 years that we've been flying for hire, there have been male, female, and transgender pilots; pilots of European descent; pilots of African descent; Indian pilots; Asian pilots; and pretty much everyone in between. The problem has been that in North America and Europe, the pilots you mostly see on an airline flight deck are male and generally of European ancestry.

Robin Glover Faure, acting president of L3 CTS, said, "To meet growth goals we have to look at a way to appeal to a more diverse and broader group of people to convince them to become pilots." According to Faure, women pilots make up just 6 to 7 percent of pilots in the UK. "Our goal would be to see that at 20 to 30 percent and on to ideally 50 percent one day," he continued.

Data from FAA and EASA indicate gender issues are beginning to resolve. The number of women earning their ATP and MCC/MPL certificates has doubled in recent years, and FAA statistics for female student and commercial pilots shows ripples of change coming. It helps that airlines such as Ryanair in Europe and corporate jet charter companies such as Desert Jet, PlaneSense, and XOJet, among others, are being proactive about using mass media to encourage women and minorities within North America and Europe to become professional pilots. Organizations such as NBAA, AOPA, WCA, EAA, WAI, and IAWA all actively promote pilot careers to young girls, their parents, and to women all over the world through outreach events and organizational chapters. That's what it will take to recruit the next round of professional pilots to the industry. **A.L.**

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after the World Trade Center disaster, it became suddenly difficult for anyone who was not a U.S. citizen to learn to fly in the U.S. That caused a major contraction of the flight training industry in the country, which had until then trained some 80 percent of the world's pilots. Subsequent economic woes stifled any recovery.

"Many programs shrank, paring down aircraft and infrastructure after 2001 and the recessions that followed," said David Ison, president of the University Aviation Association (UAA) as well as research chair and associate professor of aeronautics at Embry-Riddle Aeronautical University Worldwide.

The Colgan Air crash eight years later changed the entire system by which pilots had progressed to the right seat of a Part 121 operation. A substandard captain (who had failed numerous airline check rides over time) and an exhausted copilot made a fatal mistake on approach into Buffalo, New York, and crashed. Angry families unhappy after the NTSB investigation pushed the U.S. Congress to act. The legislative body drafted and passed Public Law 216-111 in 2010, mandating that all Part 121 airline pilots possess an ATP. The rule increased the training requirements for an ATP as well (these requirements increased the cost of that training, too). There were exceptions honed into the rule for pilots trained by a narrow list of university programs, and for pilots trained by the military, allowing them to earn an ATP with significantly less total flight time, but the age of 250-hour pilots in the right seat of airlines in the U.S. was over.

Some airlines moved first officers out of the cockpit, and even rescinded employment offers. Other small airlines took seats out of their airplanes to be able to continue with the employees they had. Within a year of full implementation of the rule (2013-14), most regional airline executives in the U.S. were screaming that they had to cancel routes because there were no qualified crews to fly the airplanes.

Cost vs. Benefits and the Anatomy of a Shortage

Meanwhile, regional airline pilots were pointing out to anyone who would listen that the real reason that regional airlines had no one to hire had little to do with finding qualified pilots and everything to do with finding pilots holding ATP certificates who were willing to work for peanuts. Regional airline pay scales were notoriously low, with some new first officers pulling down less than $20,000 a year. The pilots wanted pay scales revolutionized. "If you pay them, they will come," became their mantra.

It was a valid and compelling argument. At that point corporate pilots holding ATPs were not abandoning their cockpits to become airline pilots. Why? Most of them made more money than what the regional airlines were offering (some corporate captains made as much as major airline captains, with similar work rules).

The largest regional-airline holding company, Republic Airlines, went bankrupt—or if you prefer—restructured itself (it was profitable at the time). In the third quarter of 2015 the company lost 60 pilots per month while hiring 20. The word was out. "Airline pilot" acquired the kind of stigma that plagues "family physician" as a career: costs a lot to train and the amortization tables for recouping that expense are long. That's a lot of sacrifice asked, even if the "office" has stupendous views.

The education payback cost was particularly painful for those pilots who went into debt to finance their training. Cost estimates for ab initio to first officer position vary from a low of $50,000 (€40,500) to upwards of $150,000 (€122,000) depending on the type and intensity of training. The Part 61 flight school is not always the least expensive program, given that students tracing this training path must acquire 1,500 flight hours of experience separated into various buckets before applying for an ATP program, which itself can cost more than $20,000 (€16,300).

"Cost is a very hard obstacle," said Robin Glover Faure, acting president of L3 CTS, a large multinational flight-training conglomerate that entered the primary flight training business by purchasing several large flight schools in Europe, New Zealand, and the U.S. in recent years. "I believe the airlines will fund this training only when there is no other route. Until that happens, self-funding of flight training is reality."

Sleeping Giants Awaken

While regulation and low pay issues stifled pilot population growth in the U.S., the more than one billion people in China and another billion in India woke up to the concept of air travel and began to embrace it. Airlines popped up seemingly overnight, business jet charter companies leased aircraft for thousands of nouveau riche, and they all needed staffing. A senior official at the Civil Aviation Administration of China (CAAC) told **AIN** last year that China needs more pilots every month. Studies show that in the next five years the carriers there alone need 2,800 to 3,000 pilots per year. There are only 12 flying schools across China pumping out 1,500 to 1,650 new pilots a year, so, at best guess, more than two-thirds of Chinese airlines send their cadet pilots to Europe, Australia, New Zealand, or the U.S. for training.

This shortage has been acute for a decade now. To address it in early 2007 the airlines petitioned the Chinese government and received permission to hire foreign pilots. Since then, some carriers have enticed expatriate pilots worldwide by offering high salaries and generous benefits. Still, the Chinese airlines struggle to keep cockpits staffed.

The airlines of India and Malaysia would also prefer to staff their cockpits with native pilots, and have embraced academy-style flight training within the countries to fulfill those needs, but for the time being, they too are hiring expatriate senior pilots on contract while homegrown pilots come online.

Addressing the Issue: Today's Training for International Jet Pilots

Students who are training in airline academy programs following EASA or ICAO prescriptions for about a decade now can opt for a multi-crew or multipilot certification (MCC or MPL, depending on the jurisdiction). This training follows a significantly different path from those plying the route to a traditional ATP.

These students are tracked from day one into sophisticated flight training devices and high-level simulators modeled on the Airbus 320 or Boeing 737. They learn how to fly those aircraft as part of a crew, and never get a single-engine airplane rating or even an instrument rating. At the end of their training, after just 250 hours or so, each is required to fly an actual airplane to a landing (similar to requirements for an

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ATP jet type rating), but once that has been demonstrated successfully to an examiner, they are considered ready to fly as first officer by a growing number of international airlines that accept the MCC/MPL certificate.

Like who? Flybe, Ryanair, and a plethora of Asian airlines are hiring pilots that possess the MCC/MPL certificate.

"Our best estimates are that today, there are 1,000 MPL certified pilots," said Leontidis. "Air Asia now has captains who have risen through this program," he told **AIN**, explaining, "We think there is a lot of merit to these programs. Airlines are telling us that they find less need for line conversion training and remedial training with MPL pilots."

The MCC/MPL is efficient at teaching exactly the skills the airline wants taught, without cluttering a trainee's brain with information about airplanes he won't fly; and it is the quicker route to the right seat. Leontidis said that most of CAE's more than 1,000 ab intio academy pilot graduates around the world are both recruited and funded by airlines.

On the other hand, L3 CTS, which branched into ab intio training when it purchased CTS in the UK and Aerosim in the U.S. in 2016, told **AIN** that most of its students are self-funded.

"EasyJet might identify 75 of our academy trainees in the UK who it feels are suitable for its flight deck," explained Faure. "The company will give those pilots a letter of intent, but the candidates have to self-fund and get through the course successfully. Then they have a high likelihood that EasyJet will hire them."

Faure believes that the cost of training is holding the industry back today. "Once you extend funding opportunities to anyone you open up being a pilot to a wider population, meaning you get much higher quality pilot candidates," he said.

Back in the USA the Game Is Changing

For the foreseeable future in the U.S., it will take at least proof of qualifications for an ATP certificate to get you flying in the left seat of a corporate jet or the right seat of a Part 121 airline. Any pilot training program that has aligned itself with one of several regional airline pre-hire/tuition reimbursement programs is currently busting at the seams with trainees. Equipment is being acquired and upgraded (most with modern digital instrumentation). ATP Flight School, for example, responded to the uptick in demand for pilots by updating and increasing its fleet of aircraft to 170 Piper singles and twins and some Cessnas at 40 locations around the U.S.

"We graduate 60 pilots a month from our Airline Career Pilot program," said Danielle Calnin, ATP director of airline business development. ATP focuses primarily on the domestic pilot market, with only 2 percent of its 1,000-plus students hailing from outside the U.S. After graduating from the school's Airline Career Pilot program, pilots receive a guaranteed CFI job at an ATP school, where they can earn as much as $42,000 annually (this includes airline tuition reimbursement). "When pilots have between 300 and 500 hours' total time, they interview with an airline participating in tuition reimbursement. If the airline makes an offer of employment, and the pilot accepts, the airline will begin making a financial contribution toward the pilot's monthly loan payments. Once pilots meet the Airline Transport Pilot hiring minimums, they begin working for the airline. Pilots at ATP train from zero flight time to airline new-hire in as little as 27 months, Calnin told **AIN**. The school offers full financing for students through Sallie Mae and Wells Fargo. "The lenders recognize that these applicants are able to consistently gain successful airline employment through ATP and fulfill their loan obligations," she said.

Some companies, such as Hillsboro Aero Academy in Hillsboro, Oregon, and Embry-Riddle are updating their piston trainers with diesel-driven (and less expensive jet-A consuming) versions. Other longstanding ab intio programs are expanding their flight simulation offerings with Redbird, Frasca, and other ground trainers and upgrading their fleets, but they too are under pressure to staff up with instructors. Every one of them told **AIN** they are aggressively hiring CFIs and complained that those they do hire often don't stick around for long.

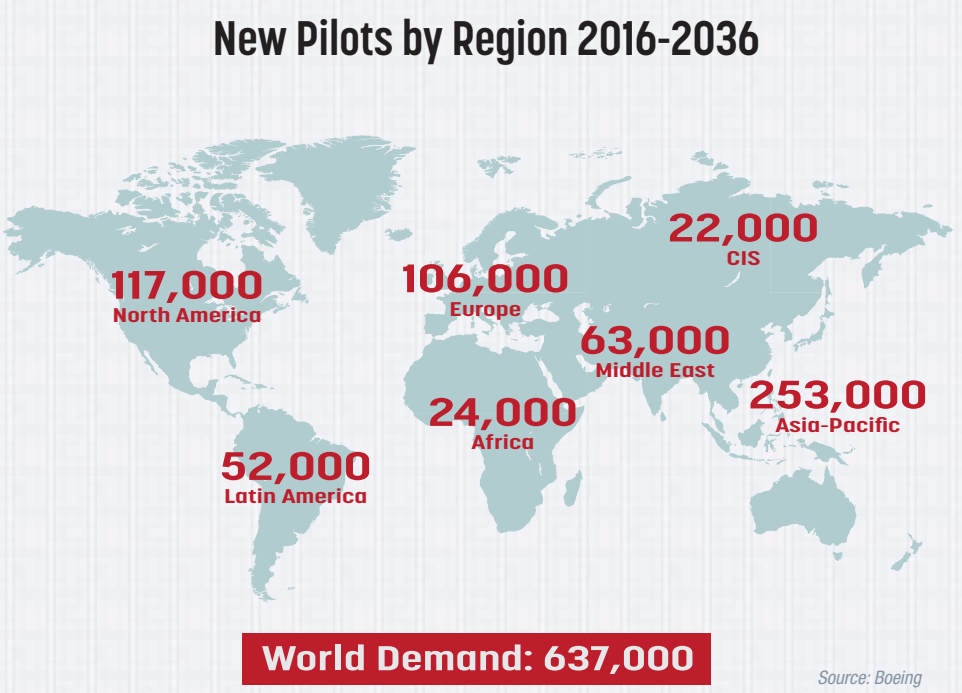
"We are absorbing large groups of incoming students each month who are finding us without advertising," said Jon Hay, president and CEO of 38-year-old Hillsboro Aero Academy in Oregon. "Our challenges are finding enough CFIs, housing students, and upgrading our facilities and fleet. About a year ago we started offering salaried positions with benefits such as health insurance for instructors."

John Bingham, president of Phoenix East Aviation (PEA) addressed the problem by becoming a specialist at obtaining F-visas for his foreign students so that they can stay on and work as CFIs for PEA as part of their time-building regime.

And as for the attractiveness of that first airline job, it was a good thing the regional airline pilots kept squawking. Eventually the market heard. "Starting wages are up more than double in the last three years at the regional airlines," Bingham told **AIN.** "Our guys now join commuter airlines with salary and bonus packages totaling as much as $59,000 per year."

Tuition assistance during training in the U.S. may become the norm, as well. While very few major airlines are onboard (JetBlue being one of them), several large regional carriers with flow-through agreements to major U.S. airlines, including Horizon, Skywest, and PSA Airlines, have developed programs for reimbursing trainee pilots who commit to a work contract with them. Incoming pilot classes at the airlines are beginning to fill with pre-qualified candidates as a result.

What does that mean for business aviation? For the moment supply and demand are balanced, but now that the airlines are upping the ante? Only time and the rising tide will tell. ■



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Maine airport goes green on recycled deicing fluid

by Curt Epstein

Maine's Portland International Jetport (PWM) this winter became the first airport in the U.S. to use 100 percent recycled Type I deicing fluid to meet its cold-weather operational needs.

With its location in the far Northeast, the airport is no stranger to harsh conditions, and the genesis of this environmentally friendly approach was in 2008 as the authorities were planning a $75 million development project, which included expansion of the terminal, a new parking garage and runway work. As part of the funding requirements, the airport was required to analyze how it would dispose of used deicing fluid going forward.

At some airports, the propylene glycol-based solution has been released directly into nearby large bodies of water or the local sanitary sewer system for treatment, if the system can handle it. The non-toxic fluid is the same used in winterizing RVs and watercraft, but it does have its drawbacks. Because it depletes oxygen "if you put a large amount in a small waterway, it would use up all the oxygen that would otherwise be used by fish and other organisms," said airport director Paul Bradbury.

Another option is diverting the waste effluent into large holding ponds, where it is aerated until it breaks down enough to be safe to release either into the sewer system or directly into waterways. Such ponds can take up valuable real estate, an option that wasn't available to land-constrained PWM, according to Bradbury. Instead, the airport looked for industry solutions and found a Canadian firm named Inland Technologies International, which had concentrator technology that employs mechanical vapor recompression to take the used effluent, which was typically between 2 and 10 percent glycol, and "boil" it down to a 50 percent solution that could then have some value to industry.

The airport built a central deicing pad with trench drains that would carry the waste fluids to 500,000-gallon underground cisterns. "We issued a competitive RFP for a deicing fluid processing vendor as part of this development program. Inland was selected through this competitive process and ultimately commenced operations in 2010," Bradbury noted.

Inland then installed near the pad a facility consisting of several glycol concentrators and a two-stage reverse osmosis membrane system that would consolidate the effluent to a 50 percent solution and eliminate ramp contaminants such as dirt and oil. Initial plans called for the company and the airport to simply sell that to other industries, but Inland later applied its distillation unit, originally used for recycling ethylene glycol, which is used for deicing in Canada, to handle the propylene glycol. Demonstrated at the Portland facility, it allowed the company to refine the concentrated glycol even further, yielding end-stream Type I deicing fluid, as well as lavatory antifreeze.

Waste Fluid In, Deicing Fluid Out

In 2016, Inland unveiled a $2 million expansion to its facility, enabling it to operate year-round and maintain a steady output of the products. Roger Langille, president and chief executive officer of the Inland Group of Companies, has been involved with the project since inception. "The partnership we have with Portland Jetport is one we are extremely proud of," he said. "The model is based on open communications with the goal of understanding and meeting the environmental and operating needs of the airport and the region."

In addition to collecting the waste fluid from PWM, Inland retrieves it in varying concentrations from 20 airports, as far away as Newark Liberty and Washington-Dulles, where it also operates a consolidation facility. The glycol mixtures are then either sold locally to industry or trucked to Portland for further processing. Inland is agnostic when it comes to sourcing propylene glycol, collecting it from a local brewery, which uses it in part of the brewing process, and even from the heating plant of an office complex across from the airport.

In all, Inland has processed more than six million gallons of fluid since it began operations at PWM. Bradbury explained that the effluent is drawn from the massive holding tanks at a measured pace to ensure a continual flow throughout the year. The goal is for the tanks to be drawn down by November and the start of the deicing season. This winter is the first the airport has relied solely on the recycled fluid, made from last year's waste. The facility can now produce approximately 10,000 gallons of pure glycol a week and can blend up to 50,000 gallons a day of Type I ADF in case of extended storms. The site, the first of its kind in the country, is certified to produce SafeTemp Type I ADF, as well as aircraft lavatory antifreeze. The newly remanufactured ADF is stored in tanks near the deicing pad, to fill the fleet of deicers operated by Northeast Air, one of two FBOs on the field.

"What we use does vary by event because temperature determines the concentrate that we're spraying," Bradbury told **AIN**. "Your normal deicing fluid is roughly an 80 percent pure propylene product and then it might be cut 50/50 again with water depending on the temperature of the snow event."

NORTHEAST AIR

Inland's facility at PWM can distill approximately 10,000 gallons of pure glycol a week and can blend up to 50,000 gallons a day of Type I ADF in case of extended storms. Portland International Jetport is the first airport in the U.S. to rely solely on recycled deicing fluid.

Future at Other Airports

Other customers for the recycled fluid are New York's Westchester County Airport and Boston Logan.

Bradbury noted his airport has a 10-year agreement in place with Inland to provide environmental services, and gets a portion of the revenues generated. He predicts the company will eventually open another processing plant at a more southerly airport, allowing the two locations to divide the Northeast and Mid-Atlantic regions.

For PWM, which sees approximately 70,000 operations a year, and last year handled nearly two million passengers, the partnership with Inland is just part of its environmental consciousness. Its new terminal, which opened in 2012, was one of the first in the country to achieve Leadership in Energy and Environmental Design (LEED) Gold Status. "Certainly it's pushed our green or sustainable side of the Portland International Jetport," said Bradbury. "I know our passengers appreciate that, and so do the people in the region." ■

Mary Mahoney 1943-2018

Production director left lasting mark on AIN

Former production director Mary Mahoney, who died on February 13 after a short illness, made a monumental contribution to the success of AIN Publications in a career with the company spanning 35 years. Four years after her retirement in 2014, many of the production processes she shaped are still the foundation of the company's operations.

She trained and inspired many members of the team that produces Aviation International News, Business Jet Traveler, and **AIN**'s stable of airshow and convention publications, plus its many digital editions. Her grasp of **AIN**'s increasingly complex portfolio was unrivaled and she worked long hours to ensure that demanding deadlines and exacting editorial standards were met in equal measure.

On a more personal level, Mary was an immensely popular figure with colleagues—a big personality whose sometimes forceful manner belied a deeply caring and supportive relationship with colleagues. While she took her responsibilities very seriously, she rarely took herself all that seriously and would readily laugh heartily at herself and with colleagues.

Born in Brooklyn in 1943, Mary spent most of her childhood in the Long Island suburbs but lived most of her adult life in her spiritual home, Manhattan. After college in Philadelphia, she briefly tried teaching, before taking her first steps in publishing. **AIN** co-founder Jim Holahan hired her in the late 1970s and there she stayed for the rest of her career, apart from a two-year sabbatical from 1981 to 1983. It proved to be her true calling.

With the expansion of **AIN**'s show daily publications came Mary's opportunity to see the world. She was soon a key figure in the **AIN** traveling circus, at home at airshow sites on four continents. The rigors of producing daily newspapers in makeshift airfield offices were an ideal challenge for Mary's organizational skills, resourcefulness and dogged determination. Industry visitors to **AIN**'s press rooms at shows would often ask, "How on earth do you guys get these issues out?" Mary Mahoney was a big part of the answer to that question.

In more than three decades on the road with the **AIN** team, she dealt with all manner of setbacks that could have stopped the next day's edition from appearing. Adopting a "failure is not an option" mentality that would have fit right in at NASA, Mary would move heaven and earth to circumvent any obstacle to getting the news out. Woe betide any rule-bound functionary who got in her way.

Many of my happiest memories of time spent with Mary were on the road. Once we got locked in Geneva's Palexpo convention center after midnight and spent several hours finding an escape.

At times, Mary's dogged determination threatened to get the better of her. In France for the airshow at Le Bourget her impatience to keep things moving could put her in conflict with the locals, with the convergence of a willful Irish New Yorker and prideful Parisians proving to be the embodiment of a rock meeting a hard place.

One time after a forceful meeting of the minds between Mary and the show organizers, she slunk sheepishly back to our press room. "What's wrong, Mary?" I asked. "I might have got a bit too Irish, Charlie," she confessed. "Do I need to go and make nice?" I asked. "I think you better had do," she replied. So, I slunk off to the organizers' office to discretely determine the extent of the diplomatic havoc that might have been wreaked by her most recent interaction with our hosts. It soon became apparent that any rancor had been entirely theatrical and that, on the contrary, the locals had been amused and charmed by Mary's bulldog spirit. "Oh no, monsieur, *tout va bien*, we love Mary," they assured me.

They were not alone in that sentiment. Mary was much loved by many colleagues and industry associates who had the privilege of working with her. She made an indelible mark on **AIN** and will live long in our memories.

Charles Alcock,
former editor-in-chief, AIN Publications

When I first came to work at the editorial offices of **AIN** in the early 1990s, there were two fighting Irish spirits that fed the engine of the publication. On the surface was the larger-than-life Jim Holahan, the World War II-era fighter pilot from Jersey City with a burning passion for business aviation—and how to tell its story in a dedicated news magazine.

But smoldering under the surface was Mary Mahoney. A full five-foot-four bundle of New York energy, she powered the production side of the magazine. It's not the visible part that readers see in the monthly, airshow, and electronic publications of today, but without that structure and strength, no publishing entity can last for very long before running out of steam.

Mary never sought the limelight, never won journalism awards or gave speeches. Nor would she have wanted to. Her dedication was to the staff she directed—sometimes with an iron fist; sometimes with a smirk and a laugh—and to the simple passion for "getting it done" no matter what the obstacle.

Sometimes, the most challenging hurdle was Jim, himself. When he pushed to squeeze in that last story for the Paris Air Show, Mary was the one who had to explain to the printer that the final page would be there "soon." And when she finally had to put her foot down at the second, third, or fourth passing of the deadline, sparks could fly.

But there was a deep and abiding love and respect between the two of them, And it extended to the **AIN** persona—what we today call its "brand"—and all the hard-working dedicated people who made up the staff, with all our quirks, foibles, weaknesses, and insecurities. She loved us all, and we loved her right back, even when we were battling through anger, frustration, or just plain fatigue in the wee hours of the morning.

We all miss you already, Mary Mahoney. You were one of a kind.

The best.

Mark Phelps
executive editor, AIN Publications ■

From the Managing Director

Only a few people contributed from the very beginning to the success of what is today AIN Publications. One of them is Mary Mahoney, who died last month, only a few years into her retirement from the company. Mary spent 35 years here—nearly her entire career—which made her the second-longest-tenured person in our organization. She worked at AIN even longer than the late Jim Holahan, our founding editor and my partner for 28 years.

KIRBY J. HARRISON

Mary was one of a kind, both professionally and personally. She had the highest standards of anyone I've ever met, and she would not budge from those standards. That made her a challenge to work with from time to time. But it didn't take us long to see that Mary's heart and head were always in the right place. Yes, she sometimes butted heads with writers, editors, and designers—and me—but only because she cared deeply about the quality of what we do.

We are all so sorry that this fine lady has departed our world so soon. We take some comfort in knowing that she loved journalism and had many happy years at **AIN**. And we will always be grateful for the immeasurably large role she played in shaping the publications we produce. **W.S.L.**

Fly-in, fly-out model proves a boon for Alliance Airlines

by Peter Shaw-Smith

Australia's "Fly-In-Fly-Out" (FIFO) market has come into its own in the past decade. The business plan allows workers in its huge mining industry to make their permanent homes in existing population centers, rather than incurring the cost of creating new communities adjacent to where the mineral assets are found. Brisbane-based Alliance Airlines has capitalized on the opportunity.

Each month, thousands of Australians fly from Perth up to the Pilbara region, in Western Australia's remote north, to work shift-weeks in mining and energy. The country is the number-one global exporter of iron ore, bauxite, lithium, rutile, and zircon, according to Geoscience Australia. In 2016, the nation exported approximately 800 million tonnes of iron ore, around 80 percent of it to China, while Australia could soon become the biggest exporter of liquefied natural gas. Coal is a big part of the mining story in the east of Australia.

To serve the resources industry, Alliance Airlines operates extensive flights around Australia, as well as New Zealand, but especially in Western Australia, using a "single OEM" model. Today, it claims to be the world's largest operator of Fokker aircraft.

Although Alliance does not specify who its clients are, it charters several flights to Australian mining companies, represented by the likes of BHP Billiton and Rio Tinto, as well as many smaller players. The company claims to be "Australia's major [FIFO] air charter operator and the largest supplier of ad hoc air charters for the Australian resources industry," and it credits the Fokker fleet for "being able to access smaller airstrips that are typical of many mine sites."

Operating 32 Fokker aircraft, Alliance has five F50 twin turboprops and eight F70 and 19 F100 jets. Following an earlier transaction for three of its Fokkers, in November 2015, Alliance announced an A$15 million (US$10.9 million at the time) transaction with Austrian Airlines, taking its entire Fokker fleet of 21 aircraft.

The last Fokker was built in 1999, and Schofield pointed out an obvious question he apparently hears regularly. "'Your fleet's not getting any younger. What are you doing about that?'

"Aircraft age is only partly determined by calendar age. We are only a third of the way through our usable life, on average. On our younger fleet, we get 8,000 cycles... [or] between 1,000 and 1,200 hours per year per airframe. At that rate of utilization, we are not going to be operating them for another 45 years. We hope to continue with low capital costs and relatively low maintenance costs."

Schofield does not rule out eventually moving the single-OEM model to another manufacturer.

Two aircraft are to be converted for VIP operations, an F100 and an F70. "With a 24-seat configuration, it will be a great product we can offer and also fill in the niche in the VIP charter segment," he said.

In addition to flying the resources industry workers, Alliance provides capacity to other airlines; and related services, such as selling spare parts, leasing, and aircraft trading. It also manages three airports—Moomba, Balera and Cape Preston—on behalf of the mining companies. ■

JetNet: seller's market for used bizjets

The preowned business jet market transitioned to a seller's market in December, with inventory now at 9.9 percent, just below the 10 percent threshold of inventory for sale and down from 11 percent in December 2016, according to data released last month by JetNet. Inventory of preowned business jets has decreased steadily from a high point of 2,938 aircraft in July 2009, or 17.7 percent of the in-service fleet, to 2,143 jets in December.

"A period of transition is now in play, wherein the pendulum swings [from] in favor of the buyer to the seller," the business aviation data firm said. "The pristine used jets that were on the market a few years ago have become more challenging to locate. The sage advice for buyers is to act now. The counsel of 'just wait a few months—the price will come down' may not present itself as we break into the seller's market environment."

According to JetNet, there were 2,668 more business jet transactions last year, an increase of 177, or 7.1 percent, over 2016. Preowned transactions were boosted last year by large-cabin jet deals, which accounted for 37 percent, or 992, of the total transactions; this was up 17.3 percent from 2016. Sales of preowned light jets also surged 8.2 percent last year, to 952 transactions. Meanwhile, preowned midsize jet sales slumped 4.9 percent, falling from 630 in 2016 to 599 last year.

"The recovery in business aviation during the post-recession period has been underwhelming," JetNet said. "Now that 2018 is here, we hope the U.S. preowned market...will continue to push more new aircraft purchases." **C.T.**

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GABRIEL WIDYNA

Aviation industry making progress on takeoff and landing performance analysis

by Pete Combs

It was frigid and snowing heavily at Chicago's Midway Airport on Dec. 8, 2005. Runway 13C was out of action with a runway visual range (RVR) of just 4,500 feet—below minimums. So, like other flights before it, Southwest Flight 1248 made its approach to Runway 31C, despite an 11-knot tailwind. The aircraft touched down normally, but the crew did not initiate reverse thrust until 18 seconds later, with just 1,000 feet of runway left, according to the cockpit data recorder

SWA 1248 didn't stop. Instead, it ran off the departure end of the runway, through a fence and onto Central Avenue just south of 55th Street, striking two cars. Inside one of them, six-year-old Joshua Woods was killed. A dozen people were hurt.

That accident, in which a slippery runway figured prominently, was the genesis of the TALPA initiative—for takeoff and landing performance assessment—as an effort to stem the growing problem of runway excursions.

FAA Demands Action

As a result of the 2005 overrun at Midway, the FAA issued Safety Alert for Operators (SAFO) 06012, urgently recommending operators of turbojet airplanes develop procedures for flight crews to assess landing performance based on conditions actually existing at the time of arrival, as distinct from conditions presumed at the time of dispatch.

"They wrote that SAFO and expected everybody to follow it," said Chet Collett, director of flight operations engineering at Alaska Airlines. "And all the airlines said, 'There's no way we can comply with that SAFO. The data is just not there.'"

So the FAA called a summit of aircraft operators in July 2006. Collett was there, as were his counterparts from several other airlines. Collett said an FAA safety inspector told the assembly that any time braking action on a particular runway was reported as "less than good," arriving pilots were to perform a pre-landing assessment.

"And I raised my hand," said Collett. "I asked, 'How is a pilot going to know that the braking action is less than good when the current ATC regulations say that braking action advisories don't go into effect until braking action is reported as less than fair?'"

The room became silent, Collett said. The first day of the summit adjourned without resolution.

The Cocker Spaniel Test

Assessing the condition of a runway covered with water, snow, slush, or ice has been a difficult issue for airport operators ever since the first runways were built. Braking action reports from pilots were considered subjective, depending on the pilot's skill, as well as the aircraft type, weight, landing speed, and a host of other factors. Airport operators initially had few choices when it came to figuring out how to tell arriving pilots what to expect when they touched down on the runway surface.

One was unique in its innovation—if not questionable in its treatment of animals. "The ARC's Airport Working Group called it the cocker spaniel test," said Collett. The idea: the airport operator would jump into the cab of a truck, put a dog in the passenger seat, drive down the runway, then hit the brakes.

"If the dog remained on the seat, braking action was poor to nil," Collett said. "If the dog stumbled, but remained on the seat, braking action was deemed fair. If the cocker spaniel fell onto the floor, then braking action was pretty good."

Perhaps not the most scientific method.

Eventually, braking action was reported in terms of "Mu" value—the co-efficient of friction between the runway and an aircraft's tire. The aviation industry developed Mu meters, small trailers that could be attached to airport vehicles and driven down the runway to objectively measure braking ability.

But FAA officials frequently pointed out the lack of direct correlation between Mu values and airplane runway performance.

"That was the FAA's biggest argument," Collett recalled. The agency insisted there is "no direct correlation between Mu that is measured by a Mu meter and the airplane's performance on a runway."

Another issue was the difference between the various Mu meters themselves. "If they're not traceable to a single standard," said Rich Boll, a member of the NBAA Access Committee, which has developed an extensive presentation on TALPA, "then they can yield different results. For example, one machine might read a certain Mu value whereas another machine running right next to it on the same runway provides a different value."

In the end, the FAA and industry experts agreed that Mu values do still have a place in the runway assessment process: determining, upgrading, or downgrading reported conditions. But they also agreed that Mu values would never be reported to flight crews. Instead, they would be used by airport operators to assess runway-braking action.

There was another problem. Data created by airplane manufacturers to calculate braking performance was remarkably varied and often not representative of real-world practices and conditions.

"I would say it was kind of like the Wild West," said Mike Byham, Collett's counterpart at American Airlines. Like Collett, Byham worked on TALPA from the beginning. "The manufacturers could pretty much produce whatever it was they felt appropriate or, in some cases, what was competitively necessary."

Byham, Collett, and other industry experts summoned to Washington, D.C., for that two-day summit in July 2006 took their deliberations to a hotel bar after the first day's meeting. And, as has often been the case when major advances in aviation are concerned, that's where they made a significant breakthrough.

"We literally wrote out the first draft of the RCAM [Runway Condition Assessment Matrix] on a cocktail napkin," said Collett.

The next day, Collett, Byham, and the

MU Values

Good: a Mu value of 0.4 and above
Med/Good: a Mu value of 0.36 to 0.39
Med: a Mu value of 0.30 to 0.35
Med/Poor: a Mu value of 0.26 to 0.29
Poor: a Mu value of 0.25 and below

others presented their cocktail napkin to FAA officials. They were immediately designated members of the TALPA Advisory and Rulemaking Committee (ARC).

Finding A Common Language

The TALPA Initiative seeks to standardize the way field conditions are assessed by airport operators and conveyed to flight crews. The RCAM defines these contaminants. The runway condition codes (RwyCC) classify the effects those contaminants have on braking action. (*See box at right.*) The observed contaminants are reported to the FAA through the Notam system. The FAA, in turn, uses that data to generate a field condition (FICON) report to flight crews.

Top-of-descent Decision-making

During the nine-year-long process of creating the TALPA initiative, the FAA also engaged in an effort to standardize runway performance data created by aircraft manufacturers. In December 2015, the agency issued two Advisory Circulars—AC 25-31 and AC 25-32—to that effect, choosing to make the process of developing data related to takeoff and landing on contaminated runways voluntary, despite the TALPA ARC's recommendation that the standards be made mandatory. Those two ACs are relatively new and manufacturers are still reacting to them. In addition, flight crews operating older airplanes that no longer have manufacturer support might have no source for such data.

"Better data that makes more sense was something we deemed a 'must-have,'" said Byham. "So there were changes made to how the landing data were actually calculated to make them more realistic."

For one thing, Byham explained, the way manufacturers calculate air distance over the landing threshold has been changed to make it more applicable to the way line pilots actually fly.

"What we found...was that the average pilot would take about seven seconds from the threshold to touchdown. So there was a seven-second requirement put in the development of the data. That was crucial in terms of making this work in the real world," he said.

Along with more accurate data from manufacturers, members of the TALPA ARC developed a landing-distance factors table to accompany RwyCC reports to pilots.

FAA Order 8900.1 advises flight crews to multiply the dry, unfactored landing distance data published in the aircraft flight manual (AFM) by the values presented in the landing distance factors table.

For example, suppose the dry, unfactored landing distance of a Cessna Citation X is 3,330 feet. Under the landing distance factors table, a RwyCC of 3 and using reverse thrust, the flight crew would multiply that 3,330 feet by 2.5. The resulting runway length requirement comes out to 8,325 feet, a number that includes a 15-percent safety margin.

Under the TALPA initiative, the flight crew performs this calculation as part of the time-of-landing assessment at the top of descent.

"I believe condition of the runway should be assessed as late as practicable before landing," Byham said. That, however, presented the ARC with concerns about how data obtained by the flight crew at the top of descent might conflict with dispatch data.

Byham said the resolution came in the amount of fuel aircraft are required to carry in situations where destination runways are contaminated and conditions are bound to change.

> **"The average pilot would take about seven seconds from the threshold to touchdown. So there was a seven-second requirement put in the development of the data. That was crucial in terms of making this work in the real world."**
>
> – Mike Byham

"We decided that, if you find yourself in that kind of situation, make sure you carry enough fuel to take you to an alternative airport where the landing distance requirements can be met," he said. "I thought that was a pretty good, commonsense way of approaching it."

Mu Values Redeemed, Upgrades Possible

Even after the TALPA system was fairly evolved, Collett still wasn't satisfied. While airport operators could downgrade the RwyCC, the FAA left no mechanism in place to upgrade the reported runway condition. His airline operates all over Alaska. Runways covered with ice are often the norm during winter. But because of the subzero temperatures, that ice, sometimes mixed with sand, often provides braking action comparable to runways deemed to be in much better condition. Without some modification to the rules surrounding contaminated runways, many airports in Alaska—lifelines to the communities they serve—would be forced to close for much of the winter.

On the last day of the ARC meeting Collett volunteered Alaska Airlines to provide the FAA with test data on seven airports in Alaska. A representative of Pinnacle Airlines volunteered to do the same at Minneapolis-St. Paul and Traverse City, Michigan, both airports also participants in the ARC.

"All of a sudden, the FAA had willing volunteers from the industry and the airports. They couldn't pass it up," he remembered. "Our motivation was to prove to the FAA through hard data that, in fact, it was safe and appropriate to be able to upgrade runways that were deemed by the RwyCC as 0 or 1."

Between 2009 and 2010, Collett and members of an FAA-appointed team monitored more than 6,000 total landings, correlating their findings with information gathered by airport operators.

"Where ice was present and runways would have been assigned a RwyCC of 0 or 1, but showed high Mu values, more than 75-percent of the time, they reported good braking action. The FAA couldn't argue with that data."

Based on their findings, the FAA now allows airport operators to raise the RwyCC on some ice-covered runways from 1 to no higher than 3, based on observations that include Mu readings.

What about Takeoff?

Much of the TALPA Initiative concerns landing assessment. But, as Collett pointed out, the "T" in TALPA stands for "takeoff."

"Many people both at the airports and among the pilots look at the RCAM and say, 'Why are we concerned about contaminant depths greater than an eighth of an inch? The answer, of course, is because of takeoff."

In assessing takeoff performance, braking is a crucial issue. Flight crews need to know how the aircraft will perform if they have to abort. But the depth of contaminants beyond one-eighth-inch is important because of the effect they can have by slowing down the aircraft's ability to accelerate—impingement drag.

"You have to be concerned not only about stopping performance, but also about the ability of the aircraft to continue and accelerate through that crap on the runway and be able to rotate and get airborne within the confines of the runway," he explained. "If there's a half-inch of wet snow or slush on the runway, you have to take a pretty severe takeoff weight penalty to ensure you have the ability to accelerate and get out of that stuff in the event of an engine failure."

Work in Progress

Although the TALPA initiative went live in 2016, it is very much a work in progress, say both Collett and Byham. For one thing, Byham said, runway condition reporting needs to be improved across the board.

"It would seem that, indeed, the airports do have the tougher end of the whole thing," he said. "You can't just say that braking advisories are in effect. You've really got to give some solid information, and a lot of flight crews in my experience seem to feel that's a difficult task—to draw that out of the airport."

Another issue Byham hopes to improve is the subjective nature of pilot-braking reports. "I'm hoping we can reduce the subjectivity on those braking-action reports or eliminate it through some type of automation," he added.

Collett wants to see changes in the RCAM format, making it easier to read.

"The way it's presented, in a vertical format, the airport, the pilot and the dispatcher have to have it all memorized to know where to look," he said. Right now, the FAA displays the RCAM in a vertical format. Under Collett's direction, the Alaska Airlines version of the RCAM is presented in a horizontal format he believes is simply easier to decipher.

Still, Byham said, the RCAM is certainly a worthy feat. "I'm proud of the way the performance engineering community has come to together on this," he said. "It really is a noble endeavor." ■

Runway Condition Codes

For reporting purposes, the runway is divided into thirds. Each third is assigned a code of between 0 and 6.

6: *Dry runway*

5: *Runway is wet or covered to some degree by frost, as well as runway portions contaminated by one-eighth inch (3 mm) or less of slush, dry snow, or wet snow*

4: *The outside air temperature is 5 degrees Fahrenheit (-15 degrees Celsius) or less and there is compacted snow on a portion of the runway.*

3: *Wet runways described as slippery, as well as runways contaminated with dry or wet snow of any depth on top of compacted snow. Also runways with more than one-eighth inch of dry or wet snow or runway portions covered with compacted snow when temperatures exceed 5 degrees F (-15 degrees C).*

2: *Runway portions covered with water or slush at any depth greater than one-eighth inch.*

1: *Runway portions covered with ice.*

0: *Runway portions covered by wet ice, slush over ice, water over compacted snow, as well as those covered with dry or wet snow over ice. Under the TALPA Initiative these runways are unsafe and must be closed until their conditions are improved.*

As ADS-B mandate nears, few answers on security

by Kellyn Wagner Ramsdell

Aircraft owners and operators flying in the U.S. and Europe are less than two years away from being required to equip their aircraft with ADS-B Out technology. Some countries in the Asia-Pacific region already require ADS-B Out, such as Australia, with others mandating the equipment to fly at altitudes above 29,000 feet.

Since the introduction of the 2020 mandate in 2010, the FAA has addressed pricing, availability of technology, the amount of paperwork required, and a variety of other concerns with the 2020 ADS-B mandate. It has yet to comprehensively address, however, cybersecurity issues with ADS-B technology. ADS-B (automatic dependent surveillance-broadcast) uses onboard GPS sensors combined with ADS-B transceivers to broadcast aircraft position, velocity, and identification information to other aircraft and ground receivers, including air traffic control facilities.

NBAA began raising questions about blocking aircraft identifying information in ADS-B messages and ADS-B's encryption and authentication standards in 2013. The FAA's ADS-B working group, Equip 2020, has done little to address these concerns in the last five years.

The central concern for most business aviation operators is the lack of provisions for blocking aircraft from being identified via online tracking websites. ADS-B does not have any mechanism in place to prevent people with ADS-B receivers from identifying aircraft. This means anyone can purchase a receiver (often for less than $100) and then begin seeing information including aircraft ID, altitude, latitude, longitude, bearing, and speed. This has long been the case with mode-S transponders, although the information transmitted by mode-S transponders is limited to the 24-bit address code tied to the aircraft's registration number.

Organizations can request an Aircraft Situation Display to Industry (ASDI) block to prevent both ADS-B and mode-S data from appearing on radar data feeds provided by the FAA. Some flight tracking websites—including Flightradar24 and FlightAware—also honor these blocks.

Other crowd-sourced websites do not honor the FAA's block list and continue to share aircraft tracking information. For example, ADS-B Exchange—a flight tracking website that gains its data from hobbyist-owned ADS-B, mode-S, and MLAT feeds. (MLAT is a technique that uses transponder signals to pinpoint aircraft position.) ADS-B Exchange states on its website that blocking is "security theater" and it does not believe the data should be blocked because it is accessible to anyone with a receiver. It claims to be providing a public service by displaying the information in an easily accessible manner.

Organizations such as ADS-B Exchange and others that oppose the blocking of ADS-B data and other flight information believe it is unlikely that a terrorist will exploit the information. However, the main threat from the exposure of the flight data comes from competitors, not terrorists.

Flight data such as location, heading, and aircraft ID that links an airplane to a specific owner or company can provide an abundance of information about ongoing operations or impending deals. Companies can use this information to gain a competitive advantage or potentially impact stock prices.

The leading idea for addressing blocking concerns is to change the aircraft ID transmitted by ADS-B so that it does not correspond to the airplane's registration information. This solution preserves the benefits of ADS-B while resolving at least part of the aircraft identification concerns. There is no word on whether the FAA will approve this change. There is therefore no current method to block sensitive ADS-B data that is automatically transmitted from aircraft.

Unencrypted Data

The configuration of ADS-B raises additional data security questions. ADS-B receivers in each aircraft receive location information from onboard GPS sensors that receive signals from GPS satellites. This information is then transmitted with data from other avionics to ADS-B receivers on the ground or on other aircraft in the vicinity. The data received by the ground stations is then transmitted to air traffic control. Aircraft equipped with ADS-B In receivers can also receive the information for use in traffic detection and take advantage of new capabilities that ADS-B In enables such as free weather information.

No data is encrypted at any point in this process. This means anyone with a receiver can view the transmitted data. And no authentication is required. These issues expose aircraft to a variety of cyber attacks.

The most well-known cyber attack against ADS-B systems is spoofing of either ADS-B or GPS data. Spoofing is a tactic wherein a hacker can insert false data into the standard communication pathways. This can be used to make it seem like there are airplanes where there are none or to make airplanes look like they are in a different location than they actually are.

Security researcher Brad Haines publicly demonstrated this type of attack in 2012 at the DEF CON20 security conference. He successfully inserted a fake aircraft into a simulation of San Francisco's airspace. In a 2012 technical report, "Ghost in the Air (Traffic): On Insecurity of ADS-B Protocol and Practical Attacks on ADS-B Devices," researchers Andrei Costin and Aurelien Francillon confirmed that this type of attack is not only possible, but also "easy and practically feasible, for a moderately sophisticated attacker."

In her 2016 research study, "Analysis of the Cyber Attacks against ADS-B Perspective of Aviation Experts," master's candidate Camilo Pantoja Viveros addressed spoofing and other types of cyber attacks that exploit ADS-B's lack of encryption and authentication. According to aviation experts she interviewed, cyber attacks that make an aircraft disappear from the ADS-B system and attacks that prevent an ADS-B ground station from receiving information are the most likely to adversely affect operations.

Aviation experts and other stakeholders have proposed several encryption schemes to address both the encryption and authentication issues with ADS-B. An Institute of Electrical and Electronics Engineers 2014 paper, "Can Cryptography Secure Next Generation Air Traffic Surveillance?" discovered that traditional encryption methods are impractical because they are burdensome to implement and vulnerable to interference.

U.S. Air Force Second Lieutenant Richard Agbeyibor proposed the use of format-preserving encryption as a solution in his 2014 master's thesis. This is the primary encryption method being explored because it can handle the larger ADS-B data packets without facing the interference issues seen with traditional encryption methods.

There is no indication that the FAA will implement encryption for ADS-B before the 2020 mandate. In the absence of encryption, many possible cyber attacks can be mitigated by cross-referencing ADS-B data with traditional radar information. This protection will last only until the older systems are phased out although that is not planned anytime soon. Equip 2020 is working with the NBAA and other industry stakeholders to address these concerns. ■

Boeing proposes cyberattack simulator

Boeing received a U.S. patent in December for a system that simulates a cyberattack within an airplane to detect pilot response and realistically determine how that response affects the airplane's operations, with the ultimate aim of strengthening an aircraft's defenses against cyberattacks.

According to the patent, the system proposed is highly adaptable, and the components it simulates can be substituted to reflect the many component configurations on airplanes. The cyberattack-specific aspect of the overall invention can also be added to an existing simulator or built into a distinct simulator.

The primary purpose of the invention is to gather information about how a pilot responds to a cyberattack. According to the inventors, "pilot reaction to cyberattacks is important." They believe this data is missing in existing models of the impact of cyberattacks on airplanes and that by gathering such data researchers can create better defenses for airplane cyberattacks.

These simulators might also be used to understand how a cyberattack actually affects airplane operations and determine whether a pilot is even able to detect a cyberattack.

Boeing plans to allow pilots to begin testing on cyberattack simulator prototypes, and then use information gathered to improve pilot training. The gathered data will also likely be integrated into existing and future Boeing efforts to secure avionics. **K.W.R.**

NEWS note

While deliveries of Embraer business jets were within its "outlook ranges," the 109 units the company shipped last year amounted to eight aircraft fewer than in 2016, according to data released in January by the Brazilian aircraft manufacturer. Last year's total includes 72 light jets (18 Phenom 100s, 54 Phenom 300s) and 37 large jets (14 Legacy 450s, 15 Legacy 500s, seven Legacy 650s, one Lineage 1000) versus 2016's 73 Phenoms (ten 100s, sixty-three 300s) and 44 Legacy/Lineages (twelve 450s, twenty-one 500s, nine 650s, two 1000s). According to Embraer, these numbers are aligned with its business jet shipment estimates reported early last year: 70 to 80 light jets and 35 to 45 large jets.

Keeping with historical trends, the fourth quarter remained the strongest for Embraer Executive Jets, which delivered 50 aircraft in the quarter, seven more than in the same 90-day span in 2016. The company handed over seven Phenom 100s, 25 Phenom 300s, seven Legacy 450s, 10 Legacy 500s, and one Legacy 650 in the fourth quarter, compared with 25 Phenom 300s, six Legacy 450s, nine Legacy 500s, one Legacy 650 and two Lineage 1000Es in the same period of 2016.

As of December 31, Embraer's backlog for both executive and commercial aircraft stood at $18.3 billion, down from $19.6 billion a year earlier. ■

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TEB crash investigation looks at crew, procedures

by David Jack Kenny

The captain of the Trans-Pacific Jets Learjet 35A that crashed during a circling approach to Runway 1 at Teterboro Airport on May 15, 2017, violated company policy by allowing the copilot to be the pilot flying (PF) on the accident leg, according to a NTSB docket file opened to the public on February 7. Both pilots were killed when the twinjet broke apart and burst into flames on impact in a crowded warehouse area in Carlstadt, New Jersey. No passengers were on board and no one on the ground was injured.

The personnel records in the 800-page document reveal irregularities in crewmember training and experience. The captain's application to the airplane's operator listed 6,600 hours of total flight experience that included 970 hours in multi-engine turbine aircraft, all as second-in-command, with 805 of them in Learjet models. His pilot certification record included failures on the initial practical tests for both his commercial and airline transport pilot ratings in multi-engine airplanes. Both failures were due to deficient performance of approaches and landings. At the time of the accident he had logged 353 hours as pilot-in-command of the Learjet 35A.

According to the docket, pilots with whom the captain had flown as first officer characterized him as "absolutely not ready" to upgrade to captain. His upgrade training required four simulator sessions rather than the expected one to prepare him for the checkride, in part due to difficulty performing circle-to-land approaches. A former colleague described him as "not proactive in the cockpit."

When hired, the first officer claimed 2,675 hours of flight experience that included 265 as second-in-command in Learjets. He had failed "takeoffs, landings, and go-arounds" on his first two private pilot checkrides.

The first officer joined Trans-Pacific Jets after resigning from his previous position pending a company review of his "weak performance" as second-in-command of the Learjet 35A. His most recent recurrent training had required six simulator sessions instead of the scheduled two to attain acceptable proficiency; his instructors catalogued deficiencies including engine start, normal procedures, incorrect flight director settings causing a takeoff crash, missed approaches, and circle-to-land procedures.

Trans-Pacific had a policy of designating new or low-time pilots with an SIC status—ranked from zero to four—that restricted the type of flying they were authorized to conduct for the company. The copilot was rated as SIC-0, meaning "may only perform SIC duties as pilot not flying (PNF)." He was not authorized to take the flight controls, even on empty legs.

The CVR transcript covers the full 30 minutes of the flight, beginning with the crew waiting for its takeoff clearance from Philadelphia International. Until the last 15 seconds of the recording, the captain conducted all radio communications with air traffic control, made checklist callouts, and offered encouragement while the first officer flew the airplane.

In addition, according to the records, the crew never conducted the approach briefing required by company procedures. During the approach they initially forgot to switch the autopilot from heading to navigation mode, and the SIC briefly mistook nearby Newark International for Teterboro.

Fifteen seconds before the end of the recording, the captain accepted the controls from the SIC. Ten seconds later the SIC said, "Add airspeed, airspeed, airspeed, airspeed."

The docket also raises questions about the crew's approach to TEB. There are no charted instrument approaches to Runway 01, due to conflicts with the arrival flow at Newark International. Aircraft in the Learjet's speed category have a minimum descent altitude of 760 feet for circling approaches from the Runway 06 localizer. Circling to Runway 01 from that point on the glideslope requires sharp right and then left turns in quick succession close to the airport. The accident site was approximately half a mile from the threshold of Runway 01.

Simulator runs conducted by the same provider who trained the accident crew were used to model a series of nine ILS approaches to Runway 06. They determined that a 65-degree right turn begun at the final approach fix 3.8 nautical miles from the airport is necessary to align with the extended centerline of Runway 01 using standard-rate turns at a distance allowing a normal descent while avoiding overflight of the New Jersey Meadowlands stadium. Turning a mile and a half later required heading changes of 90 and 140 at bank angles of 45 degrees and still left the airplane above its intended descent path. Data from the Learjet's enhanced ground proximity warning system suggested that it began its right turn less than two miles from the threshold of Runway 06.

The docket (available at https://go.usa.gov/xnsUu) does not state the cause of the accident, but contains 48 individual records documenting factual details established during the investigation. Witness statements, detailed training and employment records for both crewmembers, aircraft checklists, weight-and-balance calculations, and a detailed meteorological analysis are also among the materials collected. ■

Drone/aircraft encounters prompt call for tighter regs

by Sean Broderick

A recent instance of a drone flying over an airliner, screen grab shown here, has prompted pilot groups to call for stronger regulation of unmanned hobby aircraft.

Airlines, pilots, and air traffic controllers are calling on Congress to give the FAA full authority to regulate so-called hobby unmanned aircraft systems (UAS), or drones, following a highly publicized incident last month in which a drone flew above a Frontier Airlines Airbus A320 on approach to Las Vegas McCarran International Airport (LAS) and recorded the encounter.

In a letter to lawmakers, the Air Line Pilots Association, Airlines For America, and the National Air Traffic Controllers Association called for the FAA to modify Section 336 of the 2012 FAA Modernization and Reform Act, which prohibits the agency from regulating model aircraft, including drones that weigh less than 55 pounds and are flown for non-commercial purposes. While operating restrictions, such as a 400-foot maximum altitude, are in place, they are not always being followed, and the rule leaves no room to add layers of safety to further mitigate risk, the groups argued.

"Small drones are very difficult to visually acquire by pilots in flight or by air traffic controllers in the tower, and small drones do not currently have electronic anti-collision technologies that are compatible with airline collision avoidance systems," the groups' letter said. "However, equipped with anti-collision technology, flight crews would likely be aware of the drone's proximate location soon enough to take evasive action that would ensure that there was no threat of collision with the drone." Even if such technology is developed, the rule's language prohibits the FAA from requiring it, the groups pointed out in the letter.

Publicized Violation

The February 12 letter came shortly after a video emerged of a drone flying illegally above an active approach path near Las Vegas McCarran International Airport (LAS). The video, shot from the drone and posted to a Facebook group and then to YouTube, shows the UAS flying over Las Vegas. Soon, the A320—apparently on final approach to LAS—flies into the frame. The drone, clearly above the 400-foot maximum altitude ceiling for so-called hobby UASs, films the A320 passing underneath, clear enough to show the aircraft's registration number. The LAS video came weeks after a similar encounter, the groups said.

"We strongly urge you to remove legislative restrictions that have been placed on the FAA that limit its safety oversight of UAS," the groups wrote. "The likelihood that a drone will collide with an airline aircraft is increasing. By providing the FAA with the full authority to regulate all UAS operations, the safety of passenger and cargo flights will be protected." ■

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505 single improves on the 206's legacy

by Alexa Paprosky

In mid-January, 20-degree temperatures in Texas coupled with substantial wind gusts and the threat of snow almost placed me directly in the right seat of a Bell 505 simulator instead of the real helicopter. But with conditions improving upon my arrival at Bell's Fort Worth, Texas factory, it was announced, with great relief to me, that the flight in Bell's 505 Jet Ranger X would take place as planned.

Championed by Bell as the most advanced light single in the market, the 505 Jet Ranger X offers first-in-class features including a dual-channel Fadec and fully integrated Garmin G1000H flight deck. Designed to echo the storied career of the B206-series JetRanger while advancing its class's legacy into the future, the 505 is suitable for utility, corporate, parapublic, and training mission profiles.

Bell is working on utility options for the 505 and expects to certify a cargo hook later this year. With commercial deliveries continuing to climb along with letters of intent, the helicopter is retaining its welcomed entrance into the market.

During the pre-flight briefing session, I engaged with Tim Otteson, who would be the demo pilot for the day, and Chase Hawkins, who serves as Bell's maintenance coordinator for the demo fleet. The exceptional knowledge base of Otteson and Hawkins became immediately evident as we began discussing the 505. I was particularly interested in how it fared in comparison to the 206 series.

"The flight characteristics of the 505 are very similar to [those of] the 206," said Otteson. "It has the same teetering-style underslung rotor system that you'll find on a 206L4. The tail rotor drive shaft is a little bit longer on the 505 and the tail rotor has a lot more authority. The transmission is mounted to the fuselage in a different manner than [on] the 206 with liquid inertia vibration-eliminating mounts. You'll find the 505 to have a much smoother ride than a typical 206."

With a higher gross weight, full-fuel payload, and useful load compared to the 206, the 505 also features 504 takeoff shp compared to the 420 shp of the 206. Priced at approximately $1 million, the 505 has a max range of 360 nm. The 505 is powered by the Safran Helicopter Engines Arrius 2R, controlled by a dual-channel Fadec. "It is a much more powerful, responsive, and modern engine," Otteson said. "It's a lot more powerful than what you're used to in a 206."

Avionics

I asked Otteson about the learning curve associated with stepping from a 206 into the 505, and he explained that the most immediate challenge pilots face is adjusting to the G1000H avionics. "Once you get used to the Garmin screens and where your eyes need to go to find the information, it becomes very easy and intuitive," he said. "Additionally, the initial flight training course at the [Bell] academy here is more than enough to get someone comfortable with the helicopter."

With the briefing completed, we walked over to the ramp where N505FW, dressed in a red, black, and white paint scheme, was ready for preflight. Unaffected by the brisk temperature, Otteson walked me around the aircraft while detailing its components and notable characteristics.

I was curious about the lack of circuit breakers in the cockpit. Otteson directed me to the pilot (right) side of the aircraft to open an avionics hatch where the circuit breaker panel is located above the power unit. The decision to eliminate breakers in the cockpit stemmed from Bell's intention to eliminate the tendency of pilots incorrectly resetting breakers and not using them for their intended purpose.

"If pilots can't troubleshoot and mitigate the problem through the Garmin system, they probably don't need to be doing it in flight," explained Otteson.

Below the circuit breaker panel, I saw the True Blue Lithium-ion smart battery, much lighter and more powerful than traditional lead-acid or nickel-cadmium batteries. "This is Bell's first foray into smart battery technology," he said. "It can sense if it's cold and will run its own battery heating cycle and generate a message through the Garmin avionics indicating the battery is heating. It lets us know if it has any problems and will generate a fault or failure code in the cockpit."

The baggage compartment, also accessible from the pilot side, can hold multiple golf bags, passenger seats from the main cabin, or up to four standard suitcases, and it boasts a usable volume of 18 cu ft. The flat floor of the 505's cabin is adaptable for changing mission demands, with an overall cabin volume of 99 cu ft.

In the past, at a not-so-staggering 5 feet, 2 inches, I have found myself having to employ creative gymnastics to successfully climb into cockpits. Getting into the 505, however, came without the need for any contortionist skills. The crew

seats are mounted on in-line tracks and are equipped with a double strap shoulder harness and inertia reel. Clamshell cabin doors on the copilot side open up to 55 inches, allowing passengers to more easily enter and exit. The passenger seats are forward-facing, bulkhead-mounted seats, and these can easily be disconnected and stowed in the baggage compartment.

Much to my usual vertical deficiency-related chagrin, and even after adjusting the pedals, I was given a cushion to place behind my back for good measure to ensure full extension. Once I was fully situated, the impressive windscreen and substantial cabin size made the 505 feel noticeably roomier than the 206. Even more apparent than the increase in headroom, and certainly different from the typical 206 instrument panel, was the clean presence of the G1000H avionics.

After switching the battery on, Otteson entered our combined weights through simple inputs into the flight deck's MFD weight-and-balance display. The G1000H can be upgraded to include Garmin's Helicopter Synthetic Vision Technology and has two SD card slots, for data updates and downloads. The aircraft systems are completely integrated with the G1000H system, and Otteson defined the safety importance of that relationship by explaining, "With the integrated Garmin, you are going to literally have hundreds of different advisories, cautions, and warnings that will populate on the screen, letting you know exactly what's going on with the transmission [and helicopter]."

Bell 505 Jet Ranger X Specifications and Performance

Price (typically completed and equipped)	$1.00 million
Engine	Safran Helicopter Engines Arrius 2R, 505 shp TO (475 max cont.)
Avionics	Garmin G1000H
Passengers (typical)	1 crew + 4 pax
Range (4,000 ft, ISA, no reserve)	355 nm
Long-range cruise speed	113 ktas
Fuel capacity	84.85 gal
Ceiling (service)	20,000 ft
IGE hovering ceiling (gross weight, ISA)	14,450 ft
OGE hovering ceiling (gross weight, ISA)	10,460 ft
Gross weight (internal)	3,680 lbs
Gross weight (external load)	4,475 lbs
Maximum external load (cargo hook limit)	1,500 lbs
Cabin volume (total)	99 cu ft
Cabin volume (rear)	61 cu ft
Baggage capacity	18 cu ft

Engine Start and Flight

I examined the collective to find the throttle switches to transition between IDLE and FLY modes. "The dual-channel Fadec is all about safety, safety, safety," said Otteson. "You can maneuver and transition between IDLE and FLY and demand a lot out of the engine without having to worry about drooping the rotor, because that Fadec is going to take care of it for you."

The Fadec also incorporates an auxiliary control unit, which acts as a back-up for the hydro-mechanical unit if it fails. Surge and flame-out protection and other safety features make operating the engine much simpler. Bell's goal of reducing pilot workload through upgraded avionics and simplified engine management became readily apparent to me as we began the start-up process.

With the throttle switch set to IDLE, the START/RUN button was pushed and the Fadec took over while we monitored start limitations. For run-up, we switched to FLY mode, and with both N_R and N_P needles indicating 104 percent, we were ready to pick up into a hover. This was an exceptionally simple start-up process, and I understood how it could be immensely attractive to pilots who may be intimated by transitioning to a turbine.

"The people I have shown the 505 to, including quite a few private owners that entered the market in smaller piston helicopters and were ready to make the progression to turbine, were really looking for a safer, proven rotor system with Fadec and upgraded avionics," said Otteson.

The pickup into a hover felt extremely light and gave me the first indication of the 505's power. With a takeoff rating of 504 shp and maximum continuous rating of 457 shp, we pulled straight up into a max performance takeoff with plenty of power to spare. A dedicated, albeit presumably chilly Bell employee, captured our takeoff on video from the ramp. The resulting footage, while impressive, did not do justice to how powerful the takeoff felt from inside the cockpit.

As we flew away from the ramp, Otteson encouraged me to experiment with banks and turns. I worked on maintaining coordinated flight and scanning the G1000H, when Otteson reminded me to keep the aircraft in trim. The primary flight display indicated our attitude, airspeed, altitude, and vertical speed, plus showed an HSI display, while Bell's Power Situation Indicator depicted our power limits and indications. As we continued in flight, the intuitive layout of the G1000H became increasingly easier to scan and understand.

Otteson took the controls and demonstrated maneuvers he often shows to law enforcement pilots. He maintained a tight orbit over a fixed location on the ground and then gave the controls back to me to try an out-of-ground-effect hover. Holding the OGE hover felt extremely stable and steady, and I could absolutely understand the appeal to those involved in para-public operations.

With the hydraulics turned off, I felt that the 505 was much easier to fly than the 206 under the same conditions. With the hydraulics back on, we proceeded to a designated training field. The sight picture offered by the 505 presents a different, but more expansive view than the 206 because of the enlarged windscreen. After shooting a normal approach to the training field, I set the 505 down in the grass. Initially nervous about the set-down and my non-refined understanding of the skid height, I was surprised when the maneuver actually went very smoothly and without hesitation.

Picking back up into the hover, I asked Otteson if I could try sideward hovering and pedal turns. In an attempt to quell my excitement and fear of having my flying skills judged by the extremely proficient Otteson, I carefully began engaging in my requested maneuvers. I could tell that I was starting to have a death-grip on the controls and as soon as I reminded myself to relax, the sideward hovering and pedal turns felt much more manageable.

Moving into quick stops across the field, Otteson allowed me to execute the maneuver as I began to feel more comfortable with the 505's handling. I then requested to follow along on a power recovery autorotation. With the throttle switch set to IDLE on both collectives, we entered the maneuver. It felt very similar to the high-inertia autos typical in the 206, and after recovering, we transitioned back into a climb to normal flight.

Back at straight-and-level flight, Otteson showed me Garmin's highway-in-the-sky function. Otteson explained, "You can set the helicopter up if, heaven forbid, you end up in inadvertent IMC, [by loading] an instrument approach with the highway-in-the-sky [function] from where you are to a runway threshold." The G1000H can also be upgraded with helicopter terrain avoidance warning system (H-TAWS) and traffic advisory system.

I soon made the disappointing realization that we were headed back to the ramp and my demo flight was coming to a close. I wanted to stay buckled into that seat all day and knew it was going to be difficult to pry myself out of the 505 upon landing. My set-down on the ramp was definitely not as smooth as my set down in the grass, as I began to "stir the pot" and question the height of the skids. Otteson, with the comfortingly calm voice of an experienced instructor, guided me through the set-down, and I silently hoped that not a single soul at Bell had seen my performance. Putting my shame aside momentarily, we flipped the throttle switch to IDLE and shut the 505 down.

Just like the start-up procedure, the shutdown was simple and uneventful. Finally realizing that I would have to eventually actually exit the 505, I unbuckled the harness and stepped out onto the ramp. I felt a rush of jealousy when I saw the next group waiting for their demo flight.

In the debriefing room, I was given the opportunity to discuss the flight with Otteson before heading over for a tour of Bell's Training Academy. In search of Bell fan gear to take home with me, I discovered both gift shops were closed for the day. But knew I was taking home the best souvenir; an extremely memorable logbook entry. ■

Alexa Paprosky is a freelance writer, marketing consultant, and commercial helicopter pilot with experience in the Robinson R44 and Bell 206.

Annual event reaches record territory

by Curt Epstein and AIN Staff

With this year's theme of "Pursue Your Passion," NBAA's Schedulers and Dispatchers Conference (S&D) returned to Long Beach, California, for the first time since 2009. Now in its 29th year, the annual conference continues to grow, with more than 550 exhibitors, a record, on the sold-out exhibition floor this year. It attracted more than 2,900 attendees, including more than 150 making their first visit to the conference.

Several factors have led to more diversity of attendees at SDC over the years, said conference committee chair Robyn Carpenter. One is the entry of more men into schedulers and dispatchers career fields—positions that were previously occupied primarily by women. And changing communication needs between flight departments and corporations have led to a "trend where it's not only schedulers and dispatchers at the conference, but also other department personnel, whether maintenance, crewmembers and department leaders," she said.

Among those making their first visit to S&D was Brian Abrahamson, a corporate aircraft supervisor with Merck's flight department, who participated in the first-time attendee passport program and earned credits toward his Certified Aviation Manager (CAM) certification. "My company asked me to come and spend some time, do some networking, and see some of the new products," he said. "It's more direct information and networking for the things that schedulers and dispatchers actually need."

The show provided a slate of more than 30 education sessions ranging from planning international operations in specific regions to safety issues such as dealing with inflight medical emergencies, understanding and combatting fatigue, security in the current global environment, and vetting supplemental lift. Other sessions dealt with operational issues such as planning for operations at high-traffic events and the myriad details that must be attended to as a new aircraft joins the department fleet.

"We do find that with a lot of schedulers and dispatchers, our conference and the education that they receive is often the only education they are going to have throughout the year," said Carpenter, who serves as manager of support and training for Professional Flight Management. "We make sure that attendees are going away with knowledge that they can use directly in their flight departments. That is our main goal for the conference. Everything else is icing on the cake."

"I liked the quality of the educational sessions," said Christy Hutchinson, operations business manager with XOJet, who has attended 10 of the shows over the past 25 years. "I thought they were very informative and are touching on topics that are relevant now in the industry, that people are really interested in."

While in past years, the exhibit hall would close during lunch, while all attendees trooped into a nearby ballroom to eat, for the first time, the show floor remained open during lunch to allow visitors more time to interact with exhibitors without conflicting with the educational sessions. "Schedulers and Dispatchers is by far the best event for this group," noted Chris Little, chief marketing officer for California-based aviation services provider Desert Jet, who was attending her 11th conference. "It gives us the opportunity to really talk to the people that we work with, get to share news about what's going on, and we're able to go forward and bring some new clients into the mix, so it's a great opportunity for us to promote our businesses to one another."

A hallmark of the show has been its giving component, which aims to leave a lasting effect on the host city. Now in its eighth year, S&D's "Pay It Forward" clothing drive collected gently worn business attire from attendees. The thousands of garments were distributed to charities such as Dress for Success, Pacific Gateway, and Clothes the Deal, which will provide them to disadvantaged job seekers in the local community. Some companies have taken to conducting company-wide clothing drives ahead of the show, delivering hundreds of pounds of garments, while others donated large amounts of new clothing purchased just for the occasion.

"Fit for Duty," a show-sponsored walk/run also earned donations for the charities. For the first time this year, the S&D advisory committee worked with the local school district on a presentation describing what business aviation is and the employment opportunities that might be found in it. The following day, a group of high school students was escorted to a mini-career day at the nearby Signature Flight Support FBO. "Business aviation has so many careers...that are available to kids who might not know that business aviation even exists," said Amber Finchum, a former S&D chair and current head of the S&D advisory council's Pay it Forward education initiative. "Some of these kids have never seen an airplane or been to an airport." The next time the show is in town, she hopes to see results from the seeds that were planted, this year. "If we can touch one student, it's a huge success," she said.

NBAA's Joanne Damato, who stepped down this year as the organization's liaison to the S&D committee, a role she had held since 2004, has been a first-hand observer of the show's growth. She recalled how during that span, the show has gone from being self-contained in a single hotel, to occupying an entire convention center and becoming a major event in the host cities.

"The biggest thing I think we've done in the past 14 years is elevated the role of the scheduler and dispatcher," she told **AIN**, to one that is essential, that is not seen as a purely administrative role, but a critical member of the flight department. The non-flying professional can be an asset on the team, of equal importance to any other member of the team," she noted.

As a result of that growth, this was the last year of a single S&D committee chair overseeing the year-long planning process between shows. In the past, there would be a single chairperson and a vice chair who would succeed them the following year. At the end of this year's show, Kindra Mahler of Fargo Jet Center and Derek Fitzgerald of Boston Scientific took the reins as co-S&D committee chairs for next year's show, its 30th anniversary edition, which will return to San Antonio, Texas, from January 29 to February 1. ■

Conference notes

Lisa Swartzwelder honored for achievement, leadership

Lisa Swartzwelder, director of shuttle operations and flight administration at L Brands, was named the recipient of the 10th annual NBAA Schedulers and Dispatchers Outstanding Achievement and Leadership Award at NBAA's Schedulers and Dispatchers Conference last month. She is also a board member of the Ohio Regional Business Aviation Association (ORBAA).

A former SDC committee chair, Swartzwelder continually strives to bring training and development resources to the business aviation community in her

NBAA

S&D committee chair Robyn Carpenter (left) and NBAA head Ed Bolen present the award to Lisa Swartzwelder.

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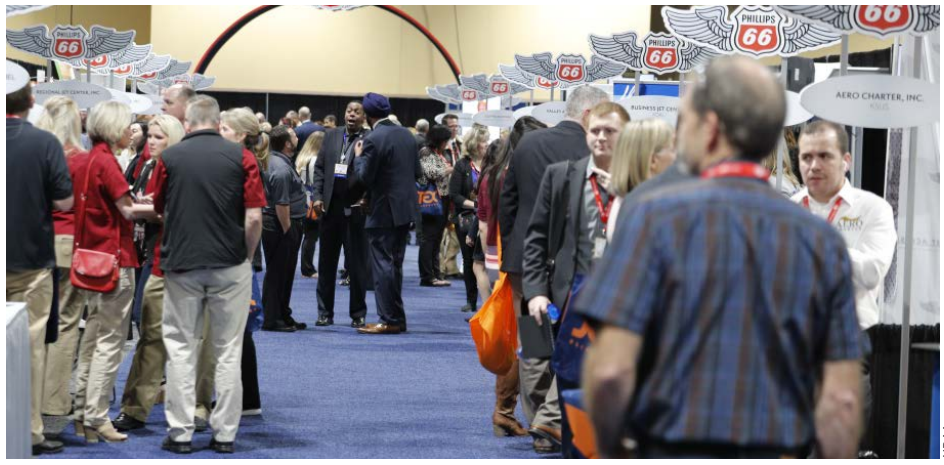
region. Engaging within academic aviation programs has also been a crucial part of her work with ORBAA, as has leading programs and conferences at the national level. With L Brands for more than a quarter century, she is involved with company programs such as the L Brands' flight operations internship program, which she co-leads, and its crisis response team. Each year through her efforts with the Corporate Angel Network, nearly 300 cancer patients are transported to treatment aboard her company's business aircraft.

"There's no one person I know who has worked harder and done more for our industry than Lisa," said Dan Wolfe, associate vice president, general manager and aircraft captain for Nationwide Aviation Business Center, who has known Swartzwelder for many years. "The more you give Lisa, the more she can do, and will do."

The award was created in 2008 to honor aviation visionaries with outstanding expertise and significant contributions to the scheduling and dispatching function.



NBAA

The exhibit floor provided the venue for attendees and exhibitors to interact. Each of the major fuel providers hosted a line-up of their dealer network FBOs.


NBAA

The slate of more than 30 education sessions attracted hundreds of attendees.

MedAire's Debbi Laux (c.) is a co-founder of the show's Pay It Forward initiative.


NBAA

As part of the S&D advisory committee's educational outreach, organizers set up a trip for students to a local FBO to learn about the industry and see business aviation in action.

NATA demonstrates system for managing fuel quality control

The National Air Transportation Association demonstrated its Safety 1st Fuel QC Management System (FQMS) at the 2018 NBAA Schedulers and Dispatchers Conference. A cloud-based digital tool for general and business aviation fuel quality management inspections, it replaces the traditional pen-and-paper record keeping process with an intelligent system that increases management visibility, employee accountability, and operational safety. A date/time stamping feature enables managers to verify where and when inspections were performed, increasing team accountability, while the digital storage allows access to all quality-control records.

The product is offered to NATA members at an "affordable" monthly rate, according to the association, "making it available to even the smallest FBO."

JetNet unveils prospecting tools for FBOs

Industry data provider JetNet introduced several major updates to its products at NBAA's annual Schedulers and Dispatchers Conference. A new Aircraft Flight Activity/Utilization program will help subscribers prospect for new customers. The program was designed with FBO and airport operations service providers in mind, so users "can easily generate lists to target decision-makers for...fuel and/or ground services," said Paul Cardarelli, the Utica, N.Y.-based company's vice president of sales. Using the new system, customers will have access to aviation activity dating back to 2005, broken down by serial number, owner/operators, OEM (including specific models), airports and fleets across North America and Europe.

The company has also launched a fuel/tech stop finder, which will enable users to determine serial-number-specific refueling opportunities. "The new Fuel/Tech Stop tool is a game changer for our customers," said Jason Lorraine JetNet's senior tech/sales specialist. "This feature allows them to identify where aircraft make fuel/tech stops across North America and Europe, and is a huge time saver in generating prospecting lists for fuel providers."

The company is also releasing a comprehensive set of market reports. The new format provides users with approximately 20 pages of model intelligence, including specifications and range maps, among other features.

Committee awards scholarships for continuing education

NBAA and its Schedulers and Dispatchers Committee announced the recipients of its scholarships during the Schedulers and Dispatchers Conference in Long Beach, California. Abbie Fox, Lindsey Kaychok, Megan Knox, Zachary Krammer, Kasia Segieda, and Jessica Wicks collectively will receive $41,000 in S&D scholarships to aid their aviation careers through continuing education.

This year Carolina Aviation Professionals Association, Jet Aviation, Million Air, Phillips 66, Rockwell Collins, Signature Flight Support, SkyVector, and Universal Weather & Aviation contributed to the scholarships. NBAA and its Schedulers and Dispatchers Committee offer scholarships through two interconnected programs. Each promotes professional and career development for business aviation schedulers and dispatchers.

The S&D Scholarship Program offers cash grants that can be used toward different professional development programs. The committee has awarded more than $700,000 in scholarships since 1997. Meanwhile, the S&D Training Scholarship Program provides opportunities for hands-on teaching initiatives.

FBO survey sees growth in 2017, optimism for 2018

On the eve of the NBAA Schedulers and Dispatchers Conference, the Aviation Business Strategies Group (ABSG) released the results of its annual FBO Survey and Industry Forecast. According to the company, more than half (53 percent) of the FBOs surveyed for the report indicated they saw a year-over-year increase in fuel sales in 2017. While nearly a third of surveyed FBOs reported lagging fuel sales last year compared with 2016, the top-fifth-performing facilities saw fuel sales climb by more than 8 percent last year, noted ABSG co-principal John Enticknap.

Those sales were boosted by an industry-wide surge in business aviation flight hours, said ABSG co-principal Ron Jackson. "Flight data provided by Argus TraqPak shows that flight activity in 2017 eclipsed 3 million flight hours for the first time since 2008," he said. "With Part 135 operators leading the way, 2017 flight activity rose 3.9 percent from 2016, while flight hours rose 5.5 percent for the same period."

Nearly half of those businesses responding to the survey said they added to their workforce last year and plan to boost staffing with newly created positions this year. When asked about their confidence in the economy, nearly three-quarters of the respondents said it is headed in the right direction. "We were encouraged to see that 73 percent gave the economy a strong thumbs-up," Enticknap said. "By comparison, in last year's survey, 53 percent approved the direction of the economy, and the year before, only 27 percent gave approval."

When asked about the coming year, half of the respondents said they expect their fuel sales to rise between 1 and 8 percent, while nearly 10 percent predicted even greater improvement. Only 7 percent forecast lower fuel sales in 2018.

As part of its analysis, ABSG predicts that the FBO industry will continue its moderate recovery from the 2008-09 downturn. The company further suggests that consolidation will be moderate among the larger chains while new FBO networks will emerge with target acquisitions that include second-tier FBO locations. Based on continued expansion of the U.S. economy, the company expects business aviation flight hours will continue to grow at a pace of between 2 and 4 percent monthly throughout the year, translating to increased FBO fuel sales. ■

Bizav safety data expert Bob Breiling dies | by Kerry Lynch

Robert E. Breiling, a business aviation safety expert who pioneered industry accident data collection and analysis, died on January 26, shortly before his eighty-ninth birthday. "As the preeminent business aviation safety data expert, Breiling helped promote standards that have led to improvements in safety and training," said NBAA president and CEO Ed Bolen.

Born Feb. 12, 1929, Breiling had an aviation career that spanned seven decades, beginning in 1951, when he joined the U.S. Navy. He became a pilot and flew a McDonnell Banshee F2H-3 and F9F Panther, one of the first aircraft carrier-based fighter jets and Grumman's first fighter jet. Stationed in the Pacific, Breiling flew from the U.S.S. *Hornet*. He continued his service in the Navy Reserves until 1974, retiring as a commander of a Lockheed P-2V squadron.

Following his active Navy service, Breiling became a pilot for Pan American World Airways. While serving with the airline, he became involved in the business aviation industry. He had met an aviation insurance executive who was concerned that his clients were purchasing business jets but knew little about them. Breiling was retained as a consultant to visit these operators. He ultimately joined the insurance industry and began to evaluate new jets and products, and began compiling business jet and turboprop accident statistics.

"It was then that I began to realize that there were a number of different operator types and began classifying each," Breiling had said. "By categorizing the accident data this way we were able to identify the areas of weakness and also show that the professionally flown jets had a safety record comparable to that of the air carriers."

This data not only helped advance safety, but was also instrumental in paving the way for an FAA alternate that permitted use of advanced simulators for pilot recurrency requirements. In fact, Breiling left the insurance industry to help found SimuFlite Training International, now part of CAE.

He later returned to the insurance industry, but found so many companies looking for information from him that he founded his own aviation safety data business in the 1980s. In addition to helping expand the use of simulation for training, his data further helped support the establishment of Part 91K regulations.

Breiling was actively involved in the industry, serving on the NBAA board of directors from 1973 to 1980, and as a regular speaker at NBAA's and Flight Safety Foundation's corporate aviation seminars. NBAA in 2012 recognized Breiling's contributions to the business aviation community with its Jack Doswell Award.

Breiling continued to compile safety data throughout the years, turning his business over to the International Business Aviation Council and NBAA in 2015. He continued to gather data for a few years, retiring completely within the past year. ■

PHOTOS: AMY LABODA

IAWA board president Alina Nassar, second from left, and several board members attended the Florida event.

At IAWA forum today's female leaders look to nurture the next generation

by Amy Laboda

Once upon a time the way women rose to positions of leadership within aviation was by fitting in, keeping a relatively low profile, and toeing the company line. The ones who made it to the top often dealt with their share of hardship on the way up, and made a lot of sacrifices. They also learned to find a good mentor: someone, or several people, who could provide excellent advice and keep counsel.

The International Aviation Women's Association (IAWA) was born nearly 30 years ago, when a group of women leaders in aviation and aerospace came together to network and mentor each other. That core of women—many of whom were lawyers, government administrators, bankers, and aircraft sales and manufacturing leaders—has grown over time to become a powerhouse network of 500 members worldwide, according to Abby Bried, past president and board member.

Bried was part of a dynamic group led by Rene Banglesdorf, CEO of Charlie Bravo Aviation in Austin, Texas, who came together January 25 for the organization's inaugural women's leadership forum in Atlantic Aviation's hangar at the Boca Raton, Florida, airport.

The one-day forum, sponsored by a host of international and domestic aviation-based companies, concentrated on coaching attendees on the traits of strong leaders as well as on work-life balance; breaking out of one's comfort zone and taking big risks to reap big rewards; how general aviation can connect one's altruism with opportunities for humanitarian aid, organ donation, and disaster relief flights; the future of general aviation regulation; and addressing the problem of recruiting more women into general aviation.

Panel presentations introduced the attendees to women who were head counsel at their firms, senior managers in government and industry, executive directors, vice presidents, founders, and CEOs of their companies. Behavioral and emotional intelligence and communication traits were fulcrum topics around which representatives from Embraer Executive Jets, Flexjet, Aero & Marine Tax Professionals, Barbera & Watkins law firm, and Greteman Group Marketing Communications talked about everything from honing a personal brand to social media marketing and the deft handling of demanding, or even demeaning, clients (or bosses).

The group broke out into small work group discussions on how to recruit more women into aviation.

The GA Humanitarian panel included compelling presentations by Jodie Krisiak, pilot for the New England Donor Services (NEDS), managed by Solarius Aviation; Robin Eissler, Founder of Sky Hope Network; and Eileen Minogue, who directs Patient Airlift Services (PALS). Krisiak described her mixed emotions upon getting a call to go fly during a 24-hour shift, explaining, "When I get the call to come fly I tear up, because I know that someone is saying goodbye to a loved one; and yet others are getting new hope all at the same time." NEDS saved more than 200 lives last year with organs transported by its flight department's Cessna Citations.

Eissler and Minogue, who have recently teamed up, showed off their Best Practices for Disaster Relief Flying manual. "We had a huge outpouring of assistance from the GA community after Hurricane Harvey," said Eissler. "All of a sudden in Texas we had all these Sunday fliers volunteering, which created interesting problems." The manual, which they are making available to all GA pilots, should mitigate those issues.

Yet one more panel focused on current issues between government, law, and general aviation. Its participants—Amanda Joyner, director of government affairs for GAMA; Katie DeLuca, attorney at Harper, Meyer, Perez, Hagen, O'Connor, Albert & Dribin; Laura Everington, senior manager, Universal Weather; Rebecca Mulholland, chief of staff and director of legislative affairs for NATA; and Jacquelyn Gluck, attorney at Roller & Bauer—discussed everything from ADS-B equipage to ATC privatization, non-citizen trusts, and changes coming to Customs and Border Protection overflight permitting procedures and APIS program.

The keynote speakers included Shaesta Waiz, the founder of Dreamssoar.org, an advocate for STEM who last year set the record as the youngest woman to fly around the world solo. Waiz reached more than 3,000 students in 20 countries, many of them young girls for whom she was a role model.

Balancing Waiz's youth was Retired Lt. Col. Christine Mau, who owns the title of first woman to fly the F-35 Lightning II for the U.S. Air Force. Mau charted her path to leadership for the crowd and left them with these key pieces of advice: "Honesty is an expensive gift. Both ask for and give feedback. Ignore the haters. Persevere, because everyone fails—get over it!"

Shaesta Waiz, founder of Dreamssoar.org, talks about her outreach to more than 3,000 children on a record-setting around-the-world solo flight.

The final hour of the forum was focused on small-group discussions and problem solving, led by Sierra Grimes, NBAA's Manager of Young Professionals in Business program. When the large white papers full of suggestions lined the massive hangar door, the groups broke up for less formal networking and conversations that buzzed with ideas and solutions.

"We're excited by the turnout and the vibrancy of this group," said IAWA president Alina Nassar, a partner with Nassar Abogados law firm in San Jose, Costa Rica. IAWA is planning more meet-ups around the world at various NBAA and other aviation events, including the third Latin America and Caribbean Forum on Women Aviation Leaders held in Mexico City last month. IAWA will celebrate its 30th birthday with its own conference in Memphis, Tennessee, October 24-26. ■

Keith Plumb to leave Executive AirShare | by Kerry Lynch

Keith Plumb—who co-founded regional fractional ownership provider Executive AirShare in 2000 with a partner, six employees, and two King Airs—has decided to leave his position as president and CEO. Plumb will step down in the 30 to 60 days following the February 1 announcement as a search for a successor is launched. He will assist in a transition under which current CFO John Owen will serve as interim president.

"It has been a privilege and an honor to work with such a great group of energetic employees, exceptional customers, and committed investors," Plumb said. "The majority of my career has been building Executive AirShare with Bob Taylor, and it is amazing where the business is today since starting as a Wichita-based company in 2000 with only two aircraft."

The company has since grown to an operation that has more than 50 aircraft, nearly 200 employees, and bases in Fort Worth, Dallas, Wichita, Kansas City, and Buffalo. He credited the passion of his employees for the successes of the company and said the company has a strong foundation for future success.

But after more than 17 years devoted to building the company, he felt the time was right to step away and "recharge the batteries." While he has not yet begun to look at other potential opportunities, Plumb said he does not plan to retire. He also stressed that he will still have an interest in Executive AirShare as an investor in the company.

"We cannot thank Keith enough for the immense contributions he has made to Executive AirShare, directly impacting the significant growth we have experienced during his tenure," said Wiley Curran, president and chairman of Curran Companies and management board member of Executive AirShare. "He has always displayed a relentless passion for customer satisfaction. The outstanding team he has built here is certainly testament to this desire. We wish him the best of luck in his future endeavors." ■

The founder of fractional provider Executive AirShare, Keith Plumb, is stepping down as president and CEO of the company. Plumb retains an interest in Executive AirShare as an investor.

NEWS note

Honda Aircraft's Chinese dealer Honsan General Aviation **in January opened its new operation**, which is housed in a new multimillion-dollar FBO complex at Guangzhou Baiyun International Airport. Honsan is the sales, service, and support provider for HondaJet in mainland China, Hong Kong, and Macau. ■

› continued from page 1

2017 delivery stats hint at postive 2018

"I am very bullish on where the industry is going right now."

The fixed-wing gains were led by increases in the piston (up 66 units in 2017 to 1,085) and business jet segments (up 15 units to 676). The only dip in fixed-wing shipments came from turboprops, with a total of 19 fewer deliveries, to 563 units, in 2017.

However, even with the 1.3 percent increase in business jet shipments and a 6.47 percent gain in piston-aircraft deliveries, billings were down by more than $900 million in 2017 to $20.2 billion. Bunce attributed the slide in billings to a shift in the mix of aircraft delivered.

On the business jet side, gains were made from a continued ramp up in the **HondaJet**, from 23 units in 2016 to 43 last year, as well as the **Cirrus** Vision SF50, from the first three units in 2016 to 22 last year. Textron also saw its Citation Latitude deliveries increase by 12 units.

At the same time though, **Bombardier**'s Global and Challenger shipments fell by 13 units, to 139, and **Dassault**'s deliveries were flat at 49. **Gulfstream**'s large-aircraft shipments, meanwhile, were down by four.

Also affecting billings was the continued pricing pressure the OEMs faced.

The turboprop drop came primarily from the multi-engine models. **King Air** deliveries slid by 20 units and **Piaggio** Avanti Evos were down by one. The single-engine turboprop models, meanwhile, were up by six units, to 473. Bunce called the overall dip a "minor blip" and noted that there is activity on the turboprop front with new models and technologies in the works.

Encouraging Outlook

Overall though, Bunce was encouraged by the outlook in the turbine market, pointing to positive signs in the used market. "You have an interesting dynamic coming into play with the used market. We're getting some really nice action happening on the used side," he said, noting this has a ripple effect to new models. He suggested that many factors could be playing into this strengthening, including the recently passed 100 percent expensing option for used aircraft, as well as the right aircraft with the right equipment. "There's some great deals to be had that won't exist forever in the used market," he said. Conversely he sees new aircraft also being helped by upcoming equipage mandates, such as ADS-B that may be forcing purchase decisions.

Bunce sees this dynamic carrying forward, noting that with a more solid gross domestic product, tax reform, and stability in many global markets. "All indications are that it's been very healthy for the jet manufacturers.

In the piston market, trainers have provided a significant boost to deliveries. Piper aircraft reported 50 percent year-over-year jump in single-engine primary trainer aircraft deliveries and a 70 percent leap in multi-engine trainers.

Bunce sees a different dynamic playing into this improving training market for both fixed-wing aircraft and rotorcraft. "We know that pilot wages are coming up because there is a very strong demand for pilots, and no one sees that abating any time soon," he said. With a rapid improvement in wages, the training market now has a need to build up fleets. "On the rotorcraft side and piston side that's very good news," he said.

As for rotorcraft results, the piston market increased by 40 units, to 264, and the turbine market by 25 units, to 662 (turbine market totals do not include Leonardo fourth quarter tallies since the company does not report results until this month).

Along with an improved training market, Bunce sees the rotorcraft market, particularly on the turbine side, benefitting from a strengthening oil-and-gas industry along with emerging markets. China in particular has been strong for rotorcraft, he said.

While Bunce admits he is not an economic prognosticator, he remains upbeat about the prospects throughout the industry. "There's nothing out there...that leads to pessimism about where we are going," he said. "We've got some very healthy markets out there. If we can get some geopolitical stability in other parts of the world, then we can really get going."

Market Challenges

However, the GAMA chief also cautioned that pitfalls still may lie ahead for the industry. Chief among them, he said, is the continued push to carve the U.S. air traffic control organization out the FAA and create an independent, user-funded organization controlled by an appointed board. "We absolutely have got to beat that back. [This] would be very debilitating not only for our industry, but overall would be terrible for all of aviation," he said.

Bunce questioned why backers are insistent on tinkering with a system he called the envy of the world. He noted that the U.S. system is an example to other locations with capabilities not found elsewhere. He added that other countries come to the U.S. to learn technologies.

Another concern is the "bandwidth within the FAA" to keep up with an increasing list of responsibilities, including the regulation of unmanned and urban mobility vehicles. The FAA will need to address how to fold them into the airspace and develop operational rules. "It's going to happen," he said of these markets, but added the FAA will need the resources to facilitate these initiatives. Bunce suggested that the aviation community, working with government, should develop means for new users to contribute to the system to provide the necessary resources. This would pave the way for such additions to the airspace, he said, expressing concern that otherwise, the technologies will be ready long before the operational rules.

On the certification side, Bunce is more optimistic, saying the new Part 23 is providing a means for certification of such new technologies. And he added that he is "absolutely convinced we are already seeing benefits" of the rewrite with new safety technologies coming on the market.

However, Congress still needs to push through with certification reforms to help on the Part 25 side, he said. This includes increased access to organization designation authorization (ODA). Companies invested heavily to transition to the ODA system, but the benefits have yet to be fully realized, he said.

ADS-B equipage remains a concern for GAMA, and Bunce said he believes aircraft will be left grounded when the 2020 deadline rolls around because owners don't book their slots early enough. The capacity is still there, but it is slowing down, he said. ■

NEWS note

Transport Canada is scheduled to start so-called "targeted inspections" of various aviation segments in a move the agency describes as a "new process to evaluate specific safety priorities." Between April 2018 and March 2019, Transport Canada will conduct targeted inspections of turbine-powered business aircraft operators, as well as heliports, aerial work, and general aviation.

The purpose of these targeted inspections as they pertain to business aviation is to "evaluate the effectiveness of the newly introduced Part 6, Subpart 4 of Canadian Aviation Regulations (CAR) Part 604." The Canadian Business Aviation Association contends some 65 private operators will be subject to the targeted inspections. ■

White House seeks cuts in FAA funding for FY2019

The White House Fiscal Year 2019 budget proposal is drawing criticism not only for its plan to privatize the U.S. air traffic control system long-term, but also for near-term cuts. Under budget documents released last month, the FAA would sustain a nearly $300 million cut overall from 2017 levels. (Congress has not yet finalized Fiscal Year 2018 levels.) The budget seeks stable airports funding at $3.35 billion, but proposes a $95 million cut in the agency's operations account to $9.93 billion, an $88 million cut in facilities and equipment, to $2.77 billion, and a $103 million drop in research and development (R&D) funding, to $74 million.

David Silver, vice president for civil aviation for the Aerospace Industries Association, expressed concern that the cuts would slash important NextGen and R&D efforts. "The NextGen modernization program represents the future of the nation's aviation infrastructure. Yet the Fiscal Year 2019 budget requests $952 million, an amount far below what is required for success and even below the Fiscal Year 2017 enacted level of $1.1 billion," he said. "The request also cuts important FAA research activities. Especially with increased resources from the recent budget agreement, Congress should reject these reductions."

As the White House looks to 2019 funding, Congress still must finalize the Fiscal Year 2018 budget. Lawmakers last month once again approved a temporary funding measure for most government agencies, including the FAA, to provide time to hash out the final 2018 appropriations levels based on newly set federal budget caps.

Congress now has until March 23 to pass the full year 2018 funding bills.

The new budget caps should provide for increased agency funding in 2018, and the FAA had already been in line for a budget increase under full year Fiscal Year 2018 appropriations bills introduced last year in both the House and Senate.

Those appropriations bills also included a number of other provisions of interest to the business aviation community such as a directive to improve use of organizational delegation authority, improved studies on Part 135 activity and continued privacy protections for real-time flight tracking activity. The Senate version of the full-year bill also includes an outright ban on a transition of FAA air traffic control functions to an independent entity. That measure emphasized the clear opposition of Senate appropriators to the ATC proposal.

The latest temporary funding measure was approved on February 8 as government funding was set to expire once more. In January, the government shut down for three days when lawmakers were unable to reach agreement before the government funding lapsed on January 20. The shutdown affected nearly 18,000 FAA employees and temporarily disrupted key activities, such aircraft registration and aviation rulemaking.

The shutdown placed a spotlight on the fact that the U.S. aircraft registry remains vulnerable a government shutdown, despite bills introduced in the House and Senate intended to shield it from such an event. Those protections are included in the FAA reauthorization package that has yet to make its way through Congress.

General Aviation Manufacturers Association president and CEO Pete Bunce said the need for those provisions further underscores the need to get a full reauthorization package passed. **K.L.**

Boeing buy would control Embraer Exec Jets

by Richard Pedicini and Kerry Lynch

After the Brazilian government used its "golden share" to block two proposals from Boeing, which initially wanted to buy all of Embraer, negotiations now focus on a joint venture with Boeing having 80 percent to 90 percent of the capital and control, according to several reports. Embraer's executive and commercial jet divisions would be included in the new venture, with a "shrunken" Embraer retaining defense.

The Boeing Company and Embraer in December confirmed that they are engaged in talks about a "potential combination." At that time, the companies issued a short statement saying the basis of a combination remains under discussion and that "there is no guarantee a transaction will result from these discussions." Such a move, though, would be subject to regulatory and shareholder approvals.

Boeing/Embraer talks do not come as a surprise given the looming alliance of rivals Airbus and Bombardier. The two have formed "clean teams" as they finalize plans for the European manufacturer to take a 50.01-percent stake in the C Series Aircraft Limited Partnership (CSALP). Under the agreement, Bombardier Aerospace and Québec provincial economic development agency Investissement Québec will reduce their stakes in CSALP to 31 percent and 19 percent, respectively.

The prospective alliance would come as Embraer prepares to bring the first of its new E-Jet E2 family, the E190-E2, to market this year. Embraer Commercial Aviation CEO John Slattery had indicated that any stimulation of the narrowbody market resulting from Airbus's involvement in the Bombardier C Series program could also serve to stimulate Embraer's E190-E2 and E195-E2, the primary challengers of the C Series in the under-150-seat market segment.

At press time, Brazlian business newspaper *Valor Econômico* predicted complex negotiations on such subjects as where engineers would be assigned, and whether Boeing would handle sales and marketing of Embraer's defense line. Agreements on parts supply, technology, and training would have to be hammered out, with the proposal returning to the Brazilian government sometime last month.

Embraer issued two denials of market rumors earlier last month, while admitting that a joint subsidiary is under consideration, though *Valor* is the first to address business aviation's destiny under any deal.

Embraer's most recent results show that through the third quarter, commercial and business aviation were responsible for 62.6 percent and 20.3 percent, respectively, of the $4.1 billion in net revenue, while defense accounted for 16.6 percent and "other" for 0.5 percent.

Previous speculation about the Boeing-Embraer deal in the Brazilian press had focused on guarantees of what production would remain in Brazil, but *Valor* concentrated on the money. According to the publication, the new firm would be independently valued, paid for in cash that would be distributed as a dividend to shareholders, and would report directly to Boeing in Chicago, with Embraer retaining the rights inherent to any minority shareholder. ■

As part of Spartan's hybrid distance-learning program, the school's students can complete a nearly year-long online section before arriving on campus to complete hands-on training.

Spartan College creates partially online AMT program

by Samantha Cartaino

Is it possible to earn a maintenance degree online? Spartan College of Aeronautics and Technology has begun to explore this question. According to the FAA, the school is "the first authorized to conduct a distance learning program." The school has created a hybrid program that combines online courses with traditional courses in person at its Tulsa, Oklahoma facility. The first class to complete this new program graduated in December 2017.

Spartan College's partially online aviation maintenance program is separated into two parts: a 10- to 13-month online section to learn the fundamentals of aviation maintenance and a 7- to 9-month on-ground section for advanced learning. The school provides each student with a Microsoft Surface tablet for online learning such as simulation programs. While students learn at their own pace, it can take approximately a year and a half to earn an FAA-approved AMT degree. The hybrid course potentially reduces loans for students, who can continue to live at home and keep their jobs during the online portion.

Boeing's 2017-2036 Pilot and Technician Outlook Forecast predicts a need for 648,000 new mechanics in the industry over the next 20 years, and Dr. Dan Peterson, Spartan Education Group president and CEO, told **AIN** he sees a flexible program like Spartan's as essential to meet this demand. The school worked with Computerized Training Systems to create the online platform for the distance education section of the program. Spartan College's program advisory board—made up of representatives from American Airlines, Bell Helicopter, and Northrop Grumman—oversee the course along with the FAA. As technology advances, the course will shift to meet expectations.

Universities in other countries are also interested in the program. Peterson told **AIN** that two universities in China as well as universities and organizations in South Korea, the UAE, and Vietnam have been in contact with Spartan College. The schools have shown interest in having their students complete the online section and then attend Spartan College to complete the traditional courses. Spartan itself is interested in expanding its hybrid program to its other facilities in the U.S.

"We want to expand our [traditional] programs in Tulsa; Denver; Los Angeles; and Riverside, California," Peterson told **AIN**. "We also want to expand our hybrid program, which is currently in Tulsa, but will grow to Colorado and California as well. [The expansion] is subject to the department of education, our creditor ACCSC, and the FAA. We are conducting exploratory research to figure out where and how fast we can expand."

Spartan College of Aeronautics and Technology is also exploring more airline partnerships for its students. The school recently started a partnership with Delta Air Lines through which students could be eligible to be hired by Delta once they receive their degree. Spartan College has a similar partnership with Envoy's Cadet Program for pilot training once they receive their degree. ■

Nextant gets FAA sign-off on G90XT

Cleveland-based Nextant Aerospace has received full approval for the G90XT turboprop, with U.S. certification for a new single-lever power control system, the company announced last month. Nextant called the latest FAA sign-off the "final piece of certification" that followed previous approvals for the GE H75 engines and Garmin G1000 avionics on the remanufactured Beechcraft King Air C90A.

"Our goal was to bring a level of technology to the King Air platform that has been missing for decades," said Nextant executive v-p Jay Heublein. "While the King Air is recognized as the most successful platform in the history of business aviation, the fleet has not benefited from the significant advances in technology that its counterpart in the jet market has."

This certification makes it the first turboprop to feature approved single-lever power control technology with a complete electronic engine control system, Nextant said. The G90XT integrates both engine and fuel monitoring on a digital basis into the multifunction display. It is also equipped with a new digital pressurization system, an environmental cooling system that triples the previous cooling capacity, and an interior that features a new composite shell, seats and an improved cabin layout.

Nextant expected EASA validation to follow shortly. With FAA certification now in hand, the company is launching a U.S. tour of the aircraft. **K.L.**

CHAD TRAUTVETTER

Russia flirts with SSBJ Tu-160

by Vladimir Karnozov

Russian president Vladimir Putin suggested manufacturing a civilian, supersonic business jet (SSBJ) version of the Tupolev Tu-160M2 swing-wing strategic bomber during a January visit to the Kazan Aviation Production Association (KAPO) to watch the maiden flight of the Mach 2 airplane. On January 29 Russia's ministry for industry and trade released a statement saying the demand for supersonic business jets (SSBJs) in Russia alone is estimated at 20 to 30 units, with each selling at $100 million to $120 million, and saying the global market would also be "substantial."

At first blush, Putin's idea was taken as a part of the rhetoric associated with the March 18 presidential elections. However, United Aircraft Corp. (UAC) president Yuri Slyusar has since announced that his company has started working on "a supersonic civilian airplane" and said "technologies and design solutions from the Tu-160 can be applied."

Seemingly, UAC's announcement was about an SSBJ scale model on display at MAKS'2017 at the stand of the Central Aero-hydra-dynamics Institute. Industry sources believe an SSBJ can be designed and built in seven years, provided it uses an existing engine such as the Nukolai Kuznetsov NK-32-02 afterburner-equipped turbofans being tested on the Tu-160M2 prototype.

A number of Russian government officials and industry leaders who spoke to the media in recent days insisted that a number of local and foreign wealthy individuals want a supersonic jet. In fact, they said some have even asked Russia to make one available.

Even though they admit the production run would be limited, the expected flyaway price of $150 million (including interior and options) would make it worth an effort, the officials said. "The main thing to consider is that the plant in Kazan has mastered production of long members in the force-bearing structure [made of titanium], [and] that we have a capable engineering team and technologies mastered on the Tu-160 which are applicable to both military and civilian airplanes," said Dmitry Rogozin, Russia's deputy prime minister responsible for the military industrial complex.

He stressed that adding commercial orders to the one placed by the Russian defense ministry for 10 Tu-160M2s (with an option for 40 more) would "increase the production run and decrease unit cost." ■

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CYWG	*Fast Air Jet Centre*	*Winnipeg, Manitoba*
CYYC	*Skyservice FBO - Calgary*	*Calgary, Alberta*
CYYZ	*Skyservice FBO - Toronto*	*Toronto, Ontario*
KABE	Lehigh Valley Aviation Services	Allentown, PA
KAFW	*Alliance Aviation Services*	*Englewood, CO*
KBED	*Jet Aviation - Boston*	*Bedford, MA*
KBFI	*Clay Lacy Aviation*	*Seattle, WA*
KBIS	*Bismarck Aero Center*	*Bismarck, ND*
KBOI	*Jackson Jet Center*	*Boise, ID*
KCMH	*Lane Aviation*	*Columbus, OH*
KCPS	*Jet Aviation - St. Louis*	*Cahokia, IL*
KCRQ	*Magellan Aviation*	*Carlsbad, CA*
KCXO	*Galaxy FBO*	*Conroe, TX*
KDAL	*Jet Aviation*	*Dallas, TX*
KDLH	*Monaco Air Duluth*	*Duluth, MN*
KIAD	Jet Aviation	*Washington/Dulles, VA*
KFLL	*Jetscape Services*	*Fort Lauderdale, FL*
KFNL	*Fort Collins - Loveland jetCenter*	*Loveland, CO*
KFTY	*Hill Aircraft*	*Atlanta, GA*
KGSP	*Cerulean Aviation*	*Greer, SC*
KHOU	*Jet Aviation*	*Houston, TX*
KJQF	*Concord Regional Airport*	*Concord, NC*
KLBE	*Vee Neal Aviation*	*Latrobe, PA*
KLEB	*Granite Air Center*	*West Lebanon, NH*
KLGB	*Ross Aviation - Long Beach*	*Long Beach, CA*
KOAK	**KaiserAir**	**Oakland, CA**
KPBI	*Jet Aviation*	*West Palm Beach, FL*
KPHX	*Swift Aviation*	*Phoenix, AZ*
KPWM	*Northeast Air*	*Portland, ME*
KSEE	*Circle Air*	*San Diego, CA*
KSSI	*Golden Isles Aviation*	*St. Simons Island, GA*
KTEB	*Jet Aviation*	*Teterboro, NJ*
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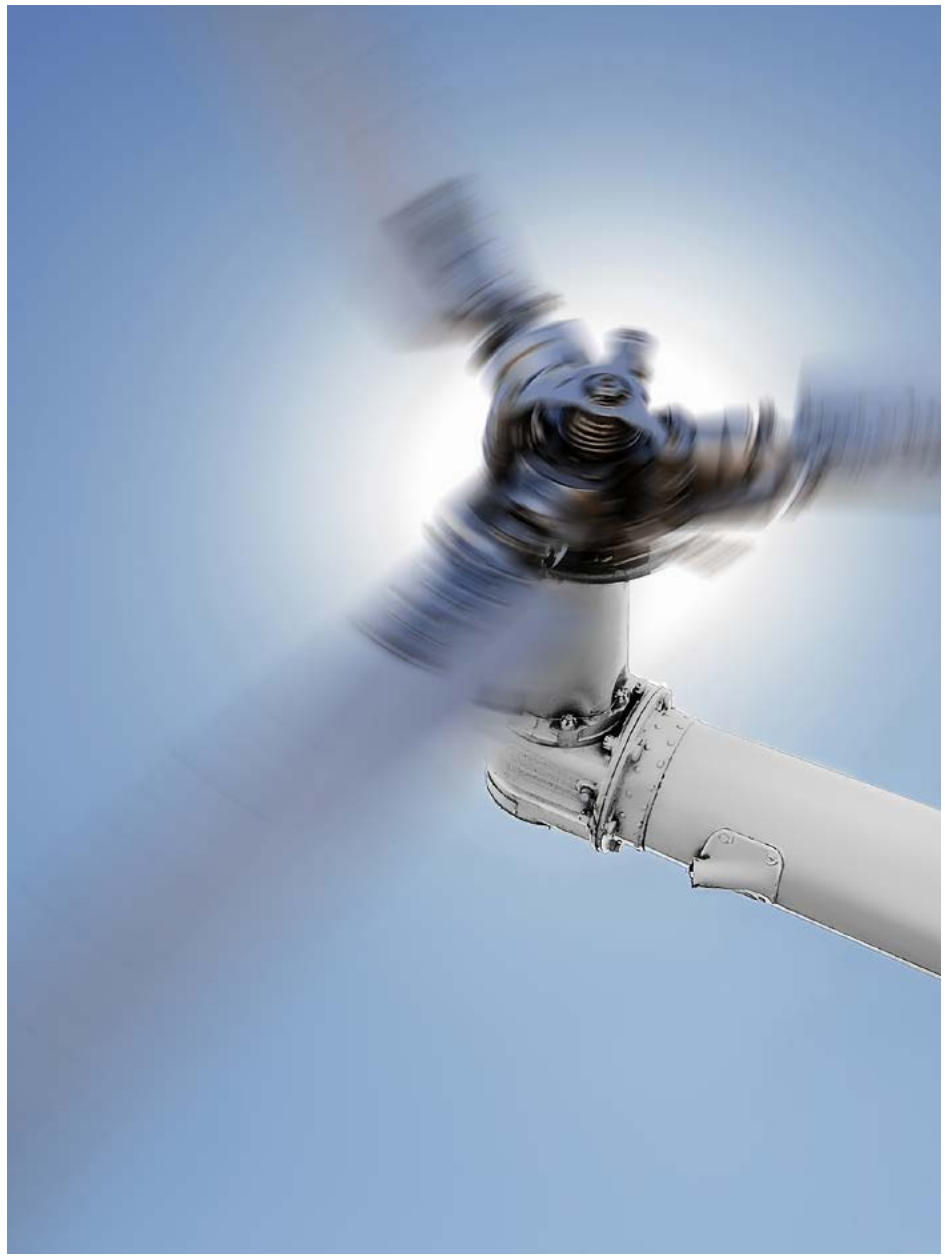
LTE avoidance: awareness and training are key to prevention

by David Jack Kenny



The sequence may seem inexplicable: a helicopter in apparently slow, stable flight begins spinning faster and faster until it falls to the ground. Its occupants may or may not escape, but the aircraft is usually destroyed. The likely cause or contributing factor: loss of tail rotor effectiveness (LTE), raising the possibility that training for LTE is inadequate and needs to be reconsidered in light of these accidents.

LTE Defined

The specific phrasing "loss of tail rotor effectiveness" is significant. While certain types of mechanical failures produce similar effects, LTE is a purely aerodynamic phenomenon in which a fully functional tail rotor system fails to provide effective directional control. The result is sudden uncommanded yaw that can't be arrested by normal control inputs. The problem is rooted in one of the basic challenges of rotorcraft design.

Conventional helicopters have a single main rotor. In most U.S.-made models it turns counterclockwise; on some European and Russian models it turns clockwise. (For simplicity, we'll describe a helicopter with a counterclockwise main rotor, bearing in mind that all the details are exactly opposite in a clockwise design.) The "equal and opposite reaction" described by Newton's Third Law of Motion spins the rest of the ship in the opposite direction, clearly not acceptable behavior in a functional aircraft. The traditional solution is to use a small rotor facing sideways—that is, perpendicular to the plane of the main rotor—at the end of a tailboom to counter that spin with lateral thrust.

The amount of thrust required depends on multiple factors: changes in the torque produced by the engine in response to the power requirements of different flight

A few recent examples:

Fallon, Nevada, July 3, 2014: A Eurocopter AS350B3 conducting long-line external load operations approached a landing zone on the lee side of a ridge with a 972-pound load on a 100-foot line. Surface winds gusted from five to 25 knots. With the cargo about 10 feet above the drop zone, the helicopter began swaying back and forth and then descended, rotating counterclockwise. The pilot tried to release the load but was unable, most likely because of the rotation, and could not stop the helicopter from hitting the ground and rolling onto its side. He suffered only minor injuries.

Wichita Falls, Texas, Oct. 4, 2014: A Bell 206L1+ EMS helicopter approached United Regional Hospital's helipad in very light winds. The pilot decided the approach was high and fast and tried to go around, pitching forward to build airspeed. A witness on the ground saw the helicopter begin spinning, slowly at first, and descend behind the building. The pilot reported that when he increased power to climb, the ship entered a "violent" right spin. He was unable to regain control. The helicopter completed at least five rotations before hitting the ground inverted and catching fire. The pilot escaped with injuries, but the flight nurse, paramedic, and patient were all killed.

Tchentlo Lake, British Columbia, May 4, 2016: A Bell 206B performing infrared scanning over a recently logged forest flew at about 30 knots airspeed and an altitude of 150 feet. The grid legs were oriented east-west. To provide a clear view for the camera operator, the pilot flew them in a left crab; winds were about 10 knots from the west. As the aircraft entered the last scan area flying downwind at a groundspeed of 14 knots, it began spinning to the right, rotating five times as it "descended steeply, though not rapidly, to the ground." All three on board survived but suffered significant injuries.

Großglockner, Austria, Aug. 1, 2017: A McDonnell-Douglas 902 evacuating a patient from above the 11,000-foot mark of Austria's highest mountain was balanced on one skid while loading. Just after the patient boarded, its tail lifted and swung to the left. The helicopter made two rotations nose-low at accelerating speed before crashing onto the rocks and coming to rest just above a 1,000-foot drop. No one on board was seriously injured; the patient was moved to another landing zone and eventually hoisted out by another helicopter.

Investigation into the Austrian accident has only begun, but the other three have been definitively attributed to one of the aerodynamic misfortunes pecul iar to rotorcraft: the loss of tail rotor effectiveness (LTE). In recent years, LTE has accounted for 3 to 4 percent of all helicopter accidents in the U.S. Because they typically occur at low altitude close to obstructions in locations either urban or remote, that figure understates the public safety consequences of this hazard.

Charlottesville, Virginia, Aug. 12, 2017: While the investigation is still in the information-gathering stage, the NTSB's preliminary report on the fatal crash of the Virginia State Police helicopter bears many of the hallmarks of LTE. Preliminary radar track data showed the helicopter beginning a right turn before rapidly descending out of sight; the final return showed a groundspeed of 30 knots. The preponderance of witness testimony indicated that from a hover, it spun to the right and continued spinning as it descended into the trees in a 45-degree nose-down attitude. These details were corroborated by University of Virginia security camera footage. The aircraft was being repositioned to provide security for the governor's motorcade after assisting ground units responding to contentious public demonstrations in the city. Both pilots were killed.

Gran Sasso, Abruzzo, Italy, Aug. 13, 2017: Footage posted to the Internet captured a red-and-white firefighting helicopter approaching a landing zone in a mountain meadow. As it slowed to walking speed, the tail swung left and it began to rotate counterclockwise as the nose dipped. After two and a half revolutions, it hit hard on the rear of the skids and rolled over. Gusty winds were reported at the scene. All three on board survived.

Clint Johnson, now chief of the **NTSB's Anchorage, Alaska office**, once narrowly escaped an LTE encounter on a windswept ridgeline. His recollections and a recreation of the flight form the core of the *NTSB Safety Alert Video—LTE*. See the videos at www.ainonline.com/LTEAccidents.

regimes, the aircraft's loaded weight, environmental conditions including density altitude, and whether the pilot wants to hold the nose straight or turn. Because the tail rotor spins at a near-constant speed—a fixed multiple of that of the main rotor, to which it's mechanically connected by a system of drive shafts and gear boxes and whose own speed is maintained within a very narrow range in all normal flight operations—tail rotor thrust is modulated by changing its blades' angle of attack. The pilot accomplishes this with pressure on anti-torque pedals, one for each foot. They vary the pitch of the tail rotor blades via mechanical linkages in small helicopters, hydraulic circuits in large ones.

Like everything else in aircraft design, tail rotor effectiveness is a matter of compromise. The engine produces a limited amount of power, so the more that's provided to the tail rotor, the less is available to the main rotor to lift the ship. And, as the FAA's Helicopter Flying Handbook points out, "Environmental factors can overwhelm any aircraft." The result is that no single-rotor helicopter has enough tail rotor authority for every conceivable situation. While the element common to every LTE accident is yaw accelerating beyond the tail rotor's ability to counter its momentum, specific situations substantially increase the risk.

When It Happens

Low airspeed is a factor in most LTE encounters. Torque reaction is greatest at high power settings, and because the main rotor operates more efficiently in undisturbed air, more power is needed to stay aloft when the aircraft isn't moving fast enough to escape its own downwash. The vertical stabilizer gains meaningful authority to reduce yaw only near cruising speed, and of course wind components make up the highest proportion of the relative wind at near-zero airspeed.

The surge in torque accompanying abrupt power increases can kick the aircraft into a spin if not precisely matched by appropriate pedal inputs. Also, yaw most quickly accelerates beyond control when it's in the same direction as the ship's intrinsic spinning tendencies, i.e., to the right with a counterclockwise main rotor. So right turns at low airspeed are particularly problematic, more so with a tailwind, as a helicopter's orientation to the prevailing wind can amplify the risk via three distinct mechanisms:

Main rotor disk interference—Winds of 10-30 knots from about the pilot's 10 o'clock position can blow the main rotor's tip vortices directly into the tail rotor, creating turbulence severe enough to significantly reduce tail rotor thrust. In a right turn, if the pilot reacts by increasing right pedal pressure, the increase in thrust after the aircraft turns through the area of interference can quickly push the turn past controllability.

Weathervaning—Tailwinds (from about the pilot's four- to seven-o'clock positions) tend to swing the helicopter's tail downwind. The initial yaw may be either left or right and begins gradually, but can accelerate quickly if not countered right away.

Tail rotor vortex ring state—More-or-less direct crosswinds opposing the tail rotor's thrust—left crosswinds from about seven to eleven o-clock—cause rapid and unpredictable fluctuations in tail rotor thrust, requiring quick and accurate pedal inputs to compensate. LTE can result when pedal inputs that fall further behind the aircraft trigger overcorrections.

Recovery and Training

As with most aviation emergencies, prevention is the best cure. Understanding the situations conducive to LTE and being ready to meet any uncommanded yaw with timely and forceful pedal pressure reduce the chances of being caught by surprise or failing to manage an adequate response. Stopping the turn immediately is essential. Once it reaches 180 degrees, successful recovery requires altitude and elbow room, neither of which is usually available.

Altitude offers the option of lowering collective, reducing both the main rotor blades' angle of attack and engine output. This decreases torque while making more power available to the tail rotor, but at the cost of the lift needed to maintain altitude. The helicopter can lose hundreds of feet before the pilot regains directional control. Forward cyclic to regain airspeed is necessary in any case. If there's no altitude to sacrifice, recovery requires an outwardly spiralling flight path that can cover half a mile or more. Landing zones rarely provide that much clearance from obstructions, and it's often impossible to keep the aircraft from descending into the ground during the attempt.

Many—perhaps most—helicopter pilots enter their careers without ever receiving realistic training in LTE onset and recovery. Full-motion simulators aren't widely available. Not all of those that exist convincingly recreate the suddenness and severity of real LTE events, and as the National Transportation Safety Board noted in a March 2017 Safety Alert, "Due to safety concerns, training for LTE is rarely done in an actual helicopter." That challenge is compounded by the fact that many instructors are themselves relatively inexperienced, having earned that credential to build the flight time needed to qualify for a "real" flying job, and shy away from the more precarious corners of the flight envelope. (Fixed-wing instruction suffers from a similar problem.)

Pete Gillies, who retired as chief pilot after 44 years with Western Helicopters and spent most of his 50-plus years in helicopters flying powerline construction, sling loads, "mountain missions of all types," fire suppression, and training other experienced pilots in the fine points of those disciplines, offers these insights on surviving LTE encounters and training for them in the aircraft:

"The only time helicopter pilots routinely apply full pedal in either direction is when checking freedom of controls before engine start. During normal flight, a small amount corrects any yaw. It is seldom necessary to apply full pedal, so this is not an automatic response to unplanned yaw.

"Coming to a hover, more pedal is normally required to counteract torque and maintain heading, but this seldom requires full deflection.

"In the case of LTE when slowing down or coming to a hover, FULL opposite pedal is required. Bell Helicopter deserves credit for researching and publishing the corrective action years ago. Immediate application of full opposite pedal will stop LTE if it's done before the yaw becomes so developed that it cannot be stopped without reducing power by lowering collective, still holding full opposite pedal.

"Realistic training can be accomplished by climbing to at least 750 feet over a suitable landing surface (to remain well above the height/velocity curve with plenty of room to lower collective and fly out of LTE) and coming to a hover. Slowly relax the pedal, allowing yaw to develop, then reapply to stop the yaw and return to the previous heading. Repeating this maneuver and allowing more and faster yaw to develop, you may find that full opposite pedal will not stop the yaw. You now have LTE. The only practical way of stopping the spinning is to reduce power by lowering collective and gain some airspeed, still holding full opposite pedal.

"The whole idea is to be able to quickly recognize the oncoming loss of yaw control and learn how to fix it before you've lost it entirely."

Alternative Designs

One way to eliminate the torque reaction is to use two main rotors turning in opposite directions, each countering the effects of the other. However, the additional weight and power requirements make this option most practical in the heavy-lift category.

Another approach is use something other than a tail rotor to control yaw. Beginning in the 1970s, McDonnell-Douglas began developing the Notar ("NO TAil Rotor") system, in which a ducted fan inside the tailboom harnesses an aerodynamic oddity called the Coandă effect to create about two-thirds of the needed lateral thrust. Air blown through a rotating nozzle by the same fan supplies the rest and provides variable yaw control. Pilot reports suggest that it's much less susceptible to the conditions that cause LTE than conventional designs, but the Helicopter Flying Handbook's caution about environmental pressures is well placed. The MD 902 wrecked in the Großglockner rescue accident was a Notar aircraft. It's believed that gusts at the landing site may have exceeded the capability of its anti-torque system. ■

The MD Helicopters MD902 employs the Notar system as a way to avoid LTE.

LTE is a purely aerodynamic phenomenon in which a fully functional tail rotor system fails to provide effective directional control. The result is sudden uncommanded yaw that can't be arrested by normal control inputs.

Garmin is certifying its new rotorcraft flight control system, the GFC 600H, for VFR and IFR helicopter operations. It's also introducing TXi touchscreen displays for rotorcraft.

Garmin GFC 600H offers new flight control for helos

by Matt Thurber

Garmin has unveiled its next foray into flight control systems, the new GFC 600H. It's designed to build on what the company has learned with fixed-wing autopilots and deliver new safety benefits to VFR and IFR helicopter operations. Garmin also announced a full suite of its new TXi touchscreen displays for rotorcraft, as well as upgraded G1000H NXi helicopter integrated flight decks.

"We're working hard to bring this type of technology to the helicopter world," said Jim Alpiser, director of aviation aftermarket sales. "For so many years, the rotorcraft world has been underserved from a technology perspective. That's why we have made the investment we did with flight displays, the G500H. Now we're updating to the new TXi and new flight control technology. This takes what we're doing in the helicopter world to a whole new level."

The first certification program for the GFC 600H and TXi displays is in Garmin's Airbus AS350B2, and the design work and installation was done at Garmin's Salem, Oregon facility. While the GFC 600H will be offered in two architectures—one for VFR and one for IFR helicopters—the VFR system will be first to market, with certification estimated in the fourth quarter this year, followed by the IFR system. The TXi displays should be certified at the same time, but these will be done via an approved model list (AML) STC in a variety of helicopters. Autopilots aren't certified via the AML process and must be approved for each helicopter model.

The GFC 600H three-axis flight control system now installed in the AS350B2 consists of a servo installed in parallel to the controls, which is simpler than the linear-actuator-based system that will be featured in the IFR-stability augmentation system. The yaw axis "is novel for light helicopters," Alpiser said. "When in hover, if you engage the yaw axis it will hold the current heading. In cruise it holds the aircraft in trim so the ball stays in the middle." A collective position sensor is tied to the system so that the flight control system automatically moves the anti-torque pedals when the pilot moves the collective.

For pilots, the parallel servo system is designed to make flying easier while allowing full control of the helicopter. In fact, the flight control system can be switched on during takeoff and landing. The system's basic mode maintain's the helicopter's attitude, and provides force feedback when the pilot deviates from the attitude. "It's a fly-through system," he explained. "You push it out of the detent to move to a different attitude, then release it and it returns to that attitude." A four-way or force trim switch on the cyclic is used to adjust to the new attitude.

A unique feature of the GFC 600H is that it incorporates Garmin's Electronic Stability and Protection, which includes a LVL button that returns the helicopter to straight-and-level flight from unusual attitudes, as well as overspeed protection, limit cueing, and low-speed protection. "We hope no one has to use these features," said Garmin flight test manager Sean Doyle, "but we hope they will."

The GFC 600H adds other features that "might be found in larger helicopters," he noted. For example, hover assist or ground-position stabilization, which helps the pilot stay in a hover, "even in strong and gusty winds." In the basic attitude-retention mode, the helicopter will maintain the same heading, even if not in heading mode and even if disturbed by a gust. When coupled with a Garmin PFD, the GFC 600H can capture a selected altitude. A flight director is optional, another feature available with the Garmin display. However, the GFC 600H can be installed by itself, without a display.

GFC 600H lateral modes include heading select, nav, and approach. Vertical modes are indicated airspeed, altitude, altitude select, and vertical speed. A beep switch on the cyclic is used to adjust some of the settings for vertical modes, such as vertical speed.

Components of the GFC 600H include a GFS 83 force-trim servo, GMC 605H mode controller and flight director computer, GSU 75H ADAHRS (for standalone installations without a Garmin display), and a collective position sensor. Total system weight is 13 pounds.

Touchscreen Displays

The TXi displays for rotorcraft replace Garmin's G500H system, with three different options: the GDU 1060 10-inch landscape, the GDU 700P portrait, or the GDU 700L landscape displays (the latter two are seven-inch sizes). The key difference with TXi is that they are touchscreen displays, although they include concentric knob controls for an alternative to touchscreen input. Both the 10- and seven-inch displays offer Garmin's HSI map, which was introduced on the G1000 NXi. The HSI map can display Garmin's Wire-Aware wire-strike-avoidance information. A PFD controller is optional, adding more non-touch controls for pilots who prefer button and knob interfaces.

A new feature for the TXi that wasn't available in the G500H is data logging, and this data can be downloaded wirelessly or via SD card. Another new TXi feature is crew profiles. Installation is easier with new configuration tools that allow export of configurations to entire fleets.

Garmin plans to obtain an AML STC for the TXi displays on the Bell 206, Airbus AS350B2 and B3 and EC130B4 and T2, Robinson R44, and MD 369. ■

AEA: retrofits hit all-time high, lift 2017 avionics sales

Avionics sales climbed 2.9 percent last year, to $2.33 billion, reversing two straight years of declines, according to the latest data from the Aircraft Electronics Association, released last month. This year-over-year increase was solely due to a 20.1 percent uptick in retrofit avionics sales, offset by lower forward-fit sales.

Of last year's sales, 42.3 percent, or $984 million, came from forward-fit sales, marking the lowest dollar amount in this category over the last five years. In total, forward-fit sales fell nearly $160 million year-over-year in 2017. By contrast, the retrofit market showed an increase in its percentage of total sales for the fifth-straight year—to 57.7 percent—recording an all-time high of more than $1.3 billion in sales last year. Nearly three-quarters of the 2017 sales volume was in North America (U.S. and Canada), while 26.5 percent took place in other international markets, AEA said.

AEA's data covers all business and general aviation aircraft electronic sales, including component and accessories in cockpit/cabin/software upgrades/portables/certified and noncertified aircraft electronics; tip-to-tail hardware; batteries; and chargeable product upgrades from the participating manufacturers. The amounts do not include repairs and overhauls, extended warranty, or subscription services. **C.T.**

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Rolls-Royce launches 'IntelligentEngine' concept

by Ian Sheppard

British engine manufacturer Rolls-Royce launched an "IntelligentEngine" concept last month at the Singapore Airshow, continuing its push toward using "Big Data." The IntelligentEngine vision is based on a belief that the worlds of product and service have become so closely connected that they are now inseparable, said the company.

According to Richard Goodhead, senior v-p marketing for Rolls-Royce Civil Aerospace, the Intelligent Engine is "the confluence of three concepts—product, services, and digital—coming together." He said that when Total Care started for Trent engines, "the [three] circles started to overlap" and now Rolls is "taking far more data and doing far more with it."

Goodhead also said it can be represented by the "Three Cs: connected, contextually aware, and comprehending," meaning the engine can learn from its own experiences and those of other engines.

"In addition to designing, testing, and maintaining engines in the digital realm, the IntelligentEngine vision sets out a future where an engine will be increasingly connected, contextually aware, and comprehending, helping to deliver greater reliability and efficiency," said Goodhead.

Dominic Horwood, Rolls-Royce director, customer and services–civil aerospace, said: "In the nearer term, it will focus us on developing the skills, tools, and technology we need to deliver an engine that is connected, contextually aware, and comprehending. In the longer term, our ambition is unbounded; we could be looking at engines that understand their own condition and can heal themselves, or even engines with interchangeable cores."

In December 2017 Rolls-Royce launched R2 Data Labs, which it described as "an acceleration hub" for data innovation. Horwood said this is playing a key role in achieving the aims of the IntelligentEngine: "Using advanced data analytics, artificial intelligence, and machine learning...to unlock design, manufacturing, and operational efficiencies within Rolls-Royce." The launch of R2 Data Labs came after it formed a partnership with Tata Consultancy Services (TCS), also complementing a preferred partner agreement with Microsoft for cloud solutions.

At its data lab, Rolls-Royce is combining its own data with that of airlines to achieve additional savings, by studying the activities that account for a majority of an airline's costs.

Aircraft Availability Center

Another recent development supporting the IntelligentEngine vision was the opening of the Airlines Aircraft Availability Centre in June 2017. The center is situated at Rolls's headquarters in Derby, UK, and is "ready for the transformation in volume and richness of data—from kilobytes of data per flight to terabytes," said the company. "This, when combined with our engineering teams' expertise, creates new insights which allow better and faster services decisions to be made. That work is complemented by Rolls-Royce's global network of customer service centers, created to work locally with customers, by providing in-depth expertise."

Combining Rolls-Royce data with customer data will lead to "dramatic improvements to airline economics in terms of aircraft availability and fuel efficiency," the company claimed.

R-R said the new approach would take the focus beyond maintenance services, and from activities representing only 4 percent of an airline's direct operating costs to nearly 70 percent. "Those availability services involve a growing understanding of what 'the perfect fuel-saving flight' involves—one which accounts for weather, air traffic control restrictions and advises airlines on the most efficient way to fly in different conditions. This offers airlines the opportunity to save millions of dollars when a one percent fuel saving equates to a $250,000 saving per aircraft per year."

Product Manufacturing

Digital capability also completes a loop within Rolls-Royce—not only informing product design and services, but also manufacturing. One example, it said, is the Joint Lab to develop Smart Manufacturing technologies set up by the Agency for Science, Technology and Research (A*STAR), Rolls-Royce, and Singapore Aero Engine Services Limited (SAESL).

The parties announced last year a plan to invest up to S$60 million (US$45.5 million) to set up a lab to develop next-generation aerospace manufacturing, as well as MRO capabilities enabled by advanced processes, automation and digital technologies. ■

Orolia, AFI KLM team on A320 ELT retrofit

Orolia, further establishing itself as a leader in advanced emergency locator transmitters and distress-tracking beacons (ELT-DTs), is teaming with AFI KLM E&M to certify its Kannad ELT-DT for retrofit on the Airbus A320 family.

The effort, part of the European Commission's Horizon 2020 Helios research program aimed at developing next-generation distress beacons, requires a supplemental type certificate (STC). The STC, expected to be available in 2019, would pave the way for airlines to retrofit A320-family aircraft with the system.

Announced at the 2017 Paris Airshow, the Kannad ELT-DT meets ICAO's Global Aeronautical Distress & Safety System standards, which call for position reporting at 15-minute intervals and autonomous distresstracking. The Kannad beacon will automatically activate should the aircraft depart from its programmed flight profile or other flight parameters.

AFI KLM E&M is responsible for system integration of ELT-DT technology. Orolia is the Helios project lead.

Meanwhile, the company will continue to supply its ELT beacons to Airbus Helicopters under a wide-ranging 20-year agreement announced on February 7.

Under the deal, Orolia will continue to supply its Integra ELT, which—unlike most other ELTs—can use an internal GPS and backup antennas to ensure communications with the Cospas-Sarsat global satellite-based search-and-rescue system. Most Airbus helicopters in service have an Integra installed.

The extension covers all civil and military helicopters made by the European manufacturer. It also includes "complete product support to the global network of Airbus Helicopters service centers," Orolia said. **S.B.**

News Update

Next-Gen training from CAE

CAE launched a new pilot training system at the Singapore show, which will begin operation later this year with AirAsia. Known as CAE Rise, the system employs the company's Next Generation Training System methods, which permit greater levels of standardardized training in accordance with the airline's SOPs.

Rise allows instructors to objectively assess pilot competencies using live data during training sessions. It enables instructors to identify proficiency gaps using evidence-based methodology. Another advantage of Rise is that it provides the operator with data that can be analyzed to evolve the training syllabus in areas that may be deficient.

STC Connects FreeFlight Sensor and L3 Transponders

Stevens Aviation has received an approved model list (AML) STC for installation of the FreeFlight Systems 1203C SBAS/GNSS sensor along with L3's NXT mode-S transponders, to provide a reasonably priced ADS-B Out solution for several Part 25 business aircraft. The first installation was done in a Cessna Citation 650 with non-integrated avionics by Stevens Aviation's Dayton, Ohio avionics team.

L3's NXT-600 is a form-factor replacement for the ACSS RCZ-852 transponder, according to Stevens Aviation, and it can also replace the Rockwell Collins TDR-94D. The ADS-B Out upgrade covers other GPS sensors and includes two NXT-600 transponders and for accurate position information, the FreeFlight 1203C GPS sensor, an L3 NXG-900 GPS, or upgrade of existing Universal Avionics FMS.

FAA: U.S. ADS-B Mandate Applies to Foreign Operators

The Jan. 1, 2020 effective date requiring ADS-B Out for operating in certain U.S. airspace applies to foreign-registered aircraft as well as N-numbered aircraft, the FAA stressed in its latest edition of *FAA SatNav News*. In addition, the agency said, ADS-B Out equipment on non-U.S.-registered aircraft must comply with the same performance requirements laid out for N-numbered aircraft in FAR 91.225 and 91.227.

The publication also contained other ADS-B reminders and clarifications. For example, operators are required to have ADS-B transmitting at all times, including while on the surface of the airport. Also, GPS receivers used as an ADS-B position source must be compatible—have "approved pairing"—with the installed ADS-B transmitter.

Portable ADS-B Out units are not authorized for several reasons, but mainly because they would not meet the applicable TSO C166b or C154c for installed equipment that is required on aircraft with a standard airworthiness certificate.

The Alsim AL250 is a generic sim that can be modified to replicate the cockpits of typical single- and twin-engine airplane models.

Hands On

Alsim AL250 prepares pilots for real-life flying

by Matt Thurber

Alsim Flight Training Solutions brought its AL250 flight simulator to the Singapore Airshow to demonstrate the system's capabilities for pilot training and the new engineering pack, which allows users to modify aerodynamic derivatives of a particular aircraft to demonstrate the effect on flight dynamics. Users can also use the pack to "redesign" autopilot features and test the resulting changes, or create and evaluate a new aerodynamic model.

The AL250 is designed as a reconfigurable generic aircraft type, capable of replicating typical single-engine and twin-engine airplanes. In the twin-engine configuration, the AL250 flies like the popular Piper PA44 Seminole.

Housed in a compact enclosure with plenty of space for a student and instructor, the AL250 includes Alsim's HDVS visual system with 250-degree horizontal and 49-degree vertical field of view. Avionics can be quickly changed between a typical large-display modern glass cockpit to traditional "six-pack" gauges. Engine, flight controls, and electrical switches are robust and accurately modeled. Avionics include a real Garmin GTN 650 GPS com/navigator. An instructor station allows for modifying weather and flight parameters and introducing failures, which can also be done via laptop computer or mobile device.

During a test flight of the simulator, we took off in the Seminole for a quick flight around Bali. While testing the feathering capability of the right propeller during a simulated engine failure, we watched as the propeller blades pitched vertically to eliminate drag on the right engine, while having to step on the left rudder pedal to maintain directional control. Performance of the simulator seemed to accurately replicate the real Piper Seminole.

We flew an ILS approach back into Bali, and the Garmin GTN 650 worked perfectly. Handling of the AL250 is closely matched to the real airplane, thanks to electric control loading, and landing the replicated Seminole was highly realistic.

Nantes, France-based Alsim has been in business for more than 25 years and has delivered more than 300 FAA- and EASA-approved simulators in 48 countries. The company recently opened a sales office in Austin, Texas, to serve the U.S. market.

Cost of the AL250 ranges from $150,000 to $180,000, depending on the configuration. ■

ArincDirect now part of Stellar Cloud

by Matt Thurber

The transformation of Rockwell Collins's ArincDirect Flight Operations Software (FOS) into an online platform running on the Stellar Cloud is complete. Upgrades to the Stellar Cloud are available at no additional cost for FOS customers with systems hosted by Stellar or Rockwell Collins. Customers running FOS on their own computers can take advantage of Stellar's On-Ramp promotional pricing.

The Stellar Cloud is "a next-generation software delivery infrastructure platform for business aviation solutions," according to the companies, and it runs on the Amazon Web Services (AWS) infrastructure. Switching to the Stellar Cloud eliminates any need for FOS customers to host the software on their own computers, thus reducing the risks of downtime and data loss due to hardware problems, and also saving time and resources on management of hardware, software, patches, and upgrades.

AWS provides "auto-scaling, elastic load balancing, replication, and auto-provisioning of computing resources," according to Stellar, and scales to "seamlessly match both operator growth and peak-day demands." Stellar Cloud also provides "data center and data storage localization, continuous security monitoring, and advanced two-factor authentication," including 99.9 percent guaranteed availability and back-up, failover, and recovery services. The overall result of hosting on the Stellar Cloud is much faster system responsiveness, according to the companies, "with nearly instantaneous response to common user tasks such as building trips and quotes."

Additional Opportunities

Stellar Labs and Rockwell Collins are working on a new flight-planning, operations, and business platform with features to help business aircraft operators expand their operations and take advantage of new market opportunities. New capabilities will include "owner access, advanced business intelligence, and operator-to-operator trip collaboration, all integrated with their existing FOS implementation."

"We started Stellar with the vision of transforming the business of business aviation for operators and consumers, and our partnership with Rockwell Collins is instrumental in executing this vision," said Stellar co-founder Paul Touw. "This announcement marks the completion of the first step of this journey." ■

Controp helps keep birds and drones at bay

Israel's Controp Precision Technologies has drawn on its experience in the field of wildlife detection to launch Speed-bird, a new product that provides early detection of birds, animals, and drones that approach sensitive operational areas. Early warning significantly improves airport safety as it provides greater reaction time to respond to the potential danger.

Wildlife incursions are an everyday hazard for airports around the world. The potential dangers of birdstrike are obvious, but they are being compounded by the recent dramatic rise in private drone use. Moreover, many airports suffer from incursions of terrestrial animals into operational areas, and there is always the danger of occasional human trespassing.

Based on Controp's Spider system, Speed-bird employs sensitive panoramic scanning technology with algorithms developed specifically to automatically detect birds and other small flying objects. It can also be used to automatically detect small moving ground objects such as animals.

Speed-bird has been developed to overcome the technological limitations of radar-based bird detection systems, and is integrated as a key element of the Pharo-vision Sentinel system. Speed-bird has a continuous zoom infrared sensor and full-color day camera, which combine to provide continuous wide-area surveillance and tracking capabilities.

Controp is supplying two Speed-bird systems to Tel Aviv's Ben Gurion airport, one of which will focus on airspace surveillance while the other will be set up to monitor ground movements near taxiways and runways. Dallas City Council has ordered a single unit for installation at Love Field in late 2018. **D.D.**

Sikorsky sells S-300 line

by Mark Huber

Sikorsky has sold the Hughes/Schweizer S-269/300 series type certificate and all related items, including its parts stores, to a new entity formed by Fort Worth, Texas-based Rotorcraft Services Group (RSG). The new entity, Schweizer RSG, will also be based in Fort Worth and will be headed by David Horton, a former Schweizer president and general manager from 2008 to 2010.

"I still have a lot of friends who operate these helicopters," Horton said. "We need to get those parts here...and support our customers as soon as possible." Horton told **AIN** that he hopes to have a website for the new company up and running soon, have parts available for customers before the end of February, and strongly suggested that the operators of an estimated 2,900 S-300-series aircraft worldwide would soon see better product support and competitive prices.

"We are going to work to remain competitive and make sure we have a very strong supply chain so we can deliver a good-quality product at a market-accepted price," noting the pressure on keeping direct operating costs low in the piston-single space. "If we don't pay attention to our customers' direct operating costs [DOCs], we're not going to be relevant. We will make adjustments to make sure our DOCs are competitive with anything else in the market space."

Sikorsky's prior agreement that dates back to 2008 with China's Avic to manufacture airframe parts for the S-300 remains in place with Schweizer RSG as part of an overall strategy to keep prices reasonable. He said Schweizer RSG would sponsor a gathering of S-300 distributors and operators at Heli-Expo next month. "We want to make sure we focus on what they tell us they need," said Horton.

Horton did not rule out eventual new helicopter production, but said for now the company will focus on supporting the fleet in place. "We have a license agreement with Avic, and we have a shared responsibility for building the entire airframe. We're going to share that responsibility on what makes the most sense. We're going to have to build new helicopters to keep the market energized, and it has to be something the market will accept. Avic is an important part of that in terms of building parts."

Since 2011, Avic's Avicopter has been manufacturing a virtual copy of the S-300 it calls the AC310 with a base price of approximately $470,000.

The Sikorsky S-300 series has faced a number of challenges since Sikorsky acquired the line from Schweizer in 2004. The helicopter will now be supported by Rotorcraft Services Group.

Schweizer History at Sikorsky

Sikorsky's stewardship of Schweizer proved troubling on a variety of fronts. Sikorsky purchased Schweizer in 2004 and over the subsequent years Sikorsky's commitment to the S-300 became increasingly ambiguous, with operators growing more frustrated with ongoing parts supply and pricing issues. While members of the Schweizer family were initially enthusiastic about Sikorsky's ability to improve their business with additional resources, by 2010 they had been dismissed from the company and were suing Sikorsky—ultimately unsuccessfully—for breach of the 2004 purchase agreement. Sikorsky's efforts to develop a high/hot variant of the S-333 turbine called the S-434 were largely unsuccessful.

While the S-434 featured a four-blade rotor, a new tail-rotor blade design and an improved Kaflex driveshaft, the main rotor and transmission came from the unmanned MQ-8 Fire Scout. And it used the same 320-shp (derated max takeoff power) Rolls-Royce 250-C20W turboshaft as the S-333, even though the S-434's mtow was 2,850 pounds, 300 pounds more than that of the S-333. Nine S-434s were delivered to the Saudi Ministry of Defense beginning in 2009, but shortly thereafter it was determined that the drive train components weren't robust enough to provide for economical operation, and plans to pursue FAA certification were dropped.

Further doubt about Schweizer's future surfaced in early 2015, when, on the cusp of being acquired by Lockheed Martin, Sikorsky announced it would no longer accept new orders for the S-300 and single-turbine S-333 and that it was "evaluating all options," including the sale of Schweizer. ■

Appeals court clears path for 16 more Army Lakotas

The United States Court of Appeals on January 25 overturned a 2016 federal claims court decision that challenged the U.S. Army's authority to expand its Airbus Helicopters UH-72A fleet without competitive bidding. The original complaint was brought by Leonardo unit AgustaWestland North America, which has repeatedly challenged the Army's decision to acquire Lakotas, dating back to 2006. The Army operates more than 400 UH-72As for a variety of missions, including primary pilot training at Fort Rucker, Alabama.

The Army has exercised its option to acquire 412 UH-72As under a 2006 contract, but this number provided insufficient units to fully meet its training requirement. Following a 2014 executive order that laid the ground for rationalizing the Army's rotorcraft fleet to four principal types—the UH-72A, UH-60, AH-64, and CH-47—on Dec. 10, 2015, the Army issued a Justification and Approval (J&A) to acquire an additional 16 UH-72As from Airbus "on an other than full and open competition basis." The Army said the decision was justified due to cost and delay concerns with "procuring and sustaining an alternate aircraft." AgustaWestland had proposed its single-engine AW119Kx for the role.

AgustaWestland responded to the Army's decision by filing a supplemental complaint, a motion for preliminary injunction, and a motion for judgment on the administrative record with the federal claims court designed to block the acquisition, arguing that the Army's decision to acquire the additional Lakotas violated federal competitive bidding law. The U.S. government challenged these, and the claims court found for AgustaWestland and enjoined the Army from proceeding with the acquisition.

In a rebuke of the claims court, the appeals court ruled that the Army's decision to acquire the additional Lakotas spawned from 2012 Department of

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News Update

Bell 525 Program Progressing

Since the Bell 525 returned to the air last July, Bell Helicopter has flown both of its remaining 525 super-medium twins and accumulated an additional 181 flight test hours. Tasks performed since then include completing a four-day, 12-flight-hour cross country ferry flight to deploy the aircraft for cold weather testing; cold weather testing in Canada and cold soak test to -35 degrees C; super drive system loss-of-lubrication test; return to flight with software addressing more than 300 problem reports; and initial coupled flight guidance testing. In addition the company installed and tested production version of GE engine software, executed and passed the boosted controls and cockpit controls proof-load test for FAA credit. Other reported progress includes initial avionics system development testing (nav and comm), finalizing upper cowling configuration, and gathering preliminary noise survey data and passing those certification requirements. The 525 program had been stood down for a year following the fatal crash of its first flight test vehicle in July 2016. FAA certification is anticipated in 2019.

Vahana Makes First Flight

The A(3) Airbus Vahana self-piloted electric vertical takeoff and landing (eVTOL) made a 53-second first hover flight on January 31 at the Pendleton, Oregon UAS range and a follow-up flight achieving an altitude of 16 feet. The single seat Vahana is aimed at the emerging urban VTOL market. It features skid gear and eight proprotors mounted to fore and after tiltwings. The company says the aircraft is designed to have a range of 50 miles and will be equipped with sense-and-avoid systems and can be configurable as an air taxi, air ambulance, or cargo delivery platform. The prototype "Alpha One" aircraft weighs 1,642 pounds and has a wingspan of 20 feet, is almost 19 feet long and 9 feet tall. A(3) is aiming to have the aircraft in production by 2020.

Russian Helicopters Advances Mi-171E2

Russian Helicopters announced that the Mi-171E2 twin has completed a 45-flight/50-hour test campaign. The new generation of Mi-17/171 series helicopter offers improved operating efficiency at high altitudes, carrying capacity, maximum and cruising speed, climbing ability, directional control reserve, reduction of noise level caused by main and tail rotors, increased main rotor thrust, better controllability and maneuverability, and significant power reserve in various flight modes. The Mi-171E2 features VK-2500PS-03 engines with Fadec, a new composite main rotor system and X-shaped tail rotor, an upgraded body, modified tail and keel beams and a larger stabilizer. **M.H.**

Deliveries down at Airbus; company rethinks heavy X6

by Mark Huber

Airbus sees a growing market for super-medium twins such as the H175 as offshore oil-and-gas operators seek more cost-effective replacements for larger models.

Airbus Helicopters delivered 409 helicopters last year, a slight decrease from 418 in 2016, the company announced in late January. Gross orders for the year were 350, also down from 388 in 2016, while net orders stood at 335 last year, 18 fewer than in 2016 but up slightly from 333 in 2015. Worldwide, the company maintained its 50 percent market share.

Outgoing company CEO Guillaume Faury, who was recently tapped to lead Airbus's commercial aircraft division, said the numbers "reached our target" in a "challenging market." Faury also revealed that, despite receiving no new orders from the oil-and-gas segment for its heavy helicopters for three straight years, the company received orders for 54 Super Puma family (H225/215) helicopters from military and parapublic customers last year; and that it is rethinking its future X6 large-helicopter project.

He said the unspecified technologies Airbus was considering for the X6 are "not ready" from suppliers and "the market is not sustainable" for a new heavy twin in the depressed oil-and gas-space, which is increasingly turning to smaller super-medium twins such as the H175. Airbus booked orders for 19 more H175s last year, and the in-service fleet has amassed 20,000 flight hours, Faury said.

He called the H175 the "joker" in the oil-and-gas space, alluding to its ability to perform missions of several different classes of helicopters efficiently. However, he cautioned, "I don't anticipate a structural recovery in oil-and-gas. There's still a very large overcapacity of heavy helicopters in this segment. We don't anticipate that the rise of oil prices in the short-term or even the midterm will absorb this overcapacity." He said the overcapacity problem could linger for "the next couple of years."

Faury hinted that the X6 might ultimately emerge as a significantly different, perhaps military-driven, product. For now, he said, Airbus Helicopters "will not launch a full-fledged program," but will rather continue research, and that the $429 million in European Union-approved subsidies for the program from France and Germany remain "in place."

"A successor [to the H225] has to be able to answer to the expectations of the military market," Faury said. "We believe this military market may be more active [in the future] than it is today." However, right now, he said, "Airbus could not make a robust business case" for the X6.

The future of the in-development H160 medium twin is bright, Faury said, given the French military's selection of the type for its HIL (hélicoptère interarmées léger) replacement program, with the promise of orders for up to 190 H160s.

Faury said the continued depressed civil helicopter market was a "crisis" that enabled the company to accelerate its companywide lean transformation and digitization initiatives. Part of the transformation involved "rationalization" of the product line by discontinuing production of the H120 and AS350B2 singles and the AS365 twin; yet-to-be-announced specifics involving "digitization" of the H125/H130 singles; and continued work on vertical takeoff and landing (VTOL) aircraft and electric propulsion.

According to Faury, the City Airbus eVTOL will make its first flight by year-end, and the compound Racer prototype will fly in 2020. Further, he said the company is continuing its digital initiatives that involved providing customers with a seamless "end to end" solution to capture, analyze, and store data and assist in operations. "First we had to learn to crawl, then to walk. Now is the time to run," Faury said.

The new initiatives have allowed Airbus Helicopters to cut costs, grow market share, and increase customer satisfaction, he noted. While his successor has not been named, Faury said that he hopes whoever replaces him will continue the company's transformation program, explore new markets and opportunities, and continue to embrace new technologies such as electric propulsion and autonomous flight.

He predicted the unmanned market would grow to a "one billion dollar business in the next 10 years." More immediately, he said the company's VS700, its unmanned/autonomous version of the Helicopteres Guimbal Cabri G2 two-place training helicopter, would gain military certification in 2019.

"We think VTOLs will grow," he said, adding that "over time, the number of missions and the nature of missions they will perform will grow," but that he didn't see any short-term cannibalization of the traditional light-single helicopter market by VTOLs. However, "Long-term, there will be a sort of fusion between what the drones and helicopters are. Helicopters will become more and more automated." ■

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Army Lakota buy

The Army operates more than 400 twin-engine UH-72As for a variety of missions, and a recent court decision allows it to acquire more without a competitive bidding process.

Defense strategic guidance and the 2014 executive order and was therefore not a procurement. As a result, the claims court lacked jurisdiction in the matter. The appeals court further ruled that the claims court "abused its discretion" by relying on "supplemental evidence" and by supplementing the administrative record. The claims court was required to consider only evidence presented by the Army to justify its acquisition decision or to explain why omitted evidence frustrated judicial review. According to the appeals court ruling, it failed to do the latter.

Finally, the appeals court noted that the Army had legal authority to eschew competitive bidding for the acquisition and had more than legally made the case to do so, specifically by noting that new Lakotas were available only from Airbus and that procuring 16 additional helicopters of a different type would impose undue and significant costs and delays—up to three years—and cause "significant gaps" in the ability of the Army National Guard to meet its missions.

In a statement issued after the decision, Airbus Helicopters praised the Court of Appeals' decision, noting that it ends "a two-year saga of one contractor attempting to wrestle business from a customer by holding Army readiness hostage. This ruling also removes the threat that Leonardo has held over the heads of our American workers in Mississippi—more than 40 percent of whom are U.S. military veterans—as it has tied up Army procurement long enough to nearly shut down our American production line.

"This wasteful lawsuit not only damaged the Army's readiness by limiting its ability to train new pilots, but [also] threatened to cost the taxpayers countless millions by attempting to force the Army to introduce a brand-new aircraft into its inventory. Had Leonardo succeeded, it would have been a massively expensive step backward from the Army's cost-saving aviation restructure Initiative. No one could ever argue that it was in the best interests of Army aviators or the taxpaying public to force the Army to train its pilots with a fleet made up of 90 percent Lakotas and 10 percent of something else.

"Today's ruling is a victory for every one of our peers and competitors that holds that view, and that prefers to win business on the strength of its products rather than the strength of its lawyers," Airbus said in a statement.

After initially indicating that it would appeal the Appellate Court decision and contest future Army Lakota purchases, Leonardo issued this statement on February 12:

"In light of the Appellate Court ruling, Leonardo Helicopters has decided to discontinue any further legal action regarding the sole-source award of trainer helicopters to the U.S. Army. We nonetheless continue to believe that strong competition for government programs is in the best interests of our warfighters, American taxpayers and the U.S. defense industrial base." **M.H.**

Air Methods and Airbus settle with crash survivor

by Mark Huber

Air Methods and Airbus Helicopters will share the costs of a $100 million settlement with a surviving crewmember of a crashed 2013 Airbus Helicopters AS350 B3e. It went down after attaining an altitude of 100 feet agl approximately 30 seconds after takeoff from the Summit Medical Center Heliport in Frisco, Colorado, on July 3, 2015. The helicopter crashed into a parking lot 360 feet southwest of the ground-based helipad and was destroyed by impact and post-crash fire.

The pilot died as the result of his injuries and the two flight nurses were severely injured. Paramedic/flight nurse David Repsher, the plaintiff, sustained burns over 90 percent of his body while paramedic/flight nurse Mathew Bowe sustained impact injuries. Both men are permanently disabled and Repsher has ongoing and significant medical issues. Air Methods will contribute $45 million of the settlement with Airbus Helicopters contributing the remainder. Repsher's lawsuit had been scheduled to start March 5.

The NTSB found that the probable cause of the accident was the helicopter's "(1) preflight hydraulic check, which depleted the hydraulic pressure in the tail rotor hydraulic circuit, and (2) lack of salient alerting to the pilot that hydraulic pressure was not restored before takeoff. Such alerting might have cued the pilot to his failure to reset the yaw servo hydraulic switch to its correct position during the preflight hydraulic check, which resulted in a lack of hydraulic boost to the pedal controls, high pedal forces, and subsequent loss of control after takeoff.

"Contributing to the accident was the pilot's failure to perform a hover check after liftoff, which would have alerted him to the pedal control anomaly at an altitude that could have allowed him to safely land the helicopter. Contributing to the severity of the injuries was the helicopter's fuel system, which was not crash resistant and facilitated a fuel-fed post-crash fire." Repsher's seat also was not properly fastened.

The settlement came just days before survivors of another Airbus Helicopters crash, this one an EC130 B4 that went down during a Grand Canyon air tour flight, suffered extensive post-crash burns.

Crash Resistance

All helicopters certified by the FAA after 1994 are required to have crash-resistant fuel systems; however, legacy helicopters whose original type certification predate the rule change—such as the AS350 and its variants including the EC130—are exempt.

In 97 fatal helicopter accidents between 2008 and 2013, post-crash fire occurred in 39 percent of Part 27 aircraft without fuel systems meeting crash-resistance requirements and contributed to 20 percent of the fatalities in those accidents, according to data from the Civil Aerospace Medical Institute (CAMI). It further discovered that only 16 percent of all U.S.-registered rotorcraft were in compliance with the fuel system crash-resistance requirements, even though those requirements had been in force for 20 years at the time of the study.

CAMI data identified blunt force trauma as the cause of death in 92 percent of all fatal U.S. helicopter accidents between 2008 and 2013; and the cause of death in 80 percent of the Part 27 accidents where a post-crash fire occurred.

As of late last year, there were two sources of retrofittable crash-resistant fuel systems, according to an Airbus Helicopters spokesman. Airbus Helicopters has received FAA approval and has offered a retrofit CRFS service bulletin for only the H125/AS350B 3e since 2016. "It should be noted that many or most installations are in some ways unique and require a service bulletin for the specific aircraft configuration," he said.

Standard Aero (formerly Vector Aerospace) is the only FAA-certified provider for all other AS350-series models, including the EC130 B4. The tank is designed as a replacement for AS350 models, including the AS350C, AS350D/D1, AS350B/B1/B2/BA/B3, AS350B3e (H125) and EC130B4. Offering the same capacity as the legacy fuel cell, safety features include a self-sealing breakaway valve, vent system roll-over protection, a vent system flame arrestor, and a crash-resistant recessed sump drain valve, all aimed at increasing survivability for passengers and crew. In addition, the new tank complies with FAR 27.952 fuel system crash-resistance requirements.

In an exclusively interview with **AIN**, Airbus Helicopters CEO Chris Emerson said, "We are helping operators" retrofit aircraft with crash-resistant fuel systems. "We are not leaving our customers alone to solve this problem. We will help them find solutions." Crash-resistant fuel systems have been standard on all new AS350 B3e models delivered since late 2015. While Airbus Helicopters is offering customers technical assistance, Emerson stresses this is not as of yet taking the form of any structured financial offering or discounting.

The Colorado accident was similar to one the year before with an AS350 B3e EMS flight in New Mexico and another one with a Customs and Border Patrol AS350 B3 in 2009 the NTSB noted. In the New Mexico accident the crew escaped with minor injuries after the helicopter crashed on departure from a hospital heliport. The pilot reported he was unable to arrest a left clearing turn with right pedal that subsequently developed into an uncontrollable spin.

The NTSB found the probable cause of that accident was "the pilot's loss of yaw control during takeoff due to the absence of hydraulic boost to the tail rotor pedals for reasons that could not be determined based on the available information" and also noted "the lack of a caution indicator to alert the pilot of the lower hydraulic system configuration."

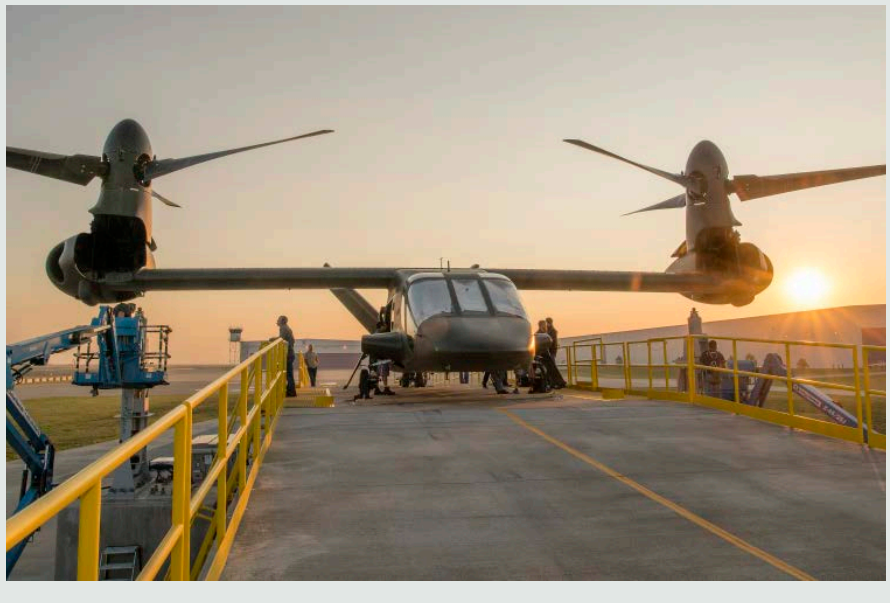
Given the Colorado accident and previous related ones, the NTSB recommended that Airbus Helicopter change the dual hydraulic system on the AS350 "that would both ensure pedal control hydraulic assistance and mitigate the possibility of pilot error during any check of the hydraulic system." ■

Bell V-280 flight campaign advances

Since making its first flight last December 18, Bell's V-280 next-generation tiltrotor has continued its flight-test campaign, conducting more than nine flight hours including pattern flights at speeds up to 80 knots, according to Ryan Ehinger, Bell Helicopter V-280 program manager. Ehinger said the prototype aircraft has accumulated more than 56 rotor turn hours to date and that the development team is continuing to expand the conversion mode flight envelope at higher speeds toward full cruise mode.

"The Bell Helicopter V-280 team continues to work swiftly and decisively to meet the Department of Defense's capability requirements for the next generation of future vertical lift," he said. The V-280 reached another milestone on February 7 when it was flown for the first time by an Army pilot. Chief Warrant Officer Tom Wiggins, U.S. Army Special Operations Aviation Command, made the flight at Bell's test facility in Amarillo, Texas.

The V-280 program is part of the Joint Multi-Role Technology Demonstrator (JMR-TD) initiative, a science and technology precursor to the Department of Defense's Future Vertical Lift (FVL) program. It combines the resources of Bell, Lockheed Martin, GE, Moog, IAI, TRU Simulation & Training, Astronics, Eaton, GKN Aerospace, Lord, Meggitt, and Spirit AeroSystems. According to the U.S. Department of Defense, the FVL program is designed to find a replacement for the Army's Sikorsky UH-60 Black Hawks and the Bell UH-1 operated by the U.S. Marine Corps. The program ultimately could result in deliveries of as many as 4,000 aircraft by 2030 under a contract potentially worth $100 billion and include significant foreign military sales.



Bell said the V-280 can carry 14 passengers and four crew and eliminates the V-22's rear loading ramp in favor of six-foot-wide fuselage doors under the wings. It also differs from the V-22 in that on the V-280 only the gearboxes and prop-rotors rotate, while on the V-22 the engines, gearboxes and prop-rotors all have to rotate as thrust direction is changed. The V-280 also eschews the forward wing sweep of the V-22. Going to a straight wing on the V-280 eliminates the need for a mid-wing gearbox and makes the wing easier to manufacture. The tiltrotor provides twice the speed and range of conventional helicopters.

Specifications include a maximum speed of 280 knots; combat range of 500 to 800 nm; maximum self-deployable range of more than 2,100 nm; and more than 13,000 pounds of useful load. It features fly-by-wire flight controls and a pair of GE Aviation T64-GE-419 turboshaft engines. **M.H.**

Bombardier can now sell its C Series jets in the U.S. unencumbered by tariffs.

Bombardier victorious in legal dispute over C Series

by Gregory Polek

The U.S. International Trade Commission has found in favor of Bombardier in the case filed by Boeing over the sale of 75 C Series CS100 jets to Delta Air Lines at a price the U.S. company characterized as far below the airplanes' cost of production. The January 26 USITC ruling means that Boeing suffered no harm from the sale, thereby superseding U.S. Commerce Department rulings that called for the imposition of tariffs equal to nearly 300 percent of the price of the airplanes.

"Today's decision is a victory for innovation, competition, and the rule of law," said Bombardier in a written statement. "With this matter behind us, we are moving full speed ahead with finalizing our partnership with Airbus. Integration planning is going well and we look forward to delivering the C Series to the U.S. market so that U.S. airlines and the U.S. flying public can enjoy the many benefits of this remarkable aircraft."

For its part, Boeing said it would review the commission's opinions in more detail and suggested a possible appeal. "Boeing remains confident in the facts of our case and will continue to document any harm to Boeing and our extensive U.S. supply chain that results from illegal subsidies and dumped pricing," it pledged. "We will not stand by as Bombardier's illegal business practices continue to harm American workers and the aerospace industry they support. Global trade only works if everyone adheres to the rules we have all agreed to. That's a belief we will continue to defend."

In its complaint filed in April, Boeing claimed that Bombardier sold the airplanes for $19.6 million each, or some $13.8 million less than they cost to manufacture, thanks to illegal subsidies provided by the governments of Canada and Quebec. Delta's April 2016 order came six months after the province of Quebec agreed to infuse $1 billion in the then-financially strapped C Series program, giving it a 49.5-percent stake in a limited partnership with Bombardier. Less than a year later the Canadian federal government agreed to grant Bombardier C$372.5 million in interest-free loans for both the C Series and the Global 7000 business jet.

The decision comes as a huge boost for Bombardier, whose C Series project effectively faced a loss of access to the U.S. market if the USITC ruled to uphold Commerce Department decisions in late September and early October that specified antidumping tariffs of 79.82 percent and countervailing measures amounting to 219.63 percent of the price of each airplane.

The Delta order called for deliveries to start this spring, but when Airbus agreed in mid-October to take a majority stake in the C Series program and assemble some of them at the site of its A320 plant in Mobile, Alabama, it looked as though Delta would have to accept a delay in deliveries while Airbus built the new U.S. assembly line. Now, the unexpected USITC ruling in favor of Bombardier means that Delta can take airplanes built in Mirabel, Quebec, the site of the primary C Series line. However, neither Airbus nor Bombardier have indicated whether or not a victory in the antidumping dispute would mean a change in plans for the source of Delta's airplanes. ■

Seventh flight-test article joins Mitsubishi MRJ fleet

Mitsubishi Aircraft plans to introduce a second new aircraft to its MRJ flight test program, bringing the total number of flight test articles to seven. The decision comes following a review of the program's requirements for additional capacity to address design changes to the MRJ90's avionics bay.

At last month's Singapore Airshow Mitsubishi Aircraft vice president of marketing and sales Yugo Fukuhara issued an update on the flight-test schedule, expected to culminate in time for a mid-2020 first delivery to launch customer All Nippon Airways.

Recent flight test accomplishments include completion of first and second avionics load testing, initial autopilot and FMS, hot and cold climatic chamber, initial natural icing, smoke penetration and detection, initial anti-skid testing, and contaminated runway testing.

Fukuhara reported "no show stoppers" in major areas such as insulation requirements and confirmation of compliance for natural stalls. Tests have also shown that performance stalls have exceeded expectations, and no flutter up to design speeds. The program has also confirmed all corners of the weight/CG envelope, handling qualities, buffet boundaries and takeoffs and landing performance.

Fukuhara also noted that the program has passed the midpoint of flight testing, accumulating more than 1,700 flight hours.

Following no fewer than five major program delays, the MRJ has reached a point where the company can integrate several design upgrades through the course of next year and test the effects of temperature extremes on the reconfigured avionics bay. Meanwhile, another six airplanes have entered various stages of assembly, laying the foundation for a plan to first build a single airplane per month and accelerate production "in a phased manner" until eventually reaching a rate of 10 per month.

First, however, engineers must endure what the head of the MRJ's product management office in Nagoya, Alex Bellamy, described as an extremely busy year of test flying in 2018, culminating in installation of the final avionics bay configuration in the fourth flight test example. Targeting certification by the end of 2019, program leadership now expects the MRJ flight test airplanes to clock as much as 3,000 hours, some 500 more than originally allocated. G.P.

News Update

Eastern Cancels MRJ Order

The new owners of Eastern Airlines have canceled an order for 20 Mitsubishi MRJ90s and waived purchase rights on another 20, the manufacturer confirmed in late January. The cancellation follows Eastern's sale to Phoenix-based charter operator Swift Air over the summer. Mitsubishi attributed the decision to a change in Eastern's "business configuration" and not to delays in the MRJ program's development. With last summer's merger Swift Air's fleet numbered 16 Boeing 737s, including three Eastern Airlines-branded 737-800s.

The MRJ's firm order count now stands at 213. The program has also collected options for 170 airplanes and purchase rights for four.

ATR Seals Breakthrough U.S. Deal

ATR converted to a firm order last year's letter of intent covering 15 aircraft from lessor NAC for operation with Florida-based Silver Airways, the Franco-Italian manufacturer announced in late January. The company plans to deliver the first aircraft from what amounted to its first 2018 order—an ATR 42-600—to Silver this month.

In total Silver Airways will take 20 ATR -600s, 16 of them 46-seat ATR 42-600s and four 70-seat ATR 72-600s. Five aircraft will come from NAC's existing backlog with the manufacturer. Twelve ATR 42-600s and three ATR 72-600s comprise the 15 aircraft added by the new order, but ATR CEO Christian Scherer said the airline could alter the mix later depending on demand. ATR expects to complete deliveries by early 2020, as Silver replaces its existing fleet of 21 Saab 340Bs.

Scherer said the order represents "ATR's comeback to the United States."

India To Allow In-flight Connectivity

After years of deliberation, the Telecom Regulatory Authority of India (TRAI) has decided to allow internet and mobile communication on aircraft for in-flight connectivity (IFC) in Indian airspace through both satellite and terrestrial networks. Once implemented in about six months, the new rules will allow domestic carriers to introduce voice, data, and video in flight. Meanwhile, airlines overflying the country—now required to shut down their systems on entry into Indian airspace—will no longer have to do so.

IFC represents another source of ancillary revenue for domestic carriers, though the structure and costs for charging passengers remain under discussion. Airlines can, as a result, facilitate better customer relationship management and more business value. Meanwhile, real-time passenger connectivity enables carriers to provide targeted marketing. G.P.

Singapore Airlines expects its first Boeing 787-10 to enter service during the second quarter.

Boeing 787-10 cleared for service by FAA

by Gregory Polek

The Federal Aviation Administration has issued the Rolls-Royce Trent 1000-TEN-powered version of the Boeing 787-10 Dreamliner an amended type certificate (ATC), clearing the airplane for commercial service in the U.S., the manufacturer announced on January 22. The award caps a flight-test program involving three airplanes that clocked some 900 hours in the air. The amended certification lays the basis for approval by other regulatory agencies around the world, including the Civil Aviation Authority of Singapore (CAAS), whose final endorsement will allow launch customer Singapore Airlines to start service during the second quarter. Boeing expects to gain certification of the GEnx-1B-powered version of the 787-10 in time for delivery to United Airlines by early in the second half of the year.

Speaking with **AIN** in early January, Boeing 787 chief project engineer Bob Whittington explained that the company had originally planned to use four test airplanes in the program, but as the 787-10's commonality with its smaller sibling, the 787-9, became more and more apparent during the early stages of design, so did the lack of a need for much of the testing to demonstrate the differences between the two models.

The 787-10 and -9 use 95 percent common part numbers, not only reducing the number of test hours needed for the -10 but undoubtedly aiding work flow once full-scale production of the latest Dreamliner begins in North Charleston, South Carolina. Apart from its 18-foot stretch, the only visually obvious difference between the -9 and -10 lies in the -10's semi-levered main landing gear, leaving only some minor structural reinforcements in the fuselage and some systems modifications to account for the bigger cabin. Boeing arrived at the 18-foot stretch by inserting five frames in front of the wing and four frames aft of the wing, allowing for the addition of 40 passengers seats and total capacity of 330 in a two-class layout. Using exactly the same wing found in the -9, the -10's only other significant differences involve localized strengthening of the fuselage, an increase in the capability of the environmental control system and enough extra cargo space for one more pallet or two extra LD-3 containers in both the forward and aft holds.

While maximum landing weight increases by 20,000 pounds to 445,000 pounds and maximum zero fuel weight jumps 25,000 pounds to 425,000 pounds, maximum takeoff weight remains unchanged at 560,000 pounds. Range decreases to 6,430 nautical miles from 7,635 nautical miles.

Completing function and reliability trials and ECS testing ahead of schedule, the third airplane, designated ZC002, revealed no surprises since its first flight during the summer. "It actually performed better than expected," said Whittington.

By the time Whittington spoke with **AIN** on January 5, the first airplane—Trent 1000-TEN-powered ZC001—had completed all but a final stage of stability and control software validation and performing crosswind landings and tailwind takeoffs in Newfoundland. Incorporating technologies from the Trent XWB and Advance engine including a "rising-line" compressor and three-stage bladed disc (blisk) at the front of the high-pressure compressor, the Trent 1000-TEN promised a 3-percent fuel burn advantage over the Trent 1000, the original Rolls option for the 787-8 and 787-9. Entering service with an Air New Zealand 787-9 and a Scoot 787-8 last November, the Trent 1000-TEN has not delivered quite the fuel burn performance Rolls promised, however, and Whittington awaited a new software package to recoup the less than 1-percent deficiency by mid-year.

However, in the 787-10, Boeing's aerodynamic measurements showed a roughly 1 percent better-than-expected drag coefficient, thereby countering the slight deficiency experienced in the Trent 1000-TEN-powered -8 and -9.

Overall, Whittington expressed complete satisfaction with the pace and performance of the aircraft program. As much as the smooth introduction of the 787-9 contrasted with the tortured path of the 787-8's launch to its entry into service, the 787-10 has done as well as if not better than the -9. "It's a tough comparison to make because of that commonality difference," explained Whittington. "The -8, of course, was so unique and so new and so innovative, that flight test program was very long and very complicated...The big difference for us is the customers told us they really wanted the -10 to be as common as we could with the -9, and that really did structure our test program... It's more common than any airplane that I know of and I've been here 32 years, and this has been the most straightforward test program that I've ever seen."

Built exclusively in Charleston largely because the mid-body fuselage section cannot fit in a Dreamlifter for transport to Boeing's plant in Everett, Washington, the first -10 moved through the South Carolina factory "significantly" more easily than the first -9 moved thorough Everett, added Whittington. "The 787-10 flowed seamlessly through the production system," he said.

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CFM tackles lag in Leap deliveries

Production glitches and durability deficiencies have resulted in CFM International having to address a delivery delay for its Leap turbofan family of four to five weeks, a deficit CFM executive vice president and general manager François Bastin characterized as certainly surmountable by the end of the year as the company triples its weekly Leap output from 2017's rate. Speaking during a January briefing to lay groundwork for CFM's activities at the Singapore Airshow, Bastin noted that CFM's production rate has reached more than 20 per week and that the company plans to build between 1,100 and 1,200 Leaps by the end of the year. It delivered 459 last year.

"It's not a walk in the park, of course; it was never meant to be," he said. "So we have some disruptions and we are working to address them. We are a handful of weeks behind demand, which is always too much. Anything but zero is too much. At the same time it is that much and only that much. If you look at the grand scheme of things...it's a tremendous ramp-up that had been set years ago. So we are keeping pace I would say."

CFM executive vice president and GE Aviation's CFM program general manager Allen Paxson reported that the Leap-1A and Leap 1-B together have registered a 96-percent utilization rate despite the need to retrofit starter air valves and pull and inspect some 70 turbine disks in Airbus A320neos' Leap-1As. Paxson said that CFM has completed the valve retrofits and more than half of the turbine disk inspections, which he said the company would finish in about three months. Finally, Paxson reported no fleet disruptions caused by an exhaust-gas temperature (EGT) margin degradation associated with peeling of ceramic matrix composite coatings on the shrouds of Leap-1As and the Boeing 737 Max jets' Leap-1Bs.

CFM plans to build between 1,100 and 1,200 Leap engines by year-end.

"We're still showing 96 percent or better utilization rates with this new product, which is outstanding," he stressed. "There's a lot of work going on behind the scenes to make sure that happens.

"We have capability for increased EGT margin in both the Leap-1A and -B engines, so we're in the process of taking advantage of that and releasing more capability in the engines to mitigate any EGT loss," added Paxson. "At the same time obviously we're improving the shrouds themselves, to provide coatings that have less EGT deterioration impact going forward."

Paxson praised the company's support team for its response to all the operators' early problems, including those in North America that encountered frozen sensor lines resulting from lengthy cold soakings. "Again, our team got after that and within days had that managed, not only for those customers in North America but for the entire world, and put that issue, in terms of a disruption, behind us," he said.

CFM's support organization now employs more than 250 field service engineers and operates 10 overhaul shops, eight component repair shops, 15 on-site support locations, five customer training facilities, and four material distribution centers. **G.P.**

MARK WAGNER

The A350-1000 flew in from Hanoi as part of a 12-city tour of Asia and the Middle East.

A350-1000 shines at Singapore

by Gregory Polek

The newly certified A350-1000 took top billing last month at the Singapore Airshow, where it flew in from Hanoi as part of a 12-city tour of Asia and the Middle East. During a pre-show visit to the Doha base of launch customer Qatar Airways, CEO Akbar Al Baker told reporters that he expects to take delivery of the first of 37 airplanes on order by February 15. After the show the airplane was headed to Bangkok, followed by Sydney, Auckland, Tokyo, and Manila.

Billed as a modern and more efficient replacement for the Boeing 777-300ER, the Airbus A350-1000 fills what the European airframer believes became a gap in the legacy 777's capacity range left when its U.S. competitor decided to start with a baseline of more than 400 seats for its 777X. Although Boeing's 777-8X—scheduled for certification in 2022—seats roughly the same number of passengers as the A350-1000, Airbus thinks that the heavier weight of the smaller of the two 777X offerings will leave its biggest A350 XWB in position to grab a sizeable portion of the world market once dominated by the 300ER.

Speaking at Airbus's opening show briefing, A350 XWB marketing director François Obe highlighted Asia as one of the A350-1000's most important markets. In fact, three of its 11 customers—Japan Airlines, Cathay Pacific and Asiana—hail from the region and account for 43 of the 169 total units on order.

The A350-1000 received type certification from the European Aviation Safety Agency (EASA) and the U.S. Federal Aviation Administration (FAA) last November, after three flight test examples spent more than 1,600 hours in the air, including 150 hours dedicated to tests performed in an irline-like environment to demonstrate readiness for service entry.

Unfortunately for Airbus, the specially configured business class interiors for launch customer Qatar Airways proved not ready for service in time for planned first delivery by the end of last year. The unique seating configuration Qatar calls its Qsuite features seats that face each other and lie-flat double beds.

Nevertheless, the fact that the A350-1000 shares some 95-percent common part numbers with its smaller sibling, the A350-900, contributed to the smooth certification effort and relatively short flight test program, said Obe. Meanwhile, the -1000 also demonstrated better airfield performance than expected, exceeding takeoff weight predictions by 5.3 metric tons out of Riyadh, 7.2 metric tons out of Newark and 3.8 metric tons out of Johannesburg.

Carrying 366 passengers in a typical three-class configuration, or 40 more than the A350-900 holds, the -1000 features an extended wing trailing edge for lower approach speeds, new six-wheel main landing gear to accommodate its higher weight and, of course, more powerful Rolls-Royce Trent XWB-97 engines. It can fly to a range of 7,950 nautical miles, allowing it to support routes for emerging markets such as Shanghai-Boston or Paris-Santiago (Chile), as well as more traditional flight segments as Manchester (UK)-Los Angeles or Dubai-Melbourne. ■

› continued from facing page

Boeing 787-10

"We had half the number of manufacturing problems on the -10 than we did on the -9 in terms of non-conformances written, and the total flow through the factory is almost identical...The manufacturing system doesn't really know the difference between a -9 and a -10."

In an effort to ensure that its customers, too, will see little difference between the two models while flying them in revenue service, Boeing spent a lot of time and energy validating maintenance manuals and preparing to operate the airplanes in flight test much like an airline would. Meanwhile, the group of airlines that comprised the program's advisory panel—including Singapore—emphasized their strong desire for commonality over range.

As of mid-January holding orders for 171 of the 787-10, Boeing most recently inked a letter of intent with Emirates Airline during November's Dubai Airshow calling for an eventual firm order for 40. On the decision to choose the Dreamliner over the Airbus A350, an order for 70 of which Emirates canceled some three years ago, Emirates chairman and CEO Sheikh Ahmed bin Saeed Al Maktoum explained that fleet planners looked closely at both options and reached the conclusion that the Boeing product made the most sense for several reasons, including maintenance cost considerations. ■

Boeing freezes configuration of 737 Max 10

The upcoming Boeing 737 Max 10 has reached firm design configuration, the company announced at the Singapore Airshow. The milestone ushers in the start of the program's detailed design phase, as the company looks toward first delivery in 2020 to one of 18 customers that have committed to 416 of the airplanes since its launch at last year's Paris Air Show.

Boeing vice president of marketing Randy Tinseth noted that although a small proportion of the new orders and commitments represent transfers from another Max derivative, most notably the Max 9, most were completely new, suggesting that the Max 10 has not significantly cannibalized demand for the smaller variant.

"We see a place for both the 9 and the 10, depending on the customer," said Tinseth. "The 10 plugged a hole that we had, and that hole was we didn't have as many seats as the [Airbus] A321."

Addressing the demand mix for the Max family, Tinseth estimated that between 60 and 65 percent of orders will go to the baseline Max 8; 20 to 25 percent to the Max 9 and 10; and roughly 10 percent "on the lower end of that market," namely the Max 7.

The Max 10 incorporates a pair of fuselage plugs to extend the Max 9's length by 66 inches. Other changes include a levered main landing gear, minor wing changes to accommodate the 777-style landing gear and a four-inch-wider mid-exit door to allow for the extra 12 passengers, bringing maximum capacity to 230. Boeing claims it delivers 5 percent better trip cost and 5 percent lower seat-mile cost than the A321LR.

In terms of the family's production, Tinseth noted that the Max 10 forced "a little bit" of a change in plans to accommodate the airplane's introduction into the existing line in 2020, right about the same time rates increase to 57 a month. He also reported that Boeing might need to raise rates beyond that to address the company's growing oversold position.

"We're going to watch it very closely and figure out what happens in terms of what we call meltaway. But if those numbers don't go away, we'll have to think very seriously about [raising rates beyond 57]," said Tinseth. **G.P.**

Bombardier 20-year forecast predicts strong need for 60- to 150-seaters

Driven by rising GDP and a rapid expansion of the middle class, the Asia-Pacific region, exclusive of China, is expected take delivery of 2,050 aircraft in the 60- to 150-seat category over the next 20 years, according to a 2017-2036 market forecast released by Bombardier Commercial Aircraft at the Singapore Airshow 2018. The figure includes 1,050 large regional aircraft (50 to 100 seats) and 1,000 small single-aisle aircraft, and represents 16 percent of Bombardier's foreseen worldwide market for such aircraft (a total of 12,550), with a projected value of $820 billion.

Bombardier expects improving regional economics to triple passenger traffic over the forecast period.

Asia-Pacific will see "compound annual growth of 6 percent GDP, and will boost the region's economy from $3 trillion in 2016 to more than $8 trillion in 20 years' time," said Ross McKeand, Bombardier's head of marketing, Asia-Pacific and China.

Small and medium-size cities with challenging airports will likely see the largest traffic growth, Bombardier says, and by 2036, most of the demand will be for short haul flights of less than 500 nm. **J.W.**

Online MRO Locator Available from Aviation Heaven

Aviation Heaven, an online platform for business aviation operators and maintenance facilities, recently introduced a web-based, worldwide directory of MRO providers to support EASA-, Isle of Man-, and San Marino-registered business jets.

The online tool, developed over the past two years, will assist operators in finding locations that can support their particular aircraft type, before they even fly to that destination. The platform will allow customers to book maintenance slots in advance and provide multiple maintenance sources in AOG situations, according to the Germany-based company.

Subscribers will be able to access a map with all the aircraft in their fleet, and they can change locations of the individual aircraft and search within a set radius to identify which maintenance providers have approval for that aircraft type. Each location will have its data available to allow operators to easily contact them directly.

All MROs with EASA approval are invited to register and submit their information to the network for free, says the company. Plans for the site include a flight-plan function, which can identify maintenance support options while en route, as well as the ability to submit maintenance requests to more than one MRO provider at the same time through the web portal.

Subscribers to Aviation Heaven's new MRO locating tool will be able to access a map with all the aircraft in their fleet. They can change locations of the individual aircraft and search within a set radius to identify which maintenance providers have approval for that aircraft type.

Gulfstream Schedules 2018 Support Events

Gulfstream Aerospace will host several product support events this year, including its biennial weeklong Operators & Suppliers Conference, two customer advisory board meetings, two flight operations forums, and 11 operators forums.

Its flight operations events are created specifically for Gulfstream flight crews and include presentations on advanced aircraft technology, connectivity, and an interactive collaboration session between pilots and Gulfstream personnel. The next one will be held on March 14 in São Paulo, Brazil.

Gulfstream's Operators & Suppliers Conference, to be held from June 3 to 7 at the Savannah International Trade & Convention Center, is the "highlight" of its customer support events this year. This event, which attracted more than 2,000 customers and suppliers in 2016, focuses on safety, operational issues, and technical updates.

The company's operator forums will include question-and-answer sessions with subject matter experts on location and in Savannah via a live feed. Fleet status, mandate and technology updates, maintenance management, technical training, and pending technical bulletins are among the topics of discussion. In addition, Gulfstream will review its fleet support services for operators.

West Star and Embraer Sign Service Agreement

West Star Aviation has finalized a service center agreement with Embraer Executive Jets. Through the agreement, West Star's facility at Tennessee's Chattanooga Metropolitan Airport will offer interior refurbishment, inspection, avionics installation and repair, engine inspections, and parts for the Phenom 100 and 300, as well as the Legacy 450, 500, 600, and 650.

Currently, the Chattanooga service center is expanding to incorporate a paint facility and other additions to accommodate aircraft as large as the Embraer Lineage 1000 and 1000E. The shop, which is expected to open in September, will offer full paint capabilities.

Ruag Teams Complete Complex Mx Projects in Siberia

Ruag Aviation continues to extend its on-site support, completing three complex maintenance and repair events on business aircraft in Siberia for Russian operator AeroGeo Airlines. The events involved two Pilatus PC-12s and a Cessna Caravan 208 that were grounded in Siberia in need of significant repair before they could return to service, Ruag said. The projects each lasted several weeks.

AeroGeo added a PC-12 that had been inactive for a period of time to its fleet to support flights in Central Siberia last year. According to Ruag, it had been stored in a hangar without maintenance checks and subjected to subzero temperatures. AeroGeo had a similar situation with a second PC-12.

The events required spare parts and work on the airframe, cables, components, and engines. Additionally, the Caravan, which had been grounded due to a "frontal impact," required significant structural repairs that involved sheet metal work.

Aussie Board Reviews Part 145

Australia's Civil Aviation Safety Authority (CASA) is nearing conclusion of the consultation phase of a planned comprehensive review of its Part 145 aircraft maintenance certification regulations and associated legislation.

Part 145 was introduced in June 2011 as part of the regulatory program to transition the requirements of aircraft or aeronautical product maintenance certificates of approval from the Civil Aviation Regulations 1988 (CARs). Since then there has been little substantive upgrading, and CASA believes that some elements of the legislation could be simplified and some requirements could be less restrictive, while still maintaining full compliance with ICAO.

Specific objectives of the consultation and eventual proposed rulemaking include ensuring that the requirements effectively address safety risks; reducing complexity; fixing any anomalies and addressing unintended consequences; removing ambiguities and streamlining the legislation; and resolving policy and functionality requirements for specialist maintenance.

No timetable was given for when interim measures might go into effect or when permanent rulemaking and legislative changes would be proposed.

Duncan Aviation Increases Rental Turbine Engine Pool

Duncan Aviation increased its available pool of rental turbine engines by 33 percent to meet customer demand. The pool includes rental engines for the Honeywell HTF7000, HTF7350, and TFE731 (-2C, -3, -5B, -20, -40, and -60).

According to Duncan Aviation's manager of turbine engine services James Prater, the company's growth in engine capabilities and authorizations has increased customer demand for engine services. Prater said that the engine pool and additional selection of rental engines provide customers with the rental engines they need to continue flying when their permanent engines are undergoing core zone inspections or overhauls.

Duncan Aviation's turbine engine services have been evolving over the past three years. Working with Honeywell, the company was able to designate its Lincoln, Nebraska facility a Honeywell AS907/HTF7000 series minor maintenance facility in 2015. In 2016, the same location was named a TFE731 heavy service facility, allowing Duncan Aviation to complete core zone inspections and repairs there.

ExecuJet Haite Becomes Dassault Service Center

Dassault appointed ExecuJet Haite Aviation Services China an authorized service center for Falcon aircraft. Based at Tianjin Binhai International Airport (TSN), ExecuJet's Chinese facility can now perform maintenance and AOG support for the Falcon 7X and 8X.

The TSN facility features a 5,800-sq-m (62,000-sq-ft) hangar and office complex. ExecuJet holds Part 145 certifications from the Civil Aviation Administration of China and the FAA, as well as approvals from the Cayman Islands, Hong Kong, and Macau. The company expects to receive EASA approval by the end of this year's first quarter.

Leonardo Helicopters Opens Mx Facility at Milano Linate

Through an agreement with FBO manager Sea Prime, Leonardo Helicopters opened a maintenance facility at Italian business aviation airport Milano Linate Prime. Equipped to provide line maintenance for private and commercial AW109s and AW139s, the 10,764-sq-ft/1,000-sq-m facility in Milan is a part of Leonardo's plan to expand its support services.

"The agreement with Leonardo happens at a time of growth and development at Milano Linate Prime, both in terms of traffic and of infrastructure," said Sea Prime president and CEO Giulio De Metrio. "Milano Linate Prime has been a natural choice for Leonardo, due to the size and importance of the airport for business and general aviation traffic, including helicopters. This agreement allows [Sea Prime] to further expand the offer of [more] services at Milano Linate Prime, delivering additional value to our clients."

Chicagoland Mx Shop Adds Avionics Service

Gary Jet Center, an aviation services provider at Indiana's Gary/Chicago International Airport, has added avionics services to the capabilities of its FAA Part 145 repair station, and is now an authorized Garmin dealer.

The new division, which according to the family-owned company was introduced to meet growing customer demand, is headed by Victor Gonzales, who brings

Gary Jet Center has added avionics to the service offerings at its Part 145 repair facility, and is now a dealer for Garmin products.

more than three decades of avionics experience on a variety of platforms, including business jets and rotorcraft.

As a Garmin dealer, the location will be equipped to handle avionics upgrades, modifications and completions—from simple installations to full glass cockpits, as well as ADS-B solutions.

London Biggin Hill Repair Center Adds to Capabilities

Interflight, a business aviation maintenance provider at London Biggin Hill Airport, has expanded its service offerings. Operating from a newly refurbished hangar, EASA Part 145–approved Interflight has added type ratings for the Hawker 400XP series, including the Beechcraft 400A and Nextant 400XT. The company provides services ranging from scheduled and unscheduled maintenance to AOG support to inspections, in addition to aircraft charter and management.

"We're delighted to add the new maintenance approvals, which cover about 600 aircraft worldwide," noted director of engineering Lee Sugden. "On top of our additional maintenance approvals, our new hangar is the latest chapter of the Interflight transformation, following new offices for the charter and management division, as well as new aircraft added to our fleet."

Stevens Aviation STCs NXT-600 Transponder

South Carolina-based Stevens Aviation has secured an approved model list (AML) STC for L3 Aviation's NXT-600 mode-S transponder. This allows the company to provide ADS-B Out compliance for several aircraft models. The first aircraft to be upgraded with the installation was a Citation 650 with a non-integrated avionics suite, and the upgrade was done at Stevens Aviation's Dayton, Ohio shop.

The NXT-600 mode-S transponder by ACSS (a joint venture between L3 and Thales) acts as a form-factor replacement for the RCZ-852 mode-S transponder and an alternative replacement for the Rockwell Collins TDR-94D. According to Stevens Aviation, the complete ADS-B Out upgrade package includes the STC and installation, two NXT-600 mode-S transponders, and one standalone NXG-900 GPS receiver, or customers can elect to retain the existing Universal WAAS FMS GPS or upgrade their Universal FMS to WAAS.

API To Distribute PWI's King Air Cabin Lights

Wichita-based PWI has named Aerospace Products International (API) a distributor. Also based in Wichita, API will add PWI's King Air retrofits and LED drop-in replacement reading lights to its product line.

API will carry PWI's 1495, 303, and 1308 LED reading lights. According to PWI, these lights feature heat-reducing technology that allows the lights to run cooler than incandescent lights and some other competitor LED lights. Compared to incandescent lights, these LED lights have a greater lifespan, as well as a brighter and more directed light.

PWI's LED cabin light retrofits are for the King Air 90, 100, 200, and 300. The lights offer a lifespan of up to 100,000 hours while running cooler than fluorescents. They are also designed to be installed easily in existing light fixtures and power supplies.

Avio Design Group Attains DAO

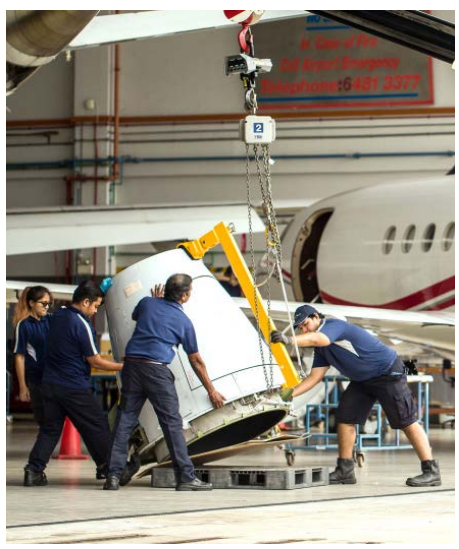
Alberta-based Avio Design Group recently received design approval organization (DAO) certification authority from Transport Canada. This certification will allow the company to expand its design, engineering, and certification services for fixed- and rotary-wing aircraft.

DAO certification allows Avio Design Group to complete its aircraft services at one time in less downtime. Some of the company's customers include Yellowhead Helicopters, Skye Avionics, Regent Aircraft Services, Black Tusk Helicopter, Chippewa Aerospace, and Saskatoon Avionics.

Hawker Pacific Asia Adds Mobile MRO Service

Soon after Typhoon Hato wreaked havoc in the South China Sea last August, Hawker Pacific (HP) Asia Pacific's customer support team received a call from a customer in Macau—two of its Embraer business jets were damaged. The company dispatched an emergency-response team to assess the damage and do on-site repairs. Once the aircraft were airworthy, they were ferried to HP Asia Pacific's facility at Seletar Aerospace Park, Singapore—an authorized service center for Embraer's entire civil product line—for permanent repairs.

"Hawker Pacific Asia offers mobile recovery support, and our teams are always at the ready to support our customers," said Louis Leong, v-p, HP Asia Pacific.



Technicians wrestle an engine cowling onto a pallet at the HP Asia Pacific MRO facility in Singapore.

HP Asia Pacific has been offering customers mobile MRO support since 2000. The facility staffs its field service recovery/aircraft on ground (AOG) desk around the clock. Once a call comes in, the company's technicians and engineers help diagnose the issue, using both descriptions and, where possible, photographs supplied by the customer.

Once the problem is diagnosed, a recovery plan is put into place. In some cases, the problem can be solved remotely, such as by resetting onboard software. In cases where parts and hands-on work are required, HP will source the needed materials and, if necessary, have a team en route in a matter of hours.

HP Asia Pacific averages about five mobile aircraft-recovery calls monthly, the company says. Teams have been sent to both major aviation hubs, including London and Tokyo, and more remote locations, such as Guam, Kazakhstan, and Mongolia.

Tempus Jets Relocates Pilatus Service Center

Tempus Jets moved its authorized Pilatus service center from Scottsdale Airport (SDL) to Falcon Field Airport (FFZ). Now in Mesa, Arizona, the facility will offer Pilatus aircraft services such as scheduled and unscheduled maintenance, repairs, modifications, inspections, and engine changes.

The FFZ facility, located on the north side of the airfield, will also offer a mobile repair unit. The unit can be dispatched to customers' hangars to conduct troubleshooting and maintenance. It can also retrieve AOG aircraft located in remote areas. Tempus Jets's mobile repair unit will be available 24/7.

Elliott Receives STC for ADS-B on Citation Excel/XLS

Illinois-based Elliott Aviation's ADS-B Out/In solution for the Cessna Citation Excel and XLS recently received FAA STC approval. The STC and equipment installation kit are now available through the Garmin dealer network, and Elliott is also currently performing installations.

Elliott's solution features integration to cockpit equipment such as TCAS II, and ADS-B In via a Garmin Flight Stream wireless gateway. The STC features remote-mount Garmin GTX-3000 transponders and can be installed in any aircraft with Honeywell Primus II avionics, such as the Hawker 800A/800XP and 1000; Citation 550s, 560s, 650s, and Xs; Learjet 40/45s; and Embraer Legacy 600/650s, as part of the FAA's follow-on installation policy.

Elliott Aviation's new low-cost ADS-B solution for the Citation Excel and XLS will be applicable to a wide range of aircraft that are equipped with the Honeywell Primus radio package, according to the FAA's follow-on installation policy.

The solution does not require current Honeywell equipment to be sent out for upgrades, which lowers the chance of additional repair costs. In addition, the ADS-B upgrade costs at least 40 percent less than the current one being offered by Honeywell, according to Elliott Aviation.

"This solution can save Honeywell operators tens of thousands of dollars," said Conrad Theisen, director of avionics sales for Elliott Aviation. "There are so many [operators of] Honeywell airplanes that have been looking for a cost-effective solution, and we can provide one to them." It requires no modifications or upgrades to the existing Honeywell hardware.

German MRO Offers CJ series ADS-B Solution

Germany's FTI Engineering Network has received an STC from EASA for an ADS-B Out solution for the Cessna Citation CJ (525) series. The retrofit—available for the CJ1+, CJ2+, and CJ3 equipped with the Rockwell Collins Pro Line 21 avionics suite—was developed in cooperation with Ganderkesee-based MRO Atlas Air Service, which will be the exclusive distributor for the upgrade.

Atlas Air Service also expects to obtain FAA approval for the CitationJet ADS-B Out upgrade. Atlas also offers ADS-B Out modifications for all other aircraft on its approved maintenance list.

West Star Offering TFS Paint Protection

West Star Aviation now offers the Top Flight Supplies (TFS) titanium paint protection system at its facilities in Grand Junction, Colorado, and East Alton, Illinois. Depending on the size of the aircraft, downtime can vary from two to four days.

Applied in two parts, the TFS titanium paint protection system works as a paint sealant by bonding with the painted surface to fuse the paint pores. According to West Star, this prolongs the appearance of an aircraft's paint and might improve fuel efficiency as the aircraft's slick surface reduces overall drag. ■

Million Air's new hangar at New York's Westchester County Airport is the first step in a massive redevelopment of the company's 23-acre leasehold.

New Hangar Up and Running at Million Air HPN

Million Air has completed construction of its new hangar at New York's Westchester County Airport (HPN). The 50,400-sq-ft structure, which features a heated floor, is in operation and can handle the latest class of big business jets. It brings the location up to 69,000 sq ft of hangar space.

The development is part of a $70 million project that will replace the company's old passenger terminal on its 23-acre leasehold and represents the first new FBO to be built at the metro New York business aviation hub in nearly two decades. The 22,000-sq-ft Adirondack-styled terminal is expected to open by the end of this summer. Million Air, one of three providers on the airfield, was issued a 30-year lease on the property in 2016, after an eight-year effort to remove lease restrictions intended to protect small general aviation aircraft from being squeezed out of the airport by limiting the weight of aircraft that could be serviced on its ramp to less than 50,000 pounds.

For the company, it was an instance of history repeating itself. In 1989, when Bill Bohlke, Billy's father, took the reins of the family business from his father, who founded the company, the facility was promptly leveled by Hurricane Hugo. As Billy officially took over as president from his father last year, Hurricane Maria gave him a hauntingly similar test of leadership. Both proved resilient, able to avoid layoffs and quickly resume business as usual. Following Maria, the BIA team played a crucial role in getting the airport back online to facilitate hurricane relief flights.

St. Croix FBO Looks To Rebuild

With its FBO heavily damaged in the wake of Hurricane Maria in the fall, Bohlke International Airways (BIA), the lone service provider at St. Croix's Henry E. Rohlsen Airport, has engaged Colorado-based aviation real estate company Western LLC to design its new multimillion-dollar facility, which will include a 20,000-sq-ft hangar. Groundbreaking is expected over the coming months with an aim of completion in late 2019.

"Hurricane Maria has given us an opportunity to rebuild in a way that furthers our position as the all-around service provider in the Caribbean," said company president and chief pilot William R. "Billy" Bohlke.

"Our new facility will be able to hangar any large-cabin jet, which surrounding islands do not offer. This, combined with competitive fuel pricing and our Part 145 repair station, will set Bohlke apart. We are optimistic about our future, and that of the Caribbean as a whole." During construction, the company, which also provides aircraft charter services, will continue to operate from the undamaged leased hangar it has occupied since after the storm.

FXE Is First GA Airport with Automated CBP Kiosks

U.S. Customs and Border Protection (CBP) has installed automated passport-control kiosks at its facility at Florida's Fort Lauderdale Executive Airport (FXE), making it the first dedicated general aviation (GA) airport in the country to be so equipped.

Like those found at larger commercially served international arrivals airports, the kiosks expedite entry into the U.S. through an automated process that eliminates the need for U.S. citizens to handwrite a customs declaration form and allows them to declare their citizenship, present documents, among other parts of the administrative process. Users will scan their passports and fingerprints, answer a few questions, and take a photo. The kiosks are also available to Canadians and travelers from visa waiver program countries.

The kiosk will then issue a receipt, which passengers will give to a CBP officer as they submit their luggage for inspection upon check out. There is no charge to use the kiosks, but visa waiver program travelers must have electronic system for travel authorizations (ESTA) approval and must have previously visited the U.S. after 2008 to use them.

FXE, which handles nearly 170,000 operations a year, was also the first GA airport to introduce the Global Entry kiosk, which allows pre-approved, low-risk travelers to expedite U.S. entry.

Fort Lauderdale Executive Airport is the first GA airport in the U.S. to receive automated customs and border patrol kiosks, streamlining the processing of passengers through the CBP facility.

Sheltair Debuts New Hangar Complex at FLL

Sheltair held the official grand opening of its new hangar complex on the west side of Florida's Fort Lauderdale-Hollywood International Airport at the end of January. The $30 million expansion adds 145,000 sq ft of hangar and office space to the FBO—one of four service providers on the field—and brings it to more than 457,000 sq ft of hangar, office, and FBO terminal space on the west side and 91,000 sq ft of hangars and offices on the north side of the airport.

"We have paid particular attention to projecting the future needs of our clients," noted Todd Anderson, the Florida-based FBO chain's senior vice president for real estate and development. "As a result, the new hangars can accommodate the newer, larger-cabin aircraft operators because of a deliberate design that includes 28-foot-tall hangar doors and an infrastructure that can meet their maintenance, repair, and overhaul needs."

The FBO, a member of the DASSP program offering direct access to Washington Reagan National Airport, is open 24/7 and has an on-site U.S. Customs and Border Protection facility to process international arrivals.

Air Elite Network Welcomes Two New Members

World Fuel Services has added two locations to its Air Elite Network thus far in 2018. XLR Executive Jet Centre in Birmingham, UK, and Silverhawk Aviation in Lincoln, Nebraska, bring the fuel provider's sponsored network of FBOs to 78 locations since it was formed six years ago from the remnants of the former Exxon Avitat network.

Located at Birmingham Airport near England's second-largest city, XLR features a modern, glass-sheathed 44,000-sq-ft terminal with direct tarmac access that offers comprehensive amenities, including VIP and passenger lounges

CHARTER NEWS notes

Tradewind Aviation has joined the Air Charter Safety Foundation and will participate in the Foundation's aviation safety action program (ASAP). "We continually look for additional ways to improve our safety culture," said Tradewind director of safety Alan Amato. "Participating in the Aviation Safety Action Program in conjunction with the ACSF will add to Tradewind Aviation's safety management system."

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Silver Air has added a Boeing Business Jet to its charter fleet. The Southern California-based BBJ is equipped with a 16-passenger interior. Up to 10 passengers can be accommodated for sleeping, and amenities include a master bedroom suite with bathroom and shower, satcom, VIP office, full-service galley, Dean & Deluca snacks, and wine selection.

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Sun Air Jets of Camarillo, California, **has added a** 10-passenger **Falcon 2000 to its charter fleet**. The Sun Air fleet includes large-cabin jets such as the Global 6000 and GV as well as the super-midsize Citation X and Hawker 800XP.

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Deer Jet is offering charter customers custom itineraries, starting with a cherry blossom trip to Japan in March and April. Passengers will travel on Deer Jet's G450 and G550 to see the blossoms in Osaka, Kyoto, Amanohashidate, Hokade, and Ine, with accommodations at the Ritz-Carlton in Osaka and Kyoto and hot spring resorts in Kinosaki and Nishimuraya.

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The U.S. military's Commercial Airlift Review Board has certified **CSI Aviation to transport military personnel** for on-demand passenger, cargo, and air-medical flights. "Nearly half of the CSI team has served in the U.S. armed forces," said William "Rock" Collins, president/COO of CSI Aviation. "To now be able to utilize our organic fleet directly with the Department of Defense to transport military men and women is especially significant for us." ■

accommodating up to 60 passengers, dedicated crew facilities, flight-planning rooms, in-facility security screening, visitor or residential crew offices, prayer room, conference and training room, and a 27,000-sq-ft heated hangar.

Silverhawk specializes in quick turns and offers Part 145 maintenance and Part 135 aircraft charter. A major renovation to its lobby is under way, which will allow it to offer new amenities.

Construction has also begun on a new $2.5 million, 28,300-sq-ft hangar, capable of sheltering aircraft up to a Challenger 604. When completed this summer, it will bring the location to more than 50,000 sq ft of hangar space.

Florida Airport Completes Major Runway Rehab

Page Field Airport in Fort Myers, Florida, has completed the year-long rehabilitation of its 6,406-foot primary Runway 5/23 and associated taxiways.

Phase one of the projected involved resurfacing the runway with a four-inch mill and overlay. In addition, Taxiways A and C now form a full-length parallel to the runway, allowing for more efficient movement across the airfield. A new electrical vault was also installed with an airfield lighting control and monitoring system for the all-new LED lighting. All direct-buried airfield lighting conductors were replaced during the course of the work, running now in conduits, which will better maintain the integrity of the circuits and allow for easier and safer repairs.

Phase two, which is expected to be completed this summer, involves similar work on the airport's crosswind Runway 13/31. Along with new LED lighting, it will receive a two-inch mill and overlay of the center 100 feet, and a complete reconstruction of the outer 25-foot shoulders. Grooving will be added to provide better performance in wet weather conditions, and Taxiway E will be extended to the approach end of Runway 13, eliminating the need to cross the active runway, or back-taxi for full-length departures.

Jet Aviation All In on IS-BAH at Mainland U.S. FBOs

Jet Aviation's eight wholly owned U.S. FBOs have achieved Stage I registration to the International Business Aviation Council's International Standard for Business Aircraft Handling (IS-BAH). The goal, according to the General Dynamics subsidiary, is to ensure the highest levels of safety, secure ground-handling services, and customer service across the U.S. "Ever since the IS-BAH program was launched, our FBO teams across the U.S. have been working to ensure that all of our processes meet IS-BAH standards," said David Paddock, senior v-p and general manager of the service provider's U.S. operations.

Those eight U.S. locations join the company's 13 FBOs in EMEA and Asia as IS-BAH Stage I compliant. Jet Aviation San Juan which is not owned entirely by the company, is currently in the certification process.

Page Field Airport has completed a major year-long renovation project on its 6,400-foot main runway and associated taxiways. The next phase of the project, under way on the 4,912-foot crosswind Runway 13-31, is expected to be completed this summer.

Skyservice To Expand at Toronto Pearson

Canadian aviation services provider Skyservice has broken ground on a new development project at Toronto Pearson International Airport. The company, which operates FBOs at Pearson, Calgary, Montreal, and Ottawa, expects to begin construction this spring on a $60 million (CDN) expansion on the south side of the airport.

The new facility will include a 100,000-sq-ft hangar capable of sheltering aircraft up to the new Bombardier Global 7000, as well as a 20,000-sq-ft full-service terminal and business center. Skyservice leases 260,000 sq ft of hangar space at Pearson, and the company says it needs even more space to support its rapidly expanding managed aircraft business. The facility is anticipated to be completed in February 2019. ■

FBO PROFILE: Northeast Air

Hospitality with a New England flair

It's been a good winter for deicing services up in Maine. Northeast Air, one of two service providers at Portland International Jetport (PWM), and the first FBO in the country to switch to 100 percent recycled Type I deicing fluid (*see article on page 26*), reported that December was especially busy. The company, which has held the airport deicing contract since 2000, noted that for the month it saw double the expected requests.

Northeast Air was founded at PWM in 1969, by Wordl War II aviator Henry Laughlin Jr., and the second generation is now leading it; the third is readying. The Air Elite FBO Network member recently completed a two-year, $3.5 million renovation and expansion of its 20-year-old terminal, which doubled its space to 8,000 sq ft. The project also added 50 spaces in the parking lot.

The glass-sheathed, two-story atrium provides panoramic ramp views, and the location offers a full slate of amenities including a fitness center, pilot lounge, flight-planning area, a pair of snooze rooms, shower facilities, 16-seat conference room, full kitchen, crew car, linen and dishwashing service, freshly baked cookies, and a porte cochere on the land side for the loading and unloading of passengers in inclement weather. Onsite car rental is available through Hertz, Avis, and Enterprise.

Several Peak Periods

"We're the biggest airport in the state of Maine," noted Mark Goodwin, company vice president and general manager of the FBO, adding PWM is also the busiest. "We consider ourselves the gateway of Maine when it comes to aviation."

Of that business, Northeast claims the lion's share, handling approximately 14,900 airline fuelings and 3,500 general aviation operations a year. That translates to approximately a million gallons of fuel pumped by the Phillips-66 branded location for GA annually, while the airlines draw another approximately 10 million gallons.

The location, which is open daily from 4:30 a.m. until midnight with after-hours callout available, maintains a fuel tank farm that holds 62,000 gallons of jet-A (with 12,000 dedicated to GA use) and 20,000 gallons of avgas. It is served by eight jet-A tankers and a lone 750-gallon avgas truck, operated by the company's NATA Safety 1st trained line service team. The facility also offers self-serve for its avgas customers.

Customs is available with advance notice, through a facility on the other side of the field, and the FBO can meet arrivals there for quick turns.

The facility, which occupies 23 acres on the field, currently has nearly 35,000 sq ft of space in its heated hangars. They are home to six turbine-powered aircraft ranging from an MU-2 to a Falcon 900, and can accommodate anything up to a regional jet. The company broke ground on a new 9,600-sq-ft hangar last fall, which it expects to be completed in May. It also operates a Part 145 repair station and performs major inspections and maintenance activities such as wing and engine removals and replacement.

According to Goodwin, the FBO serves local industries such as the General Dynamics-owned Bath Iron Works shipyard, and the city's based insurance and law firms year-round. Its peak activity, however, comes in the summer, as swarms of tourists descend on Maine's rugged, unspoiled scenery.

The area is home to numerous youth camps, and the airport sees three peaks during the summer, according to Goodwin; one when the campers are dropped off in June, midsummer when families return for visiting weekends, and then at the end of the summer when it's time for the campers to return home.

During those periods, the FBO can handle 100 aircraft a day. That activity allows the business to bookend the flow of its year, with the busy winter deicing period. Indeed, the FBO's staff swells by 20 workers in the winter to handle the deicing load.

Goodwin, who has been with the company since 1979, noted return clients make up a large portion of its business. "We do the same thing everybody else does, but we do it with a New England flair," he told **AIN**. "We strive to provide a delightful customer service, that's really in our core values." **C.E.**

by David Jack Kenny

PRELIMINARY REPORTS

Gulfstream Captain Killed By Cabin Door

GULFSTREAM G150, JAN. 4, 2018, KITTILÄ, FINLAND

The German captain of an Austrian-registered Gulfstream G150 was killed opening the cabin door after completing his preflight inspection. The Kittilä airport, Finland's fourth busiest, is located north of the Arctic Circle, and the airplane's auxiliary power unit was reportedly operating to provide heat for the flight attendant. Cabin pressurization had apparently also been activated, causing the door to blow open violently when unlatched. There were no other injuries. Aircraft damage was limited to the door and its frame and described as "minor."

Pilots Seized After Caravan Crash in South Sudan

CESSNA 208B, JAN. 7, 2018, AKOBO, SOUTH SUDAN

Two Kenyan pilots were taken captive by South Sudanese rebels after their Cessna Caravan crashed on takeoff. The flight was attempting to return members of a South Sudanese non-governmental organization (NGO) to Juba, the national capital, but failed to clear the airport fence. The pilots and passengers suffered only minor injuries. One woman on the ground was killed, according to the Kenyan press.

Members of the rebel Sudan People's Liberation Army-In Opposition released the NGO staff but held the pilots, demanding "compensation" of nearly $200,000 for the death and property damage. A government spokesman decried this demand as "ransom...beyond any normal compensation." At press time several weeks of negotiations involving the Kenyan ambassador, the UN mission, and the aircraft's operator had yet to resolve the crisis.

Initial accounts suggested that 18 passengers were on board the 11-seat airplane, but more recent reports revised that number to nine.

Boeing 737 Written Off After Landing Excursion

BOEING 737-82R, JAN. 13, 2018, TRABZON, TURKEY

A Pegasus Airlines 737 was damaged beyond repair after sliding off the left side of Runway 11 of the Trabzon Airport during its landing roll. No injuries were reported to any of the six crewmembers or 162 passengers, all of whom evacuated through the rear exits. Photographs of the airplane perched nose-down on a steep embankment just above the shore of the Black Sea were widely circulated afterwards. "Icy mud" on the slope was credited with bringing the sliding aircraft to a stop.

Flight 8622 flew a straight-in approach at the end of its scheduled 90-minute trip from Ankara. Reported weather conditions included calm winds and light rain. Radar track data suggests that the airplane failed to decelerate after landing and was still travelling at 110 knots in the last third of the 8,661-foot runway. Investigators have not confirmed the pilot's account of an uncommanded increase in thrust in the right engine.

Midair in Germany Kills Four

EUROCOPTER EC135P2 AND PIPER PA-28RT-201T, JAN. 23, 2018, PHILIPPSBURG, GERMANY

Two pilots on each aircraft were killed when an EMS helicopter collided with a single-engine airplane in the vicinity of the Philippsburg nuclear power plant. Both aircraft were on training flights in early afternoon weather described as clear.

The helicopter was operated by DRF Luftrettung, Germany's civil air rescue service. The Swiss-registered airplane, a Turbo Arrow IV, was operated by a flight school in Basel and was en route from Basel to Speyer. The Speyer control tower reportedly advised the Piper's pilot that the helicopter was operating in the area.

No injuries to anyone on the ground or damage to the nuclear facility were reported.

FINAL REPORTS

Unstable Approach Cited in Fatal MU-2B Crash

MITSUBISHI MU-2B-60, MARCH 29, 2016, ILES-DE-LA-MADELEINE, QUEBEC

The accident was the result of poor energy management during an unstable instrument approach caused by the pilot's lack of make-and-model experience, according to the final report issued by Canada's Transportation Safety Board. All seven on board died when the twin-engine turboprop crashed 1.4 nm short of its destination airport in the sparsely populated archipelago in the Gulf of Saint Lawrence. High winds, low ceilings, and the high-performance qualities that have made the MU-2B subject to stringent model-specific training and currency requirements contributed to the accident sequence.

The flight departed from the Montreal/St. Hubert Airport at 10:31 a.m. with a filed alternate of Charlottetown, Prince Edward Island. The CVR captured the airline transport-rated pilot briefing the GPS approach to Runway 07 with his front-seat passenger, a commercial pilot and flight instructor with no prior MU-2B experience. He delayed descent from FL 210 to save fuel, then began descending at just 800 fpm instead of his planned 1,500 fpm. The descent rate subsequently reached 2,500 fpm, but the airplane crossed the initial approach fix (9.7 nm from the runway threshold) 1,500 feet high and 100 knots faster than its recommended approach speed, overshooting the final approach course before correcting.

It crossed the final approach fix nearly 800 feet high and 50 knots fast as the pilot made increasingly aggressive attempts to lose altitude and slow the airplane. At 600 feet above the ground it was less than five knots above stall speed but still descending at 1,500 fpm. "The pilot rapidly advanced the power levers to their full forward position," causing the airplane to roll 70 degrees to the right. He was able to level the wings at 150 feet, too low to recover the aircraft.

A safety evaluation of the MU-2B led the U.S. FAA to issue Special Federal Aviation Regulation No. 108, which imposes specific experience and currency requirements to operate or teach in the airplane. Unlike most other U.S.- and European-made airplanes, its engines turn counterclockwise, giving it a tendency to roll right when most pilots would expect it to turn left.

The 2,500-hour pilot had completed the requisite training but flown just 125 hours in the MU-2B, 100 of them under the supervision of SFAR 108-qualified instructors. The TSB concluded that he lacked the proficiency necessary to make the flight under that day's conditions, and that his inadequate make-and-model experience led to "task saturation" in which immediate demands absorbed his attention at the expense of longer-term planning.

Despite the rushed descent and a weather report including 24-knot gusts and ceilings more than 400 feet below approach minimums, the pilot never discussed performing a missed approach.

In addition to the two pilots, the casualties included former Canadian Transport Minister Jean Lapierre, his sister and two brothers, and his wife.

Altimeter Miscommunication Led to Russian Accident

BRITISH AEROSPACE BAE-125-800B, JUNE 5, 2016, NERYUNGRI AIRPORT, RUSSIA

The flight crew's misunderstanding of ATC's altimeter setting led the Russian-registered corporate jet to drop below its intended approach path, eventually hitting trees 18 km (10 nm) from the runway threshold. The crew was able to maintain control, climb away from the ground, and make a safe landing on Runway 08 of the Neryungri Airport. There were no injuries to the three crewmembers or five passengers.

During initial descent on a flight from the Tyumen-Roschino International Airport, the crew was advised that QFE (field elevation) pressure at the destination airport, elevation 857 meters, was 685 mm Hg, and that QNH (sea-level pressure) was 1012 hPa. The crew read back, "I understand 685... is 1012 hectoPascals, is that correct?" ATC's response was, "QNH 1012, for information the height of the threshold 08 is 857 meters."

Rather than converting 685 mm Hg to 913 hectoPascals, the crew interpreted this as a local altimeter setting of 1012 hPa, and the jet hit trees 17 seconds after the ground proximity warning system began calling, "Pull up!" Investigators later determined that the flight crew did not have the correct frequency for the Neryungri Airport ATIS and was unaware of the correct procedures for requesting local barometric pressure in hectoPascals. The report also notes ATC's failure to detect the confusion or monitor the jet's approach path.

Aircraft damage was limited to the wings' leading edge and winglets, the number-two engine cowling, and the flaps and right-hand horizontal stabilizer.

Main Rotor Damage Linked to Missing Cable

MCDONNELL-DOUGLAS 369E, OCT. 4, 2016, WAIMEA, HAWAII

Damage to the main rotor system that forced an emergency landing was caused by an unsecured lift cable stowed inside the helicopter, according to the NTSB's final report on the accident. Following the completion of external load operations, the pilot had jettisoned the 20-foot cable, which ground workers then recovered and placed in the rear of the cabin but did not tie down. The helicopter was being operated without its cabin doors.

As the helicopter was climbing through 75 feet at an airspeed of between 20 and 25 knots, the pilot felt "a significant vertical vibration" and noticed "a substantial blade spread" in the main rotor track.

He made a successful emergency landing, after which about nine inches was found to be missing from the tip of one main rotor blade. That damage and scuff marks on two of the four other blades were consistent with their having struck a metallic object that was not recovered at the scene. The lift cable was not in the wreckage and could not be located.

There were no injuries to the pilot or two ground crewmen on board. Impact damage to the helicopter included the fuselage and instrument panel, tail rotor, tailboom, and horizontal and vertical stabilizers. ■

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by James Wynbrandt

Aeria Wins BBJ Completion Contract

Aeria Luxury Interiors has been awarded a BBJ completion contract—the company's third since its 2014 founding—with the green 737-700 slated to arrive at the company's San Antonio, Texas completion facility in the first quarter. The Aeria-designed interior, executed in a light color palette, will feature a VIP stateroom complemented by an en suite lavatory with shower; an office/meeting room; staff seating; and separate passenger and crew galleys. Luxury touches include generous use of gold plating, wood, fine fabrics and ornate detailing, said Ron Soret, Aeria's vice president and general manager for completions. A division of Singapore's ST Aerospace, Aeria made the announcement at the Singapore Airshow in February.

Infinity Aircraft Services Launches Completions Group

Part 145 repair station Infinity Aircraft Services has launched Prestige Interiors, an aircraft completions division offering interior soft and hard good refurbishments and replacement retrofits. Housed in a new 16,000-sq-ft facility that includes a 100 percent climate-controlled holding area for materials at its West Palm Beach, Florida location, Prestige offers custom handcrafted cabinets and solid surface countertops, and in-house made seat coverings and cabin soft goods. With a full dye room, Prestige can create new or match custom colors. Refurbishment specialties include wood refinishing; full upholstery and seat foam replacements; leather repairs and replacement; headliners and baggage panels; and carpet extraction and replacement, according to Infinity.

Master Palette Reflects Transitions at Edelman

Edelman Leather has re-organized all its collections by color, creating a Master Palette of 36 color families and laying "the foundation for our color theory and thoughtful transitions moving forward," the Connecticut company said. Highlighting the change, Edelman is showcasing three popular embossed leather collections: Shagreen, Sulky, and Wagon Lit, all having wide application by designers in business jet interiors.

The 15 shades of the new palette of Shagreen, the irregular, pebbled surfaced leather, include shimmering colors and saturated hues that create dramatic interior effects. The burnished texture of the Sulky palette has been given five new colors, creating an even gradient from light to dark, and bringing an added level of sophistication to the overall palette, the company said. Wagon Lit's palette of "highly usable colors" represents "a hidden gem" for designers, and "demonstrates the chromatic logic and continuity of the Edelman palette as a whole," according to the company.

Jet Aviation's New Hangar at Seletar Open for Business

MRO and completion specialist Jet Aviation has officially opened a hangar, at Singapore's Seletar Aerospace Park. The company's third hangar at Seletar, opened during the biennial Singapore Airshow in February, includes an upgraded interior shop, drying rooms, a new soft goods area and woodshop. Recently approved as an upholsterer of Rockwell Collins (formerly B/E Aerospace) 16g seating, the facility claims to be the only approved 16g seating center in Asia, authorized to re-foam and re-style 16g seats, including those of China-registered aircraft. The 41,000-sq-ft hangar can accommodate up to two BBJs or ACJs, or five Gulfstream G550s.

C&L Spotlights Valuable Interior Upgrades

Aftermarket services provider C&L Aviation Group has identified what it believes are the three cabin upgrades that deliver the biggest boost in aircraft value. Though "interiors do not fully translate into a higher resale value," said Larry Dean, president of the Group's C&L Jet division, "it does make the aircraft stand out from the crowd" and "puts them at the top of the market for the specific model."

The cabin carpet is the interior item most in need of replacement, according to C&L. The "turn spot," where passengers pivot to the right and flight crews pivot left is usually the most worn area, and also one of the first things potential buyers see. A carpet upgrade provides a big improvement in "buyer appeal" for a relatively low cost.

Cabin seats and upholstery, starting with the "chairman's seat," typically wrinkle in the seat pan. If one seat is particularly worn, recover all of the chairs in that group, if not in the entire cabin, C&L advises. If the cabin includes both chairs and divans, an artful mix of newly covered seats in coordinated materials with divans that were in good shape to begin with can produce a nicely maintained cabin without a complete overhaul.

With North American buyers demanding onboard Wi-Fi, cabin connectivity and electronics round out the top value boosting interior upgrades, whether via air-to-ground or satellite system, according to C&L. ■

by Gordon Gilbert

Within 6 Months

March 14, 2018

EASA Proposes Parts Approval Revisions

Aircraft parts approvals would be revised under this notice of proposed amendment (NPA) from EASA. The notice mandates that parts and appliances need to be accompanied by an EASA approval form, particularly the so-called commercial parts that are often not designed exclusively for aviation use. This NPA also proposes to assign a criticality level for each part based on the safety consequences should the part fail to meet its design standards. Comments are due by March 14, 2018.

March 20, 2018 **NEW**

Revisions Proposed to SFO Class B

A notice of proposed rulemaking seeks to modify the San Francisco, California Class B airspace to contain aircraft conducting instrument approaches to San Francisco International Airport (SFO). The FAA is taking this action to improve the flow of air traffic, enhance safety, and reduce the potential for midair collision while accommodating the concerns of airspace users. Further, this effort supports the agency's national airspace redesign goal of optimizing terminal and en route airspace to reduce aircraft delays and improve system capacity. Comments are due by March 20, 2018.

March 29, 2018

Comm and Surveillance Implementation Changes

Iceland, Portugal, and the United States continue with their performance-based communication and surveillance (PBCS) implementations, as planned, on March 29, 2018. Due to different operating environments in the Gander and Shanwick operational control areas, Canada, and the United Kingdom, different implementation paths might be needed to ensure accommodating non-PBCS authorized users without penalizing them unintentionally.

June 16, 2018 and Jan. 1, 2019

CVRs and Underwater Locators Need Upgrades

EASA will require upgraded CVRs and underwater locating devices (ULDs). Starting June 16, 2018, ULDs must be capable of transmitting for at least 90 days instead of 30 days. By Jan. 1, 2019, airplanes with an mtow of at least 59,500 pounds with more than 19 passenger seats and performing transoceanic flights must be retrofitted with an "additional ULD with a very long detection range." Also by Jan. 1, 2019, all CVRs with a 30-minute recording duration must be replaced by units with two-hour recording capability. Additionally, CVRs recording on magnetic tape must be replaced by solid-state units.

Within 12 Months

Nov. 8, 2018

ICAO Adopts 15-minute Position Reporting

The International Civil Aviation Organization Council adopted a tracking standard for certain international flights that requires crews to report their aircraft's position at least every 15 minutes. It will become applicable on November 8. The new requirement will be made formal as Amendment 39 to Annex 6—*Operation of Aircraft*, Part I. The new standard is the outcome of recommendations stemming from the disappearance of Malaysia Airlines Flight MH370 on March 8, 2014.

Jan. 31, 2019

Canada Revises CRM Requirements

Transport Canada has introduced so-called "contemporary" crew resource management (CRM) training standards applicable to commercial aircraft operations, including air taxis. The new requirements go into effect Jan. 31, 2019. This latest iteration of CRM now includes the concept of threat and error management (TEM). TEM "advocates the careful analysis of potential hazards and taking the appropriate steps to avoid, trap, or mitigate threats and manage errors before they lead to an undesired aircraft state."

Beyond 12 Months

Jan. 1, 2020 and June 7, 2020

ADS-B Out Mandates

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. The ADS-B Out retrofit requirement in Europe takes effect June 7, 2020.

Jan. 30, 2020

Expansion of Datalink Com in North Atlantic

Phase 2 of the North Atlantic datalink mandate will expand to all flights in North Atlantic Tracks region above FL290 on Jan. 30, 2020. At this time aircraft will be required to be equipped with FANS-1/A controller-pilot datalink communications (CPDLC) and ADS-C. ■

Compiled by Kerry Lynch

RON ALDRICH

RON JENNINGS

DOUG KREULEN

DAVID KAY

Sonnie Bates has stepped in as CEO at *Wyvern*, succeeding Art Dawley. Bates has a more-than-30-year aviation background that includes service in the U.S. Air Force, as well as senior roles with Baldwin Aviation, the International Business Aviation Council, CAE, and his own firm, Corporate Aviation Solutions.

Avant Aerospace appointed **Donald Snodgrass** president, overseeing Avant teams in Texas, Illinois, and Colorado in addition to his current responsibilities as president of Dallas Aeronautical Services (DAS). Snodgrass, who has served as DAS president for 13 years, has also held roles with Chromalloy Gas Turbine, Aero Fabricators, ILFC and Lufthansa Technik Composites, among others.

Peter Maurer, who has led *Diamond Aircraft's* Canadian operations for nearly two decades, is retiring. **Scott McFadzean**, who has been chief operations officer, is succeeding Maurer as CEO, and **Kevin Sheng** is taking the role of COO.

Dassault promoted **Rémy St-Martin** to senior v-p/COO of Dassault Aircraft Services (DAS). St-Martin, most recently vice president and general manager of DAS Little Rock, joined Dassault Falcon Jet in 2013 as senior director after serving as president at Discovery Air Technical Services in Canada.

Metrojet appointed **Lanny Schindelmeiser** general manager of its maintenance, repair, and overhaul operation in Hong Kong. Schindelmeiser previously has held senior positions with Ameriflight, as well as with Bombardier in the U.S., Canada, and Tianjin.

Global Jet Capital appointed **Mike Christie** vice president-sales, Midwest U.S., and **Jeremy Dials** as vice president-sales, South Central U.S. Christie, who most recently led a team of middle market relationship managers for Huntington Bank, has more than 20 years of experience working with clients in the middle, large corporate, and high-net-worth individual markets. Dials has more than 15 years of experience in the equipment finance industry, most recently as vice president at GE Capital Healthcare Financial Services

Quest Aircraft appointed **Hitoshi Moriguchi** vice president of production. Moriguchi, who will continue to serve as executive vice president and as a board member, joined Quest in 2016.

Gulfstream Aerospace named **Ron Aldrich** vice president and general manager at its service and completions facilities in Appleton, Wisconsin. Aldrich joined Gulfstream in 1996 as an industrial engineer and since has held leadership positions in Savannah and Brunswick, Georgia, including as general manager of the Brunswick service and completions center.

The company also appointed **Becky Elliott** general manager of its service center in Brunswick, Georgia. Elliott has 20 years of experience with Gulfstream, having previously spent three years as director of operations at the Savannah, Georgia location and also holding a role as director, final phase operations in Savannah.

The *Aircraft Owners and Pilots Association* (AOPA) added **William Ayer** to its Board of Trustees. Ayer, an AOPA member since 1980 and previously chairman of the AOPA Foundation Board of Advisors, was a former chairman of Alaska Airlines, founded Air Olympia, served with Piper Aircraft, and also held board positions with NBAA and Honeywell.

FlightSafety International promoted **Alex Thurmond** to manager of St. Louis learning center. He succeeds **David Glass,** who is retiring from full-time employment. Thurmond joined FlightSafety in 1998 as an instructor and held a number of positions of increasing responsibility, from program manager, director of standards and training, and most recently assistant manager of the St. Louis center. Succeeding Thurmond as assistant manager is **Johnny Cruz**. Cruz joined FlightSafety's Atlanta center in 2001 and has served as director of the center's quality management system.

Ron Jennings joined *C&L Aviation Group* as regional sales manager.

The *Metropolitan Nashville Airport Authority* (MNAA) named **Doug Kreulen** president and CEO. Kreulen has served as acting and later interim president and CEO since July 2017 and previously has served as director of operations for Huntsville International Airport.

Ashley Bowen Cook was named vice chair of the *Wichita Aero Club* (WAC) Executive Committee. Cook, who is vice president/brand director at Greteman Group, has held roles with the WAC since it reestablished in 2008.

Exclusive Aircraft Sales appointed **David Kay** director of aircraft sales. Kay has nearly 25 years of industry aviation experience, having previously served with companies including Emery Air, J.A. Air Center and Chicago Piper/Des Moines Flying Service.

West Star Aviation appointed **Josh Peterson** avionics technical sales manager. Peterson joined West Star in 2002 after serving as a cargo aircraft mechanic with the U.S. Navy and then as a maintenance technician working on firefighting aircraft.

On Air Dining has appointed **Alex Berry** head of strategy and development. Berry has held senior positions with companies including NetJets, VistaJet, Bombardier and Chapman Freeborn before starting his own consultancy.

Premier Jet Center appointed **Michael Lawrence** operations manager.

Trans-Exec hired **Aaron Cummings** as director of business development. Cummings has a background in charter operations, having previously served at Scottsdale Corporate Jets, Aero Jet Services and Advanced Air Management.

Executive AirShare promoted **Caleb Gillaspie** to assistant chief pilot. Gillaspie joined Executive AirShare in 2013 as a Phenom 100 copilot and since has been qualified as captain in the King Air 350, Phenom 100 and Phenom 300. ■

AWARDS and HONORS

GE Aviation CEO and president **David Joyce**, Bigelow Aerospace founder **Robert Bigelow**, and ForeFlight co-founders **Tyson Weihs** and **Jason Miller** were among the list of honorees for the 15th annual Living Legends of Aviation Awards. The awards are presented annually to honor those who have made significant contributions to aviation.

Joyce, who also serves on the boards of the Smithsonian National Air and Space Museum and the Aerospace Industries Association, among others, is the recipient of the Lifetime Aviation Industry Award. Bigelow was selected for the newly renamed Kenn Ricci Lifetime Aviation Entrepreneur Award, and Weihs and Miller share the Aviation Entrepreneur of the Year Award.

Other Living Legends honorees include **Sen. James Inhofe** (R-Oklahoma), selected for the Harrison Ford Aviation Legacy Award; **Jack Dailey**, who is retiring from the Smithsonian Air and Space Museum and received the Steven F. Udvar Hazy Award; and **Mike Silva**, a retired news helicopter pilot and Bronze Star recipient who was recognized with the Vertical Flight Hall of Fame Award.

Frank Franke further was selected for a special Legends Wings of Help Award for his assistance in founding Aviation Without Borders. Meanwhile, the slate of a half-dozen new Living Legends inductees included Aircraft Owners and Pilots Association president **Mark Baker**. ■

FINAL FLIGHTS

D.L. "Whitey" Varney, who built a legacy of safe flying over a 40-year career as a corporate pilot and director of aviation, passed away on January 17 from Alzheimer's disease. He was 86.

Born on April 20, 1931 in Logan, West Virginia, Varney became interested in flying while serving as flight deck director on the USS Kula Gulf in the U.S. Navy in the 1950s. Following his service, he earned a commercial pilot certificate at Embry-Riddle Aeronautical University and embarked on a career in business aviation in 1957.

Over the next four decades, Varney flew as copilot, captain, and chief pilot and served as director of aviation for a number of top corporations, amassing more than 18,000 accident-free flying hours in a range of business aircraft. During his time, he flew CEOs, celebrities, foreign dignitaries, and former U.S. presidents, and was rated on 14 business aircraft. He supported aviation at Allied Chemical, American Can, General Foods, Combustion Engineering, Dun & Bradstreet, National Intergroup, and Coastal Oil.

Over his career, Varney had received numerous pilot safety awards from FlightSafety International, as well as from NBAA. In 1974, then Finland President Urho Kekkonen recognized Varney with the Order of the White Rose of Finland and the Order of the Lion.

Adam Ashley Klein, who co-founded West Palm Beach, Florida-based Exclusive Charter Service (ECS) in 2004, died on January after a battle with cancer. He was 42. Klein originally was involved in the technology sector and had run a technology department for an international bank. But an interest in aviation led him to team with Jason Johnson to help found ECS. Through his stewardship, the company has grown into a full-service charter and management firm.

After his April 2017 cancer diagnosis, Klein channeled his experience into fundraising for children's cancer and was active in charities including the Make-a-Wish Foundation and Angel Flight, among others.

Those activities came in addition to ECS's work in hurricane relief, most recently delivering thousands of pounds of goods to the Caribbean in the wake of the hurricanes that ripped through the region late last summer. ■

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MARCH

NATA FBO SUCCESS SEMINAR... March 6-7,
Atlantic Aviation, Miami, FL. Info: events@nata.aero;
http://nata.aero/Events/2018-FBO-Success-Seminar.aspx.

EUROPEAN CORPORATE AVIATION SUMMIT... March 8,
The Palace Hotel, Sliema, Malta. Info: register@aeropodium.com;
www.aeropodium.com/ecas.html.

ASBAA CEO SERIES LUNCHEON... March 9,
The Hong Kong Club, Hong Kong, China. Info: cathy.chiu@asbaa.org;
www.eventbank.com/event/7075/.

2018 AIR CHARTER SAFETY SYMPOSIUM... March 13-14,
Ashburn, VA. Info: bburns@acsf.aero;
www.acsf.aero/symposium/.

BUSINESS AIRCRAFT FINANCE, REGISTRATION & LEGAL CONFERENCE...
March 18-20, Sanibel Harbour Marriott
Resort & Spa, Fort Myers, FL. Info: sobrien@nbaa.org; www.nbaa.org/events/finance-registration-legal-conference/2018/.

OPERATING LEASE SEMINAR 2018...
March 20-22, Hilton Garden Inn Hotel Dallas, TX.
Info: info@everestevents.co.uk;
https://everestevents.co.uk/event/operating-lease-seminar-2018/.

WOMEN IN AVIATION CONFERENCE... March 22-24,
Peppermill Reno, Reno, NV. Info: www.wai.org/conference.

SINGAPORE AVIATION SEMINAR... March 26-28,
Singapore Aviation Academy, Singapore.
Info: https://flightsafety.org/event/4th-annual-singapore-aviation-seminar-sass/.

AEA INTERNATIONAL CONVENTION & TRADE SHOW...
March 26-29, MGM Grand Las Vegas, Las Vegas, NV.
Info: www.aea.net/convention/2018/.

NBAA INTERNATIONAL OPERATORS CONFERENCE... March 26-29, Las Vegas, NV.
Info: info@nbaa.org; www.nbaa.org/events/ioc/2018/.

NBAA PDP COURSE: WHEN LEADERS TALK: MASTERING COMMUNICATIONS... March 30, JW Marriott Las Vegas Resort & Spa, Las Vegas, NV. Info: taustin@nbaa.org;
www.nbaa.org/events/pdp/mastering-communications/20180330/.

APRIL

GARMIN G500/G600 & GTN PILOT TRAINING... April 2-3,
Garmin Headquarters, Olathe, Kansas. Info: aviation.training@garmin.com; http://newsroom.garmin.com/press-release/garmin-announces-new-2018-classroom-pilot-training-classes.

COMMERCIAL UAV EXPO EUROPE... April 10-12,
RAI Amsterdam, Amsterdam, The Netherlands.
Info: https://www.expouav.com/europe/conference-information/.

SUN 'N' FUN... April 10-15,
Lakeland Linder Regional Airport, Lakeland, FL. Info: www.flysnf.org.

ASIAN BUSINESS AVIATION CONFERENCE & EXHIBITION... April 17-19,
Shanghai Hawker Pacific Business Aviation Service Centre,
Shanghai, China. Info: info@abace.aero; https://abace.aero/2018/.

AIRCRAFT RECORDS & TOTAL ASSET MANAGEMENT SEMINAR...
April 18, Gibson Hotel Dublin, Dublin, Ireland.
Info: www.everestevents.co.uk/event/aircraft-records-total-asset-management-seminar-2018/.

RACCA SPRING CONFERENCE... April 24- 26,
Hilton Scottsdale Resort & Villas, Scottsdale, AZ.
Info: richardm@raccaonline.org; https://www.raccaonline.org/.

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EURASIA AIRSHOW...April 25-29,
Antalya International Airport, Antalya, Turkey.
Info: http://eurasiaairshow.com.

GARMIN G1000/G1000 NXI PILOT TRAINING... April 26-27,
Garmin Headquarters, Olathe, Kansas. Info: aviation.training@garmin.com; http://newsroom.garmin.com/press-release/garmin-announces-new-2018-classroom-pilot-training-classes.

AVUSI XPONENTIAL... April 30-May 3,
Colorado Convention Center, Denver, CO. Info: www.xponential.org.

MAY

NBAA MAINTENANCE CONFERENCE... May 1-3,
Albuquerque Convention Center, Albuquerque, NM.
Info: info@nbaa.org;
www.nbaa.org/events/maintenance-conference/2018/.

NATA CERTIFIED FBO SAFETY MANAGER WORKSHOP...
May 8-10, Thunderbird Aviation, Minneapolis, MN.
Info: events@nata.aero;
http://nata.aero/Events/2018-NATA-Certified-FBO-Safety-Manager-Workshop.aspx.

NBAA BUSINESS AVIATION TAXES SEMINAR... May 10-11,
Dallas, TX. Info: info@nbaa.org;
www.nbaa.org/events/taxes-seminar/2018/.

63RD ANNUAL BUSINESS AVIATION SAFETY SUMMIT...
May 10-11, Radisson Blu Aqua Hotel, Chicago, IL.
Info: solorzano@flightsafety.org;
https://flightsafety.org/event/bass-2018/.

4TH ANNUAL BUSINESS AVIATION GOLF OUTING...
May 15, Safari Gold Club, Powell, OH.
Info: trentd5@nationwide.com; https://www.golfevent.org/.

EUROPEAN BUSINESS AVIATION CONVENTION & EXHIBITION...
May 29-31, Palexpo Convention Center, Geneva, Switzerland.
Info: info@ebace.aero; https://ebace.aero/2018/.

JUNE

GARMIN PILOT TRAINING CLASSES... June 4-5,
Garmin Facility, Salem, Oregon. Info: aviation.training@garmin.com; http://newsroom.garmin.com/press-release/garmin-announces-new-2018-classroom-pilot-training-classes.

MAINTENANCE RESERVES SEMINAR 2018... June 5-6,
Jury's Inn, Prague, Czech Republic.
Info: info@everestevents.co.uk; https://everestevents.co.uk/event/maintenance-reserves-seminar-2018/.

PILATUS OWNERS AND PILOTS ASSOCIATION ANNUAL CONVENTION... June 7-9, The Roosevelt Hotel, New Orleans, LA.
Info: http://pilatusowners.org/popa-annual-convention-off-season/.

GREATER WASHINGTON AVIATION OPEN... June 11,
Washington, D.C. Info: www.gwao.org.

NATA ANNUAL MEETING AND AVIATION BUSINESS CONFERENCE... June 12-14, Grand Hyatt, Washington, DC.
Info: events@nata.aero; http://nata.aero/Events/2018-Annual-Meeting-and-Aviation-Business-Conference.aspx.

NBAA REGIONAL FORUM... June 21,
Westchester County Airport (HPN), White Plains, NY.
Info: info@nbaa.org; www.nbaa.org/events/forums/2018hpn/.

JULY

FARNBOROUGH INTERNATIONAL AIRSHOW...
July 16-22, Show Centre, ETPS Rd, Farnborough, England.
Info: +44 (0) 1252 532800, enquiries@farnborough.com;
www.farnboroughairshow.com/trade/.

EAA AIRVENTURE... July 23-29,
Wittman Regional Airport, Oshkosh, WI. Info: www.eaa.org.

AUGUST

LABACE... August 14- 16, São Paulo, Brazil.
Info: www.abag.org.br/labace2017.

SEPTEMBER

NBAA REGIONAL FORUM... September 6,
San Jose International Airport (SJC), San Jose, CA.
Info: info@nbaa.org; www.nbaa.org/events/forums/2018sjc/.

NATA GROUND HANDLING SAFETY SYMPOSIUM...
September 18-19, NTSB Training Center, Asburn, VA.
Info: events@nata.aero; http://nata.aero/Events/2018-NATA-Ground-Handling-Safety-Symposium.aspx

REGIONAL AIRLINE ASSOCIATION ANNUAL CONVENTION...
September 26-28, Long Beach, CA.
Info: www.raa.org.

OCTOBER

NBAA BUSINESS AVIATION CONVENTION & EXHIBITION... October 16-18,
Orange County Convention Center, Orlando, FL.
Info: (202) 783-9000; www.nbaa.org.

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