September 2016
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First-half delivery report: slide continues for turbines

by Curt Epstein

Pressurized turbine-powered business aircraft deliveries were down more than 3 percent for the first half of this year compared with the same period last year, according to statistics released early last month by the General Aviation Manufacturers Association (GAMA). OEMs handed over 292 jets worldwide, a downturn of 4 percent from the 305 delivered a year ago, despite the service debut of the HondaJet, which accounted for 10 aircraft.

"In an extremely challenging global fiscal climate, every segment of the fixed-wing and rotorcraft market showed declines for the first half," GAMA president and CEO Pete Bunce said. "As we saw at AirVenture, general aviation manufacturers are working hard to regain momentum by delivering innovative products and technologies that enhance safety and provide substantial improvement in capability."

Overall, airplane billings logged by GAMA fell 11 percent, to $9.3 billion from $10.4 billion.

"Unless something changes in the second half, we could be at least even with last year, or maybe a little bit behind," said industry analyst Brian Foley, president of New Jersey-based Brian Foley Associates. "Our hope as forecasters is that we see some momentum in this upswing, principally driven by the U.S. and how well its economy is doing right now, but from what we heard from the manufacturers so far, just to get to where we were last year would be good news."

Bombardier was 19 aircraft off the pace it set in the first six months last year, handing over less than half the number of Learjet 70/75s it shipped in the first half last year, and 11 fewer Global 5000/6000s. The Canadian airframer said it remains on target to deliver, as planned, 150 aircraft over the course of the full year.

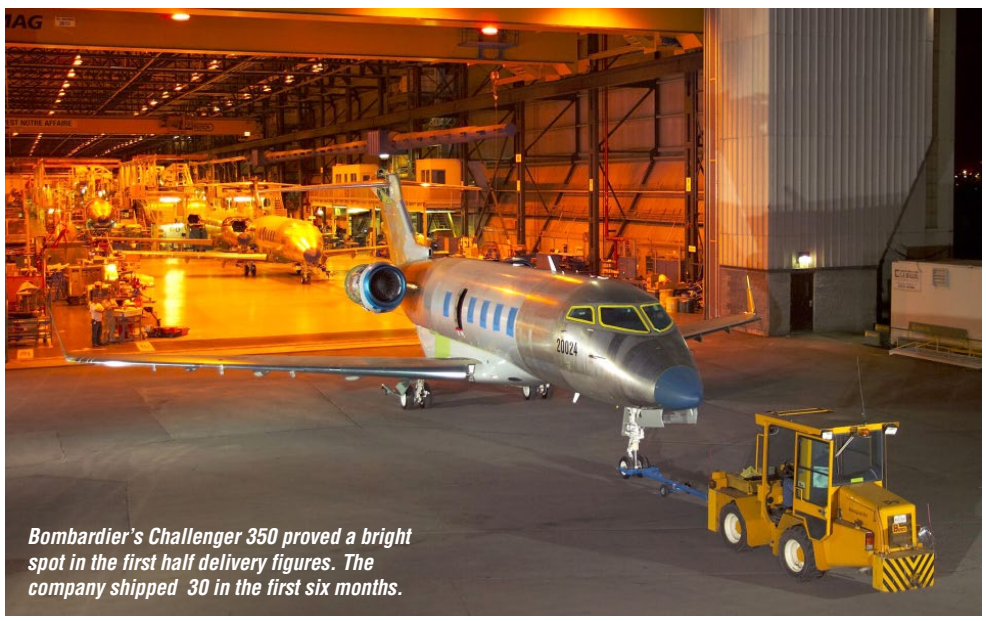
Gulfstream reported a 16-percent slide in deliveries year-over-year. The large-cabin segment accounted for most of the decline; the company handed over 46 aircraft in the first six months this year, compared with 58 in the same period last year.

Dassault, which does not reveal numbers for individual models, handed over three fewer aircraft year-over-year, a decline of 17 percent. At the end of July, the French manufacturer downgraded its 2016 delivery forecast to 50 Falcons, from 60.

On the plus side of the ledger, Cessna delivered 10 more aircraft in the first half of this year than it did in the first six months of last year, a boost of 14 percent. The company handed over 16 Citation Latitudes, which received certification last June, as well as four more Citation XLS+s than it did in the first half of 2015.

Embraer likewise noted a rise in deliveries from the first half of last year, recording gains with the Phenom 100, Legacy 500

Continues on page 40 ▶



Bombardier's Challenger 350 proved a bright spot in the first half delivery figures. The company shipped 30 in the first six months.

At long last, aeromedical reform is on horizon

by Kerry Lynch

On July 15, the Aircraft Owners and Pilots Association (AOPA) and Experimental Aircraft Association (EAA) celebrated the signing of third-class medical reform into U.S. law, a milestone reached after a long push both on Capitol Hill and at the FAA.

Aeromedical reform had become one of the most pressing issues for the general aviation organizations, who viewed the changes as a key step forward in their efforts to arrest the erosion of the pilot population. "It was by far our top legislative priority," said Jim Coon, senior v-p, government affairs and advocacy for AOPA. "We think there are thousands of pilots sitting on the sidelines who are capable of flying safely."

These pilots did not want to deal with the expense or hassle of the FAA medical process, especially when the prospect of a lengthy special issuance process arises, he said, estimating that medical process is costing pilots a cumulative $20 million annually.

The measure, Coon said, is "one of the most monumental reforms in a decade for general aviation and will have a real, positive impact."

Aeromedical reform was among a limited number of measures included in the FAA extension bill that passed the House and Senate in July. (*See* **AIN**, *August, page 1*.) But getting the measure to that point wasn't easy. It began with a 2012 joint petition by EAA and AOPA that had garnered 16,000 comments, and had to be passed three times by the Senate alone before the reform measure made its way to the must-pass FAA extension bill.

"[The measure has] been a long time coming and resulted from an incredible amount of work over the past five years," said EAA chairman and CEO Jack Pelton. "This is a win for everyone who loves recreational flight."

Continues on page 41 ▶

COMPLEX Avionics

The vast capabilities of modern technology are having a profound effect on cockpit avionics design. The broader functionality introduces challenges for both pilots and manufacturers: learning the systems thoroughly and preventing information overload. **page 51**

Inside this issue

COMPLEX Avionics

Combating Complexity

Nobody questions that avionics have made stunning advances in capability, but somewhere along the way, learning how to use those wizard black boxes became fiendishly complex. With input from pilots, avionics designers are trying to fix that.
Page 51

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As we go to press

LONGITUDE COMPLETES INITIAL ENGINE TESTS

At press time, Textron Aviation had completed ground engine tests of the first Cessna Citation Longitude. The tests of the super-midsize jet's Honeywell HTF7700L turbofans verified engine start, fuel system and autothrottle functions, along with avionics, electrical and hydraulic system interfaces. "The engine run tests are one of the final major milestones as we prepare for first flight," said Scott Ernest, president and CEO of Textron Aviation. Entry into service is scheduled for later next year.

VISTAJET POSTS ITS BEST RESULTS IN 2Q

Despite the global economic malaise, membership jet charter firm VistaJet posted its best quarter ever in the three-month period ending on June 30, while its traffic and passenger numbers surged 23 percent and 20 percent, respectively, in the first six months. It sold 3,000 new annual flight hours, including multiple deals for annual blocks of 400 or more hours, during the second quarter. During the first half, it saw "strong performance" in the U.S. as traffic in the region climbed 145 percent, bucking concerns about the strength of the U.S. economy and uncertainty ahead of the Presidential elections in November. VistaJet experienced "triple-digit growth" in flights from the U.S. to Europe and Asia, and traffic to Central and South America were up threefold. Its flights to China from the UK quadrupled, and flights from the UK to India were up 50 percent.

NBAA RELEASES BIZAV PAY SURVEY

NBAA's latest annual business aviation compensation survey is out and, for the first time, it has been internally audited to ensure accuracy. Salary data for U.S. Part 91 operations is broken down by 16 common aviation job descriptions, as well as other categories such as number of aircraft, department size and location. For the audit, NBAA staffers directly contacted a randomly selected 5-percent sample of respondents to verify/confirm the salary data. According to the survey, the average total compensation—salary and bonus—last year for a captain at a U.S. Part 91 flight department was $89,055 for a light jet; $108,805, midsize jet; $134,942, large-cabin jet; and $161,335, ultra-long-range jet.

COURT OVERTURNS LICENSE SUSPENSION

A three-judge panel on the U.S. Court of Appeals for the Fifth Circuit overturned a 60-day suspension of the ATP certificate of Richard Boeta. It found that the Beechjet pilot in question "inadvertently" flew in RVSM airspace without aircraft authorization after his company, an aircraft management firm, had ended an agreement with a Part 135 certificate holder. That Part 135 holder had added the twinjet to its operations specifications and obtained FAA authorization for RVSM. In 2011 it ended the agreement and removed the aircraft from its operations specifications, but Boeta was not informed of this change. Following the September 2011 flight in RVSM airspace, the FAA subsequently suspended his ATP, and the NTSB upheld the suspension. The Appeals Court disagreed, finding that once aware that RVSM authorization exists, the pilot "has no ongoing obligation to confirm that it remains current."

ARSA WARNS ABOUT LABOR SHORTAGE

The Aeronautical Repair Station Association (ARSA) delivered a letter to the U.S. House of Representatives last month urging support for and swift approval of bipartisan legislation to reauthorize, reform and improve the Carl D. Perkins Act, the primary dedicated federal funding source for career and technical education programs. The association's membership consistently cites the shortage of skilled technical workers as a top policy concern. "You can't fly without AMTs," an ARSA spokesman told **AIN**. "Failing to build a dependable, highly skilled workforce will ground us all."

LACK OF EVIDENCE IN FLEXJET UNION SPAT

The National Mediation Board (NMB) has determined that Flight Options and Flexjet failed to provide sufficient evidence of election interference in a complaint they filed against the International Brotherhood of Teamsters (IBT), the union that represents the companies' pilots. Flight Options/Flexjet, considered as a single carrier in the complaint, filed the motion for a determination of interference on January 8 following the December 16 certification of a vote by the carrier's workers in favor of representation by the IBT. According to the NMB, the carrier did not provide "substantial evidence" for its claims that the IBT misused private customer and employee data to influence the election, as well as for allegations that the IBT unlawfully obtained or misused pilot contact information or that it engaged in a "pervasive campaign of coercion, intimidation, harassment and misrepresentation."

CONSTANT EXPANDS AOG SUPPORT

Cleveland-based Constant Aviation is expanding its maintenance support coverage by adding hubs in Naples and Palm Beach, Fla. Constant Aviation now has AOG hubs in 17 cities in the U.S. and anticipates its network of AOG mobile hubs will exceed 25 by year-end.

Sales of Piaggio's Avanti Evo remain slow but the Italian manufacturer insists that a switch in emphasis to the military market does not mean it will abandon business aviation.

Piaggio CEO steps down after Avanti future pledge

by Charles Alcock and Curt Epstein

Piaggio Aerospace insisted last month that it will keep producing and supporting the Avanti Evo. In an August 16 statement, the Italian manufacturer sought to reassure operators who appear to have been discouraged by a July 28 press release indicating that a new "industrial plan" will see the company focus primarily on military programs.

However, in an unexpected move on August 24 the Piaggio board announced that CEO Carlo Logli is stepping down from the position to be replaced on an interim basis by chief operating officer Renato Vaghi.

Annual deliveries of the civil version of the twin-turboprop pusher have dropped into the low single digits for the past several years. Some Avanti operators complained to **AIN** about poor product support, which they said makes them question Piaggio's long-term commitment to the program.

"There is no plan to stop Evo production or customer support of the Avanti programs, after having borne the considerable development costs and finally starting the delivery period," Logli told **AIN** in a written statement.

This appeared to mark a change in emphasis from the July 28 statement in which the company hinted that it might walk away from the civil aircraft sector. "Military platforms provide a sustainable and scalable growth trajectory for Piaggio Aerospace, which has been severely impacted by the contraction of the business aviation market," said Logli. At the time, the company noted that it would continue to deliver its existing commitments for the Avanti Evo, and when questioned further by **AIN** it responded only that "At present, the Avanti Evo will continue to be part of the Piaggio business."

Piaggio says it has delivered four Avanti Evos so far this year. However, the latest shipment numbers from the General Aviation Manufacturers Association show delivery of just one Avanti in the first half of this year—suggesting that three of them might have been military versions, or that one or more was delivered in July or the first half of August. An unmanned patrol/reconnaissance version known as the P.1HH HammerHead is currently under development.

Piaggio delivered only three Avantis last year and is now reporting an order backlog for 10 Evos, including options. The in-service Avanti fleet numbers 219 of the original model, the Avanti II and the new Evo variant.

Frustrated Operators

Before Piaggio's August 16 statement, the perceived uncertainty over the manufacturer's commitment to the Avanti appears to have unsettled some operators. Exclusive Charter Service, which operates six Avanti IIs as part of its Aero Club membership program fleet, told **AIN** that it now intends to sell the aircraft and has cancelled plans to take delivery of a new Evo by year-end.

According to company founder Jason Johnson, it has become too difficult for the operator to guarantee availability of the aircraft, mainly because of problems getting required parts in a timely way. He cited a small seal that needed to be replaced as part of an inspection conducted in June, but for which delivery could not be assured until October.

The airframer acknowledges

Continues on page 14 ▶

CITY COUNCIL VOTES TO CLOSE SMO

As expected, the Santa Monica city council voted unanimously last month to approve a resolution calling for closure of Santa Monica Airport (SMO) by July 1, 2018, and in the meantime replacing the airport's two FBOs—Atlantic Aviation and American Flyers—with city-run services. The resolution also calls for the city to begin the process of planning a "great" park to replace the airport; investigating whether fractional-share operators are operating as scheduled airlines; applying to the FAA to remove the so-called Western parcel, which would mean cutting 2,000 feet from the existing 4,973-foot runway; rigorously enforcing the noise ordinance; changing hangar leases to permits; and eliminating the sale of leaded fuel.

These moves appear to be designed to discourage operators, especially those flying jets, from using SMO. Jet operations have been growing in number in the past three years, from 34 movments per day to 46, while piston traffic has declined.

A recent FAA director's determination requires the city to keep the airport open until at least Aug. 27, 2023. City council members believe that the city, as the airport owner, has the right to determine the future of the airport, despite the city's signing an instrument of transfer agreement in 1948 in which the city agreed to keep the airport open in perpetuity. A trial is scheduled for next August to resolve the city's dispute over whether that agreement still applies. —*M.T.*

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NEWS BRIEFS Compiled by Chad Trautvetter

European Bizav Activity Logs Gain

Business aircraft activity in Europe climbed 1.9 percent year-over-year in July, to 85,685 business aviation departures, according to data from WingX Advance. This marks the largest monthly gain so far this year in Europe, taking the year-to-date trend to -0.2 percent versus a year ago. However, the month was still 4 percent below the pre-crisis activity peak in July 2008. Business aircraft departures in France, Europe's busiest market, rose 11 percent year-over-year in July and year-to-date activity is up 4 percent, averaging 389 new flights per month. Flight activity also made gains in Italy, Spain and Switzerland. Activity was flat in the UK, and flying in Germany slumped 7 percent in July. The failed coup attempt in Turkey resulted in flight activity falling 17 percent for the month. There was also no sign of recovery in the Russian market.

Jet Aviation Launches FBO Program

Jet Aviation launched an affiliate program for its FBO network last month, naming the Jet Center at Santa Fe, which shares the flight support business at the New Mexico airport with Signature Flight Support, as its first alliance member. The agreement is similar in scope to the Signature Select program, under which independent FBOs receive network benefits—in essence becoming part of the chain's network. For Jet Aviation, which operates seven FBOs in the U.S., an affiliate such as Jet Center at Santa Fe expands its footprint.

FAA Taps ERAU for Training Research Hub

The FAA has selected the University of Oklahoma and Embry-Riddle Aeronautical University to lead the new Air Transportation Center of Excellence for Technical Training and Human Performance. This center will conduct research and development on technical training for air traffic controllers, aviation safety inspectors, engineers, pilots and technicians. The center, to be operational this fall, will examine human factors, such as changes in learner expectations and academic best practices for training.

Texas Firm Launches Unlimited Service

Texas Air Shuttle, a scheduled public charter operation, has launched service in Texas. Flying Beechcraft King Air 200s with two pilots, the company is operating scheduled routes among McKinney National Airport north of Dallas; Conroe/North Houston Regional Airport; Stinson Municipal Airport south of San Antonio; and Austin Executive Airport. Two all-you-can-fly membership plans are offered: an executive plan that costs $1,895 per month and allows two outstanding reservations and one free guest pass; and a super commuter plan for $2,850 per month that allows six outstanding reservations and one guest pass. Texas Air Shuttle says it will eventually add Citation Bravos to its fleet.

North American Bizav Flying Dips

Business aircraft flying in the U.S., Caribbean and Canada dipped 2.1 percent year-over-year in July as Part 91 activity slowed, according to data from Argus International. Part 91 flying sank 5 percent from a year ago, while Part 135 activity edged up 0.5 percent and fractionals logged a 2.7-percent gain. Flight activity by aircraft categories was down across the board, with large-cabin jets leading the erosion with a 6.2-percent year-over-year decline. Turboprop flying fell 2.9 percent from a year ago, while light and midsize jets experienced declines of 0.6 percent and 0.4 percent, respectively. Once again, Part 135 turboprop flying saw the largest gain in individual segments, rising 17.9 percent over July 2015. Part 91 large-cabin jets experienced the biggest drop, lagging last year's numbers by 9.3 percent.

GAO: fuel fraud law costs aviation trust fund billions

by Kerry Lynch

The U.S. aviation trust fund has lost between $1 billion and $2 billion "or more" in tax revenue as a result of the decade-old fuel fraud law, a government watchdog has determined. The Government Accountability Office (GAO) released a report on August 8 in which it finds that less than half of noncommercial jet fuel tax receipts are being deposited in the aviation trust fund and that aviation fuel vendors have overpaid by as much as $230 million in fuel taxes as a result of the fraud law.

The IRS has cited some instances of jet fuel diversion, but had no documentation of instances that occurred before the enactment of the fuel fraud law. Further, over the past decade jet fuel on average cost $2 more per gallon than highway diesel fuel, the GAO said, providing economic disincentive for such diversion. The watchdog agency also reported that new emission standards have forced diesel engines to evolve to the point that the higher sulfur content of jet fuel could damage trucks' emission-reducing technologies.

Less than half of noncommercial jet fuel tax receipts are getting deposited into the aviation trust fund, according to the GAO.

Enacted as part of the 2005 highway bill, the fuel fraud law was designed to discourage truck drivers from purchasing aviation jet fuel to avoid paying the 2.5-cent-per-gallon higher tax levy on highway diesel fuel. The law requires noncommercial jet fuel to be treated as highway diesel fuel—taxed at the same rate and deposited into the highway trust fund until approved aviation vendors demonstrate that the fuel was used for aviation purposes and seek refunds.

Congress directed the GAO study after industry leaders raised concerns about the losses in aviation revenues, harm to small businesses and cumbersome requirements. The GAO's report traced the history of the fuel fraud measure, noting fears that truck drivers were using various means to avoid billions in highway diesel fuel taxes and pointing to activity where six individuals pled guilty to illegally blending jet fuel with diesel fuel.

But the GAO questioned the extent of the problem, noting that "reported instances of jet fuel diversion for non-aviation purposes are rare, and economic and technological disincentives may further discourage such activity."

Refunds Go Unclaimed

Aside from the underlying justification of the rule, the GAO found that many vendors that are authorized to seek the tax refunds aren't filing for them. While the GAO does not have an exact accounting of the total number of approved fuel vendors ("ultimate" vendors), the agency's analysis indicates that only about a quarter of those vendors filed a claim for a refund in Fiscal Year 2015. Filing for refunds is voluntary.

Industry stakeholders pointed to numerous reasons for the dearth of refund claims, including the challenging process for vendors to register for authorization. Also, for many vendors the refund on 2.5 cents per gallon does not justify the hassle of seeking a refund. Stakeholders also noted that documentation required to prove fuel was used for aviation purposes can be difficult to obtain. The net result is the funds are remaining in the highway trust fund.

Rep. Mike Pompeo (R-Kan.), who spearheaded the congressional directive for the GAO study, reacted to its results by saying that Congress must fix the problem it created when it approved the fuel fraud measure. "This GAO report not only confirms that the fuel fraud provision is deeply flawed and misguided; it also demonstrates that the impact on general aviation is far worse than we originally thought," he said. "This policy serves no practical purpose in the real world and has accomplished nothing short of robbing the aviation industry of billions of dollars over the past decade."

"The report quantifies the dramatic impact of this revenue diversion, which is undermining the viability of the Airport and Airway Trust Fund," agreed Andrew Priester, chairman of the National Air Transportation Association (NATA), which has long urged Congress to overturn the 2005 fuel fraud law. Priester added that the amount lost to the trust fund is "simply staggering" and said, "Consider how many new runways, instrument approaches or additional ATC towers could have been built had this money been available for its intended purpose."

NATA officials also noted that the report questions the rationale behind the tax law and whether it serves any purpose in the future. "The GAO report lays bare the fact that there was never much utility to the provision," said NATA senior v-p William Deere. "In 2005, the policy change was justified by a belief that the 2.5-cents-per-gallon difference between the highway diesel and jet fuel tax rates somehow gave truckers an incentive to use jet fuel. This ignores the fact that in 2005 the average price of highway diesel was $1.30 less than jet fuel. Today, the disparity between those prices is even greater."

Deere added that the FAA "presciently predicted" that the measure would create a burden and harm the trust fund. The FAA wrote the Internal Revenue Service in late 2005 that "the solution to [the highway diesel fuel tax] problem should not harm legitimate aviation users in a fragile industry or create significant administrative burden." The agency had asked the IRS to set aside the rule until the affected industries could hammer out a workable rule, but that request went unheeded.

The report provides industry advocates with the necessary background to seek the overturn of the fuel fraud law. However, they still face an uphill battle in convincing lawmakers to make a change since the law is creating a windfall for the highway trust fund. ❑

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NEWS BRIEFS Compiled by Chad Trautvetter

Hong Kong Jet Joins Forces with Asia Jet

Deer Jet subsidiary Hong Kong Airlines Corporate Jet Ltd (Hong Kong Jet) completed its acquisition of Asia Jet Partners last month. The two companies announced during ABACE 2016 that they had signed a letter of intent for Hong Kong Jet to purchase Asia Jet and its subsidiary Asia Jet Partners (Shanghai), as well as its joint venture Asia Jet Partners (Malaysia). Bringing Asia Jet into the Hong Kong Jet portfolio will enable both companies to enhance their service offerings to their respective clients, Hong Kong Jet said. The company added that the acquisition will bolster its business aircraft management and maintenance capabilities, as well as its charter footprint in Hong Kong. Hong Kong-based Asia Jet has nearly a dozen aircraft in its fleet, while Hong Kong Jet manages 25 aircraft.

BBA Aviation Sees Revenue Growth

Signature Flight Support parent company BBA Aviation's business and general aviation operation, which accounts for more than 90 percent of its revenue, was largely flat, with U.S. departures up 0.2 percent year-over-year for the first half, while European movements were down 0.8 percent. Yet Signature, which generates 93 percent of the company's operating profit, saw its adjusted organic revenue climb by 3.6 percent in the first half, while revenue from BBA's engine repair and overhaul and Ontic Legacy Support aftermarket services units declined by 14 percent in the same period.

JetSet To Open Interior Shop at VNY

JetSet Interiors is opening at Van Nuys (Calif.) Airport—its fourth location in the U.S.—thanks to a partnership with Western Jet Aviation. The jet interiors company will be moving into Western Jet's aircraft maintenance facility in Van Nuys and will add aircraft interior refurbishment capabilities at the shop. Western Jet, which specializes in Gulfstreams, offers airframe and engine maintenance packages, troubleshooting and repair, modifications, paint and dealership authorized avionics services. JetSet will add modification and finishing of cabinetry and woodwork, soft-goods refurbishment, custom seating modifications and upholstery capabilities. JetSet will also offer a line of custom seating designed for Gulfstreams.

Bizav Adds $10.7B Per Year to Canada's Economy

A study commissioned by the Canadian Business Aviation Association reports that business aviation operations (including FBOs) and manufacturing in Canada contribute $10.7 billion annually and 43,200 jobs to the country's economy. Furthermore, business aviation operations and manufacturing in Canada provide $315 million in tax revenue to the government each year. About 1,900 business aircraft are registered in Canada and, according to the study, the operation of each produces $430,000 in wages annually.

Landing Fees Increase at KTEB

A hike in landing fees at Teterboro Airport (KTEB) takes effect on September 1. According to airport manager Renee Spann, the increases are necessary so "revenue more closely aligns with capital and operating costs." The new schedule raises fees for aircraft weighing less than 6,000 pounds to $21.25 from $17; aircraft weighing between 6,000 and 12,499 pounds will incur a fee of $31.25, up from $25. For aircraft weighing between 12,500 pounds and 79,999 pounds, fees will rise to $4.38 per 1,000 pounds from $3.50; and for aircraft exceeding 80,000 pounds they will jump to $8.15 per 1,000 pounds from $6.50. The increases are the first at the New Jersey general aviation-exclusive airport since 2009.

FAA aims to improve helo crash survivability

by Mark Huber

The FAA has begun a process that could lead to mandating retrofit of safer passenger seats and restraints as well as more fire-resistant fuel systems in legacy normal- and transport-category rotorcraft.

In September last year the agency charged the Aviation Rulemaking Advisory Committee (ARAC) with making recommendations to enhance the safety of normal- and transport-category rotorcraft, even those that remain in production, whose certification basis predates crashworthiness and occupant protection standards adopted in the 1980s and 1990s. The ARAC held its first meeting on the topic late last January. The FAA noted that most designs currently in production are "grandfathered" and therefore a relatively small percentage of the current civil fleet, estimated at 16 percent at the end of 2014, had complied with modern requirements for crash-resistant fuel systems, for example. The ARAC has formed a Rotorcraft Occupant Protection Working Group, tasked with providing advice and making recommendations to the ARAC ahead of what likely will be proposed rulemaking by the FAA. For all intents and purposes the cake is already in the oven, and the working group would appear to provide the industry with its only opportunity to influence the degree of the outcome.

Improving Survivability

In its Nov. 5, 2015, federal notice of the working group, the FAA noted, "While the number of U.S. helicopter accidents and the corresponding accident rate over the past 10 years has steadily decreased, during that same period data associated with fatal helicopter accidents and fatalities remains virtually unchanged. A number of regulations were promulgated in the 1980s and 1990s to address and greatly improve occupant protection in a survivable emergency landing or accident. These occupant-protection improvements involve seat systems that reduce the likelihood of fatal injuries to occupants in a crash; structural requirements that maintain a survivable volume and restrain large items of mass above and behind the occupant; and fuel systems that reduce the likelihood of an immediate post-crash fire. If the occupant-protection improvement rules are not incorporated in new production helicopters, there will be no meaningful reduction in the number of fatalities in helicopter accidents."

The FAA cited data from its own Rotorcraft Directorate and its Civil Aerospace Medical Institute (CAMI) with regard to 97 fatal helicopter accidents between 2008 and 2013 related to post-crash fire and blunt-force trauma. It found that 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. 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. "The Rotorcraft Directorate further discovered that only 10 percent of U.S.-registered, type-certified rotorcraft complied with increased occupant protection measures related to blunt force trauma mandated in the (FAR) 27.562 and 29.562 rules, despite the rules being in effect for 25 years at the time of the study.

"Additional research found that about 9,000 occupants had been involved in U.S. helicopter accidents in the 25 years since (FAR) 27.562 and 29.562 became effective. Only 2 percent of helicopters in those accidents were compliant with (FAR) 27.562 and 29.562. More than 1,300 occupants were killed in accidents involving 98 percent of helicopters that were not compliant with (FAR) 27.562 and 29.562," the FAA noted.

The working group is charged with performing a cost-benefit analysis for "incorporating the existing occupant protection standards" into "newly manufactured rotorcraft" and with making specific recommendations that address the viability of alternative performance-based occupant protection safety regulations. That study is slated for release this fall. ❑

Bristow Group provided SAR-equipped helicopters to the Louisiana flood relief efforts, performing numerous rescue missions last month.

BRISTOW HELICOPTERS, CREWS AID LOUISIANA FLOOD RESCUES

Bristow Group is lending its SAR-equipped helicopters to the Louisiana flood relief efforts, performing numerous rescue missions last month in cooperation with the Office of Homeland Security and Emergency Preparedness for Livingston Parish. Bristow teams based in Galliano and New Iberia deployed a SAR-equipped Leonardo AW139, Sikorsky S-76C++ and Bell 407 to provide relief to displaced residents and their pets, performing multiple hoist operations and EMS flights.

Equipment on Bristow's SAR AW139 includes a 700-Mhz radio that allows for communication with the multiagency responders and mission management capabilities, an external rescue hoist system and critical-care medical equipment. The crew consists of two pilots, a hoist operator, a rescue swimmer and a flight paramedic.

Bristow crews retrieved people from flooded homes, small boats, levees and high ground surrounded by floodwaters. They supported emergency services at Gray Elementary School, which was being used as an emergency shelter, lowered water and supplies to people stranded by the floodwaters and conducted aerial reconnaissance of the area for local authorities and media. Emergency calls and SAR taskings were communicated to Bristow's SAR dispatch, which were triaged for severity and relayed to rescue crews. —*M.H.*

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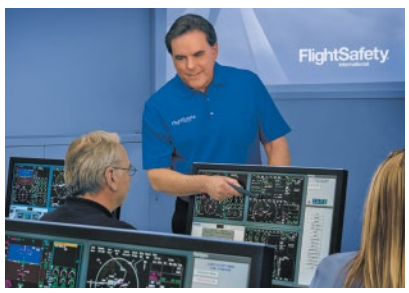

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NEWS BRIEFS Compiled by Chad Trautvetter

Gulfstream Says Outlook Improves After Brexit Vote Jitters Hit Jet Sales

The UK's June 23 Brexit vote put a damper on Gulfstream sales at the end of the second quarter, but the company insists prospects are still good. According to Phoebe Novakovic, chairman and CEO of parent group General Dynamics, the continued solid U.S. economy and quick stock market recovery after the UK voted to exit the EU have calmed the nerves of potential buyers. Geographically, half of the jet orders placed in the quarter were from North America, with the remainder from the Middle East, Asia, Europe and South America, "in that order," she said. Second-quarter revenue at General Dynamics's aerospace division, which includes both Gulfstream and Jet Aviation, fell $124 million year-over-year, to $2.134 billion, as completed Gulfstream deliveries dropped by seven aircraft, to 34. Aerospace quarterly profits fell by $25 million from a year ago, to $845 million.

Europe Requires SMS for U.S. Operators

The FAA is advising U.S. Part 135 operators that they will soon need an approved safety management system (SMS) program to fly throughout Europe under the Third Country Operators (TCO) regulation. Part 135 operators based outside Europe will be required to obtain a TCO authorization from the European Aviation Safety Agency by November 26 to operate in that region. TCO authorization requires that the operator has a state-recognized SMS program, such as those recognized by the FAA, the agency noted. The FAA has an SMS voluntary program available for Part 135, 145, 141 and 142 organizations.

FAA Aims To Reduce Takeoff Excursions

While landing excursions outnumber takeoff excursions by four times, the latter category of mishap "still occurs at an unacceptable rate," the FAA said in a new Safety Alert for Operators. Two-thirds of takeoff-related events are overruns, and turboprops are involved in the largest percentage, followed closely by jets, the agency said. According to the FAA, it's often errors in takeoff performance calculation that elevate the risk of a takeoff runway excursion. The FAA said that it is of "primary importance" that weight-and-balance and takeoff performance numbers be verified by both pilots. In addition, training should also focus on "risk recognition and mitigation" regarding the hazards of incorrectly entering data into the flight management system, electronic flight bags or other electronic devices used for takeoff performance calculations.

Falling Prices Boost Pre-owned Sales

Pre-owned business aircraft transactions gained steam in the first half of this year, up for both business jets and turboprops, but other market indicators are showing signs of sluggishness, with available inventory creeping up and asking prices moving down, according to JetNet's latest industry report. The number of pre-owned business jet transactions in the first half of the year climbed by 1.9 percent versus a year ago, while average time on market was 12 days shorter, JetNet said. At the same time, average business jet asking prices have dropped 11.2 percent, while the percentage of business jets available for sale had increased to 11.7 percent in July. Likewise, the available business turboprop fleet has inched up from 8 percent last June to 8.3 percent. Average asking prices for turboprops fell 2.3 percent, but actual sales climbed by 8.8 percent and took 15 fewer days.

The Learjet 70 and 75 are the only aircraft in the product line, and they have lost market share to the Citation XLS+.

MARK WAGNER

Slow sales spur questions about Learjet's future

by Chad Trautvetter & Kerry Lynch

A divestiture of Wichita-based Learjet from Bombardier's aerospace portfolio is "increasingly plausible to lighten the overhang of $6.7 billion in debt" that matures between 2018 and 2023, according to an investor analyst report published August 8 by Cowen and Company. During its second-quarter financial call, Bombardier chairman and CEO Alain Bellemare said the company is "addressing Learjet's position due to significant pricing pressures."

Cowen aerospace analyst Cai von Rumohr said that while the lone products at Learjet—the 70 and 75—have lost considerable market share to the Cessna Citation XLS+ over the past year and have "no opportunity for growth," the aftermarket business for the more than 2,300 Learjets in service is worth $400 million annually. Thus, he said, Textron Aviation could be an "interested potential buyer for cost synergies (both are located in Wichita) and potential to upgrade Learjet service customers to its bizjets."

A Bombardier spokesman said the company would not comment on "speculation" about Learjet's fate. "Our immediate focus is on aggressively selling aircraft in a highly competitive [light jet] segment—this includes being aggressive on price and driving cost reduction to better compete in this market," he told **AIN**. "The Learjet 75 offers unmatched performance versus competitors," he said, noting its flat floor, operating costs, 2,040-nm range and recently introduced pocket door.

Bombardier delivered six Learjet 70/75s in the first half, compared with 14 in the same period last year. In total, it shipped 32 Learjet 70/75s last year.

Orders for Learjets did improve in the second quarter, but Bellemare cited continued softness for light aircraft sales. Asked by an analyst whether Bombardier's intention to address the Learjet position signaled a possibility to exit that end of the market, Bellemare responded, "It's a very competitive segment of the market. So there is significant pricing pressure. And what we meant by that is we're going to continue monitoring this and making sure that we keep on pushing sales, and then we'll see where it goes."

While Learjet order activity remained below expectations, Bombardier achieved a book-to-bill ratio of 1.0, with net orders more than doubling to 70 in the first half. This compares with orders for 27 aircraft in the first half of last year and a book-to-bill ratio of 0.3.

2016 Deliveries on Target

Bombardier executives also remained encouraged that the Business Aircraft division remains on target for its planned 150 deliveries for the year. Business jet deliveries and revenue did drop overall in the second quarter, but the executives said that the results are in line with previously announced cuts.

Bombardier delivered 42 business jets in the second quarter, down five from a year earlier. Global deliveries were down by six to 14 for the quarter, leading the second-quarter decline, and Challenger 350s were down by two to 16. But Challenger 605/650 deliveries helped offset some of that drop, rising by four aircraft to seven.

As Global deliveries slid, so too did revenue, by 19 percent to $1.473 billion for the quarter. But with cost cuts in place, profit jumped by 78 percent to $212 million (earnings before interest and taxes).

For the first half, deliveries of all Bombardier business aircraft are down by 19 to 73. Learjets accounted for eight of that drop; Globals were down by nine.

Pointing to last year's announced plans to cut Global production, Bellemare said the company was a year ahead of its competitors, who are now evaluating the market, and said Bombardier executives "feel pretty good" about the rate. "This is… the right level of production and volume given market demand."

What would be a sustainable rate for Learjet? CFO John Di Bert said it is still "tough to make that call right now." The focus is on selling airplanes, he said, adding that "We'll look at 2017 in the fall." ❑

News Note

Signature Flight Support marked the reopening of its FBO at Chicago Midway International Airport (MDW) on August 18. The four-month renovation project saw the expansion of the facility's lobby to 3,700 sq ft from 2,000 sq ft, with a new fireplace; internet bar; modernized customer service representative workspace; upgraded sound system and bathrooms; and broadened coffee bar. The pilots' lounge, shower facilities and flight-planning areas were also enlarged.

One of two FBOs at Chicago Midway, Signature occupies 17 acres on the west side of the airfield and provides the terminal, 190,000 sq ft of hangar space—sized to accommodate aircraft up to a Global 6000—and ramp and vehicle parking. ■

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NEWS BRIEFS Compiled by Chad Trautvetter

Daher Offers Quick-change Lav for TBM 900/930s

Daher announced a quick-change private lavatory option for new-production TBM 900s and 930s. The "Elite Privacy" configuration, available next year, integrates a lavatory area in the TBM's aft fuselage. It serves as a bench-type seat with a low divider wall when not in use during flight and converts to a private toilet compartment at the touch of a button, which electronically deploys a multi-segment partition with a door. The compartment also has a large mirror that automatically illuminates. Built with lightweight composite materials and cabin soundproofing, the compartment weighs 90 pounds and can be installed or removed by a maintenance technician in 30 minutes, converting the TBM cabin's standard six-seat layout to a four-passenger configuration, and vice versa.

Gogo Biz Partners with App Developers

Gogo Business Aviation has partnered with Garmin, ForeFlight (JetFuelX) and FltPlan to bring new cockpit and operational applications to its ATG 1000 in-flight connectivity system for the light jet and turboprop markets. Starting in the fourth quarter, the ATG 1000 will support the Garmin Pilot, JetFuelX and FltPlan Go apps, adding to the already supported ForeFlight Mobile, FlightAware Flight Tracker, WSI PilotBrief Optima and myGDC apps. When the device is connected to the GoGo Biz network, traffic and weather information can be received in flight via Garmin Pilot, while ForeFlight's JetFuelX helps operators find the best fuel prices. FltPlan Go features approach plates on maps; animated weather; auto syncing of NavLogs, weather and routes; checklists; and airport and FBO information.

Czech Gov't OKs Backing for GE Aviation ATP

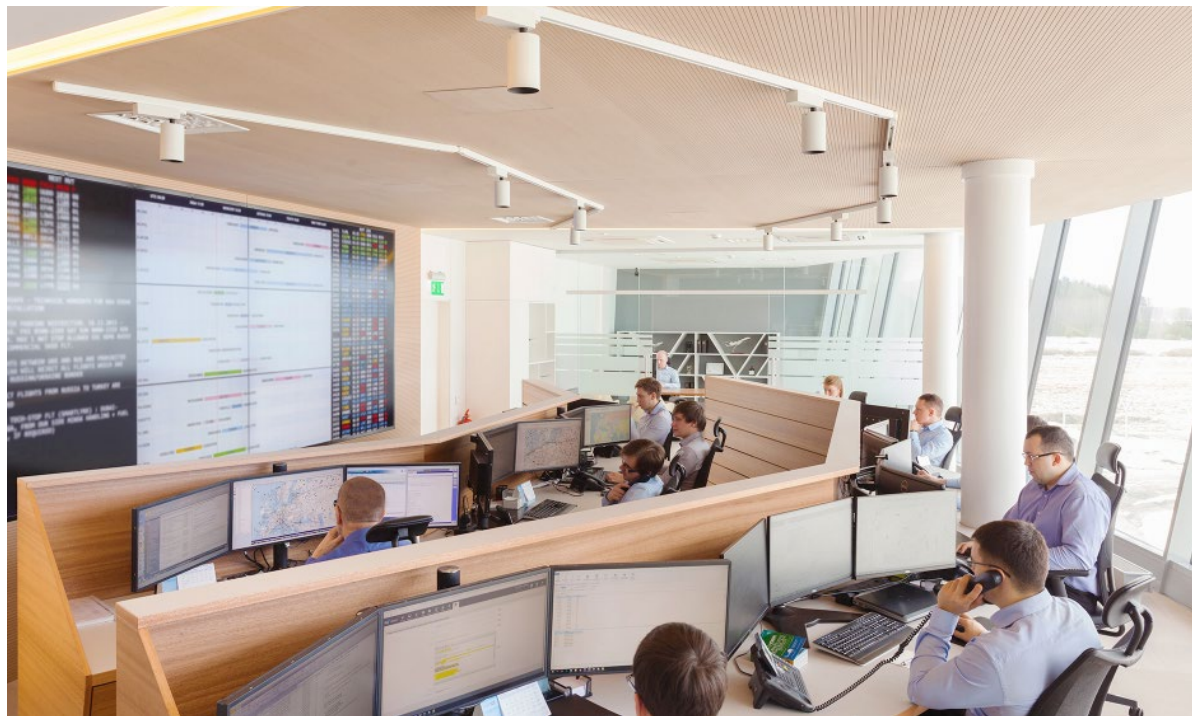
The Czech government has approved an investment to secure the development and production of GE Aviation's Advanced Turboprop (ATP) engine in the Czech Republic. In January, GE Aviation stated its intention to build the ATP in the Czech Republic, but negotiations over financial incentives have continued. Czech Trade and Industry Minister Jan Mládek announced in late July that the "Czech government approved cooperation with GE Aviation" and added that "aviation engines will be developed, examined and produced in the Czech Republic."

New Group Aims To Bolster China's GA Growth

In an effort to further develop China's nascent general aviation industry, Z-Park Sky Innovations General Aviation Alliance has partnered with Blue Sky Innovations, a Texas-based general aviation consulting company, to form the Z-Park Blue Sky Innovations General Aviation Industrial Alliance. According to its organizers, the group, the first of its kind for GA in China, will "expedite expansion of the industry." Headquartered in Beijing's Zhongguancun Science Park (Z-Park), the non-profit organization is the first industrial alliance licensed by the Civil Aviation Administration of China with a focus on GA, and among its founding members are some 60 organizations, among them GA enterprises, research companies and associated institutional investors. Blue Sky Innovations will act as the alliance's exclusive representative in the U.S.

NBAA Memberships Grows to 11,000

NBAA has reached 11,000 members, as the association nears its 70th anniversary. NBAA was established in 1947 by 19 charter members. Its membership has more than doubled over the past 20 years, reaching 5,000 members in 1997 and then 6,000 in 1999. NBAA signed up its 1,000th member in 1974.



Baltic Business Aviation Forum host modernizes facility to support growth

by Charles Alcock

The VIP-Center at Latvia's Riga International Airport was the venue for the fifth annual Baltic Business Aviation Forum on August 5. Organized by the Russian United Business Aviation Association, the event drew members of the growing business aviation community from across the Baltic region, including Latvia, Estonia and Lithuania.

Hosting the meeting was Riga-based Flight Consulting Group (FCG), which has been in the flight planning and support business since 2010. It is the parent of FBO Riga, which handles much of the private aviation traffic in the Latvian capital.

FCG says it is seeing annual growth of between 15 and 20 percent in the number of flights supported by its 22-strong operations department, which it claims is bucking a wider negative business aviation traffic trend across Europe. It mainly supports executive charter operators, as well as aircraft management companies and private operators, with an even split of clients between Europe and the Commonwealth of Independent States. FCG supports between 700 and 800 flights each month, mainly for the 90-odd business jets it services regularly.

This year has seen FCG expand its ground handling supervision network to all airports in Kazakhstan. It also has supervisors available to support operators in Lithuania, Estonia and Belarus, providing slot arrangements, handling, access to private terminals, refueling, catering, flight following and ground transportation.

The Baltic Business Aviation Forum was hosted by Flight Consulting Group at Riga International Airport in August. The company operates the FBO at Riga.

Last year, FCG developed its own flight planning and support IT platform called Air Traffic Operation Management (Atom). As well as integrating key flight planning software tools (such as JetPlanner, JeppView, PPS and Arinc), Atom is intended to incorporate multiple aspects of flight support services, business planning and customer relations. The company aims to complete integration of the system next year.

According to FCG, Atom has allowed the company to minimize the potential for errors in flight support operations, while also providing a highly personalized level of service to individual operators. In 2014, the privately owned company started modernizing and expanding its operations department with a focus on deploying new technology, a revised manual for procedures and standards, and a program to recruit and train suitably qualified staff in a location that does not have a long business aviation heritage.

FBO Riga opened in the airport's new business aviation complex in September last year. The facility also houses FCG's operations center, which has a "digital wall" equipped with 12 widescreen monitors to present all aspects of the movements being supported each day around the world. ❑

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Avanti support to continue

▶ *Continued from page 4*

that parts supply response times have not been satisfactory. "Piaggio Aerospace recognizes that in the last few months there have been some delays in providing some of the spare parts, mainly due to the restructuring process in which the company has been recently engaged," said Logli. "We are working hard to optimize the organization of the parts warehouses located in Genoa [Italy] and Fort Lauderdale, Florida; we can affirm that we are on track to provide the level of service and parts support expected from a top-class aircraft manufacturer."

Piaggio-authorized Avanti service centers Banyan Air Service and West Star Aviation both said they expect the aircraft to stay in production and that they intend to continue supporting operators.

"Banyan Air Service technical divisions are recognized experts on Piaggio aircraft and [Banyan is] a factory-authorized service center," said Don Campion, president of the Florida-based company. "We will continue to support the fleet and customers, working closely with Piaggio America."

West Star Aviation, based in East Alton, Ill., has been an authorized service center since 2009 and supports seven Avantis. "Some parts can be challenging to track down, but overall we have a 90-percent on-time delivery rate with the Avanti," commented Kevin Syfert, director of Cessna and Piaggio programs. "We have found similar issues with support from other OEMs."

Other Avanti operators were reluctant to speak on-the-record about their relations with Piaggio but generally echoed the complaints about poor product support and also questioned whether current levels of Avanti sales can sustain production indefinitely. One U.S. operator said that it intends to buy a number of pre-owned Avantis to use as a source of parts, indicating that it is determined to keep operating what it describes as "a great airplane."

Plans for Restructuring

Piaggio, wholly owned by Abu Dhabi's Mubadala Development Company since last year, is now seeking buyers for its engine-support business, which offers maintenance, repair and overhaul of a range of powerplants under license from Rolls-Royce, Honeywell, Pratt & Whitney and Pratt & Whitney Canada, as well as its MRO support organization for the Avantis currently in service.

The manufacturer said it is seeking approval from its lenders and the Italian government for the restructuring plan. On July 15, Mubadala announced that it has sold its 80-percent stake in MRO group SR Technics to China's HNA Aviation.

"Shareholder approval of our military-focused industrial plan marks the next phase for one of the world's oldest aircraft manufacturers," added Logli in the July 28 press statement. "We now have a state-of-the-art manufacturing base at Villanova and a proven military program with the P.1HH HammerHead, both of which allow us to take on this new challenge."

On May 29, a P.1HH prototype crashed off the coast of Sicily during flight-testing. The company said it is still "assessing the impact" of the accident on the program. Piaggio also confirmed that the jobs of the 132 employees who were temporarily laid off in 2014 have now been permanently cut.

As of press time, Piaggio is not booked to exhibit at November's NBAA Convention in Orlando. Until now, the manufacturer has been a leading exhibitor at the world's largest business aviation show. ❑

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Challenging market prompts cuts at Embraer

by Gregory Polek and Kerry Lynch

Embraer has announced a plan to cut its workforce in Brazil through a so-called Voluntary Dismissal Program (VDP) in an effort to save some $200 million. Citing a "challenging global aerospace scenario," the company referred to its recent plans to cut its delivery forecast for next year, most prominently in its business jet division. An Embraer spokesman told **AIN** that the program will apply to all its divisions, including commercial and military.

"The company informed its employees that it will take measures to reduce costs at all of its units and businesses around the globe," the company said in a statement. "As part of this process, it will be necessary to adjust the company's administrative and operational structure. Embraer has announced a Voluntary Dismissal Program (VDP) for employees in Brazil. The company believes that the VDP gives the decision opportunity to the employees and offers an attractive benefits package." The Brazilian airframer added it continues to analyze "all plan-related definitions" and that it would communicate details to employees in "a couple of weeks."

"Embraer believes in its perpetuity, as it works to overcome this moment," it concluded. "The company needs to secure its longevity and, for that, needs to maintain its financial discipline by taking immediate actions." The planned cuts come as revenues in the company's executive jets unit had dropped by 25 percent in the second quarter. Margins in the executive jets unit for the quarter were -8.5 percent.

Speaking during his inaugural quarterly earnings call as CEO July 29, Paulo Cesar Silva expressed a need to maintain discipline amid an environment of high levels of used jet inventory and falling prices. "It is a soft market," said Silva. "The revisions to the guidance we are making today are in line with what the market is doing…We do not want to fight against the market. So we will no longer fight for market share."

The company stated an intention to ship between 70 and 80 light jets by year-end, compared with its previous projection of between 75 and 85, and some 35 to 45 large jets, compared with its earlier estimates of between 40 and 50. Consequently, the company now expects revenues generated by its Executive Jets division to total $1.6 billion to $1.7 billion, short of its previous projection of $1.75 to $1.9 billion.

Cost-cutting Measures

With the anticipated drop in deliveries, Silva told analysts that the company is "adjusting its internal costs in the unit [so] we can get to the margins we need."

However, the São Paulo-area steelworkers' union has tried to connect the move to a $200 million second-quarter charge the company took in reaction to a U.S. corruption investigation. "Embraer cannot throw the cost of this corruption case onto the backs of the workers," the Sindicato dos Metalúrgicos said in a statement.

In addition to the weak results of its executive jets unit, Embraer's second-quarter results were marred by the $200 million provision set aside as the Brazilian manufacturer prepares for a possible settlement in the

six-year-old U.S. government investigation over potential violations of anti-corruption laws. The U.S. Securities and Exchange Commission and Department of Justice have been investigating possible non-compliance with the U.S. Foreign Corrupt Practice Act (FCPA) surrounding certain aircraft sales outside Brazil.

Announcing the charge during release of its second-quarter 2016 results, Embraer did not provide detail about the investigation. According to multiple press reports, authorities have been probing the company's alleged involvement in a reported bribery case involving the sale of military and commercial aircraft in the Dominican Republic. Without commenting specifically on this case, Embraer said it had voluntarily expanded the scope of the investigation to include sales in other countries.

Ongoing Investigation

The Brazilian manufacturer noted in its second-quarter earnings release that "negotiations with the U.S. authorities for the settlement of allegations of non-compliance with the FCPA have significantly progressed, to the point that Embraer recognized a $200 million loss contingency in the quarter ended June 30, 2016, reflecting the likely outcome of this matter." Embraer added that it anticipates that the final settlement could include a "deferred prosecution agreement," under which criminal charges would be deferred and ultimately dismissed if Embraer demonstrates compliance with agreement terms.

Embraer stressed that the contingency is only in anticipation and the settlement has not been finalized. But, Silva told analysts, "I think it's very important that we are getting to the end of this case. So we will turn this page, and with that we'll be looking again to develop our business and to further develop Embraer."

As a result of the $200 million contingency, Embraer posted a $127.4 million loss in the second quarter, compared with a $102.2 million profit (earnings before interest and taxes) a year earlier. This gave Embraer a margin of -9.3 percent.

As for the possible non-compliance, the company said it has "embarked on a comprehensive effort to improve and expand our compliance program worldwide."

Silva announced the results shortly after taking the helm of the company. In June Embraer had made the surprise announcement that Silva was succeeding Frederico Fleury Curado as CEO. ❑

CBP COMMISSIONER KERLIKOWSKE TO ADDRESS NBAA OPENING SESSION

U.S. Customs and Border Protection (CBP) Commissioner Gil Kerlikowske has agreed to speak at the opening general session at the NBAA Convention in Orlando, Fla., on November 1. Sworn into office in March 2014, Kerlikowske has been lauded for his efforts to collaborate with the business aviation community on key access issues.

He has repeatedly met with NBAA president and CEO Ed Bolen on these issues and the CBP has established a working group to focus on general and business aviation. Kerlikowske had been set to address the session during last year's NBAA show, but was forced to cancel in the wake of the Paris attacks in November.

"Commissioner Kerlikowske views business aviation as a security partner and has demonstrated his willingness to work with the industry to reduce delays, streamline operations and facilitate entry into the U.S. without compromising CBP's primary mission of security," said Bolen. "We look forward to having the commissioner at our convention and hearing how the efforts of the past year, such as the formation of a CBP working group focused specifically on general aviation, have furthered the agency's service to our aviation segment." *–K.L.*

TORQUED Full-throttle opinion from former NTSB member John Goglia

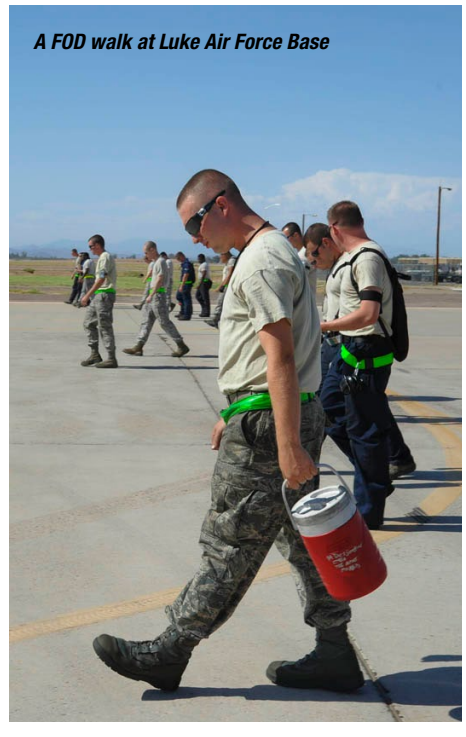
FOD damage: small pieces do matter

John Goglia is a former member of the NTSB and currently a safety consultant. He welcomes your e-mails at gogliaj@yahoo.com.

I recently wrote about the importance of remembering the lessons of ValuJet so we are not doomed to repeat the same mistakes. *(See* **AIN**, *July, page 18.)* The lessons involved ensuring that low-cost airlines have adequate infrastructure to support growth, fleet mix and oversight of outsourced maintenance. Specifically, those lessons center on complex oversight issues of airline operations and management of outside contractors. After all, determining adequate airline infrastructure to oversee growth and expansion, as well as contract maintenance providers, is not an exact science and often depends on proper auditing to spot indicators before they grow and become big problems.

While that article looked at big-picture issues that can affect the safety of flight, sometimes with devastating consequences, this month I got to thinking about how even the tiniest items can have significant safety implications. Once again, my topic is inspired by my thoughts around the anniversary of a tragic accident that occurred while I was a member of the NTSB. It also coincides with a recent Safety Alert about minimizing the opportunity for FOD *(see page 69)*. So this month, my focus is on the smaller, more tangible problem of foreign object debris. Not a glamorous aviation subject, for sure. But, as we know, a deadly serious one.

The accident I'm referring to is the July 25, 2000 crash of an Air France Concorde on takeoff from Paris Charles de Gaulle Airport to JFK International in New York. According to the BEA (the French equivalent of the NTSB) accident report, during takeoff and shortly before rotation "the front tyre of the left landing gear ran over a strip of metal, which had fallen from another aircraft, and was damaged. Debris was thrown against the wing structure leading to the rupture of [one of the fuel tanks]. A major fire, fueled by the leak, broke out almost immediately under the left wing." The aircraft took off but was unable to gain height or speed and crashed shortly thereafter into an airport hotel, killing all on board (100 passengers and nine crewmembers) and four people on the ground.



A FOD walk at Luke Air Force Base

The NTSB was initially an observer on the accident investigation but was subsequently made an accredited representative as issues involving the origin of the aircraft debris—from a U.S. airliner—became prominent. According to the French report, the metal piece fell off a Continental DC-10 because the aircraft had been improperly maintained. Since the aircraft had taken off just five minutes before the Concorde, the debris could not have been reasonably found and cleared in advance, the report concluded. So while spotting and removing this debris before the Concorde began its takeoff roll was unlikely, this accident illustrates how critical the consequences of even a small piece of debris can be.

Although the debris that caused the Concorde crash would have been more difficult to prevent, the NTSB Safety Alert points to a number of recent accidents where the debris that apparently caused the crashes could have been noted and removed in advance. The NTSB highlights the problem as follows:

• Mechanics, or others who help with aircraft maintenance, might leave items or residual debris behind after performing maintenance tasks that could become foreign object debris (FOD). Examples of FOD include tools, hardware, eyeglasses, keys, portable electronic devices (PEDs), paint chips and metal shavings.

• If mechanics and others do not account for every item that they use in or around an aircraft and clean as they go, this FOD can be ingested into the engine or interfere with critical flight systems, leading to an accident.

Accident History

The NTSB cites five accidents it has investigated since 2010 in which FOD was involved. Two separate helicopter accident investigations found evidence of maintenance rags or towels that had been ingested. In one case material consistent with a towel was found in the inlet guide vanes and in the compressor section. The helicopter engine had been replaced on

Continues on page 69 ▶

Long-term U.S. budget action unlikely

by Kerry Lynch

The U.S. Congress appears headed for another stopgap measure to tide over federal funding, but questions remain about how long that measure will last and whether Capitol Hill will address any substantive issues this fall.

Congress, which returns from a seven-week break on September 6, faces a September 30 deadline to pass funding bills for just about all of the federal agencies, making it increasingly likely that lawmakers will opt instead for a simple extension of the budget. Many Washington lobbyists believe that this extension would fund the government through March, pushing off major funding decisions until after the next Congress settles in in the New Year.

Such a move would keep funding for the federal agencies at current levels and defer other legislative initiatives that are typically included in funding bills. At stake is a potential slight budget boost for the FAA, funding for hiring more controllers and safety inspectors, as well as directives to ensure implementation of the Part 23 rewrite and to encourage improved certification processes. And, one lobbyist noted, a stopgap measure fuels the fire for ATC reform backers who claim the FAA needs a more stable funding stream.

No Legislative Consenus

The House and Senate Appropriations Committees each approved their respective versions of the Fiscal Year 2017 transportation funding bill last spring. They each called for a small bump in the FAA's funding; the Senate would have provided $16.4 billion, while the House called for $16.3 billion. Lawmakers authorized $16.28 billion for the current fiscal year.

The Senate also separately approved the transportation funding as part of a larger multi-agency bill (H.R.2577). But the transportation funding portion was dropped in a House-Senate conference on H.R.2577, and the bill stalled on the Senate floor once out of conference. The full House has not taken action on transportation funding.

With the November elections looming, Congress is scheduled to be in session for only some 30 days for the rest of the year—up through the end of September and then possibly for a few weeks in November and December. Along with passage of a funding bill (or bills), lawmakers have little time to address other major issues.

Some are pushing for a small tax bill to sweep up provisions that were left out of a tax extender package that passed last year. These include some energy tax breaks. Such a tax bill could provide a venue for other measures. Business aviation advocates have been eyeing potential venues for a bill clarifying that aircraft management fees are not subject to the 7.5-percent air transportation tax. Sponsored by Rep. Pat Tiberi (R-Ohio), H.R.3608 was among a number of tax measures cleared by the House Ways and Means Committee in July, shortly before Congress went on break for the party conventions and August recess.

Both the National Air Transportation Association and NBAA welcomed the action on the management fee measure, but it is unclear whether there will be enough time—and will—to push through a tax bill as Washington quickly turns its attention to the elections, industry advocates say. ❑

AIN's PRODUCT SUPPORT SURVEY

Part 2: Avionics

Product Support Survey: Avionics

In the results from this year's **AIN** Product Support Survey, Garmin remains in the top spot for cockpit avionics manufacturers, with a first-place overall average of 8.2, down 0.1 from last year. Rockwell Collins takes second place, with an overall average of 8.0, the same as last year. In third place this year is Universal Avionics at 7.9, down 0.1 from last year when it and Rockwell Collins shared the second-place slot. Honeywell and BendixKing (they are sister companies but serve different market segments) swap places this year, with Honeywell in fourth place at 7.6 (up 0.1) followed by BendixKing at 7.4 (down 0.3).

Garmin's score this year sees top ratings for overall product reliability (8.8), technical reps (8.4), cost of parts (7.4) and parts availability (8.3). Top ratings for Rockwell Collins are technical reps (8.4), technical manuals (7.9) and parts availability (8.3). Universal Avionics scores the highest rating for warranty fulfillment (8.5) and AOG response (8.4).

On the cabin electronics side, two companies received enough ratings this year to be added to the results: cabin monitor manufacturers Aircraft Cabin Systems and Rosen Aviation.

Tying for first place this year are Gogo Business Aviation and Satcom Direct with an 8.3 overall average, both up 0.1 from last year's first-place tie. Rockwell Collins received the second-highest score this year with a ratings jump of 0.4 to a 7.9 overall average, followed by Aircraft Cabin Systems (7.8), Honeywell (7.5) and Rosen Aviation (7.4).

Satcom Direct tops the charts for overall product reliability at 8.6 and receives high marks for technical reps (8.9), technical manuals (8.3) and warranty fulfillment (8.8). Gogo Business Aviation's high scores are for AOG response (8.4), cost of parts (7.8) and parts availability (9.1). ■

Rockwell Collins Customer Support Center

What have you done for me lately?

Avionics and cabin electronics are critical equipment in modern aircraft and an area of intense focus for product support organizations. **AIN** asked the avionics and cabin electronics manufacturers to summarize their improvements in delivering support to customers during the past year. Not all the companies that were ranked in the **AIN** Avionics Product Support Survey responded to **AIN**'s request.

Garmin

Garmin's avionics products cover a variety of aviation segments from experimental amateur-built aircraft to Part 25 business jets. To support all of these customers, Garmin has bolstered its product support staff and added training opportunities for in-house support personnel to improve quality of service and responsiveness to customer needs, the company told **AIN**.

In addition to its on-site pilot training offerings, Garmin now provides product tutorial videos on its website. It is also working with aviation "training and education providers to make our courses accessible to even more pilots and maintainers around the world." To support the experimental market, Garmin launched an experimental aviation support team.

"Garmin maintains its firm commitment to delight customers by establishing the industry benchmark for excellence in avionics customer support, product training, publications, warranty, and related services," the company said.

BendixKing

BendixKing is expanding the markets it serves from the traditional light aircraft to turboprops and light jets with its AeroWave low-cost satcom and soon-to-be-certified AeroVue integrated retrofit cockpit.

During the past year, the company has begun hosting

Continues on page 22 ▶

2016 Average Ratings of Cockpit Avionics and Cabin Electronics	Overall Average 2016	Overall Average 2015	Rating Change from 2015-2016	Parts Availability	Cost of Parts	AOG Response	Warranty Fulfillment	Technical Manuals	Technical Reps	Overall Product Reliability
COCKPIT AVIONICS										
Garmin	**8.2**	**8.3**	-0.1	**8.3**	**7.4**	8.0	8.2	7.8	**8.4**	**8.8**
Rockwell Collins	8.0	8.0	0.0	**8.3**	6.7	8.2	8.3	**7.9**	**8.4**	8.5
Universal Avionics	7.9	8.0	-0.1	8.1	7.1	**8.4**	**8.5**	7.4	7.1	8.6
Honeywell	7.6	7.5	0.1	8.0	6.2	7.6	8.2	7.6	7.4	8.0
BendixKing by Honeywell	7.4	7.7	-0.3	7.6	6.6	7.3	7.8	7.3	7.2	8.3
CABIN ELECTRONICS										
Gogo Business Aviation	**8.3**	**8.2**	0.1	**9.1**	**7.8**	**8.4**	8.5	8.0	8.1	8.4
Satcom Direct	**8.3**	**8.2**	0.1	8.4	7.2	8.2	**8.8**	**8.3**	**8.9**	**8.6**
Rockwell Collins	7.9	7.5	0.4	8.0	7.1	7.9	8.3	7.5	8.3	8.0
Aircraft Cabin Systems	7.8	NA	NA	7.4	7.1	7.8	8.5	8.1	8.0	7.9
Honeywell	7.5	7.5	0.0	7.6	6.5	7.4	7.9	7.1	7.8	8.1
Rosen Aviation	7.4	NA	NA	7.6	6.7	6.6	7.2	8.1	7.8	7.7

Companies listed in order of their 2016 overall average. Ties are listed alphabetically.* ***Bold* *indicates highest number in each category.*

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▶Continued from page 20

AIN's PRODUCT SUPPORT SURVEY

Part 2: Avionics

product introduction training webinars for avionics shops that install its products. Installers can also tap into the company's remote access system so that experts can assist with troubleshooting during installations, especially with AeroWave systems.

The company has added dedicated field service engineers available to travel to help with entry into service of new products. It has also improved the Web-based repair capabilities locator "with features such as advanced search, multiple part number searches, detailed information on each repair option and repair location information."

Gogo Business Aviation

Gogo Business Aviation, the Gogo division that manufactures air-to-ground airborne connectivity equipment for business aircraft, has made investments in product support that include adding new personnel, investing in technology and delivering more training for customers and employees.

During last year's second half, Gogo Business Aviation integrated its customer support, technical support, network operations, training and data analytics operations into the customer operations team. The company also invested in training, process support and data analytics and added network tools to resolve problems more quickly.

New support personnel were hired, and these included an instructional designer to improve content, a business process analyst to aid documentation and continuous improvement, two data analytics engineers and a trainer to "extend our reach internally and externally," according to Gogo.

In this year's first half, the company hired or promoted three field support engineers to improve product support.

Garmin G1000 avionics training system

Gogo plans to hire another field support employee this year. Technology investments support a new learning management system, a hosted PBX to improve inbound call handling and, according to Gogo, "Extensive and continuous improvements for online customer care on mygogoair.com, resulting in 30 percent improvement in resolution."

Gogo Business Aviation has lowered its overall trouble ticket rate by 20 percent year-to-date by implementing a detailed performance scorecard at the organization, tier and individual employee level. The company has increased training for tier one technical support personnel, and this allowed them to close 18 percent more cases year-to-date, freeing up tier two support techs to focus on more complex issues.

Honeywell

Honeywell has developed a new system to follow up on AOGs. The closed-loop feedback system summarizes AOG status for the customer and "allows the customer to confirm that the order has been fulfilled," according to Honeywell. In cases where the customer isn't satisfied that the AOG was fulfilled, Honeywell opens a survey to get active feedback from the customer to establish exactly what is needed. "Since May 20, 2016, we have received more than 2,200 responses with a 98.7 percent agreed completion rate."

Honeywell solicited customer feedback on its MyAerospace.com website and plans on releasing periodic improvements this year, including estimated ship date information. The site already was upgraded with an improved repair capabilities locator that allows customers "to make decisions about product support based on specific repair requirements."

In the first quarter of next year, Honeywell expects to receive STCs for its new wireless data loader (DLMU-W) for Primus Epic-based flight decks. The unit has received FAA TSO approval and is a drop-in replacement for the existing Epic data loader. Equipped with its own short-range Wi-Fi antenna, the DLMU-W should greatly simplify data uploads, which will be available via mobile devices running Honeywell apps such as Honeywell's Database Loading app and the MyMaintainer Maintenance app. "These apps simplify the traditional methods of uploading and downloading data from aircraft avionics, which saves time, money and frustration for the operator," according to Honeywell.

For customers of its satcom products, Honeywell has added service enhancements that include the new GoDirect Satcom Toolkit, a mobile app that helps customers with log retrieval and operators' requirements table loading. Product support engineers can log in remotely to customers' laptops to help troubleshoot their satcom systems, and this has helped improve service, according to Honeywell. Operators with the HS-720 satcom can get software upgrades done on site, without having to return the unit to Honeywell or schedule a visit from a product support engineer.

Continues on page 24 ▶

Honeywell GoDirect

SURVEY RULES AND METHODOLOGY

As with **AIN** Publications' previous annual Product Support Surveys, the objective this year was to obtain from the users of business jets, turboprop airplanes and turbine-powered helicopters statistically valid information about the product support provided by manufacturers of business aircraft, avionics and engines over the last year and to report this information to our readers. The ultimate goal of the survey is to encourage continuous improvement in aircraft product support throughout the industry.

The survey was conducted via a dedicated website, created by **AIN** from the ground up to provide improved ease of use and to encourage greater reader participation. **AIN** emailed qualified readers a link to the survey website and also sent a postcard invitation with login credentials to the survey website.

The survey website was open from May 2 to June 15. Respondents were asked to rate individual aircraft and provide the tail number, age (less than 10 years old or more than 10), primary region of service and whether they used factory-owned or authorized service centers, or both. Respondents were also asked to rate, on a scale from 1 to 10, the quality of service they received during the previous 12 months in the following categories:

- **Parts Availability**–in stock versus back order, shipping time.
- **Cost of Parts**–value for price paid.
- **AOG Response**–speed, accuracy, cost.
- **Warranty Fulfillment**–ease of paperwork, extent of coverage.
- **Technical Manuals**–ease of use, formats available, timeliness of updating.
- **Technical Reps**–response time, knowledge, effectiveness.
- **Overall Product Reliability**–how the product's reliability and quality stack up against the competition.

Respondents were also asked to recognize individuals who have provided them with exceptional product support and service. The full list of these people is available online at www.ainonline.com/above-beyond-2016.

The 2016 **AIN** Product Support Survey results for aircraft were published in the August issue, and engines will be featured next month. ■

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▶Continued from page 22

AIN's PRODUCT SUPPORT SURVEY

Part 2: Avionics

Satcom Direct network operations center

Honeywell has also partnered with FlightSafety International to deliver training on APUs, avionics, engines, environmental controls and satcoms. Training is available at FlightSafety learning centers, online or at the customer's site.

Rockwell Collins

Early last year, Rockwell Collins added a "customer effort" metric to measure "the ease of customer interaction and resolution during a service request." During the past year, the company's customer support organization received a customer effort score of 90 percent. "Research has proved that effort is the best transactional loyalty metric," according to Rockwell Collins. The company also uses feedback from surveys, advisory boards and customer interactions "to drive support strategies that make it easy for customers to solve problems quickly."

Rockwell Collins is also focusing on proactively resolving issues and preempting future customer contacts by training product support managers "to identify areas where customers might make contact in the future and address the issue during this initial contact, [thus] preventing follow-on calls." This has been combined with data analytics to identify and address issues that result in repetitive customer contacts as well as measuring time between customer callbacks using the "Next Issues Avoidance" metric.

Supporting all these efforts is a growing team of customer support engineers deployed around the world, and they provide support to customers and Rockwell Collins dealers. Customers can access the list of support engineers and dealers on the Rockwell Collins Service First app, available for Apple and Android mobile devices.

Satcom Direct

Satcom service provider and router manufacturer Satcom Direct opened a network operations center at its new world headquarters in Melbourne, Fla. The headquarters features a 24/7 real-time monitoring center to support customers worldwide. Satcom Direct also introduced its new entry-into-service program, which is "targeted at visiting every customer to educate them on the value of each service SD offers its customers," the company noted.

New hardware introduced this year includes the SD Wi-Fi Hub, a standalone router and Wi-Fi provider for small to midsize aircraft. The Hub received its first STC on the Citation CJ3 in May, and many more STCs are under development. During the past year, Satcom Direct has also added training courses and released SD Pro, its latest integrated operating platform.

Universal Avionics

To improve customer support by placing resources within easy reach of customers, Universal Avionics added a technical support representative in Singapore to support Asia and the western Pacific. Patrick Nenninger joined the company to support European customers from its Switzerland office in Basel. James Thompson was hired as the new repair station manager. Universal Avionics added two authorized support centers for its CVR and CVR/FDR products: Flight Data Systems in the UK and Australia.

The Universal Avionics training department now offers online FMS and UniLink Operational Familiarization courses on the UniNet customer portal. Universal is also developing classroom courses for the new InSight integrated flight deck, including Operational Familiarization and Integration and Installation, which will be available in the fourth quarter. Training events are available quarterly at Universal's Tucson, Ariz. headquarters and Wichita offices.

Warranty coverage for non-warranty repairs and exchange transactions has been extended to a full year from the previous 90 days. Universal Avionics has added a return material authorization service, "which improved tracking ability and provides customers with new options to choose turn times," according to the company. And turnaround time on repairs has been reduced to an average of five days. ❑

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AirVenture 2016

Story and photos by Matt Thurber

Oshkosh Excitement:

The Experimental Aircraft Association's 2016 AirVenture show drew nearly 563,000 people and featured 2,855 showplanes at Wittman Regional Airport (OSH) in Oshkosh, Wis. The weeklong event, which concluded on July 31, marked a 1-percent gain in attendance over last year. "Our attendance was particularly outstanding, since we had some weather challenges mid-week compared to seven perfect days in 2015," noted EAA chairman Jack Pelton. A quick rainstorm blew through on July 27, knocking down some banners, and a rainstorm pelted the airport the following morning, but the rest of the week was benign and warm.

Showplanes were up by 7 percent overall, driven by homebuilts (up 11 percent, to 1,124), vintage airplanes (up 7 percent, to 1,035) and warbirds (up 6 percent, to 371). Also on display were ultralights, light-sport aircraft, seaplanes, rotorcraft, aerobatic aircraft and other "non-categorized" aircraft. The big attraction this year was the four-engine Martin Mars flying boat, which delighted showgoers with water-dropping fly-by demonstrations drenching Runway 18/36 with 7,000 gallons scooped from nearby Lake Winnebago. Unfortunately, during a landing on July 29, the Mars hit a solid object that breached the hull and prevented it from performing during the final weekend airshows. Another incident that occurred during the show was some damage to a Martin A-26 that suffered a nosegear collapse while landing on the evening of July 25. The day before the show started, a Bristell E-LSA "collided with the terrain following a loss of control while landing," at Oshkosh, according to the NTSB. "The pilot received serious injuries."

In all, more than 10,000 aircraft arrived at OSH and surrounding airports, according to EAA. "Our grounds crew and our volunteers, who number more than 5,000, did a superb job keeping the site ready for visitors and campers who arrived by ground or by air," Pelton said.

Alongside the show aircraft, the number of commercial exhibitors climbed by 10 percent, to 891. In addition, the event featured 1,050 forums and workshops.

"It was a magical week at Oshkosh this year," Pelton said, noting that EAA premiered its Founders Innovation prize, designed to motivate solutions to prevent loss-of-control accidents in amateur-built aircraft, and celebrated the flight of the two millionth Young Eagle, represented by Jodie Gawthrop, of Westchester, Ill. Former Young Eagles chairman Harrison Ford took Gawthrop for her first flight in his de Havilland Canada Beaver, and she also received a Lightspeed headset and a $7,500 flying scholarship.

The winner of the $25,000 Founders Innovation prize was Ihab Awad of San Jose, Calif. According to the EAA, Awad's "Airball synthesizes air data from a number of sensors and graphically presents it so that a pilot can quickly understand the current flight state of the airplane. A blue ball on the display grows, shrinks and moves around the display as airspeed, angle of attack and yaw change. Keeping the ball the right size, and in the right place, ensures that the airplane is well outside any regime that may result in a [loss-of-control] accident."

"From the aviation anniversaries we celebrated, to the magnificent performances by the Canadian Forces Snowbirds, to the airplanes and aviators who were here, there was an energy that reinvigorated everyone involved in aviation," said Pelton.

Work is already under way for next year's event, scheduled for July 24 to 30, with an eye on celebrations of the 80th anniversary of the Piper Cub and the 70th anniversary of the U.S. Air Force, among other early plans.

The annual event welcomes all kinds… and some of the biggest aircraft mingled with some of the smallest.

The Martin Mars waterbomber proved one of the stars of the show, dropping water over Runway 36 at Oshkosh Wittman Regional Airport during a fly-by.

Meet the FAA

FAA Administrator Michael Huerta used his annual AirVenture platform on July 28 to summarize recent successful efforts that may jump-start the general aviation economy. They include speeding up technology adoption by aircraft owners and allowing more pilots to fly without traditional medical certification.

The recent FAA reauthorization legislation that included third-class medical reform requires the FAA to move ahead with new regulations allowing pilots to fly without a medical certificate if they meet certain criteria. Huerta acknowledged that he has heard pilots urging the FAA to enact medical reform "many times myself, right here at Oshkosh. We took this feedback seriously, especially since it's in keeping with our shift toward more risk-based decision-making."

Although the FAA did work on some rulemaking itself, it was hung up in Department of Transportation bureaucracy, and it appeared there was no path forward until Congress forced the issue in the recent legislation. In any case, he said, "Getting this done is a priority for our agency, and Congress agreed. I've assembled a dedicated team that's in charge of drafting the necessary regulatory text and moving it through our rulemaking process on the timeline Congress has laid out. We know you're eager to see this new rule in place. And both the FAA and the Department of Transportation are committed to getting it done as soon as possible."

The annual event marked a 'magical week' for aviation, commented EAA chairman Jack Pelton.

Below, reps from Mexican charter company Across and the Emirates Academy sign on as the launch customers for the Embraer Phenom 100EV.

A rainy day did nothing to dampen the spirits of the more than half a million people who turned up at Wittman Regional to see aircraft of nearly every stripe.

Huerta also highlighted technology changes that will alter the way aircraft and pilots are certified, including the new Part 23 rewrite and Airmen Certification Standards. "Over the past several years, we've taken a long, hard look at how we certify aircraft and parts," he said. "Our Part 23 rewrite overhauls how we certify aircraft in the future. But we also recognize how important it is to modernize the existing general aviation fleet."

The recent approvals to install non-TSO'd Dynon and Garmin displays in certified aircraft are an example of how the FAA and industry are working to improve safety using modern technology. "We want to reduce unnecessary regulatory barriers that make it costly and time-consuming to develop and install safety technologies in GA aircraft," he said. "Many of these technologies aren't required by regulation, but they still provide a number of valuable safety benefits; we want to make sure you can easily take advantage of them."

Aircraft

Phenom 100EV

Embraer announced an updated version of the Phenom 100E light jet with new avionics, slightly faster top cruise speed, substantially faster climb-to-altitude times, 43 pounds more full-fuel payload and better high/hot performance. The latter includes takeoff distances that shrink by nearly 1,000 feet. The $4.495 million Phenom 100EV will feature Prodigy Touch avionics built on the touchscreen-controlled Garmin G3000 system and Pratt & Whitney Canada PW617F1-E engines that each deliver 1,730 pounds of thrust, 35 pounds more per side than the PW617Es on the 100E.

Cessna Denali

Textron Aviation revealed the name of its long-awaited new single-engine turboprop at AirVenture, dubbing it the Cessna Denali and unveiling the airplane's cabin mockup publicly for the first time. First flight is anticipated in 2018 and Textron Aviation began accepting letters of intent for the $4.5 million (introductory price), single-pilot, six-to-nine-passenger turboprop at AirVenture.

The Denali is expected to have a range of 1,600 nm, a maximum cruise speed of 285 knots and a full-fuel payload of 1,100 pounds. The aircraft features a flat-floor cabin, a 53-inch-by-59-inch rear cargo door, a digital pressurization system that maintains a 6,130-foot cabin to 31,000 feet and an optional externally serviceable belted lavatory with pocket door enclosure in the aft cabin. The cabin design also incorporates large passenger windows, interior LED lighting, a refreshment cabinet and an in-flight-accessible baggage compartment. The interior is designed to be easily and quickly converted between passenger and cargo configurations.

The Denali will be powered by a new GE Aviation Fadec-equipped, 1,240-shp

AirVenture Clips

Electroair has come up with a hybrid electronic ignition/magneto that replaces aging Bendix single-shaft dual magnetos. The RC4000 hybrid magneto contains both an electronic ignition system to fire one set of sparkplugs and an internal generator to energize a capacitor that powers single coils mounted near each cylinder that fire the other set of sparkplugs. Even if the aircraft's electrical power fails, the mechanical portion of the hybrid magneto will continue to energize the capacitor and the coils to fire one set of sparkplugs. The company claims the hybrid is much lighter and more compact than the Bendix dual magneto and much simpler to maintain and offers improved performance using a wasted spark method that adds a cleaning spark in the exhaust stroke. Electroair is aiming to certify the hybrid magneto in about a year for four-cylinder engines fitted with the Bendix dual magneto.

Electroair hybrid magneto

King Schools has released a new version of its private pilot practical test video course, which incorporates the new FAA Airmen Certification Standards. The content has been reshot in HD video and includes a simulated checkride to ACS standards. Buyers can opt for an online version, which can be downloaded to the King Companion iOS app and includes lifetime updates, or a Windows disc version.

In its mission to encourage general aviation pilots to fly more and participate in local aviation activities, **SocialFlight** has added a feature to its online and app-driven events and destinations information service. The new Expert-led Forums in SocialFlight are designed to help users learn about various aspects of general aviation in a structured environment hosted by experts from aviation vendors. "While there are many forums for communication that are generally pilot to pilot," said SocialFlight founder Jeff Simon, "it's a complete free-for-all in most cases. There are some great forums, but just like the Internet it doesn't always mean that you're getting good information." The Expert-led Forums, he added, "create a safe place that is respectful and information-based and constructed for how people get information. It's a wonderful easy way to use a forums tool on a smartphone, tablet or the Web."

AirVenture continues on next page ▶

Continued from preceding page

engine with single-lever power and propeller control. GE announced the development of the engine late last year. It incorporates the modular architecture of the T700/CT7 turboshaft for better performance and lower operating costs, and features an all-titanium, 3-D aero compressor design for light weight and efficient power generation; cooled turbine blades enabling higher thrust and fuel efficiency; and integrated and electronic propulsion control to enable the single-lever power control. The Denali's cockpit will be equipped with the Garmin G3000 touchscreen-controlled avionics suite.

Cessna revealed the name of its pressurized single-engine turboprop, the Denali, and unveiled the cabin mockup. The interior is designed to allow quick changes from passenger to cargo configuration.

Eclipse Canada

One Aviation chairman Alan Klapmeier said his company's new Eclipse Canada project will likely replace the 550 in the production line-up eventually. "It's likely that the 550 goes out of production," he said at AirVenture. However, the company will still offer the EA550 as a remanufactured aircraft. "Those used airplanes are the future SEs," he said, referring to the company's Special Edition program that currently remanufactures Eclipse 500s. Klapmeier said the company sold eight SEs last year.

While Klapmeier would not commit to a firm timetable for the new $3.595 million larger and longer-range Eclipse jet, he said it likely would be available in two to three years, but stressed "there is no schedule. But we do feel very good about the task." He added, "The root section of the wing gets two feet added on either side. So we are rebuilding the existing wings that we have in inventory to do that. The engines will sit on the same engine beams, but they are a little bit heavier so there will be some changes there. And obviously with the avionics and systems there will be some changes. Each of these is relatively easy. It's no big deal. It's relatively easy compared to the task of designing an airplane." Klapmeier said the new airplane will use the same production line and tooling as the EA550.

He also said that it is his preference to offer the Canada project aircraft with a choice of avionics packages, either the Garmin G3000-based system or a package similar to the current IS&S flight deck in the EA550, because "I like the idea of competition."

Klapmeier said that while One Aviation remains "very excited" about the development of its Kestrel single-engine turboprop, the company has shifted resources from that program to support the Eclipse Canada project and that the Kestrel had "shifted to the right."

Epic Slides Right

Anticipated FAA certification of the $2.95 million Epic E1000 turboprop single has slipped six months, to the first quarter of next year, to redesign "about four parts" in the wing, CEO Doug King told **AIN**. King said the delay is "unfortunate," but "one of the things we weren't going to do was compromise the performance of the airplane. Some of the engineers said that if we just lower the gross weight or drop the speed down we could lower some of these loads." But King said he resisted all suggestions to compromise the aircraft's performance and insisted on an engineering solution even when it meant a further program delay.

"We took the time and got through that and I am happy to report that our wing passed structural testing," he said. King said the E1000's main differences from the Epic LT kitplane include the addition of an emergency exit, different pressurization, air conditioning, lighting systems, several switches and a few structural changes. "But the really big difference is that we are certifying this airplane [the E1000] to Flight Level 340," he said, compared to FL280 for the LT.

King said orders sit just north of 60 and that plans call for an initial production run of one aircraft per month following certification next year, gradually ramping up to one aircraft per week "once we reach full production, and we're going to get there as quickly as possible."

Epic anticipates certification of the Epic E1000 next spring, a delay prompted by a minor wing redesign.

AirVenture Clips

Innova Aerospace brought two King Air 90s to AirVenture to highlight the company's pending STC for installation of the BendixKing AeroVue flight deck and its paint and interior refurbishment and re-engining programs. One of the King Airs, an A90, is equipped with both the AeroVue avionics suite and GE's H80 turboprop engines plus fresh paint and interior, and the other, a C90A, is equipped with the AeroVue flight deck.

Innova showed a King Air A90 with GE H80 turboprops and AeroVue avionics suite at AirVenture.

The re-engining program stems from Innova's purchase of the Power 90 Walter (now GE) upgrade program from Smyrna Air Center more than a year ago. Innova's upgrade replaces the original Pratt & Whitney Canada engines with GE H80s, although the A90 on display was equipped with Walter 601s, which were replaced with H80s. Compared with the PT6A-135A-powered C90A, the H80-equipped King Air 90 adds 10 percent range, lowers specific fuel consumption by 8 percent and adds 90 shp for a power output of 800 shp per engine. The H80 conversion is available now on the C90 and E90, and Innova is adding more H80 STCs for other 90-series models in the first quarter of next year.

AeroVue is a modern integrated flight deck with all-new radios and autopilot, three 12-inch high-resolution displays, cursor control device, FMS with coupled Vnav and ADS-B OUT-compliant transponder. SmartView synthetic vision will be optional. Basic price for the King Air 90 AeroVue upgrade is $348,000, and this includes engine instrumentation on the cockpit displays. Innova estimates a conservative turn-time for AeroVue installation at 30 days, but this will likely drop as shops gain experience with the program.

Quest Aircraft, manufacturer of the Kodiak utility turboprop single, is adding a paint shop and more space to its manufacturing facility in Sand Point, Idaho.

Last year Quest began the expansion by launching construction of 27,000 sq ft attached to the back of the production facility, to accommodate subassembly work and inventory. The addition officially opened in June, and it will allow expanding the single production line into two lines. Quest has also acquired another 32,000 sq ft of hangar and

AirVenture continues on page 30 ▶

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Continued from page 28

The Cirrus Vision is nearing FAA certification, as the company was set to begin FAA function and reliability testing shortly after AirVenture.

Cirrus Vision

Cirrus Aircraft brought the first two production copies of the single-engine SF50 Vision jet to AirVenture, in addition to prototype aircraft. Cirrus is completing function and reliability testing on the jet, and the FAA will soon begin its own F&R flying, it said. The company noted that it is close to receiving FAA certification for the jet.

"It's been a long time coming, but it's finally here," said Cirrus Aircraft chairman Dale Klapmeier. Cirrus said its Grand Forks, N.D. facility is spooled up, with SF50s already on the production line, and that production has been "decoupled" from the certification process.

Meanwhile, Cirrus's delivery center in Knoxville, Tenn. will come on line later this year, initially with deliveries of SR-series piston aircraft and then SF50 jets beginning next year. Cirrus was scheduled to begin its flight safety review board with the FAA to cover training issues regarding the SF50 last month. Training and deliveries remain on track to begin later this year.

The Icon A5 amphibian generated plenty of interest at AirVenture.

Piper showed off the recently certified M600, an airplane it sees as a natural step up for owners.

Icon Aircraft

After last year's big splash when Icon Aircraft finally started giving demo rides to buyers of the A5 amphibious LSA during the AirVenture show, this year the company showed up on a more even keel, acknowledging that its goal of producing 20 airplanes a month remains unachievable in the short term. "We've got to walk before we run," said Icon founder and CEO Kirk Hawkins. "We couldn't go that fast." After opening its new factory in Vacaville, Calif., in February, Icon ended up laying off half of its production workers. "We didn't allow enough time to produce slowly before we [ramped up]," he said. Icon is also moving to a more vertically integrated business model and has relocated composites structure manufacturing from Cirrus to its own factory in Tijuana, Mexico.

Buyers will have to wait a little longer to take delivery because the 20 A5s that will be produced this year are all slated for Icon's own flight-training centers, to help get more Icon instructors and new pilots trained as the production lines speed up. The company's backlog currently stands at 1,850 A5s. Current base price of the aircraft is about $207,000, and with all options it tops out at $257,000.

Fuel-injected Archer

Piper Aircraft is expanding the engine options for its Archer TX training airplane to three with the planned certification later this year of a fuel-injected version. University of North Dakota has placed the first order for the fuel-injected Lycoming IO-360-B4M-powered Archer TX, and this engine will be offered as

AirVenture Clips

office space, which will be used for research and development, maintenance operations, training and associated Quest businesses, according to president and CEO Sam Hill.

Construction of the paint shop is set to begin shortly and it should be done in the first quarter of next year. Designed as a "drive-through" building, the facility will be designed with separate areas for paint removal and preparation, painting and pre-delivery processes. "We're now using two or three outside vendors," Hill said. "If we raise production, we need to control the schedule better."

Quest Kodiak

Quest will deliver 39 Kodiaks this year, he said, up from 32 last year. Since certification in 2007, 182 Kodiaks had been delivered as of late July, and that number should reach 204 by year-end. Some potential contracts for next year could drive deliveries to 52, and the company needs to prepare for the growth. "We're seeing a lot more activity in the U.S.," he said, but there are also new buyers in Southeast Asia and Japan. "Our Chinese dealer is really picking up the pace."

Texas-based **Redbird Flight Simulators** announced several new products and enhancements to its training device lines at AirVenture. In its Alloy line of controls for home-built simulators, it has added the new TH1 single-engine throttle, TH2 multi-engine throttle and YK1 yoke, all of which—along with the company's RD1 rudder pedals—are intended for simulator users looking for durable high-quality controls, according to the manufacturer. The Alloy line is compatible with most popular simulator programs such as Microsoft Flight Simulator, Lockheed Martin's Prepar3d and Laminar Research's X-Plane.

The Redbird VTO is designed to provide low-cost training for helicopter operations.

AirVenture continues on page 32 ▶

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Continued from page 30

an option for Archer buyers. The other options are the carbureted O-360 and the Continental CD-155 diesel-powered version. All are equipped with a Garmin G1000 avionics suite with Aspen EFD-1000 standby display and Garmin GTX 33ES ADS-B OUT transponder.

Sales of training airplanes continue to grow, according to Piper president and CEO Simon Caldecott. Deliveries during the first quarter were "relatively light, but we planned it that way. It's typically back-end-loaded to later in the year. The second quarter was up a little." Now that deliveries of the M600 turboprop single, which was certified on June 17, have begun, he expects that model to accelerate overall deliveries during the remainder of the year. However, Piper plans to build just 35 M600s per year to prevent a surge in initial orders and deliveries followed by a flattening out of production, which is difficult to manage. "We've already sold out this year, and we're taking orders for 2017," he said. "The M600 is the big thing for us; it's the natural step up for a lot of customers."

Mooney Dual Certifications

Mooney Aircraft's latest models—the M20V Acclaim Ultra and M20U Ovation Ultra—are slated to receive FAA certification in the third quarter, and flight-testing continues on the new M10T all-composite trainer.

Work on the fixed-gear M10T and retractable-gear M10J is under way at Mooney's Chino, Calif. research and development facility. The M10s are powered by Continental's CD-135 diesel and feature Garmin G1000 avionics and a slotted wing design. The M10J will also be equipped with an autopilot.

The M10T has logged more than 47 flights and 66 hours, exploring stall testing, envelope expansion, handling qualities evaluation, engine cooling tests and engine tuning. Mooney hasn't announced the certification timeline for the M10s, but expects to do so by year-end.

Lancair Assets For Sale

Lancair International, one of the oldest kit-aircraft manufacturers, is restructuring its business and selling assets that it no longer needs while focusing on the more popular Evolution piston and turbine experimental amateur-built models.

"As we have grown, our customer base has changed dramatically from the early days," said director of business development Kevin Eldredge. The Evolution models are the company's primary products, while the Lancair 360, IV, IVP and Legacy kits have seen declining interest from customers who want to buy a kit, take it home and build an airplane. The Evolution kits are built by customers at a builder-assistance facility, which provides assistance and tools and helps speed up the construction effort.

"We are separating into two organizations," he explained. The primary and remaining business will be called Evolution Aircraft and will be responsible for all Evolution-related development and support. The sale will include all Lancair assets, which include intellectual property, the Lancair brand, the kit designs, parts, tooling and support for the roughly 1,200 airplanes flying and 2,000 kits sold. The package extends to rights to sell more Lancairs as military trainers. The entire Lancair business currently accounts for about 10 percent of the total revenue of Lancair International, according to Eldredge.

The company plans to sell all assets combined and will not split any out. Even at just 10 percent of revenue, the Lancair segment "is pretty profitable," he said, "but it could be much more. It's a substantial business with a great customer base."

Meanwhile, the Evolution business is growing quickly, and the company needs the money from the sale of the assets to continue growing and serving customers. As of late July, 63 Evolutions were flying, and the company had sold kit number 78. Production is averaging one kit every three weeks, and Eldredge said he expects that to continue through the end of the year, then increase to one every two weeks next year.

A new company, Evolution Aircraft, will be responsible for the aircraft previously known as the Lancair Evolution.

Avionics

Aspen Avionics is releasing a new software upgrade for the Evolution 500/1000 glass MFDs that adds ADS-B IN features such as textual Metars, TAFs, TFRs, Airmets, Sigmets, convective Sigmets and winds aloft. The ADS-B IN features are available from any Aspen or Aspen-compatible ADS-B receiver, and Aspen has partnered with FreeFlight Systems, Garmin and L-3 Avionics for solutions that don't require replacing the entire avionics system. Notams are not yet available, but Aspen president and CEO John Uczekaj expects such features to become available "as the FAA and industry make them available. Notams are important, and having that capability is a huge deal."

At **Avidyne**'s AirVenture booth, the avionics manufacturer demoed some innovative applications resulting from the marriage of wireless data transfer capabilities of its IFD-series navigators and Apple iPads. The demo showed how an iPad can be mounted in a bracket directly over a typical six-pack traditional instrument panel to give the pilot a large-format synthetic vision display. The iPad in this display is running Avidyne's AFD100 app, which wirelessly obtains attitude, GPS, flight plan and ADS-B IN weather and traffic from Avidyne's new IFD550 to drive the synthetic vision display. The iPad can simply be removed from its bracket to return the instrument panel to its normal configuration.

The M20V Acclaim Ultra adds a welcome pilot-side door to the iconic high-performance Mooney airframe.

AirVenture Clips

The company also unveiled upgrades to its FAA-approved aviation training devices. The new Horizon Pro visual expansion kit is now available for most of the company's trainers, including the SD, FMX and MCX models, as well as for numerous cockpit-specific trainers such as the K35 King Air simulator. The upgrade provides two more monitors, bringing the total to eight, extending visual range to 260 degrees. Prepar3d version 3 upgrades are also included in the Horizon Pro purchase.

Kitplane maker **Sonex Aircraft** aims to bring homebuilt aircraft culture to China. The Oshkosh, Wis.-based company has partnered with Chinese firm Uniworld and is set to promote its line of aircraft kits and AeroConversion products in the Asian nation. To do this, it has adopted a multi-tier strategy consisting of governmental advocacy, participation in the Chinese training infrastructure for GA pilots and technicians and stoking the growth of its recreational aviation enthusiast base.

Beijing Aviation Technology (BAT) has been selected as a franchisee of the Sonex brand, with Uniworld's Francis Chao named as director of Sonex operations in China. "Sonex Aircraft is under no illusion that expanding business in China will be a fast or easy process," said Sonex general manager Mark Schaible. "It is a complex place for Western companies to do business, and aviation in China presents its own unique and complex challenges; however, we are confident that Sonex is positioned for success with Francis Chao and Uniworld/BAT as our teammate."

BAT has established a new aviation education center in Beijing featuring Sonex and flight simulator manufacturer Precision Flight Controls. It has workshop space for seminars and aircraft projects with the goal of educating the Chinese public, entrepreneurs and government officials about general aviation, as well as living quarters and offices for international aviation professionals who wish to share their knowledge and experience with center visitors.

The companies plan to lobby the Civil Aviation Authority of China (CAAC) to relax controls on recreational aviation, including construction of amateur-built aircraft, using current FAA regulations as a working template, and to work to establish a dealer and support network throughout the country. "The current aviation infrastructure in China supports training operations primarily for the airlines and military," Schaible noted, adding that situation applies to both pilots and mechanics. "For privatized GA to grow and succeed in China, a network of private A&P and flight schools must be established to train the qualified personnel required to support GA, and to become owner/operator consumers of GA products in China." To that end, the company also seeks to obtain approval for the use of kit aircraft in training operations.

AirVenture continues on page 34 ▶

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TEXTRON AVIATION

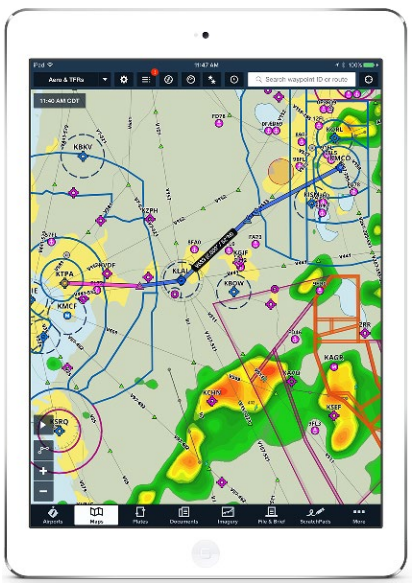
Continued from page 32

Another demo showed an IFD550 driving two iPads, one acting as a primary flight display, the other as a multifunction display, bringing large-format displays into smaller aircraft.

Garmin's G5 electronic flight instrument, which was introduced last year for experimental aircraft, has received FAA approved model list supplemental type certification for installation in 562 aircraft models on 82 type certificate data sheets. The approval aligns with the FAA's recent moves to facilitate installation of safety equipment in light aircraft. The G5 retails for $2,149 or $2,499 with an optional GPS antenna, and both include the installation kit, back-up battery and STC.

A new software update released last month allows pilots to use pinch-to-zoom gestures on Garmin's GTN-series navigators. The free update also adds Garmin's Telligence Voice Command and integration with the new Flight Stream 510, which enables wireless database transfers.

The latest version of Garmin's Flight Stream device—the 510—comes on a MultiMediaCard (MMC) that installs in the card slot of a Garmin GTN-series com/navigator with no wiring changes. Available for $1,495, the 510 contains Wi-Fi and Bluetooth wireless capability, enabling communication between the GTN 650/750 and two Apple or Android devices running the Garmin Pilot app.



Version 8.0 of ForeFlight's mobile iOS app will feature the company's new mapping engine.

ForeFlight's new mapping engine will soon be available in version 8.0 of the ForeFlight Mobile iOS app. The new data-driven maps eliminate delays in reloading and refreshing map elements when panning and zooming, and dynamic "always-up" labels and adjustable text sizes make reading labels easier. Each zoom level displays information appropriate for that level, and for more detail, the user simply zooms in more. With the new version, ForeFlight airport diagrams are integrated into the map and can be viewed by zooming in until the airport's details are visible.

The ForeFlight team has been working on the new mapping engine for the past two years. Basically, ForeFlight moved all the mapping functions to the graphics processing unit on the iPad, which speeds up the re-rendering every time the zoom level is changed or the map is panned to a different area. Another benefit of the new mapping engine is that third-party developers can add their own layers and content to the map. For example, airshow organizers could add a layer for the airshow layout, airport buildings, parking areas and so on, and this could reside within the ForeFlight map temporarily, until the show ends. A static display, for example at the annual NBAA show, could show each aircraft's location and details.

"The mapping engine lets us do much more, and quickly," said ForeFlight CEO Tyson Weihs. ForeFlight is also introducing other new features with the next version, including TFR alerting, new web flight-planning capabilities and logbook functions such as flight sharing, remote signatures, progress tracking and Logbook Connect, which allows third-party access to ForeFlight logbook APIs for developing their own functions.

Pilots using the flight debriefing app **CloudAhoy** will soon be able to view worldwide aeronautical charts in their post-flight debriefs. CloudAhoy is currently beta testing the new charts, which are provided in a partnership with SkyVector. The new charts include VFR and IFR-Lo and Hi and they can be displayed in CloudAhoy's 2D-track, 3D-track and 3D-cockpit modes.

Astronics offers two non-TSO'd infrared camera systems for the amateur-built market, including the new Max-Viz X1+HR (for high-resolution), which uses a 640x480-pixel resolution long-wave infrared thermal imager with electronic zoom. It is compatible with any display that accepts NTSC or PAL/Analog RS-170 signals and is priced at $18,000. The Max-Viz X1 EVS, which has 320x240-pixel resolution, is also compliant with RTCA/DO160G environmental qualification test standards, and it sells for $6,000. Both systems enhance safety by allowing pilots to see up to 10 times farther than the unaided eye in visually challenging conditions such as smoke, haze and light fog, in both daylight and nighttime, according to the company. ❑

The beloved daily flying displays entertained the crowds that made the trip to Oshkosh for the best general aviation has to offer.

AirVenture Clips

Development of the **Aero Electric Sun Flyer** solar-electric flight trainer continues, and the two-seat proof-of-concept prototype was on display at AirVenture. The all-composite airplane, which is powered by a 100-KW electric motor fed by LG lithium-ion batteries, is entering the next phase of ground and then flight-testing, and it should fly in early fall. FAA certification in the primary category is expected in 2018, and plans are to obtain certification in more countries.

Aero Electric shows the proof of concept for its electric flight trainer.

The $249,000 aircraft is designed for a maximum endurance of three hours, but for the training role it will likely fly missions of about 1.3 to 1.5 hours. Recharging time for the airplane's lithium-ion battery pack after a typical sortie should be 20 to 30 minutes using "supercharging" technology. Cost of energy for the Sun Flyer should be about $2 per flight hour; for a piston-powered training airplane $50 per hour is typical. The Sun Flyer will be equipped with photovoltaic cells on the wings, which will charge the batteries about 10 to 12 percent during flight and, given enough time, fully while on the ground.

A fleet of Sun Flyers could generate surplus electricity while parked during the day, allowing the operator to sell electricity to the grid at peak times, then the batteries could be charged at night when electricity costs go down. The prototype is not equipped with the solar cells. ■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Flexjet buys FlairJet in European expansion bid

by Chad Trautvetter

Flexjet Ltd., the UK subsidiary of U.S.-based Flexjet, announced the acquisition of aircraft charter management firm FlairJet from Marshall Aerospace on August 3. The move expands the fractional provider's footprint into Europe, using eight Nextant 400XTis (yet to be delivered), as well as Flairjet's existing cadre of seven managed business jets. All of its aircraft will be UK registered.

The company, which announced plans at EBACE to begin service in the region by year-end, will operate aircraft under Birmingham Airport-based FlairJet's UK CAA air operator certificate in Europe. It will employ the Flairjet-managed fleet for initial operations, but plans to begin phasing in the 400XTis by year-end, Ray Jones, Flexjet's managing director for international, told **AIN**.

Besides the UK, the company will have a base in Paris and then evaluate establishing a presence in other major cities in Europe as it expands.

Flexjet's European aircraft will be made available to North America-based Flexjet owners in need of point-to-point private jet travel within the region, as well as from Europe to the Middle East and Africa. U.S. customers can use Flexjet's long-range, large-cabin aircraft, currently the Global Express and G450, to fly to Europe and then use the Europe-based aircraft for intra-EMEA travel.

The European aircraft will also be available for charter to customers in that region. "We are in the process of developing additional programs that are in step with the market demands of the EMEA region," Jones said.

He noted that all FlairJet employees and managed aircraft are being retained. "FlairJet will continue to provide aircraft charter and management services during and even after its transition to Flexjet," Jones said. Flexjet chairman Kenn Ricci added, "Our acquisition of FlairJet enables us to operate a Europe-based fleet of aircraft within our system and consistent with Flexjet's service and quality standards."

According to Jones, Flexjet went through with the Flairjet acquisition despite the June 23 UK vote to leave the European Union. "Europe is a difficult market, but the Brexit vote isn't going to move the demand needle left or right," he told **AIN**. "Likewise, it will have no immediate effect on our operations as a UK-based operator within Europe. We don't expect anything different in the longer term, either."

"The move into Europe further validates Flexjet as a global competitor within the private aviation industry," concluded Ricci. ❑

Marshall Aerospace and Defence Group CEO Steve Fitz-Gerald (left) and Flexjet chairman Kenn Ricci signed a deal tor the latter company's UK subsidiary to acquire FlairJet.

Fractional operator adds Legacy 450

by Kerry Lynch

Flexjet has added another aircraft model to its portfolio with last month's acceptance of its first Embraer Legacy 450. The 450 is part of an order that Flexjet announced in May last year for an unspecified number of 450s and 500s. Flexjet first accepted the slightly larger 500 in September last year and now has four. The fractional provider anticipates that it will have five Legacy 450s by year-end.

The 500, which can carry up to 12 passengers and has a maximum range of 3,125 nm, was certified in October 2014, while the 450, which can carry up to nine passengers and has a maximum range of 2,900 nm, was approved by the agency one year ago. The aircraft share a common type rating, feature Rockwell Collins Pro Line Fusion flight decks and incorporate fly-by-wire controls.

"The Legacy 450 will become the mainstay of our midsize program, which has been growing rapidly in response to increased demand for aircraft of this size," said Flexjet CEO Michael Silvestro. "Not only does the Legacy 450 offer the capabilities and performance of larger aircraft, but fractional owners can access it at an investment level more commonly associated with much smaller aircraft."

The Legacy 450 and 500, the mainstays of Flexjet's midsize offerings, fit between the Bombardier Learjet 75LXi light and Challenger 350 super-midsize jets. In addition, the 450 is part of Flexjet's Red Label offering, which includes dedicated flight crews and interiors that are designed to give fractional owners more of a sense that they are flying in their own aircraft.

The 450 becomes the third Embraer product in the Flexjet portfolio, joining the Phenom 300 and Legacy 500. This addition comes as Flexjet has been restructuring its fleet and ramping up on its newer aircraft models. "Our fleet expansion has been strong over the past 24 months," Silvestro said. "We will close this year with 52 new aircraft delivered in a 24-month period." ❑

Flexjet added its third Embraer Executive Jets type on August 15, accepting its first Legacy 450.

AEA MARKET REPORT REVEALS SECOND-QUARTER WEAKNESS

The Aircraft Electronics Association's second-quarter 2016 Avionics Market Report showed continued weakness in avionics spending, with total first-half 2016 worldwide sales by participating companies of $1.115 billion, down 6.5 percent from the first-half 2015 number. The dollar amount reported (based on net sales price) includes all components and accessories for cockpits and cabins, as well as software upgrades and portable equipment. The total covers both certified and non-certified electronics, in addition to all hardware, batteries and chargeable product upgrades for general aviation (including business aviation) aircraft.

The forward-fit market (installations in new aircraft) accounted for 54.3 percent (some $605 million) of the $1.1 billion reported during the first half of this year, while the retrofit market amounted to 45.7 percent or some $509 million, according to the AEA. North America (U.S. and Canada) sales totaled 66.8 percent, while the rest of the world reached 33.2 percent.

"With so many new avionics products introduced to the general aviation market in the first half of the year, it is disappointing to see decreasing sales figures compared to the first six months of 2015, particularly in the retrofit market," said AEA president Paula Derks. "The lower sales figures are somewhat surprising given the fact that the deadline to equip aircraft flying in U.S. controlled airspace with ADS-B OUT avionics is only 40 months away, and the fact that we have seen a slight uptick in the ADS-B equipage pace this year. It will be interesting to see future sales reports following the recent AirVenture Oshkosh event, which brought even more avionics products to market, along with the FAA's ADS-B rebate program expected to begin later this year." —*M.T.*

U.S. EPA moves closer to CO_2 regs

by Kerry Lynch and Bill Carey

The Environmental Protection Agency moved forward on its effort to regulate aircraft greenhouse gas (GHG) emissions, formally issuing findings that emissions from certain types of aircraft contribute to air pollution that endangers public health and welfare.

These findings were proposed a year ago alongside an advanced notice of proposed rulemaking considering the regulation of aircraft GHG emissions. At the time, the EPA indicated the possibility of a "subsequent domestic rulemaking process to adopt standards that are of at least equivalent stringency as the anticipated [International Civil Aviation Organization] CO_2 standards."

GHG Reduction

In releasing the formal findings on July 25, the EPA noted that "aircraft remain the single largest GHG-emitting transportation source not yet subject to GHG standards in the U.S." and that U.S. aircraft account for 12 percent of GHG emissions from the transportation sector in the U.S., 3 percent of total U.S. GHG emissions and 0.5 percent of global GHG emissions.

The EPA findings relate to carbon dioxide (CO_2), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride, all of which contribute to GHG pollution, the EPA said. The finding applies to jets weighing more than 12,500 pounds and turboprops weighing more than 19,000 pounds.

The findings were widely anticipated and recognized as a necessary step as the U.S. government works with international regulators to establish a standard, said Ed Smith, senior v-p of international and environmental affairs for the General Aviation Manufacturers Association, adding "the industry supports it. EPA is doing what it needs to implement the CO_2 standard." Smith added that industry has worked closely with international regulators on the CO_2 standard.

In February, ICAO's Committee on Aviation Environmental Protection (CAEP) agreed on international standards for aircraft CO_2 emissions. They will be presented to the ICAO Assembly for approval next month; the organization plans to adopt them formally next March. The EPA said that it "anticipates moving forward on standards that would be at least as stringent as ICAO's."

The Aerospace Industries Association said it favors ICAO as the forum to enact emissions standards. "AIA believes the U.S. government and industry stakeholders should continue to work together under the International Civil Aviation Organization to make regulations that work globally," said the association, which represents major U.S. aerospace companies.

The association also emphasized that aerospace manufacturers are committed to reducing the industry's environmental impact.

"In regard to climate change, AIA hopes and anticipates the aggressive CO_2 goals our industry set—1.5-percent annual fleet fuel-efficiency improvement, carbon-neutral growth from 2020, halving CO_2 emissions by 2050 relative to 2005—along with further technology improvements and the stringent regulations recently agreed to by the [CAEP] will illustrate how committed our members are to protecting our environment." ❑

Six Hawker 1000s have been extensively refurbished and modernized by Flying Colours for Mac Air's new QJet Shares fractional ownership program.

Mac Air's QJet Shares frax is offering Hawker 1000s

by Charles Alcock

Maine-based business aviation services group Mac Air last month launched a niche fractional ownership program called QJet Shares. The company is offering shares in six Hawker 1000s with an initial focus on providing flights between the northeast U.S. and south Florida.

Six shares, priced at $800,000, will be offered for each of the pre-owned aircraft, which were produced in the mid-1990s. Monthly management fees for a five-year agreement have been set at $13,500, with an occupied flight hour rate of $2,850, which Mac Air says will equate to an all-inclusive hourly rate of $6,283 on the assumption that owners will fly 100 hours per year.

"An aircraft with similar size and range in one of the larger fractional ownership programs would have an hourly rate of around $10,709," said Pat Reed, who recently joined Mac Air to run QJet Shares. Owners will also be offered the chance to share in revenues raised when the aircraft are made available to third-party customers for charter. They can also opt to share trips with other owners, thereby reducing hourly costs.

The Hawker 1000s have been refurbished by Flying Colours of Canada with cabins that seat up to nine passengers. "You wouldn't know if these are 10 years old or 10 days old; they have all the amenities, including Wi-Fi," Reed told **AIN**.

QJet owners will be asked to give 24 hours' notice for trips, except during peak periods when at least seven days' notice will be required. They will have the option to pay more to interchange with other larger aircraft operated for charter by Mac Air, such as the Challenger 850.

The first Hawker 1000 was due to join the fleet by last month, and this is being offered at preferential rates. The aircraft will be based at Mac Air's headquarters in Portland, Maine, with the second aircraft likely to be positioned at an airport in south Florida. The aircraft will also be available for flights elsewhere in the continental U.S., with positioning fees and overnight charges applying as necessary.

Customers will have the following financing options: putting $200,000 down and paying the remainder on closing or taking advantage of a liquidity program offered by the UBS bank through which clients borrow against the value of fine art works at low interest rates.

The QJet Shares program may subsequently be expanded to offer other pre-owned aircraft, according to Reed, who was formerly with Magellan Jets and PlaneSense. In addition to aircraft management, charter and leasing, Mac Air Group operates an FBO and provides maintenance, parts support and avionics modifications. ❑

Extensive cabin refurbishment has freshened up the look of the aircraft built in the mid-1990s.

2015 NBAA INTERCEPT STUDY SUMMARY RESULTS

CONVENTION NEWS/DAILY EDITIONS

LAS VEGAS, NEVADA

Methodology: During the 2015 NBAA Convention, SJL Inc. of Broken Arrow, OK, interviewed 456 attendees outside the convention hall about their magazine readership. The company spoke with non-industry "target" attendees—chief pilots and other decision-makers who were attending NBAA as buyers. Beta Research Corp., of Syosset, NY, tabulated the results.

The data to the right supports AIN's long-standing position that our *NBAA Convention News* product is the one publication that most business aviation operators and executive attendees consider indispensable.

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*** Which Publication or Publications Do You Find Most Valuable?**

AIN's *NBAA Convention News*	**76%**
FlightGlobal's *Flight Evening News*	22%
B&CA's *Show News*	17%

If There Was Only One Publication Covering NBAA, Which One Would You Prefer?

AIN's *NBAA Convention News*	**78%**
FlightGlobal's *Flight Evening News*	11%
B&CA's *Show News*	11%

*** Which Publication or Publications Are Most Newsworthy & Informative?**
(covers more of what I want to read about at NBAA):

AIN's *NBAA Convention News*	**79%**
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*** Which Publication or Publications Do You Feel Are Most Detailed?**
(covers show stories in greatest depth)

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FlightGlobal's *Flight Evening News*	18%
B&CA's *Show News*	18%

If You Were to Pass Along Only One Publication to Those Not Attending, Which Would You Choose?

AIN's *NBAA Convention News*	**72%**
FlightGlobal's *Flight Evening News*	17%
B&CA's *Show News*	11%

*** Which Publication or Publications Will You Save for Future Reference?**

AIN's *NBAA Convention News*	**79%**
FlightGlobal's *Flight Evening News*	33%
B&CA's *Show News*	32%

* Respondents were asked to choose all that apply, so totals do not add to 100%.

1H deliveries

▶ *Continued from page 1*

and Legacy 600/650 good for a 9-percent improvement over its deliveries a year ago. Despite the uptick, the Brazilian airframer now expects to ship between 70 and 80 light jets by year-end, compared with its previous projection of between 75 and 85, and some 35 to 45 large jets, compared with earlier estimates of between 40 and 50.

During the first six months of this year, One Aviation tacked on one more Eclipse 550 VLJ to its total from the same period in 2015.

In the bizliner class, Airbus delivered no ACJs in the first half of the year, while Boeing handed over one BBJ. Embraer, which delivered one Lineage 1000 in the first six months of last year, shipped none in the same period this year.

"What's really kept the market where it is today and can hopefully carry it through to the end will be the small and medium cabins," noted Foley. "They are the stronger players carrying the torch right now. I think we'll see continued weakness in the big-cabin market."

Turboprops Flat

The pressurized turboprop segment, while still negative, fared better, at just one fewer aircraft delivery year-over-year. Switzerland's Pilatus delivered 38 PC-12s in the first half, a major gain over the 18 aircraft it shipped in the first half last year. Deliveries of turboprop singles by Piper shrank by half as the company made the transition from the Meridian to the M500.

Likewise, French manufacturer Daher also saw a drop-off in deliveries as it switched to the TBM 930 from the TBM 900. Beechcraft experienced an 11-percent slide, handing over four fewer King Air 250s and two fewer King Air 350s year over year. Piaggio delivered one Avanti Evo.

Rotorcraft Down

For the turbine rotorcraft market, still reeling from the downturn in petroleum prices and its subsequent effect on helicopter order books, the first-half results were even bleaker. Sikorsky saw its year-over-year deliveries plummet by 78 percent, to five for the first six months of this year from 23 in the first half last year. Robinson, the world's most prolific helicopter maker, delivered 25 aircraft in the first six months versus 64 this time last year, a 61-percent decline.

A 30-percent slide at Bell was led by the 407 single, deliveries of which were down to 29 from 45 in the same period last year.

Deliveries for Leonardo Helicopters (née AgustaWestland, Finmeccanica) were off by one unit year-over-year, as the company handed over one AW189 in the first half of the year compared with six in the first half of last year.

Airbus Helicopters changed its reporting practices to lump together military and civil versions of its helicopters. In the first half of last year, military helicopters (excluding the Tiger attack helicopter) accounted for 21 aircraft. Commercial helicopters accounted for 112 deliveries. This year combined (and once again excluding the Tiger), the European manufacturer delivered 145 helicopters, giving it on aggregate 12 fewer deliveries.

Enstrom was the lone rotorcraft maker on the plus side, delivering four more 480B turbine singles year-over-year.

Overall, the helicopter segment saw billings fall by 32 percent when last year's first-half numbers are compared with this year's.

"Unfortunately, the U.S. Congress has not done its part to support aircraft manufacturers or maintenance, repair and overhaul companies through its collective failure to include reforms of the outdated and overly prescriptive certification processes in the recently passed FAA extension," noted Bunce. "We hope to see greater commitment by policymakers around the globe to give manufacturers the regulatory environment they need to succeed and allow our industry to continue to move forward." ❑

Turbine Commercial Helicopters Worldwide Deliveries 1H 2016 vs.1H 2015

Mfr./Model	2016	2015	% Chg.
Airbus Helicopters*			
H120	4	1	
AS350B2	2	3	
H125/H125M	49	42	
H130	32	27	
AS355NP/AS555AP	2	2	
H135/H135M	12	10	
H145/H145M	37	27	
AS365N3+/AS565Mbe	3	3	
H155	0	2	
H175	1	1	
H215/H215M	1	0	
H225/H225M	2	14	
Total	**145**	**132**	**+9.8%**
Bell			
206L-4	3	5	
407/407GX/407GXP	29	45	
429	16	21	
412EPI	3	3	
Total	**51**	**74**	**-31.1%**
Enstrom			
480B	**5**	**1**	**+400%**
Leonardo Helicopters (formerly AgustaWestland)			
AW119Ke/Kx	3	8	
AW109Power	0	1	
GrandNew	10	6	
AW139	19	22	
AW169	7	0	
AW189	1	6	
SW4	2	0	
W3	0	0	
Total	**42**	**43**	**-2.3%**
Robinson			
R66	**25**	**64**	**-61%**
Sikorsky			
S-76	3	10	
S-92	2	13	
Total	**5**	**23**	**-78%**
Grand Total	**273**	**337**	**-19%**

**Airbus Helicopters no longer separates commercial and military helicopters in its quarterly reporting.*

Turbine Business Airplanes Worldwide Deliveries 1H/2016 vs. 1H/2016
Pressurized airplanes only

Mfr./Model	1H 2016	1H 2015	%Chg.
Airbus			
ACJ318*	0	1	
ACJ319*	0	0	
ACJ320*	0	0	
ACJ321*	0	0	
ACJ330*	0	0	
Total	**0**	**1**	**-100%**
Boeing			
BBJ*	1	1	
BBJ2*	0	0	
BBJ3*	0	0	
B777-300ER*	0	1	
787-9*	0	2	
Total	**1**	**4**	**-75%**
Bombardier			
Learjet 70/75	6	14	
Challenger 350	30	32	
Challenger 605	9	8	
Global 5000/6000	28	37	
CL850/870/890	0	1	
Total	**73**	**92**	**-20.7%**
Daher			
TBM 900/930	**18**	**25**	**-28%**
Dassault			
Falcon 900LX, 2000LXS, 2000S, 7X			
Total	**15**	**18**	**-16.7%**
Embraer			
Phenom 100E	9	7	
Phenom 300	26	29	
Legacy 500	8	5	
Legacy 600/650	6	3	
Lineage 1000	0	1	
Total	**49**	**45**	**+8.9%**
Gulfstream			
G150/280	15	15	
G450/550/650/650ER	46	58	
Total	**61**	**73**	**-16.4%**
Honda			
HondaJet	**10**	**0**	**n/a**
One Aviation			
Eclipse 550	**4**	**3**	**33.3%**
Piaggio**			
Avanti EVO	**1**	**1**	**0%**
Pilatus			
PC-12	**38**	**18**	**+111%**
Piper			
Meridian/M500	**8**	**16**	**-50%**
Textron Aviation: Beechcraft			
King Air C90GTx	9	9	
King Air 250	13	17	
King Air 350i/ER	27	29	
Total	**49**	**55**	**-10.9%**
Textron Aviation: Cessna			
Mustang	3	5	
M2	17	17	
CJ3+	10	11	
CJ4	15	15	
Citation XLS+	12	8	
Citation Sovereign+	3	9	
Citation Latitude	16	0	
Citation X+	3	4	
Total	**79**	**69**	**+14.5%**
Grand Total Jets	**292**	**305**	**-4.3%**
Grand Total Turboprops	**114**	**115**	**-0.9%**
Grand Total Jets/Turboprops	**406**	**420**	**-3.3%**

**Denotes green aircraft deliveries*

Third-class medical

▶ *Continued from page 1*

"It has taken years of commitment and hard work to make these reforms a reality," added AOPA president Mark Baker, who had called the changes "the most significant legislative victory for general aviation in decades. These reforms will provide relief to hundreds of thousands of pilots from an outdated, costly and unnecessarily burdensome system."

Less Onerous Rule

The final reform language, as passed, ended up being much more expansive than earlier measures under consideration and beyond even what the associations originally sought. Importantly, the measure establishes a hard timeline for implementation to make sure the FAA rulemaking process does not bog down the required changes. The FAA has up to six months to issue a rule. But if a final rule is not out within a year, the bill protects pilots from enforcement actions under current medical renewal policies.

The reform essentially eliminates the requirement for certain certified pilots to renew their third-class medical. The measure applies to pilots who have held a medical certification within the past decade. New pilots must still obtain an initial third-class medical, but will not need to renew.

To qualify for the exemption from renewal, pilots are limited to operating aircraft that have no more than six seats (a maximum of five passengers) with a max takeoff weight of no more than 6,000 pounds. Also, the pilots must remain below 18,000 feet msl and fly no faster than 250 knots indicated airspeed. The pilots may not fly for compensation or hire. But the aircraft can be single- or twin-engine and can be operated either day or night, VFR or IFR.

While an FAA medical is not required under the reforms, the pilots must still get checked out by their own physician every four years and take a free online medical training course every two years.

While applicability captures pilots who have been certified over the past 10 years, pilots who have lost their medical—either through revocation, suspension, withdrawal or denial—must obtain a new one.

AOPA estimates that the measure possibly could cover hundreds of thousands of pilots, far more than the tens of thousands of recreational pilots who would have been covered under earlier reform proposals.

Protracted Process

AOPA traces its efforts as far back as 1979, when it pushed to extend the two-year renewel requirement to three years. But the most recent effort began with a petition it filed jointly with EAA in 2012. That petition was armed with data gathered through the experience of the sport-pilot certificate, which does not require a medical.

The original petition sought an outright exemption from the third-class medical but was more limited in scope: applying to pilots who fly under day VFR conditions in fixed-gear, single-engine aircraft with up to four seats and up to a 180-hp engine. That exemption would have limited flight to no higher than 10,000 feet msl (or 2,000 feet agl) and a single passenger.

The FAA had published that petition for comment, and more than 16,000 people weighed in—mostly in favor. Agency officials had indicated plans to act on the petition and, after an apology from FAA Administrator Michael Huerta for a prolonged delay, even stated in mid-2014 that a proposed rule had reached the Department of Transportation for review. But a year later, the Administrator offered little hope that any proposal would be coming in a timely fashion. "I know that this is extremely frustrating for all of you here," Huerta told EAA AirVenture attendees last year. "We want a standard, as painful as this is, that is not going to require yet another debate or another process for years to come."

While the proposal languished at the FAA, Congress became engaged, beginning with the General Aviation Pilot Protection Act introduced by the House in late 2013 and then the Senate in early 2014. While the bills attracted substantial support, 178 House representatives and senators signed on to co-sponsor, Congress ran out of time to act on them. The bills died in both chambers at the end of the 113th Congress.

But the 114th Congress jumped back in, introducing measures as part of the Pilot's Bill of Rights 2 (PBOR 2). Sens. James Inhofe (R-Okla.) and Joe Manchin (D-W.Va.), along with Reps. Sam Graves (R-Mo.) and Todd Rokita (R-Ind.), led the charge on Capitol Hill. Inhofe had called PBOR 2 "the single most important general aviation bill" that was before Congress.

Once again, medical reform quickly gained support, with the number of co-sponsors of PBOR 2 surpassing 250 in the House and Senate. The Senate then passed medical reform three times—once as an independent bill, once as part of the comprehensive Senate FAA reauthorization bill, and once as part of the National Defense Authorization Act. But the full House did not take up PBOR 2 or a comprehensive FAA bill, and had disagreements with the Senate on the National Defense Authorization.

At the same time, the associations waged major grassroots campaigns, calling on members to keep the pressure on Congress. Their members responded. Coon notes that lawmakers received thousands of calls, letters, emails and other forms of appeals. Two action calls by AOPA in the summer last year alone generated close to 150,000 responses.

He credited this grassroots support, as well as the strong bipartisan support on Capitol Hill, for pushing the issue to the forefront when lawmakers crafted the FAA extension bill. And this became one of the limited measures thrown into the bill that reached President Obama's desk for signature on July 15.

While significantly expanded, the measure did represent a compromise. The original reform sought by associations earlier did not call for a medical checkup by a private doctor. This was included after some lawmakers raised concerns about a blanket exemption. In fact, the bill was temporarily derailed in one Senate Commerce Committee meeting, with Sen. Bill Nelson (D-Fla.) calling an earlier version of PBOR 2 "a very flawed piece of legislation." Nelson insisted that the checkup with private physicians involve a checklist. The checklist requirement was included in the final measure.

But Coon said the association is pleased with the scope of the final measure, which he said evolved after substantial research of safety data and discussions on Capitol Hill.

The associations have vowed to follow the rulemaking process closely since many details will be ironed out through then. ❑

HTS900 will power TriFan 600 prototype

by Charles Alcock

XTI Aircraft announced a preliminary agreement last month for Honeywell Aerospace to provide the HTS900 turboshaft to power the first prototype of its planned TriFan 600 vertical-takeoff business aircraft. The airframer expects to fly a two-thirds piloted subscale prototype by August 2018.

Denver-based XTI will now build a test stand to house the HTS900, the drive train, fans and flight controls as it prepares to complete development of the prototype. Honeywell has agreed to provide another HTS900 for the ground propulsion test system.

Propelled by three ducted fans, the fixed-wing TriFan 600 will take off and land vertically. The six-seat aircraft's two wing fans will rotate forward to achieve a cruise speed of 347 knots and range of up to 1,390 nm. The aft-mounted third fan will be engaged only during takeoff and landing.

The TriFan 600's aft-mounted third fan is stowed during cruise, while the wing-mounted fans rotate

During the cruise phase, at altitudes in excess of 30,000 feet, it is retracted and stowed behind clamshell-shaped doors for drag reduction. Previously selected to power the Marenco Swiss-Helicopter Skye SH09 and Bell ARH-70 Arapaho armed reconnaissance helicopter, the HTS900 has dual centrifugal compressors.

The TriFan concept prototype will have one engine, but the full-scale TriFan 600 will be powered by two 2,500-shp turboshafts. In both cases, the engines will drive the three ducted fans through a single transmission. XTI, which intends to build the test stand when sufficient funding is in place by around the fourth quarter of this year, will have the option of using the HTS900 for both the ground test unit and the prototype, or deploying Honeywell's LTS101 turboshaft for ground testing.

Investment Offering

In January this year, XTI launched an international stock offering under SEC Regulation A+ rules. Later this year, it intends to expand the equity offering through an over-the-counter secondary market for all Reg A+ investors. In August last year, the company, which started work on the TriFan 600 in 2012, launched a crowd-funding campaign that it said attracted some $20 million in non-binding expressions of interest for the program.

According to XTI founder and chairman David Brody, the company expects to need $450 million to take the TriFan 600 to service entry over the next six to eight years. "We're taking this one step at a time and focusing right now on raising the $15 million needed for the two-thirds-scale piloted prototype," he commented. "Testing and flying the prototype is a milestone that will validate the engineering and enable XTI to raise additional funding. We will be announcing our financing progress from time to time as we move forward." ❑

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In the Works

by Matt Thurber

There has never been a shortage of innovators in aviation, champing at the bit to come up with new aircraft. The urge to fly higher, faster and farther lives on. Here are some of the new designs in development–from those still on computer screens to those deep into their flight-test programs.

Gulfstream G500

Gulfstream added a fifth G500 to the flight-test effort, bringing the program closer to certification next year, the company announced on August 5. The aircraft, the first production test aircraft to fly with a full interior, took off from Savannah-Hilton Head International Airport, climbed to 48,000 feet, reached Mach 0.84 and flew for four hours, five minutes.

The aircraft will serve as the cabin testbed, enabling Gulfstream to check form, fit, function, noise, comfort and passenger interface. Testing will include the repetitive operation of all systems during all phases of flight and on a range of missions such as overnight trips, hot and cold weather flights and in turbulence. "The many hours of interior testing this aircraft will undergo, from galley and lavatory use to comfort and cabin health during long flights, help us hone every aspect of flying on the G500," said Gulfstream president Mark Burns.

With the addition of the fifth aircraft to the program, at press time the G500 test aircraft had made 320 flights and accrued more than 1,300 hours. The fourth test aircraft recently made its first transatlantic flight and European debut at the Farnborough Airshow. The longest flight by a G500 lasted eight hours, 24 minutes. The G500 has achieved a top speed of Mach 0.995 and altitude of 53,000 feet during testing. Scheduled for certification next year and entry into service in 2018, the G500 is designed to fly 5,000 nm at Mach 0.85 or 3,800 nm at Mach 0.90.

Bombardier Global 7000

Bombardier is preparing to fly the Global 7000 later this year as it pushes to bring the aircraft to market in the latter part of 2018, company president and CEO Alain Bellemare told analysts early last month during release of second-quarter results. Bombardier set the new 2018 timeline for market entry a year ago, but has remained quiet on when the aircraft will fly. Noting that the company has now wrapped up certification of the CS100 and CS300 airliners, Bellemare said that "all hands are on deck on the Global 7000 now."

Introduced in 2010, the 7000 will be Bombardier's flagship business jet. It has suffered delays as the company struggled to manage cash flow among several major development programs, including the C Series. In the summer last year, Bombardier pushed back the timing of the 7000 by two years to 2018. The aircraft has also encountered delays related to wing development, but Bellemare told analysts he is confident that the company and its supplier, Triumph, are working through the issues.

Meanwhile, the company is advancing on systems integration and static testing of the aircraft, and all flight-test vehicles are in various stages of production. The GE Passport engines received FAA approval in April. The company reported that it has invested $325 million in program tooling and research and development expenses this year, the vast majority of that dedicated to the Global 7000/8000.

Bellemare noted that while the company is working toward development of both the 7000 and the longer-range 8000, the 7000 is the priority. He did not provide an estimate on when the 8000 might reach the market, saying, "The only thing we are focused on is to make the Global 7000 a huge success." He added that once the 7000's development is "far advanced," then the company will look toward the 8000. ❑

BUSINESS & UTILITY TURBOPROPS

Diamond – DA50-JP7 (3/15 p. 10)	Two versions: Tundra for unpaved runways, takeoff distance 650 feet; and training/private owner model, high-speed cruise 230 knots. Seven seats. Powered by 465-shp Motor Sich AI450S. First flight 1/19/15. Cert. est. second half 2016.
Epic Aircraft – E1000 (5/16 p. 62)	Single-engine all-composite turboprop, based on Epic LT kit airplane. P&WC PT6A-67A engine, Garmin G1000 avionics, $2.95 million. Cert. est. 1Q17.
Evektor – EV-55 (10/15 p. 37)	Nine- to 14-passenger twin turboprop. CMC SmartDeck avionics. First flight 6/24/11. Program has received new Malaysian funding. Cert. est. 2017.
Mahindra – Airvan 10 (10/15 p. 38)	10-seat single-engine turboprop, powered by RR250. First flight 5/1/12. Cert. pending, first in Australia, followed by FAA.
Mahindra – Airvan 18 (10/15 p. 37)	Resurrection of the Australian twin-turboprop Nomad program. Entry into service pending.
Mallard Aircraft – Turbine Mallard (10/15 p. 37)	Twin-turboprop amphibian, conventional all-metal construction, Rockwell Collins avionics, P&WC PT6 engines.
One Aviation– Kestrel K350 (5/15 p. 1)	Six- to eight-seat composite single, powered by Honeywell TPE331-14GR. Garmin G3000 avionics. Program "shifted to the right," no timeline available.
Privateer Industries – Privateer (10/15 p. 38)	Single-engine composite amphibian with dual sponsons, GE M601 pusher powerplant. Prototype on hold because of production difficulties.
Textron Aviation – **Cessna Denali** (6/16 p. 1)	Powered by single new GE turboprop, range 1,600 nm, max cruise speed 285 ktas, $4.5 million. Garmin G3000 avionics. First flight 2018.

Numbers in parentheses in left column indicate issue and page of previous reference in **AIN**.

BUSINESS & PERSONAL JETS

Aerion – AS2 (11/15 p. 28)	Supersonic three-engine business jet; Mach 1.6 max speed; 5,300 nm max range. 9/22/14 alliance with Airbus aims for service entry 2Q/22.
Bombardier – Global 7000 (11/15 p. 21)	7,300-nm range, 59.6-ft-long cabin, GE Passport engines, Rockwell Collins Pro Line Fusion-based Global Vision avionics. EIS est. 2H/2018.
Bombardier – Global 8000 (11/15 p. 21)	7,900-nm range, 50.6-ft-long cabin, GE Passport engines, Rockwell Collins Pro Line Fusion-based Global Vision avionics. Certification est. unspecified.
Cirrus – Vision SF50 (7/16 p. 58)	All-composite, $1.96 million single-engine jet powered by Williams FJ33-4 turbofan. Cirrus Perspective (Garmin) avionics. First flight 7/3/08. First flight of conforming SF50 3/25/14. Cert. and delivery est. "close."
Dassault – Falcon 5X (4/16 p. 8)	Twin-engine fly-by-wire large-cabin jet, powered by Snecma Silvercrest engines, Honeywell EASy flight deck. Rolled out 6/2/15. First flight and cert. delayed by engine program.
Dassault – Falcon 8X (5/16 p.14) CERTIFIED	Trijet, derivative of 7X with longer fuselage and 6,450-nm range. First flight 2/6/15. Awarded FAA and EASA type certification June 2016.
Diamond – D-Jet (4/13 p. 50)	Five-seat, all-composite single-engine jet; first flight 4/18/06; powered by 1,900-pound-thrust Williams FJ33. Program on hold for lack of funding.
Flaris – LAR 01 (11/15 p. 28)	Composite single-engine jet, five seats, Williams FJ33-5A. $1.5 million, 1,700 nm range. Taxi tests begun 02/15. First flight est. 2016.
Gulfstream – G500 (8/16 p. 40)	Pratt & Whitney Canada PW800 engines, Honeywell-based, touchscreen-control Symmetry flight deck, sidestick fly-by-wire, 5,000 nm at long-range cruise (Mach 0.85). Fuselage sized between G550 and G650. First flight 5/18/15, service entry 2018.
Gulfstream – G600 (8/16 p. 40)	Same technology and engines (but higher thrust) as G500, 6,200 nm range at Mach 0.85. First flight late 2016, service entry 2019.
HyperMach Aerospace – SonicStar (11/15 p. 28)	Mach 3.6, powered by SonicBlue electric-turbine hybrid engines. First flight est. 2024/2025. Unmanned half-scale-model testing est. 2018.
Pilatus – PC-24 (6/16 p. 1)	All-metal jet powered by a pair of Williams FJ44-4As and designed for short and unimproved runways. Honeywell Primus Apex avionics. Rollout 8/1/14. First flight 5/11/15. EASA and FAA cert. est. 2017.
Spike Aerospace – S-512 (11/15 p. 28)	Twin-engine, 12- to 18-passenger, 4,000+-nm range, Mach 1.6 supersonic business jet. Service entry five to seven years from program launch, current est. 2022.
SyberJet – SJ30i (11/15 p. 26)	Production to resume, with deliveries beginning in late 2017 with new SyberVision cockpit, based on Honeywell Epic 2.0 avionics suite.
Textron Aviation – Beechcraft 400XPR (3/14 p. 12)	Hawker 400A/400XP re-engined with Williams FJ44-4A-32, choice of Garmin G5000 or Rockwell Collins Pro Line 21 avionics and new winglets. First delivery 2016.
Textron Aviation – Citation Hemisphere (12/15 p. 4)	4,500-nm jet with 102-inch-wide cabin, still in product definition phase. First flight 2019.
Textron Aviation – Citation Longitude (7/16 p. 12)	Longer than the Latitude, Honeywell HTF7000 engines, range 3,400 nm, Garmin G5000 avionics. First flight est. 2016, EIS 2H/17.

Numbers in parentheses in left column indicate issue and page of previous reference in **AIN**.

NetJets expanding longer-haul segment

by Kerry Lynch

MARK WAGNER

NetJets is hoping to tap into the still relatively small but growing longer-haul business with new pricing incentive programs developed for Challenger 350 and Global shareowners. Launched in July, the cross-country program provides operational savings on 3.5-plus-hour flights for Challenger 350 shareholders who have purchased a minimum of 50 hours (a one-sixteenth share).

The company has also developed a transatlantic program providing savings on five-plus-hour flights for Global 5000 and 6000 shareholders who have purchased a minimum of 50 hours. The cross-country flights must fall within NetJets' cross-country service area, while the transatlantic flights must depart the NetJets Collective Service Area (essentially the U.S. lower 48 states, along with a few locations in Canada) and arrive in the company's European primary operational area.

NetJets doesn't typically offer such incentives, said Patrick Gallagher, executive v-p, sales and marketing for NetJets, but they provide an opportunity for the fractional provider to expand its longer-haul operations.

Growth in Trying Times

The average flight time for NetJets has remained at two hours for years. "That holds true for much of our industry," Gallagher said. That average is driven largely by the economics of an industry that tends to charge by the hour, he added. "Ten percent of our flights are cross-country. It's obviously appetizing for us to expand that segment."

The larger-aircraft, longer-haul business has been growing at the same rate as the company's other businesses: "It hasn't been stagnant. It hasn't been shrinking," but it is an area where NetJets sees potential, Gallagher said. "We think it is a great opportunity."

He also stressed that programs are driven by customer inquiries. "We've had a lot of interest in recent months," he said. "It's something we simply formalized. We're highly confident in our ability to sell it."

Programs like this are helping NetJets evolve and strengthen during a time that has been tumultuous for the fractional industry. "The fractional industry in general has suffered a lot over the past few years," Gallagher said. "We've seen a number of competitors exit the stage, and we've seen consolidation." He pointed to the exits of CitationAir and Avantair, as well as the merging of Flexjet and Flight Options. At the same time, NetJets has been growing. Noting the numerous ways to measure growth of fractional operations, he said, "No matter how you slice that, NetJets

Continues on next page ▶

DON PURDY RETIRES FROM ASRS's *CALLBACK*

The Aviation Safety Reporting System's (ASRS) monthly safety newsletter, *Callback*, is undergoing a changing of the guard, with Don Purdy retiring after more than 10 years as editor. Purdy, who held dual roles as *Callback* editor and safety analyst for NASA's ASRS publication, wrote in last month's edition, "After 50 years in the challenging, sometimes wild but always wonderful world of military, commercial and private aviation, it is time for me to hang 'em up." Succeeding him is Ned Kintzing, who has been on the ASRS team.

Purdy, who succeeded Rowena Morrison to take the helm of *Callback*, has been only the third editor for the publication, which was established by former Naval aviator and corporate-aircraft test pilot Rex Hardy in 1979 to provide "lessons learned" from the ASRS in a short, readable format. *Callback* publishes de-identified ASRS reports with supporting commentary. Purdy called *Callback* a "community effort" and thanked readers "for your kind words, for your constructive feedback and, most important, for sharing your safety reports with the aviation community." —*K.L.*

NetJets expands longer-haul biz

▶ *Continued from preceding page*

has returned to growth." The company's sales numbers have been rising each year since the downturn, he added. "Our business is doing quite well, but the fractional industry has suffered. We're expanding our market share of a shrinking pie."

He believes a key factor in the resurgence has been the company's decision to streamline the fleet and add new anchor models in each market segment. "The customer reception has been great," he said. He pointed to the Challenger and Global acceptance, but also noted that the company has fattened its Phenom order.

Many operators will make larger order announcements at the NBAA annual convention in November, but that will not necessarily translate into full deliveries, he said. "It could not be more different in our case. We're not only exercising firm orders; we're exercising the options as well."

He noted NetJets' recent decision to expand its order for the Citation Latitude to 200 from 150 and accelerate the delivery schedule. Gallagher was particularly enthusiastic about the introduction of that model. "We're excited about that airplane. I can't remember an aircraft that we've introduced that has so much buzz associated with it," he said. "We've introduced lots of great airplanes, but the Latitude addresses such a wide segment of the market with midsize jet operating economics but almost a super-midsize cabin. People are finding that attractive."

While the new fleet and pricing programs are helping NetJets grow, Gallagher maintained, "The underlying value of NetJets has not changed. People buy with us for guaranteed availability, more consistency and for our reputation for safety. Those remain the key pillars of the NetJets system. We're excited to introduce a new way for people to tap into that."

As of June 30 NetJets had 32 Challenger 350s and 25 Globals in its fleet. ❑

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Charity turns old airplanes into cash

by Matt Thurber

When they have reached the end of their life old airplanes could help raise money for a worthy cause.

Leslie Weinstein is trying to help owners dispose of old aircraft that are either unflyable and would cost way too much to restore to airworthiness or are unable to find new owners and ultimately headed to the scrapyard. That there are many such aircraft isn't news. Weinstein's challenge is to persuade owners to relinquish emotional attachments and let the aircraft go, whether to a technician school, an operator that is willing to squeeze the remaining life from the airplane or the scrapyard, where some of the components may help keep other similar models flying a bit longer. Another alternative is for the owner to donate it to a deserving charity.

"We're having a lot of problems getting airplanes from people," said Weinstein, founder of Boise, Idaho-based True-Lock, a manufacturer of specialty aviation fasteners. "People don't like giving up anything," he added. Often they have unrealistic expectations of flying the aircraft again. "You'll see the aircraft just sitting there rotting. There is a tremendous number of aircraft sitting around that will never be recertified."

Limited Liability Option

Airports sometimes can't even give away abandoned aircraft. Weinstein thought he had arranged to pick up some airplanes from Long Beach Airport in Southern California, but he said the airport's lawyers put the brakes on the plan. The lawyers pointed out that to give away the abandoned airplanes, the airport would have to offer them to the public. They could not simply give them to the charity that Weinstein works with which benefits from funds raised from selling the old aircraft.

Weinstein has been helping dispose of old aircraft for the past three years, and the money raised goes to the University of Florida Foundation. When Weinstein receives a donated aircraft, he sells it and puts the money in escrow. The money then becomes available to the University of Florida Foundation, which funds various programs such as the Archie Carr Center for Sea Turtle Research. The escrow program helps limit liability for the recipient of the funds, given that an aircraft is involved that could eventually fly again and create some kind of future legal issue.

Anyone interested in donating any kind of aircraft can contact Weinstein at True-Lock (leslie@true-lock.com or 208/375-4846). ❑

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NEWS UPDATE

Upgrade Available for RDR 2000

BendixKing is offering owners of the digital RDR 2000 weather radar the opportunity to upgrade the unit to the RDR 2060 specification for an introductory price of $5,995. The upgrade requires sending the RDR 2000 to BendixKing, which inspects, disassembles and upgrades the unit with a 6-kW magnetron that has 50 percent more transmit power than the original.

Features of the RDR 2060 include extending detection range to 340 nm from 240 nm, auto-range limiting to warn of blocked (attenuated) areas and auto-tilt (which requires an air data source). BendixKing also brings the upgraded radar to the current mod level (available for radars already at mod 3 or above) and provides a one-year warranty.

Pro Line Fusion-equipped CJ3 Makes First Flight

At last year's NBAA convention, Rockwell Collins and Duncan Aviation announced a Pro Line Fusion cockpit upgrade for the Citation CJ3, and early last month the first CJ3 with the touchscreen display-equipped flight deck took to the skies at Duncan's Lincoln, Neb. headquarters.

The cockpit upgrade replaces Pro Line 21 portrait-oriented displays with three larger 14.1-inch touchscreen displays in landscape format. Included in the upgrade are ADS-B OUT, Waas LPV and synthetic vision, and the touchscreens eliminate the traditional FMS control display units mounted in the pedestal. The synthetic vision shows Rockwell Collins's airport dome, which highlights the destination airport and extended runway centerlines with mile markers. The upgrade also adds a USB port on the displays for database updates. Buyers can opt for Rockwell Collins Aircraft Information Manager wireless data loading.

Certification of the CJ3 Pro Line Fusion upgrade is expected by year-end. Installations will be available from Duncan Aviation and Textron Aviation service centers. Last year, Rockwell Collins estimated the fly-away cost for the upgrade in the $315,000 to $325,000 range.

Butler STCs ADS-B Upgrade for Learjet 24/25 and 35/36

The FAA has issued supplemental type certificate approval to Butler National for ADS-B OUT upgrades for the Learjet 24/25 and 35/36. The 24/25 upgrade is an expansion of Butler's existing Learjet 60 ADS-B upgrade.

The STCs are for replacement of the existing transponders with Garmin's GTX 345R (ADS-B OUT and IN) or GTX 335R (ADS-B OUT only) along with a GTN-series touchscreen navigator to provide the required position source. The GTN can also provide Waas LPV coupled approach capability and roll steering guidance to the autopilot. The GTX-345R delivers ADS-B IN information to mobile devices.

Butler plans to develop ADS-B STCs for the Learjet 31/31A and 55 and also to offer Tcas compatibility. The company's avionics shop is already booked through late this year. "With our subsidiary, Avcon Industries," said Clark Stewart, president and CEO, "we offer the flexibility of combining aircraft maintenance, such as A or B inspections, along with the ADS-B retrofit. Butler continues its efforts to be a 'go-to source' for legacy Learjets."—*Matt Thurber*

Ergo 360 adds shipping for ditching dilemmas

by Matt Thurber

Aeronautical Data Systems has added a feature to its Ergo 360 safety planning app, a vessels tab that shows the location of ships in case a dire emergency requires a water landing.

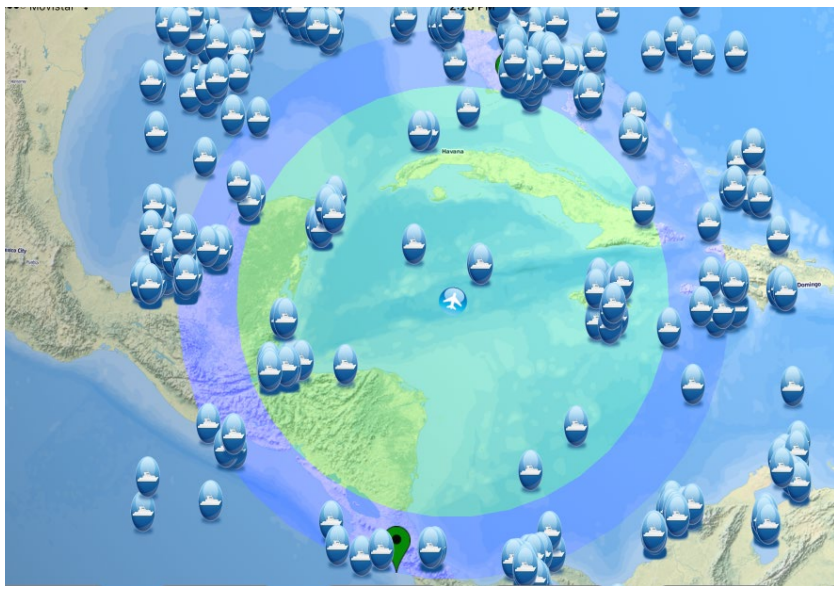
Developed by airline pilot Jim Stabile, Ergo 360 allows pilots and flight planners to maximize the benefits of onboard oxygen supplies to minimize the amount of fuel that must be carried. The original Ergo 360 presentation shows two range circles on a map with the aircraft's own position and planned diversion airports. One circle shows the airplane's fuel range (blue) and the other (green) is the airplane's oxygen range during an emergency diversion. If something happens that means the airplane can't reach an airport, such as an engine failure after decompression, the flight crew might have to plan to ditch.

Pressing the vessels tab in Ergo 360 pulls up a near real-time display of all ships that participate in the Automatic Identification System (AIS) vessel-tracking service. Touching any blue vessel symbol pulls up speed, ship type and track. On the app's SOS tab, Stabile plans to add a method for contacting the ship via Apple's FaceTime app for aircraft equipped to connect to the Internet.

The new vessels feature can be used offline, for aircraft without Internet connectivity. In this case, Ergo 360 should be updated just before departure, then once in the air it will display ships' predicted positions.

In an emergency where a water landing is inevitable, for example a fire requiring an immediate ditching, it would be better to land near a suitably sized ship that could help effect a rescue, and Ergo 360 is a tool that can help operators mitigate risks of over-water flying, a requirement for a safety management system. There are about 220,000 ships on AIS at any given time, according to Stabile. While developing the vessels feature, he has used Ergo 360 to find ships on over-water legs that he has flown. Often he can spot a nearby ship on Ergo 360 then find it visually or using binoculars.

"It gives you a good feeling," he said. "If something should happen you've finally got someplace to go." ❑



The Ergo 360 app now shows vessel locations in case of a ditching emergency.

News Note

The FAA released guidance clearing the way for the use of five-knot increments in speed adjustments, rather than 10 knots. The guidance, the agency said, is part of its effort to increase its performance-based navigation activities. "To support deployed and planned NextGen capabilities, it is necessary to allow for the use of five-knot speed increments," it said. NBAA noted that the change might initially "give some business aviation pilots pause," but is designed to help make the airspace more efficient, as the FAA moves from distance-based separation to time-based metering of air traffic. ■

AVIDYNE EXPLORING DIY PLUG 'N' PLAY AVIONICS INSTALLATIONS

Avionics manufacturer Avidyne makes various FMS/navigator/radio systems that are designed to fit into existing avionics trays without any hardware modifications. The IFD440, for example, is plug 'n' play compatible with Garmin's GNS 430W, and the same is true of the IFD540 and upcoming IFD550 (which can be swapped into the tray of a GNS 530W). But aircraft owners buying the IFD units must pay an avionics shop to make the swap, check some configurations, run ground tests and sign off the installation. "Why can't I swap my own box?" asked Avidyne president and CEO Dan Schwinn. "We designed the IFDs to be plug 'n' play."

After checking the applicable FAA regulations, Avidyne feels that wording in Part 43 should allow a pilot to perform such an installation on his or her own airplane, under the preventive maintenance regulations. Item (31) in Appendix A permits "Removing and replacing self-contained, front instrument panel-mounted navigation and communication devices that employ tray-mounted connectors that connect the unit when the unit is installed into the instrument panel (excluding automatic flight control systems, transponders and microwave frequency distance measuring equipment [DME]). The approved unit must be designed to be readily and repeatedly removed and replaced, and pertinent instructions must be provided. Before the unit's intended use, an operational check must be performed in accordance with the applicable sections of Part 91 of this chapter."

So Avidyne put together a guide to show pilots how to perform the swap to an IFD unit, including configuration instructions and how to perform ground and flight-testing as well as the sign-off. One caveat is that only existing Waas GNS units can be replaced with an IFD. A non-Waas GNS isn't eligible for plugging and playing with an IFD, which includes a Waas GPS sensor. Avidyne also tested the process with an FAA inspector, who did the swap/installation in an Avidyne lab then wrote a report for FAA headquarters to review. According to Schwinn, reaction from different FAA personnel has ranged from favorable to vehemently against the idea. But he feels confident that the FAA will not oppose this practice and that pilots will be able to do their own IFD swaps.

This effort is not intended to deprive Avidyne dealers of business, Schwinn explained. It does help IFD buyers add a modern navigator to their panels, and then they will likely be interested in an ADS-B upgrade, which must be installed by the dealer. "It's a way to let people get started themselves," he said. "You can put this in, then let the dealer do the rest of the ADS-B installation. Avidyne offers a money-back guarantee: if you put it in you can return it if you don't like it. The odds are pretty good on this, and it's a great way to say, 'try one of these things out.'" —*M.T.*

COMPLEX Avionics

by Matt Thurber

Industry Tackling Avionics Complexity Issues

In many accidents, confusion in the cockpit seems to have been a factor. This is not a new subject, but one that remains top-of-mind for pilots, regulators, safety experts and agencies and, of course, the companies that design and manufacture avionics.

As technology advances and offers greatly enhanced features, more and more capability is added to modern cockpits. But this apparent benefit can also add a burden for pilots, who must learn how to use these capabilities safely and effectively. If technology is so great, why can't it be used to make pilots' jobs easier instead of more complex? And if technology has advanced to the point that it can add significantly useful capabilities while at the same time reducing complexity, shouldn't this reduce training times for pilots transitioning into modern cockpits? Alas, this does not appear to be the case, but it is something that aircraft manufacturers and avionics designers are working on, and ultimately technology should offer a roadmap to a future that helps pilots instead of confusing them with complexity.

AIN polled readers to identify their issues with avionics complexity and confusion, then asked avionics manufacturers how they are addressing them. While some of the pilots' complaints are specific to certain avionics systems, this report is intended to focus less on such granular issues and more to highlight challenges and examine how to overcome them.

This report first summarizes comments from pilots who responded to **AIN**'s request, followed by major avionics OEMs' insights into this important subject.

More Study Needed

James Lara, a principal at consultancy Grey Stone Advisors, is an active participant in the NBAA Safety Committee's Single Pilot Working Group. "One of the big issues for single-pilot aviators is 'task saturation,'" he told **AIN**. In discussions with pilots who fly their own business aircraft, he added, "I have discovered that many, but certainly not all, of these aviators learn enough to be functional with their 'state-of-the-art' avionics suites. They learn the basics: the 'hows.' What they often don't take the time to learn are the 'whys,' otherwise known as the software design philosophy or architecture that is at the heart of these avionics suites. Today's avionics suites are incredibly powerful tools. Once one truly understands the system's architecture, achieving mastery of the most arcane functionality is relatively straightforward. This does take some time and dedication, but it's essential if one is to be truly 'in command.'"

"Does it take a Ph.D.? Nope, not even close. However, it does require rigorous study, application, experimentation and practice. You must understand the 'whys' and never be satisfied with the 'hows.' Each of us needs to be in pursuit of excellence and eschew acceptance of [meeting the bare] minimums," he said.

The Human Factor

Ed Wischmeyer is a student of human factors, an engineer and pilot with ATP and CFI certificates, and he has strong opinions about avionics design and how pilots interact with technology. He has worked for Apple, Boeing, Gulfstream, Honeywell and Rockwell Collins and is now retired but still flies and volunteers with the EAA as awards chairman at the annual AirVenture show.

He believes there is a fundamental problem in aviation, related to the way certification holds back new developments, and this has created an environment where pilots have to spend an extraordinary amount of time and effort learning how to overcome the "gotchas" built into the system. "This can be interpreted two ways," Wischmeyer suggested. Pilots take a certain amount of pride in mastering all the arcane information needed to fly safely: the symbols on charts, specific profiles for different airplane types they fly, IFR procedures and so on. The two ways are, he added, "Look at us, we're so cool, we mastered all these gotchas, aren't we wonderful? Or 'Look at all these gotchas, the system is poorly designed, and as long as the avionics have to accommodate all the gotchas there is no way it can do a good job.' [Either it's] look at how cool we are because we know all this stuff, or what a kludgy system. When I was a young pilot, I thought, 'Look at all this stuff I learned, aren't I cool? Now that I'm [older], it's 'Why learn all this stuff? Why can't they get their [act] together?'

FOTOLIA

"[This whole subject] gets down to the early stages of system design and system requirements. People will typically design a system to meet the requirements and provide functionality. But in terms of how it will be used and what it will do for the overall workload, these issues are seldom considered in the design stage. By the time the design is implemented, [the attitude is], 'I'm the brilliant designer, how come you can't figure it out?'"

Read the Label

Bennett Taber, who flies charter King Airs equipped with both Rockwell Collins Pro Line and Garmin G1000 avionics, has strong opinions about the design of the systems installed in the airplanes he flies. Fundamentally, he can't understand why something as important as the flight guidance panel can be designed so differently. "They all do the same things except there's not a single button or knob in the same place," he said. For example, setting the airspeed bug with Pro Line uses a rotary knob, while the G1000 uses the pitch wheel, and this can be confusing for a pilot who flies both flight decks.

New technology has changed how pilots interact with avionics, and Taber recognizes that. "In the old days, you turned a knob, and that's what happened. Now you have to make sure it's doing what you asked. You have to ID the button before you push it, then look at the 'scoreboard' [flight mode annunciators] and make sure it does it. [Some pilots] push the button and

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happily truck along. One of the biggest challenges is to get pilots to recognize it's not what button you push; it's what the scoreboard says. Is it doing what you want now, and is it going to do what you want when you want? As always, read the label before pushing the button."

Unique Perspective

Corporate pilot Brent Keyes also flies aircraft with two distinctive flight decks: the Rockwell Collins Pro Line 21 in a Gulfstream G150 and the Honeywell Epic-based Gulfstream PlaneView in the G450 and G550. "In an industry like this where people fly multiple airplane types, it would be nice if there was some harmonization and that it was set by the feds," he said.

Keyes has experienced issues that have taken a long time to fix, in Honeywell's case a Vnav speed problem where the correct speed was not held during an arrival, and the airplane was allowed to accelerate to the set speed of 300 knots then slowed to meet a speed constraint. What he is concerned about is that "it introduces chances of human error," and also that major software update cycles take so long because of certification requirements that problems can persist until the next update.

There are two areas Keyes feels should be addressed by the industry. One is harmonization of avionics among manufacturers. "It would be nice if nomenclature, colors and basic human-factors [elements] were harmonized. On a dark and stormy night after flying ten-and-a-half hours, every bit that can help you out is good."

The other move should be more line-oriented flight training exercises during initial type rating training. Training providers tend to stick to the FAA-approved airports in their systems, and pilots end up not practicing approaches that they typically fly. "Let's do a Teterboro departure to a complicated arrival in Washington, D.C.," he suggested. "The two circling approaches that I do I have never trained in the simulator. We don't fly into Memphis and Kennedy a lot, but Teterboro and Palwaukee; those would be the airports where we should do [the training on circling approaches]. It's not about making it easy for a test. Try circling at Palwaukee on a dark and stormy night. That'll get your attention."

More Pilot Comments

Pilots who answered **AIN**'s call for comments about the issue of avionics complexity responded as follows:

• "So Honeywell and Collins: is there any possible justification for lack of standardization of such basic things as colors? For example, FMS controlled speeds: blue in one, magenta in the other. C'mon guys. Microsoft needs to buy out both and just do it one way!"

• "I believe the most recent challenge is the added complexity to Stars and SIDs, the older boxes [FMSs] and ATC's growing habit of switching your SID or Star while in that phase of flight. The box takes time to program, the crossing altitudes and speeds take time to verify and you are moving along at 400 knots."

• "The Garmin G1000 I learned behind was intuitive. The thing is that you need to learn the order the system is going to expect or provide information. Most of the time it is based on the chronological order of the flight crew duties. Starting with the destination, then the clearance, standard departures if available, en route navaids and approaches at the destination. The only time things go wrong is when things depart from the normal sequence, or one manufacturer might have a different way of entering the data. An example: the Universal FMS and the Collins Pro Line 21 units were both fantastic, but the data input sequence was as different as driving on the left side of the road versus the right. Both can get you to the destination, but in a different fashion. So you don't need a Ph.D., but you do need to train a lot more."

• "I'm not sure just one Ph.D. is adequate to operate today's avionics suites. Fifty-some years ago when I started my aviation career we operated in a totally different universe. VOR, ADF, transponders were the new gadgets, and radar was spotty coverage at best. Today, I have dual FMS, RVSM, Tcas, XM Weather and am looking at ADS-B. We stopped traveling to Europe several years ago because of the new avionics required. I believe we have a serious problem in the lack of training by the manufacturers of the new avionics. The lack of training is leading to numerous navigation errors. Another problem I am seeing is ATC issuing conflicting navigation commands faster than the crew can load them into the FMS!"

Rockwell Collins combined vision

Avionics OEMs

Avionics manufacturers are well aware of the issues facing pilots as they struggle to overcome the learning curves that come with new technology designed to make flying more efficient and safe. As new features proliferate, manufacturers and human factors experts are working diligently to make sure that adding features doesn't add more complexity.

Aspen

Commenting on the FAA's allowing more non-TSO'd avionics to be installed in light aircraft at the recent EAA AirVenture show in Oshkosh, Wis., Aspen Avionics president and CEO John Uczekaj cautioned that just installing a new device might not provide the required safety improvement. "When we throw equipment into the airplane without taking into account usability and situational awareness, are we going to have pilots who quit because they can't handle all the information? When we put all that new technology in, we still need to make sure pilots know how to fly with it."

Aspen works closely with pilots, pilot organizations, competitors and its Italian partner and research organization CIRA. "They help us with research and different ways of using avionics," Uczekaj said.

Aspen Evolution synthetic vision

Avidyne IFD550 synthetic vision

Avidyne

Also at AirVenture, Avidyne demonstrated some innovative applications resulting from the marriage of wireless data transfer capabilities of its IFD-series navigators and Apple iPads. The demo showed how an iPad can be mounted in a bracket directly over a typical six-pack traditional instrument panel to give the pilot a large-format synthetic vision display. The iPad in this display runs Avidyne's IFD100 app, which wirelessly obtains attitude, GPS, flight plan, air data and ADS-B IN weather and traffic from Avidyne's new IFD550 and replicates that box's display on the iPad. The iPad can simply be removed from its bracket to return the instrument panel to its normal configuration.

Garmin

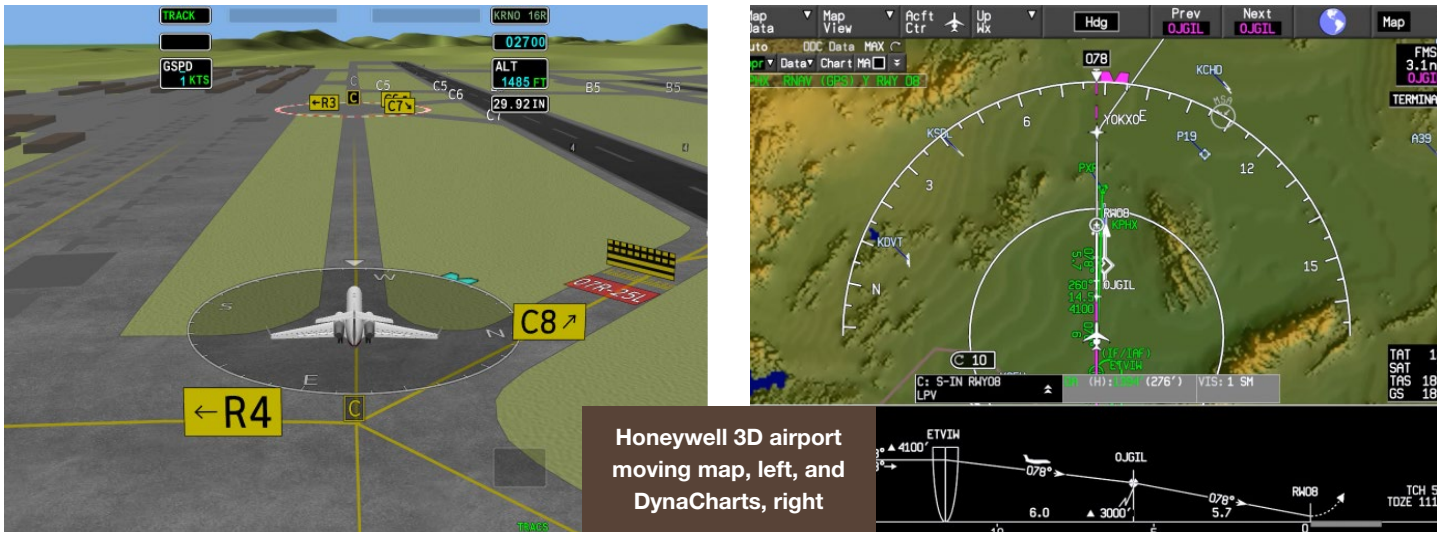
"So much more information is readily available," said Garmin avionics product manager Bill Stone. "There's a thirst for more, but how do you manage that into something

the human being can interact with easily, and comprehend and use that data? Our job is to turn that [huge] amount of data into information that can be acted on, without overloading the crew and without generating superfluous information."

Garmin employs about a dozen human-factors specialists who work with design engineers. A lab flight simulator can be quickly configured into a G5000 in a specific jet or a G1000 in a light airplane. "It's one thing to look at the equipment and see how easy it is to work," he said, "but totally different when you're in the airplane and getting task-saturated. We can do it in a controlled environment and measure response times and error rates. That's a big part of our developmental processes."

As a relatively young player in the avionics industry, Garmin skipped over the FMS generation and therefore isn't hamstrung by having to add features to that kind of interface. "As technology moves forward," he said, "we don't have to replace boxes, and we don't have to try to leverage boxes like the MCDU [multifunction control display unit] to add functions that they weren't originally intended to handle."

What Garmin has been able to do is add functionality to its existing systems by expanding the user interface to touchscreens, whether on the display itself as in the G3X system or with controllers that are relatively easy to add to turn a G1000 into a G2000, G3000 or G5000. "It makes for a new user interface," he explained. "Not because we use a finger to touch a piece of glass. The real power is the screen behind it that can be configured to be context-sensitive based on the task you're performing. We are offering controls only for the task at hand. You don't have to search for the right button or remember which button. The power of a touchscreen is the reconfigurable display behind it."



Honeywell 3D airport moving map, left, and DynaCharts, right

Honeywell

Bob Witwer, Honeywell vice president of advanced technology, started in the avionics industry with early FMS designs, and he is well aware of avionics complexity problems. "One thing that is a big challenge for us—and it's very doable both by Honeywell and industry—is to cut down on the complexity associated with what pilots don't need right now."

What this means is that instead of just throwing a bunch of information at pilots on their cockpit displays, why not present information only when requested or needed, and in a way that helps pilots? "I look at most PFDs today," he said, "and there's so much stuff on there. A lot of PFDs have data up all the time whether it's of interest to pilots then or not. It gets back to the whole idea of providing pilots with what they need when they need it, unambiguously and easy to understand. Our industry doesn't do that."

Witwer sees pilots adding to the way they interface with avionics with new modalities. One example is touch, which is already in Garmin and Rockwell Collins flight decks and is coming in the Honeywell-based Gulfstream Symmetry flight deck in the G500 and G600. "Voice has matured a lot in the consumer world," he said, and this is something that Witwer's team is exploring. [Garmin has already implemented voice commands with its Telligence technology on the GTN navigators.—Ed.] "What if I call up, 'Show me DME data,' and it pops up instead of me having to find it?" he asked. The idea is to reduce complexity, even where there is more information offered to pilots, by making it easier for pilots to get what they need when they need it.

The future is only going to bring more information to cockpits, and Honeywell is not interested in using technology to eliminate pilots from the cockpit but rather to help them. "It's about drawing on the best [characteristics] of machines and people and emphasizing the notion of human-machine collaboration," he said. "The big [question] is how do we apply advances in machinery to establish a human-machine collaboration that provides pilots with superb situational awareness?"

Witwer sees two technology drivers affecting cockpit complexity. One is the rapidly growing connectivity speed of airborne Internet access. This will enable all sorts of new capabilities, such as avionics tapping into a ground-based expert system to aid with decision making, but not control of the aircraft. The idea is not to dump more information into pilots' laps but to help them complete their missions.

The other area is the growth of tablets as a means of offloading workload or aiding pilots. Many avionics manufacturers are already putting this to work, allowing pilots to flight plan away from the airport then upload tablet flight plans directly into the avionics. "This is a big engagement area for us," Witwer said. One area where this could be of particular utility is for pilots who fly different airplane types, because the tablet remains a familiar interface.

Rockwell Collins

Rockwell Collins is pushing quickly into modern technology with touchscreen interfaces, first with the Pro Line Fusion flight deck for King Airs (new and retrofit) and now working with Duncan Aviation and Textron Aviation on a retrofit Fusion touchscreen cockpit for the Citation CJ3. The CJ3 installation looks to be the first business jet that will be certified with touchscreen displays, not just touchscreen controllers, as the Pro Line Fusion system for the King Airs and CJ3 features full touch displays in the instrument panel.

Pilot feedback on the touchscreens has been positive, according to Adam Evanschwartz, director of marketing for business and regional systems. Pilots like the easy transition, intuitive simplicity and absence of having to memorize steps. Another benefit of having touchscreens up front is that the pilot doesn't have to look down to program an FMS. "Now in the King Air," he said, "we see many of those same operations completed with pilots head-up, eyes on the main displays and using the touchscreen to interact graphically and more intuitively with information." Touchscreens could even find their way into larger jets, perhaps not as PFDs but as an MFD in the center of the panel or on a tilt panel in front of the pedestal. "There is an opportunity to use other touchscreen devices as well, to add value and simplify operations," he said.

Some pilots are skeptical about using the touchscreens, said Matt Carrico, a fellow in avionics programs for Rockwell Collins, and initially plan to use only the pedestal controls. "It doesn't take them long to become familiar with the touchscreens and even rave about them," he claimed.

In addition to exploring wider uses for touch interactivity, Evanschwartz said, Rockwell Collins researchers are evaluating voice-recognition. "We continue to drive research for customers who value pilot-in-the-loop operations, particularly for approach, takeoff and landing safety, and in particular HUD [head-up display] technology. We see technologies

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Garmin G5000

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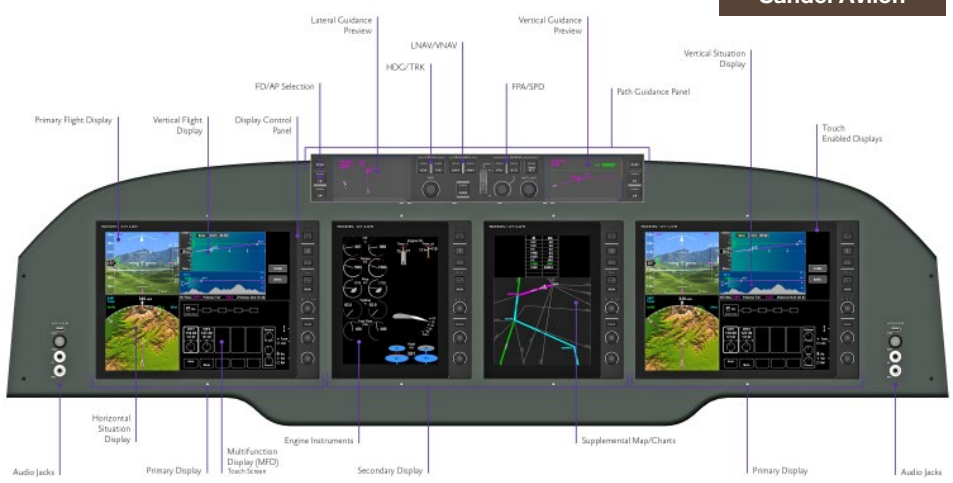

Sandel Avilon

like synthetic vision on the HUD as making flying more intuitive and safer." Synthetic vision might also be useful for upset recovery, he added. "We've got some work there that will be another benefit of synthetic vision."

To ensure that all these new features ease the burden on pilots, Rockwell Collins works on human-factors issues with industry-standards-setting groups such as RTCA, Eurocae and SAE. "We try to work on standards for the benefit of the entire community," said Carrico. "The SAE G10 committee deals with a whole range of human factors topics on the flight deck. We do try to work together to standardize where we think it benefits the community."

Sandel Avionics

Sandel Avionics is breaking into the King Air retrofit market with an avionics package called Avilon, which is designed to exploit path-based flight operations that fit perfectly into the NextGen and Sesar performance-based navigation (PBN) protocols.

"Current cockpits have poor use of graphics, and pilots are buried in information," said Steve Fulton, now Sandel's v-p of sales and marketing but until recently the company's senior flight-test pilot and PBN advisor. "It's bad enough in normal conditions, but if there is a problem that requires a recognition of failure modes, pilots are in a worse situation.… The consumer electronics industry has crept into cockpits, 'because we can,' so we have put that information in front of pilots. The result is an operating process that is fairly complex, with failure modes that are not friendly. We want to move forward. The FAA's plans for upgrading airspace include PBN. We need the capability, and how to conduct these operations needs to be fairly simple."

Fulton represents Sandel at the RTCA NextGen Advisory Committee and focuses on PBN and other issues, including the fourth dimension—time—and how aircraft can flow together efficiently and safely when flying PBN operations. "Sandel is involved and aware of what is intended with NextGen," he explained, "so we're using that position to inform how we're doing design. This is a great time with Avilon in the final stages of development; we have not just 3-D but 4-D navigation.

"We want to make sure we provide the right level of information, simple enough to interpret and help the pilot stay proficient. Training is an important part. We have strong ideas about that, and we're making provisions so that people have access to what they need. This is an area that is underserved. As we look at technically advanced cockpits, pilots are pretty much on their own to figure them out, and the results haven't been impressive."

Ultimately, Fulton explained, Avilon was created to solve the problem of avionics complexity, to answer the question "What's wrong with today's technology?

"The state of the art was pretty bad, in the estimation of Sandel, particularly in general aviation," said Avilon technical advisor Delmar Fadden. The Avilon design is intended to simplify the pilot interface using graphical displays, especially of the vertical dimension. "Since maps were first introduced [in aircraft], the acceptance of the map display has been incredibly fast," he said. "People gravitate to it. I think the same will happen with the vertical display. And NextGen airspace has it."


Thales Avionics 2020 cockpit

Thales

Thales has spent many years on cockpit designs that meet not only the PBN needs of modern airspace but also solve complexity problems for pilots. The effort was first demonstrated as the One Display Interactive Cockpit Solution at the 2009 Paris Air Show, and that work led to the Avionics 2020 cockpit, which Thales unveiled in 2013.

"In our work on connected and digital aircraft," the company told **AIN**, "we realized that the aerospace industry is fast approaching the limit of the complexity and number of functionalities that can be included in the current designs of cockpit architecture."

The Avionics 2020 flight deck puts one large display in front of pilots, and all aircraft systems and functions can be controlled by touching the display. The display's features won't be fixed, however, and users will be able to reconfigure some features such as colors. The design philosophy focuses on three pillars, according to Thales: "crew-centric design; use all available information to manage the mission; [and] give operators and OEMs the means to create their own variables."

To optimize the one-display touchscreen interface, Thales worked with ergonomics experts, human-machine interface specialists and psychologists. "To understand how the human brain reaches decisions under different situations, we developed a display that helps the pilot reach an operational decision in the most intuitive way possible," Thales explained. "This design merges data from different systems, both from secure avionics and from the 'open world' (public information) and displays it in a way that mirrors how the human brain works and reaches decisions; therefore, the pilot has the information needed when it is needed."

Universal Avionics

Universal Avionics, a pioneer in FMS development, is also one of the few avionics manufacturers that makes an integrated flight deck. The integrated InSight suite is now undergoing retrofit certification in the Citation VII and has been selected by MD Helicopters for the latest version of the MD Explorer.

CEO Paul DeHerrera recognizes the dilemma facing avionics manufacturers, for whom new technology offers seemingly unlimited options. "There's so much stuff you can do," he said. "That's all great, but it's got to have value and some logic to it. We don't want to have this cockpit where all we did was take hundreds of dials and shove them into an electronic format. We can be a lot smarter about what we put in front of the pilot by knowing what's going on in the cockpit. "

Universal InSight

How this takes form in the InSight flight deck is to give the pilot information needed for the current phase of flight. "That way we can clean it up so we're presenting the pilot with the most likely scenario," he said. While this isn't available today, DeHerrera anticipates a new feature that will take weather information and compare it to the flight plan then suggest a deviation around severe weather. Or use the destination weather report and automatically plug in the most likely approach procedure and runway.

InSight still has an FMS electronic control display unit (ECDU), but changes are coming in the interface, said DeHerrera. "It's going to change dramatically." Pilots still need to be able to do direct entry on certain items, he noted, "but the transition is going to be more electronic communications." Although datalink clearances are becoming more common, someone still has to enter the information into the FMS. "We will get that datalink and fire it right into the FMS," he said. ❑

Helicopter EMS operators face a difficult road, as receiving only partial reimbursement is the norm, from both private insurance and Medicaid.

U.S. HEMS operators at odds with insurers

by Mark Huber

Over the last several years, patient transport fees charged by the helicopter EMS industry in the United States have come under scrutiny from public policy makers, the private health insurance industry and elements of the general media. In some instances, the debate has become emotionally charged, with stories of uninsured or underinsured patients forced into bankruptcy by HEMS bills that at first blush appear usurious, sometimes exceeding $1,000 per mile. Concurrently, private health insurers are taking a harder line against HEMS charges, and the relationship between the health insurance companies and the HEMS industry often proves contentious and litigious, with HEMS companies more frequently taking insurers to court to compel payment or insurers extracting deeply discounted service to allow HEMS companies to participate in their networks as "approved providers."

Air Methods, the nation's largest HEMS provider, notes that it collected on only 74 percent of its private insurance claims in the first quarter of this year. A spokeswoman said the problem is more acute in states where one or two insurers have high market concentrations. "We do notice a trend, where a state or a concentrated market within a state has a dominant payer the insurance reimbursement is almost certainly below the national average for insurance reimbursement," she said. She added that Air Methods has sued insurance companies to recover payments, but it no longer litigates with individual patients unless they keep insurance reimbursements.

"At the heart of the issue is that health insurance isn't doing what health insurance is supposed to do: protect its members. The core purpose of health insurance is to protect individuals from catastrophic events, yet private health plans continue to shrink their coverage, shifting toward high-deductible, high-out-of-pocket models and reducing coverage for their members," the company spokeswoman explained. "They don't offer patients adequate protection—financially or medically. No one wins in this scenario, except the insurance companies who choose to abandon their members by paying a minimal amount and walking away, leaving the hospital, Air Methods and, most important, their member and our patients to deal with the aftermath of their poor business practice. We have occasionally engaged in litigation in the past with a number of insurance companies, and we continually consider all our options to pursue certain legal claims against insurance companies when necessary."

The spokeswoman presented Air Methods' response to patients whose insurance companies leave them in the lurch. "We don't like it when our patients are put in these situations and we do everything we can to help them. We understand that every patient's individual and financial circumstances are unique, and our team is dedicated to partnering with every one of them as they navigate through the post-flight and critical-care process. Our long-established charity care process allows us to reduce patient financial responsibility within appropriate legal parameters, and we provide patient financial counselors to patients to assist them throughout the process," she said. "In addition, Air Methods has an air medical membership ($49 per year per household) called OmniAdvantage; there is no additional transport cost for members flown via Air Methods. The most important thing a patient can do when faced with an air medical transport bill is to engage with our team. We will assist them through the process and help them in the process with the insurance company. The poor outcomes relative to unresolved balance bills are usually the result of a patient's refusal to engage with us in the process. If they do not engage we cannot help them with the insurance company or complete the required financial relief application which allows us to write down part or all of an air medical bill for an individual."

Cost-containment Efforts

One third of all patients transported by HEMS have private insurance. Yet it is that one-third that is expected to disproportionately carry the cost of keeping the domestic HEMS industry afloat. This is a cost-sharing structure to which the commercial insurers naturally take umbrage. Blair Beggan, director of communications of the Association of Air Medical Services, drew the pie chart for **AIN** last month. "Today, roughly 14 percent of Americans are uninsured or underinsured, 18

Continues on page 57 ▶

NEWS UPDATE

AW609 Flight-testing Resumes

AW609 prototype AC1 arrived at Leonardo-Finmeccanica's Philadelphia plant on August 10 after recently resuming flight-testing in Arlington, Texas. Plans call for the aircraft to be based in Philadelphia, before being shipped to Italy for updates and modifications. The AW609 is being certified by the FAA and the aircraft will be built in Philadelphia. The AW609 flight-test program had been voluntarily halted following the fatal crash of AC2 in Italy last October. In May, Italian prosecutors impounded AC3 before it could make its first flight as part of their manslaughter probe into the AC2 crash. That aircraft was released in July and is expected to be shipped to the U.S. to join the flight-test program in Philadelphia, where AC4 is currently being assembled and readied for first flight next year. Despite the 10-month delay in the flight-test program as well as calls by Italian ANSV accident investigators for wind-tunnel retesting and redesign of the fly-by-wire flight control system, the company insists that the AW609 will be certified in 2018.

FastFins for AStars

BLR Aerospace is taking orders for its FastFin tail rotor enhancement and stability system for new and used Airbus H125-series helicopters for installation under STC. FAA certification is expected in the third quarter, with certifications from the EASA, Transport Canada and ANAC following by year-end. H125s fitted with FastFin are expected to gain up to 10 percent more right pedal authority, 140 pounds more useful load in OGE hover and 85 pounds more useful load during high/hot operations in IGE hover. Additional benefits include a reduction in pilot workload, easier control in precision hover-hold operations and better management of the yaw axis when hovering in challenging crosswinds. Unlike that of other FastFins, the design for the H125 does not modify the vertical fin; rather, it is composed of a tailboom aerodynamic cowling, a tailboom strake and vortex generators.

Air/SkyCrane Composite Blades Fly

New composite main rotor blades jointly developed by Erickson and Helicopter Transport Services for the S-64 and CH-54 recently made their first flight. Certification is expected later this year. The new blades are expected to provide better high/hot performance, greater fuel efficiency and reduced manufacturing and maintenance costs. The blades bolt onto the existing rotor head of the CH-54B/S-64F and require a minor main rotor head modification for the CH-54A/S-64E.

The blades are now produced at a composite manufacturing facility in Medford, Ore.

Russian Helicopters Pitches Firefighting in Australia

Russian Helicopters is touting the capabilities of the Ka-32A11BC at Australia's Aerial Firefighting Asia-Pacific international exhibition and conference this month. The Ka-32 can be equipped with 40 firefighting options, among them water cannon and Bambi bucket. Russian Helicopters claims the FAR Part 29-compliant helicopter is in use in 30 countries, and is particularly well suited to the firefighting mission because it can perform "complex maneuvers with a high degree of accuracy even in unstable atmospheric and climatic conditions."—*Mark Huber*

New challenges for Erickson

by Mark Huber

Despite attracting several new significant contracts in recent months, Erickson continues to struggle in a challenging market while under a crippling debt load and while trading in a market that is pummeling its stock price to penny value. On August 15 the company reported a second-quarter operating loss of $29.3 million on operating revenue of just $50.8 million, a $17 million revenue decline from the same period a year ago.

In late July, the company filed a new Form 8-K with the U.S. Securities and Exchange Commission that suggests it has entered into new interim financing agreements to keep it afloat and agreed to pay substantial penalties—that could amount to more than $6 million—if its $140 million revolving credit facility is not refinanced soon. Erickson's current lenders view its revolving credit simply as too high risk to continue to carry. Overall at the end of the first quarter, the company was pinned under $362 million in long-term debt, much of it related to its $250 million 2013 acquisition of then failing Evergreen Helicopters. Erickson has not been profitable since.

The Evergreen deal was sold to the market as a growth opportunity; Evergreen had substantial lift contracts with the U.S. Department of Defense in support of operations in Afghanistan and Iraq and also had an offshore energy business. However, shortly after the acquisition, those opportunities largely vaporized in the face of the U.S. troop draw down in the region and the collapse in the price of oil.

In late July, Erickson revealed that it had received two letters of listings qualifications from the Nasdaq stock exchange, warning the company that it was out of compliance for trading on the exchange—namely that its shares had to have a value of more than $1 for the last 30 consecutive days and the company had to have a market value of publicly traded shares of more than $5 million. If Erickson does not satisfy those requirements by January 23 next year, the Nasdaq could delist it.

Erickson reported a first-quarter loss of $26 million on a net revenue plunge of nearly $20 million in May, hired a new CFO in June and engaged Imperial Capital the next day to "explore strategic alternatives for the company." Earlier this summer, Erickson CEO Jeff Roberts told the Portland *Oregonian,* "We're sick, but we're not terminal." But he did make it clear that financial deleveraging is essential to the company's future.

Exactly how that happens remains to be seen. Despite the settlement with shareholders and enlisting Imperial's help, a buyer has not emerged, and the 8-K filing hints that Erickson is finding long-term debt refinancing difficult. Roberts and his management team have cut operating losses and brought in new business, landing contracts in recent months from customers in Africa, Australia, Canada and India as well as from the U.S. Navy and NASA.

Roberts said the latest quarterly results mean there is more pain in store at the company. "Our second-quarter results were unsatisfactory. We were unable to secure material business wins in a timely manner and we were unable to reduce our costs fast enough to align with the level of revenue generation. Our backlog and pipeline did not convert to revenue quickly enough, which resulted in heightened focus on managing cash and liquidity.

"In light of these circumstances, we are making further reductions in general and administrative and support costs, and deferring non-critical capital expenditures into future periods, which are aimed at improving our liquidity position. These measures will provide the time needed for our cost and revenue initiatives to mature. In addition, we are making good progress with our advisory firm to address our immediate liquidity needs, as well as options with respect to our longer-term capital structure and strategic alternatives," he said. ❑

BLADE STRIKES ON LOST BELL 525

The NTSB is looking at why the main rotor blades struck both the tailboom and the nose during the July 6 in-flight break-up sequence that destroyed Bell 525 FTV1 (flight-test vehicle 1), N525TA, and killed both test pilots. FTV1 was one of three 525 prototypes in the flight-test program, which has been put on indefinite delay in the wake of the accident. Scott Donnelly, chairman of Bell parent company Textron, said in late July that the company remains committed to the program and is continuing non-flight certification and program activities.

"At this time we do not have an estimate as to when flight-testing might resume or the length of delay in certification or first deliveries," he said. "We do remain committed to the Bell 525 and we'll work to ensure the aircraft will be a safe, reliable and high-performance helicopter," he said.

FTV1 was believed to be conducting tests at or near Vne when main rotor rpm dropped off and the main rotors significantly "departed their normal plane of rotation," according to an NTSB spokesman. The Board also issued a brief preliminary report early last month. Flightradar24 shows the last data point for FTV1 was at 1,975 feet at a groundspeed of 199 knots. At the time, it was tracking south to north with a 20-knot tailwind, equating to an airspeed of approximately 179 knots. Bell's projected high-speed cruise for the 525 is 162 knots. Dallas television station KXAS broadcast video from the scene that showed two large sections of the tailboom lying at a distance it said was 1,500 feet from the main wreckage impact site.

ENG helicopter pilot Ken Pyatt flew over the scene an hour after the accident and remained on site for an hour. He told **AIN** he saw "dozens of pieces of main rotor blade scattered quite some distance from the main crash site. We saw one entire main rotor blade that had been mangled, but you could see the attaching hardware, and in other places we found two- and three-foot sections of main rotor blades. That [rotor blade] debris field was over a quarter mile [behind] the impact site." Pyatt said the debris trail was both left and right of the course line and started south of the main impact site.

The accident investigation will include copious data from real-time telemetry associated with the flight-test process, as well as the crew observations and video recordings from the chase helicopter, a Bell 429. —*M.H.*

Kit maker Cicare eyes certified model

Argentine kit helicopter maker Cicare plans to enter the certified helicopter market. Raul Oreste, the company's chief commercial officer, told **AIN** that the company is working on a certified version of the Model 12 two-seater that is currently sold as a kit. It hopes to have it certified to Part 27 standards within "three to four years."

The Model 12 kit sells for $189,000. It is powered by a Lycoming HIO-360G1A four-cylinder piston engine that delivers 180 hp; empty weight is 948 pounds and mtow 1,543 pounds; and cruise speed is 89 knots, with a Vne of 110 knots. The Model 12 has a two-blade composite main rotor system lifed on condition, monocoque cabin construction and tube skid gear, a cabin that includes a T-bar cyclic, a bullet-shaped instrument cluster and no-nonsense toggle switches. It is stylistically similar to the smaller 992-pound-mtow, 130-hp, 80-knot Model 8, which has already been certified under ULM rules in Europe and Argentina. Cicare hopes to expand the ULM certification of that helicopter in other countries in the coming years. The company has had success selling its even smaller, Rotax-powered Model 7B (single seat) and 7T (tandem seat) kits recently, at prices ranging from $77,000 to $129,000, depending on build level and if engines are included. Cicare brought a Model 7B to this year's EAA AirVenture at Oshkosh, Wis.

MARK HUBER

Cicare brought its Model 7B to AirVenture this year. The company plans to pursue certification of a larger model in the near future.

Cicare sells an unusual training device called the SVH4, basically a Model 7B attached to an adjustable ground-based platform, which allows liftoff, to normal hover, to hover taxi all at the safe controlled altitude of 3 feet agl. The FAA has approved the device for the first 10 hours of flight training, according to Cicare's Oreste. He says the SVH4 provides the new helicopter student with numerous benefits over training in a conventional helicopter early on. "It makes it easier for the student because he doesn't have the stress of the instructor or the stress of flying in a helicopter alone. It makes it so you are learning gradually. In the first stage it [the device] is locked on the floor. You can't move so you can control only the collective and the pedals. The worst thing you can do is go around and around and around. So that is for two hours. Once you master the pedals you can release the platform and you can move around with the cyclic. It makes it more friendly. It takes away that fear for a person who is starting from scratch." The predecessor of the SVH4, the SVH3, was declared Argentina's national invention of the year in 1998 and awarded the gold medal for best aerospace invention at the 1999 Geneva Motor Show.

To date, Cicare has sold just 60 helicopters and 30 flight training devices. Oreste attributes this slow gestation to company founder Augusto Cicare's humble nature and lack of access to capital, but says all that is changing now. While Cicare remains family owned and Augusto Cicare remains active in the business, the company has new outside investors and a game plan to expand. It sold 18 helicopters in 2014, retrenched slightly with sales of 15 last year as the company focused on engineering projects, and now plans to sell 20 this year, Oreste said. Backed by funding from the Argentine government, Cicare is also developing the low-cost, turbine-powered, tandem seat Model 14 for the parapublic market. It is powered by a 420-shp Rolls-Royce 250-C20B. —*M.H.*

UNITED ROTORCRAFT

United Rotorcraft has installed 10 EMS kits in Air Methods helicopters.

H130 finds niche in single-engine EMS ops

Airbus Helicopters and United Rotorcraft have teamed to offer the H130 as a helicopter EMS machine for single-engine operators who need good high-hot performance and large-cabin utility. To date, United Rotorcraft has installed 10 EMS kits in aircraft for parent company Air Methods, another in a demonstration aircraft for Airbus Helicopters and another in a helicopter delivered to Enloe Flight Care in Chico, Calif., last year. Wysong installed another kit in an aircraft for Hospital Wing.

United Rotorcraft president Mike Slattery said installation typically takes 90 days because most customers opt for the EMS kit along with other accessories to create a "full air ambulance" with wirestrike kits, searchlights and avionics packages "that support the EMS mission. If you just install the EMS kit it would be quicker, but people rarely do that," Slattery said. "In the avionics suite, we add the Garmin GTN 650/750, traffic advisory, XM weather and tactical communications, and the whole suite is STC'd. Field approval for installations is going away so we've done a lot of STC approvals for these suites. It has been a lot of investment, but has certainly paid off in the end." All the cockpit lighting is NVG certified, he noted.

The EMS package proper comes with United Rotorcraft's patient loading system. "Twenty years ago one of the major problems medical attendants faced was back injuries from loading patients. We've developed a patient loading system for a dozen aircraft makes and models that quickly allows them to slide the patient onto a platform, slide the patient into the aircraft, and maneuver the patient within the aircraft with ease. It minimizes the potential for injuries to the caregivers," Slattery said. The H130's huge sliding doors also ease patient loading. "The H130 has so much room inside…by maneuvering the patient around they are able to get full body access. Our litter also allows you to raise the patient's head at a number of different angles and is approved for the patient to be elevated during taxi, takeoff and landing. That's a big part of it from the standpoint of patient care."

Slattery said the H130's large cabin also provides more room for medical crew, ride-along family members and medical equipment. "You can transport up to three medical crew or a combination of crew and family members or a specialty team and they have crash-attenuating seats. You also have locations for securely mounting whatever medical equipment the customer uses. The other things are the systems on board. Right now the aircraft is equipped with medical oxygen that can provide 8,400 gaseous liters of oxygen. We also have pressurized medical air and medical suction. We have 115V or 12V to power any [medical] devices." The H130 is also big enough to accept specialty mission items such as neo-natal isolettes and balloon pumps. The modular design of the EMS suite allows components such as medical equipment and the EMS crew seats to be removed quickly to compensate for extreme high/hot conditions.

"There's been a good response to the H130 in the industry and the demonstrator has been well received," Slattery said. The H130 offers about the same cabin space as the pricier H135 light twin. For the increasingly cost-conscious helicopter EMS industry, that might prove to be a winning prescription. —*M.H.*

U.S. HEMS reimbursement

▶ *Continued from page 55*

percent are covered by Medicaid, 35 percent by Medicare and 33 percent have commercial insurance," Beggan said. "Again, government-sponsored health insurance reimbursement has not kept pace with the cost to provide air ambulance services. Today, we estimate Medicare reimbursement averages about 30 percent of the average cost per transport, while Medicaid payments range between 2 and 25 percent. The fact is that unreimbursed care is a major factor in the cost structure, not just of air medical transport but of medical care in general. For seven out of 10 air medical transports, air medical providers are compensated significantly below the cost of providing the service." Fairly or not, commercial insurers are compounding the problem. "Commercial insurance companies that cover healthcare provided in a brick-and-mortar hospital refuse to negotiate fair in-network rates for those same services when they are provided by clinicians in the back of an aircraft," Beggan said.

Legislative Efforts

AAMS is quarterbacking legislation on Capitol Hill to track air ambulance costs and raise the Medicare reimbursement rate accordingly, but it faces an uncertain future in this abbreviated election-year Congressional session. Beggan notes, "Under the current system, Medicare reimbursement fails to cover the basic cost of even the lowest-cost flights. Failure to correct this imbalance will make it difficult for providers to continue offering access to trauma, cardiac and stroke care in many less populated rural areas or areas with larger Medicare- and Medicaid-dependent communities."

Beggan characterized the disconnect between the Medicare reimbursement level and the industry's costs as extreme. "During the ten-plus years of the Air Ambulance Fee Schedule, providers have seen limited inflationary updates, on average 2.2 percent a year, as basic aircraft, labor, healthcare, safety and other operational costs continue to climb at a much faster pace. Keep in mind that the Fee Schedule has never been based on the cost of service. Rising operational costs have resulted in an estimated Medicare reimbursement-to-cost shortfall that exceeds 70 percent. Additionally, air medical operators have invested tens of millions of dollars to install the most modern safety technology benchmarked against international best industry practices. These technologies, which include HTaws and enhanced vision systems, are consistent with the NTSB's recommendations to the FAA and were voluntarily adopted by the industry in advance of (recent) rulemaking by the FAA," she said. (*See box below.*)

The Air Methods spokeswoman noted that the company has invested heavily in recent years in fleet renewal as a means of both meeting the most modern standards and attempting to contain costs. "The investment in new aircraft, which come with lower operating expense, fuel consumption and enhanced safety systems, will pay long-term dividends in managing a significant line item of our costs." However, she acknowledged that the nature of healthcare makes some cost containment difficult. "We continually seek every efficiency and innovation to keep our costs down, but the nature of our service—and the complexities of the healthcare industry—dictate costs that are beyond our control."

Beggan isn't ruling out action on the bill this year. "We are having productive conversations with our Hill sponsors and committee leaders on potential paths to move our legislation forward this year. We are confident we are positioning ourselves with maximum maneuverability to be able to take advantage of any number of potential scenarios that could unfold," she said.

Currently, the air ambulance industry falls under the protections of the Airline Deregulation Act (ADA) and is therefore immune to state regulation, including the rationing of air ambulances in any given state. States currently have the authority to regulate the number of ground ambulances that operate within their jurisdictions. Critics of the industry have long argued that an overabundance of idle EMS helicopters—more than 800 are operating within the lower 48 states—is artificially driving costs. The overcapacity argument aside, the Air Methods spokeswoman asserts that carving the air ambulance industry out of the ADA and turning it over to the states is simply impractical, and Air Methods opposed a recent attempt to do so in the U.S. Senate.

"Under the Airline Deregulation Act, states are precluded from regulating rates and services of a common carrier; as a common carrier under FAA rules, Air Methods is safe harbored under the ADA. Recently, there was a proposal in the U.S. Senate for an amendment that would have required a carve-out of the ADA and its application to air medical operators," she said. "However, those amendments did not survive final approval by the Senate. Air Methods did not support these proposed amendments. A large percentage of our flights cross state lines. As such, having different regulations governing our operations when we are transporting patients—in some cases, across two or three state lines—would be too chaotic. We strongly believe there should be a healthy conversation about the importance of access to these life-saving services, and Air Methods is committed to being an active participant in these conversations." ❑

Relief Coming through Federal Regulation

Pending federal legislation contains several components designed to provide the industry with long-term relief:

Cost-reporting Requirements: The legislation would require the Department of Health and Human Services to create and implement a system for air medical Medicare providers to report their cost on specific cost drivers. These cost drivers represent the basic operational costs at an average air medical base.

Independent Cost Analysis and Report to Congress: The Government Accountability Office (GAO) is tasked with analyzing the aggregate data and issuing a report to Congress that includes a recommendation as to the adequate level of Medicare reimbursement that reflects current operational costs while preserving access to critical air medical services.

Annual Report on Industry-Submitted Safety and Quality Measures: Additionally, the GAO will issue a report, updated annually, on certain industry safety and clinical quality measures. The quality measures chosen have received industry consensus as to critical metrics to track and are currently being collected by most air medical programs.

Temporary Payment Adjustment: To provide a certain amount of immediate financial relief, the legislation would provide for a 20-percent increase in the air medical transport base rate the first year after enaction and subsequent adjustments of 5 percent for three subsequent years until Congress receives the GAO data study. –*M.H.*

NEWS UPDATE

Malaysia Airlines Orders 737 Max

Malaysia Airlines Berhad (MAB) has placed an order for 25 Boeing 737 Max narrowbodies and reserved purchase rights on another 25. Schedules call for delivery of the 25 Max 8s on firm order to start in the third quarter of 2019 and continue to 2022. MAB could convert its purchase rights into firm orders for either Max 8s or larger Max 9s. The order previously appeared in Boeing's orders and deliveries list as belonging to an unidentified customer. The Max deliveries will replace some of the 737-800s currently on operating lease while MAB returns the older airplanes to their lessors. MAB operates 56 Boeing 737-800s, 21 of which it leases.

Previously known as Malaysia Airline System, MAB is now looking in the open market to lease four Pratt & Whitney-powered Airbus A330-300s to complement its existing fleet of 15. Plans call for its six Airbus A380s to remain in service until mid-2018, after which it will attempt to place them either on a wet-lease basis or directly.

Strike Costs Air France €90 Million

Air France estimates the seven-day strike by cabin crew that ended at midnight on August 2 cost it €90 million ($101 million). The strike grounded 1,400 flights and 180,000 passengers.

"Air France management [on August 3] invited the cabin crew unions to resume negotiations in August," said the airline. "It hopes to allow time for peaceful negotiations."

The patience of the flight attendants remained in question, however, and union leaders threatened to strike again as early as last month. Unions representing half of the striking crewmembers called for the last weeklong action after they failed to negotiate an extension to the existing contract, which expires next month. Management wants the extension to last 18 months, while union negotiators are seeking between three and five years. At issue remain pay, work rules and promotion policy.

Fuel Leak Culprit in SIA Engine Fire

Investigators have determined that fuel entered the oil system of the right engine of the Singapore Airlines Boeing 777-300ER that caught fire at Singapore Changi Airport on June 27. (*See* **AIN**, *August, page 58.*) The breach resulted from a crack in a tube in the engine's main fuel oil heat exchanger (MFOHE), according to an interim report issued by the Air Accident Investigation Bureau of Singapore. Engine maker GE Aviation had issued a Service Bulletin in December 2014 calling for the removal of certain MFOHEs, inspection for cracks in their fuel tubes and for repairs and certain "improvement works," it added. While GE recommended that operators conduct the actions no later than the next engine shop visit, the engine that caught fire had last undergone a shop visit in March 2014, nine months before the company issued the bulletin.

Flight SQ368 caught fire after returning to Changi Airport some two hours into a flight to Milan. The crew diverted after a cockpit indicator for its right GE90-115B engine had shown oil loss. Shortly after landing at 6:50 a.m. local time, the airplane's wing caught fire near the right engine. All 222 passengers and 19 crewmembers evacuated the airplane unharmed after firefighters put out the fire.—*Gregory Polek*

PROFITS CAN'T MASK TRADING CONCERNS AT EUROPEAN AIRLINES

International Airlines Group, parent company of British Airways and Spain-based Iberia, in late July reported falling revenues during the first six months of this year. Passenger unit revenues (defined as passenger revenues per available seat kilometer) fell 10.2 percent, to €6.67 ($7.17). At the same time, profitability received a boost from additional income from the recent acquisition of Ireland's Aer Lingus.

Net profit (after tax) for the first half climbed by 67 percent, to €554 million ($595 million). In the second quarter alone, operating profits stood at €555 ($596 million)—4.7 percent up on the same period in 2015. However, without the contribution from Aer Lingus, profits would have fallen 8 percent, to €487 million ($523 million).

Commenting on the mixed results, IAG chief executive Willie Walsh said that multiple factors have converged to make for "a softer than expected trading environment." Those factors included economic uncertainty around the UK's June 23 vote to leave the European Union (EU), currency exchange rate instability, multiple terrorist attacks across Europe, weakening economies in Latin America, Spain's general election and operational disruption caused by no fewer than 22 European air traffic control strikes so far this year.

Similar factors appear to have dogged the performance of several other European carriers. Announcing first-half results on July 27 for Air France-KLM, chief financial officer Pierre-François Riolacci indicated that the airline has seen a significant decline in demand for flights into Europe, and especially into France, which has suffered multiple terrorist attacks. However, while second-quarter revenue dipped by 5.2 percent to €6.22 billion ($6.7 billion), the group achieved a better-than-expected operating profit of €317 million ($341 million), a 77-percent improvement on the same period last year.

On July 25, Ireland-based low-cost carrier Ryanair, which uses a different fiscal reporting period, announced a 4-percent gain in first-quarter profits to €256 million ($275 million). The company indicated that performance would have been stronger were it not for the effects of terrorism and the cost burden of ATC disruption. Chief executive Michael O'Leary commented that while its overall growth plans will continue, Ryanair likely will scale back expansion in the UK market, which he said will see weakened demand in response to uncertainty over the country's future relationship with the EU. —*C.A.*

UK opens fraud investigation into Airbus commercial deals

by Gregory Polek

The director of the UK Serious Fraud Office (SFO) has opened a criminal investigation into allegations of fraud, bribery and corruption in the civil aviation business of Airbus Group, the agency announced early last month. The allegations relate to irregularities concerning third-party consultants, it said.

Word on the possibility of investigation surfaced in April, when the SFO began looking into the manufacturer's failure to reveal the identity of some intermediaries in applications for export credit financing for certain airline customers.

At the time Airbus issued a statement acknowledging "certain inaccuracies" in the applications and that an interruption in UK export funding would likely result. It said it immediately notified the SFO of its internal findings in the interest of transparency.

On August 7 it referred to "previous disclosures" relating to the SFO and European export credit agencies. "Airbus Group has been informed by the SFO that it has opened a criminal investigation into allegations of fraud, bribery and corruption in the civil aviation business of Airbus Group relating to irregularities concerning third-party consultants," it confirmed. "Airbus Group continues to cooperate with the SFO." Neither German nor French authorities have opened parallel fraud investigations because their laws do not require disclosure of the identities of third-party consultants.

In April Airbus said it expected no interruption in financing from the export credit agencies in France and Germany—the other European countries in which it builds most of its components and assembles airplanes. However, those countries subsequently cut off funding as well in cooperation with the UK agency. Export credit accounted for some 6 percent of funding for Airbus airliners last year.

A spokeswoman for UK Export Finance (UKEF) would not comment on the SFO investigation, but confirmed that the agency "paused" its support for Airbus deliveries in April and had not funded any new deliveries since January. She added that UKEF continues to work closely with its French and German counterparts on the matter. ❑

An Airbus A380 gets towed into position at this year's Farnborough Airshow.

Russians say politics at play in Bombardier contract revision

by Vladimir Karnozov

Russia's Ilyushin Finance (IFC) claims that a politically motivated decision by Export Development Canada (EDC) to refuse low-interest financing played a key role in its decision to reduce a significant order for Bombardier's C Series CS300 airliner. The restructuring of a 2013 firm purchase agreement saw IFC cut its C Series order to 20 from 32 and add an order for a single Q400 twin turboprop.

Acknowledging the order reduction in an August 5 statement on its 2016 financial results, Bombardier had attributed the order revision solely to a need to "align with [IFC's] current market needs." However, a few days later a Bombardier spokesperson added that "financial conditions" in the region also played a part, and that "the financing challenges [associated with the EDC decision] could speak to those financial conditions."

An IFC spokesman offered a more direct explanation. "The adjustment is related to the fact that EDC didn't cooperate with the Russian side and also didn't participate in the transaction," the spokesman told **AIN**. The refusal by EDC reflects the stance of the Canadian government to funding sales to Russian companies since the Kremlin's annexation of Crimea in early 2014, he added.

Notwithstanding IFC's assertions, Russia's economic woes lend credence to Bombardier's original statement about the country's changing market needs. Since the companies first signed an agreement that included a provision for smaller CS100s in 2011, the landscape of the Russian air transport system has indeed changed, as the country grapples with a period of low oil and gas prices, the falling value of the ruble and economic stagnation. Many airlines have cut their foreign fleets because they sell tickets in rubles while paying lease installments in dollars, making most domestic services unprofitable.

Bombardier and IFC, which previously specialized in indigenous Il-96, Tu-204 and An-148/158 jets, signed an initial agreement at the 2011 Moscow Airshow, establishing major terms and conditions on procurement of up to 30 CS100s and CS300s. They signed the firm order in 2013, under which the manufacturer took obligation to start deliveries in late 2015 in return for prepayments worth dozens of millions of U.S. dollars.

At the 2014 Farnborough Airshow, amid rapidly worsening relations between Moscow and the West, Bombardier and IFC made "adjustments" to their deal, including converting some of the options on the CS300s into a firm order for 32 aircraft and eliminating the CS100 from further consideration. At the time the sides rescheduled first delivery for the second half of this year. The latest revision calls for first deliveries some two years later. ❑

Russia's IFC now holds a firm order for 20 Bombardier CS300s following the restructuring of a 2013 agreement.

Air China will remain the anchor tenant at Beijing Capital International Airport following the scheduled 2019 opening of a new gateway for the city in Daxing.

Planning for new airport in Beijing excludes Air China

by William Dennis

Chinese national carrier Air China and its Star Alliance partners will continue operating from Beijing Capital International Airport (BCIA) when the city's new airport in Daxing opens for operations in the first quarter of 2019, according to officials at the Civil Aviation Administration of China (CAAC).

China Southern Airlines (CSN) and China Eastern Airlines (CEA), together with SkyTeam partners that currently operate from BCIA, will move to Beijing Daxing International Airport (BDIA), 31 miles south of the Chinese capital.

According to CAAC official Lu Shen, CSN and CEA must move to the new Daxing airport to ease congestion at BCIA, which already accommodates more passengers annually than its intended 72 million capacity limit. Moving the two airlines will also release a substantial number of slots. In 2015 BCIA handled 93.1 million passengers, up 8.1 percent over the previous year.

Lu said organizers had to hatch plans for CSN and CEA early to give the two carriers time to build their respective facilities. CSN, China's second biggest airline in terms of fleet size, will serve as the anchor tenant at BDIA. Officials said they will inform other carriers operating at BCIA, including China's fourth biggest, Hainan Airlines, whether or not they have to move at a later stage.

The authorities do not anticipate a delay in the opening of BDIA. Construction started late because it took seven years before the governments of Beijing, Tianjin and Heibei reached a consensus in July 2009 on the preferred site. Before choosing Daxing, planners had identified two other possible sites—Wuqing in Tianjin and Langfang in Hebei province. Originally expected to start in 2010, construction finally got under way in 2014. Plans now call for completion of the $13.1 billion facility late in the third quarter of 2018, followed by testing and trial runs of the systems. Under the government's master plan, BDIA will provide enough capacity to handle 45 million passengers by 2020, 72 million in 2025 and 120 million in the longer term. Plans include a provision for nine runways.

Lu said the big Chinese carriers could face problems shifting operations, specifically involving the transportation of heavy ground equipment on Beijing's busy roads from BCIA to the new facility. Lu said that it could take three to four years for CSN and CEA to complete the move. "This the airlines will have to iron out and plan their schedule carefully," Lu noted.

Planners expect CSN and CEA and their subsidiary carriers to account for about 80 percent of BDIA's domestic passenger traffic when it becomes fully operational. Air China will emerge as the big winner on the most profitable domestic route—BCIA-Shanghai—as China Eastern's current 50-percent market share would likely erode with the shift. ❑

QATAR AIRWAYS RAISES STAKE IN IAG AS STOCK FALLS

Qatar Airways announced early last month that it has raised its stake in British Airways parent International Airlines Group (IAG) to 20.01 percent from the 15.67 percent it held as of July 12. In a statement, the airline said that while it holds a purely financial interest in IAG, the expanded shareholding reflects the strength of commercial and strategic ties between the companies and Qatar's continued support of IAG's strategy. Both airlines belong to the Oneworld Alliance.

Although Qatar reiterated it might consider building on its shareholding within the allowable limits for non-EU shareholders, Qatar Airways Group CEO Akbar Al Baker said he does not intend to do so "unless there are material changes to the current situation." European Commission rules require that European shareholders own at least 50 percent of airlines based in the EU.

"The recent market valuation of one of the world's leading airline groups has provided what we believe is an attractive opportunity to increase our shareholding in IAG," said the Qatar statement.

IAG's stock valuation plummeted by more than 30 percent following a British referendum vote to leave the EU on June 23. Qatar raised its stake to 20.01 percent in IAG, which also owns Ireland's Aer Lingus and Spain's Iberia and Veuling, by July 28.

In July the Doha-based carrier announced it would buy 49 percent of Italy's Meridiana and 10 percent of South American group Latam as it tries to match the growth of fellow Gulf carriers Etihad of Abu Dhabi and Dubai's Emirates. —*G.P.*

Maintenance News

Calstar took delivery of the first two of five Airbus H135P3s it has on order.

METRO AVIATION COMPLETES TWO AIRBUS H135P3s

Metro Aviation has delivered two Airbus Helicopters H135P3s to California Shock Trauma Air Rescue (Calstar), the first of five H135 air medical transport helicopters the operator ordered last year. Calstar is the first U.S. customer for this newest variant.

"Calstar is happy to receive the first two Airbus H135P3s to be delivered in the U.S. This aircraft proved its capabilities to us during a rigorous, competitive fly-off we conducted last August from our South Lake Tahoe base," said Lynn Malmstrom, Calstar president and CEO. "Our pilots and crews were enthusiastically in favor of moving forward with this aircraft; and from a fleet, maintenance and support perspective, it fits beautifully with our new fleet of eight EC135P2+s."

CONSTANT, NEXTANT PARTNER ON BEECHJET, XTi Mx PLAN

Nextant Aerospace and sister company Constant Aviation have joined forces to provide guaranteed per-flight-hour maintenance plans for the Beechjet 400A/XP and its remanufactured variant, the Nextant XTi. Constant Aviation has a network of MRO facilities in the U.S. that offers maintenance, repair and overhaul and AOG response for business aircraft.

Under the new program, 400A/XP/XTi operators can choose independent airframe, avionics and engine coverage, or combine them for whole-aircraft maintenance protection. The airframe component will provide coverage for scheduled and unscheduled maintenance, along with replacement parts.

ONTIC TAKES ON MORE JT15D RESPONSIBILITIES

BBA Aviation subsidiary Ontic has acquired additional manufacturing rights from Pratt & Whitney Canada covering certain new JT15D engine components. According to Ontic, this second acquisition from P&WC elevates its level of responsibility for JT15D content to 178 parts from 108, ranging from low-pressure compressor counterweights to valves and vanes. Ontic plans to manufacture and sell the additional parts from its facility in Chatsworth, Calif., and continue to distribute them through Aviall Services.

Ontic provides FAA, CAAS, CAAC, EASA Part 21 and Part 145 support, including new and serviceable spares and repairs for 4,500 "maturing" aircraft parts. Its portfolio of products, licensed or acquired from OEMs such as Honeywell, UTC Aerospace, Safran, Thales and GE Aviation, spans all major aircraft systems.

J.A. AIR CENTER TO INSTALL CAV TKS ICE PROTECTION

CAV Ice Protection has named J.A. Air Center a recommended TKS installation center. Sugar Grove, Ill.-based J.A. Air Center is an avionics, maintenance and modification center.

"CAV Ice Protection is pleased to add J.A. Air Center to the company's network of recommended TKS installation centers, adding retrofit TKS Ice Protection Systems installation to a highly skilled maintenance and modification center," said Jeff Holden, CAV Ice Protection sales manager.

J.A. Air Center is the CAV's fourth recommended installation facility for its TKS Ice Protection System.

STANDARDAERO TO PROVIDE TBM ENGINE SUPPORT IN EUROPE…

Daher has selected StandardAero as the maintenance, repair and overhaul (MRO) supplier for Pratt & Whitney Canada PT6s powering TBM turboprop singles based in Europe. TBMs operated by the French Ministry of Defense in a fleet managed by Daher under a full support agreement are included in the coverage.

"We have selected StandardAero for its excellent track record in MRO operations, which fully matches our expectations—and the requirements of our European operators—for support," said Nicolas Chabbert, senior vice president of Daher's airplane business.

…AND RECEIVES STC FOR PT6A-140 ENGINE UPGRADE

StandardAero, with support from its in-house organization designation authorization (ODA) delegation, has obtained FAA STC approval for a program that installs replaces the PT6A-114/114A on the Cessna 208B Caravan with a -140. The newly STC'd upgrade boosts power by 28 to 45 percent, which can reduce takeoff distance to a ground roll of less than 1,200 feet and improve rate of climb to 1,200 fpm or more, a 40-percent improvement. The added power will also give operators enhanced safety margins during flight in known icing.

As a P&WC-designated PT6A distributor and overhaul facility, StandardAero can repair (as well as upgrade) the -114/114A-powered Caravan 208B. In addition, StandardAero said it can provide enhanced warranty offerings that exceed basic OEM warranty benefits on new engines.

HARTZELL UPS ANTE ON TOP PROP WARRANTIES

Hartzell Propeller, marking its 100th anniversary this year, has extended the warranty on Top Prop propellers until after their first overhaul. According to Hartzell president Joe Brown, "We are doing our part to reduce costs while at the same time promoting safety through recommended periodic maintenance." The warranty extension applies to all Top Props delivered as of July 1 this year and extends their previous three-year/1,000-hour term (whichever came first). "It helps that we are reducing the concern about overhaul sticker shock. That first overhaul can now be scheduled without surprises," Brown added.

The new warranty periods vary depending on propeller type and utilization and reflect recommended TBO intervals published in Service Letter HC-SL-61-61Y, which is available on the Hartzell website.

StandardAero will provide MRO services for the engines on Europe-based TBMs.

SUMMIT AVIATION OK'D FOR SIKORSKY SUPPORT

Summit Aviation has been named a Sikorsky-authorized customer support service center for the Sikorsky S-76D. The authorization covers scheduled maintenance and maintenance management, inspections and parts procurement. Summit Aviation was already an authorized service center for other S-76 variants.

Located in Middletown, Del., the company offers aircraft and engine maintenance and modification services on Airbus, Bell, Boeing, MD and Sikorsky helicopters as well as on airplanes built by Pilatus, Cessna and Beech (King Airs and Beechjets), among other models. It provides maintenance and support for Pratt & Whitney Canada, Turbomeca and other engines.

DUNCAN TO SERVICE AVIONICS FROM NEW SAN ANTONIO SATELLITE

Duncan Aviation opened its San Antonio, Texas avionics work-away location last month. Located on the southeast side of San Antonio International Airport, the satellite facility will provide Duncan Aviation technicians a base of operations from which to respond to customers' avionics repair and installation needs.

"Numerous customers have asked us to establish a presence in San Antonio, and after assessing the city and the airport, we agree that it's a great place for Duncan Aviation to offer service options," said Duncan Aviation manager of satellite operations Matt Nelson, adding, "It's especially attractive because the city has such a strong and diverse economic base."

AMAC AEROSPACE COMPLETES MAJOR A320 COMPLETION

Amac Aerospace has installed a private interior on an Airbus A320 that had been used as an airliner. The airline interior was removed and replaced with custom furniture, decorative inlays, handmade carpet, a master bedroom with lavatory, two more lavatories and high-end technical support systems.

Ten single seats and four divans convertible into beds were installed and the remaining economy-class seats were refurbished. All three lavatories provide a foot washer developed and installed by Amac. The project installed satcom and a cabin management system with digital in-flight entertainment, including zoom and quad cameras. Various service bulletins were also completed, and two auxiliary fuel tanks were added. ❑

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FBO OPENS ON ALABAMA'S GULF COAST

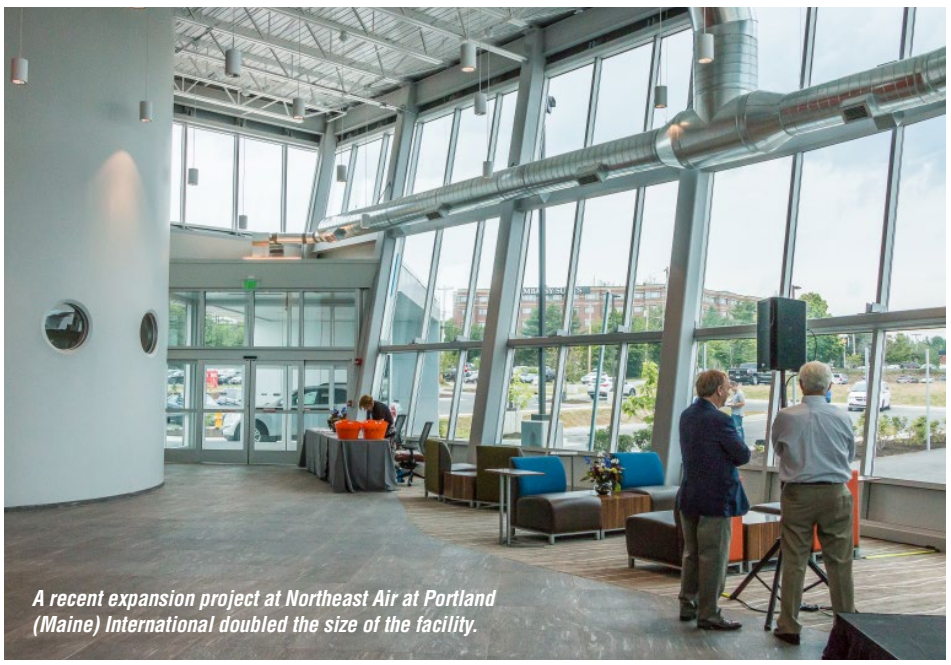
Platinum Air Center, a new FBO at Jack Edwards Airport (JKA) in Gulf Shores, Ala., began operations last month. One of three service providers at the airport, the facility is based in a 3,500-sq-ft temporary modular complex—providing a pilot lounge, flight planning room and work stations with high-speed Wi-Fi—on the southeast side of the nearly 7,000-foot main Runway 9/27. A new fuel tank farm, holding 20,000 gallons of jet-A and 12,000 gallons of avgas supplied by World Fuels, has been installed.

Meanwhile, construction of a $5 million permanent FBO terminal with an adjoining 22,400-sq-ft hangar, capable of sheltering big business jets, is scheduled to start early next year, with completion expected in mid-2019. Owned by FBO industry veterans Arve and Emily Henriksen, the location is the cornerstone of what they expect will become an FBO chain. In support of the new development, the airport recently completed a new five-acre ramp reinforced to accommodate large corporate and commercial aircraft, along with two taxiway entrances leading to the new FBO. To attract business the Henriksens said the facility will initially sell fuel at below-margin prices.

NEW MEXICO OPERATOR ADDS STORAGE SPACE

Jet Center at Santa Fe, one of two service providers at Santa Fe Municipal Airport, has unveiled a 23,000-sq-ft heated hangar. Capable of sheltering aircraft up to a Global 7000, the $1.7 million structure features 28-foot by 130-foot doors. The location will now turn its attention to the construction of a 15,000-sq-ft heated hangar for aircraft up to the size of the G450. According to general manager Troy Padilla, the size of the location's second hangar was constrained by available space.

The company, which has been in business for a year, is operating out of a temporary facility. It plans to break ground on a multimillion-dollar 6,500-sq-ft terminal as soon as it receives approval. Construction awaits completion of the airport's master plan.



A recent expansion project at Northeast Air at Portland (Maine) International doubled the size of the facility.

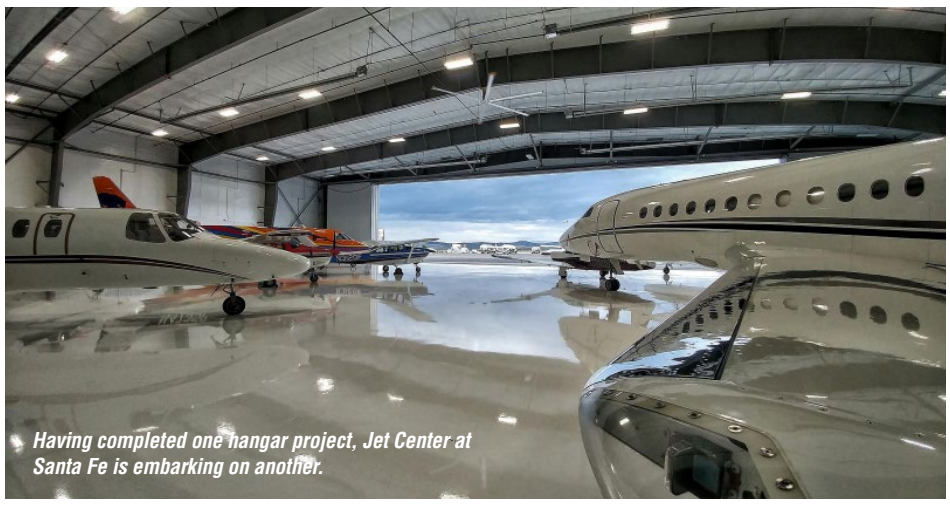
PARAGON NETWORK EXPANDS

The Paragon Network, a group of independent FBOs, has welcomed several new members to its ranks. Platinum Air Center at Jack Edwards National Airport (JKA) in Gulf Shores, Ala., Business Air at Texas's Denton Enterprise Airport (DTO) and Indy Jet at Indianapolis Regional Airport (MQJ) are the latest to join the group, bringing the current roster to 25 in the U.S. and Caribbean.

Platinum Air Center opened this month as the third service provider at JKA. Indy Jet, the lone provider at MQJ, has a recently renovated lobby and pilots' lounge, along with an executive conference room and flight-planning facility. Business Air at DTO has served North Texas for 15 years. It charges no ramp fees, offers complimentary GPU usage and has a fleet of new refuelers.

MAINE FBO ADDS TO TERMINAL

Northeast Air, a family-owned FBO at Portland International Airport in Maine, has completed a $3.5 million renovation of its 20-year-old terminal, with a new two-story, glass-fronted 4,000-sq-ft addition that has doubled the size of the structure. Dedicated entirely to customer use, the new space provides an enlarged pilots' lounge and flight-planning area, two private snooze rooms, a shower, 20-seat A/V-equipped conference room and upgraded customer service desk. The project also installed a porte-cochere on the street side to provide protection from the elements, 50 new parking spaces and landscaping. According to company vice president Mark Goodwin, the project was facilitated by the city's demolition of a neighboring 1950s-era general aviation terminal. Northeast Air then acquired the property's lease.



Having completed one hangar project, Jet Center at Santa Fe is embarking on another.

DESERT JET OPENS FIRST FBO

Desert Jet Center, the newest FBO at California's Jacqueline Cochran Regional Airport (TRM) in Palm Springs, began operations last month from a temporary facility on the airport's main arrival ramp. It is providing fueling from its recently completed, Epic-supplied tank farm, which holds 48,000 gallons of jet-A, and offers aircraft storage in a leased hangar.

In May, the company broke ground on a permanent $5 million, five-acre FBO facility, its first, which will provide a 10,000-sq-ft terminal, office and maintenance space, along with a 22,500-sq-ft hangar that can accommodate Global 7000-size business jets thanks to its 130-foot-wide, 28-foot-tall doors. It is scheduled for completion by year-end. In addition to a self-serve fueling station, TRM is also served by Signature Flight Support and Ross Aviation.

CUTTER EXPANDS COLORADO FBO

Cutter Aviation broke ground last month on an expansion of its FBO terminal at Colorado Springs Municipal Airport (COS), where it has had a presence since 2006, when it acquired former FBO Discount Fuels. The addition, expected to be completed in May, will bring

An artist's rendering shows the Cutter facility expected to be completed in May.

CHARTER NEWS NOTES

> **Windsor Jet Management** of Fort Lauderdale **has added another Citation X to its charter/management fleet**. Configured for eight passengers, the X is equipped with two cabin monitors, Rockwell Collins Airshow and Gogo Business Aviation Wi-Fi.

> Charter broker **Magellan Jets opened a seasonal member center on Nantucket Island** in Massachusetts. The 2,000-sq-ft center is open until September 30 and is intended to help potential clients learn more about Magellan Jets and business jet charter.

> Charter operator and aircraft management provider **Omni Air Transport has opened a base at Lakefront Airport** in New Orleans. Headquartered in Tulsa, Okla., the company already has satellite bases in Oklahoma City and Nashville.

> **Silver Air has added a Citation X to its charter fleet** and placed it at the company's newly opened base at Dallas Love Field. The Silver Air fleet consists of three Gulfstreams, a Falcon 2000, three Citations, a Learjet 60, a Beechjet and a Phenom 100.

> **Jet Aviation Flight Services** now has authorization **to fly charters to Cuba**. Direct flights must originate from 19 airports designated by the U.S. government, among them Chicago, Dallas, Los Angeles, Miami and Palm Beach.

> **Wing Aviation**, based at Houston Hobby Airport, **has added a GV to its charter fleet**. The latest addition is equipped with Gogo Business Aviation Wi-Fi, seating for 12 passengers and Rockwell Collins Airshow.

> **Vertis Aviation's South Africa-based fleet now includes a Challenger 350**, which was delivered to Fireblade Aviation in June. Based at OR Tambo International Airport in Johannesburg, the Challenger is equipped with satcom, two large cabin monitors and a forward galley.

> **Jinggong Global Jet has placed a Falcon 2000EX into charter service** in Hangzhou, China. The jet seats 11 passengers and has satcom, and it operates on the B register on the company's new AOC.

> Public charter operator **JetSuite X added flights between San Jose and Burbank, Calif.** The new service is operated by 30-seat Embraer ERJ-135s, and the frequency is 12 round trips weekly. ■

The main runway at Page Field in Fort Myers, Florida—and several connecting taxiways–will get a refresh as part of a year-long, $20 million project funded in part by the FAA's Airport Improvement Program.

the terminal space to 9,000 sq ft. Designed in the architectural style of a mountain retreat, it will be the foundation of Cutter's major expansion plan at COS. The company has doubled its leasehold to 16 acres and purchased a 23,000-sq-ft hangar capable of sheltering a Boeing 737, which brings its aircraft storage space on the field to 132,000 sq ft. It recently completed a 62,000-gallon fuel tank farm.

SERVICE PROVIDER TAKES OVER AIRPORT MANAGEMENT

Konect Aviation Oregon has been tapped to take over management duties at Oregon's McMinnville Municipal Airport (MMV). Konect, which assumed aircraft support at MMV from Cirrus Aviation in January, has had a presence at the airport since 2009 as a charter operator and scenic tour provider. "The city has been shifting focus to support the airport, so Konect's timing is great," said company owner and general manager Holly Nehls. The city is slated to renovate the airport's 5,400-foot main Runway 04/22 next year, and the company plans to take advantage of that lull to build a terminal.

PAGE FIELD SET FOR MAJOR REHAB

Florida's Lee County Port Authority (LCPA) has received a $13.6 million grant from the U.S. Department of Transportation (DoT) for a major rehabilitation project at Page Field in Fort Myers. Issued under the FAA's Airport Improvement Program, the money, along with federal entitlements and $980,000 from the Florida DoT, will fund a year-long $20 million project that will see the milling and repaving of 6,400-foot main Runway 5/23, along with the relocation or repaving of several connector taxiways. Scheduled to begin in January, the effort will involve other infrastructure improvements such as drainage, airfield lighting and signage and a new electrical vault. According to the LCPA, Runway 5/23 will close around the middle of April, after the busy snowbird season, and remain closed for three months. At the end of that period, work on the intersection of 5/23 and secondary 4,900-foot Runway 13/31 will require the entire airport to shut down for three days.

AIR BP STERLING CARD ENTERS U.S. MARKET WITH SIGNATURE

Air BP's Sterling Card is now accepted at 62 of Signature Flight Support's 122 U.S. locations for fuel purchases, as well as other ancillary FBO purchases such as ramp fees, lavatory service, lubricants and de-icing. The agreement takes the card's acceptance beyond 700 locations, and marks its entry into the U.S. market.

"We are delighted that this latest development in our relationship with Signature has resulted in our Sterling Card holders benefiting from a significant expansion of our network

in the all-important North American market," said Julio Casas, Air BP's director for North American general aviation. "Now our customers can access the best fuel provision and FBO services with one card program." Cardholders will benefit from 24/7 support, a dedicated account manager and access to the fuel provider's eNabler electronic invoicing system.

According to a Signature spokesman, after the initial introduction the company will evaluate expanding the payment option to more facilities in its network. ❑

FBO PROFILE: Silverhawk Aviation

A CONVENIENT STOP FOR COAST-TO-COAST FLIGHTS

For a quarter century, Silverhawk Aviation has been caring for Nebraska's general aviation aircraft. The company, which was founded at Seward Municipal Airport and then moved to Crete Municipal Airport, finally planted roots at Lincoln Airport nearly 20 years ago and has been there ever since. While the two former airports had runways with a maximum length of 4,200 feet, Lincoln, a former World War II training facility and later Strategic Air Command bomber base, is in another league altogether. The 12,900-foot main runway allowed the airport to be listed as an alternate landing site for the space shuttle. It is still home to the state's Air National Guard refueling wing and its KC-135s.

One of two service providers on the field, Silverhawk occupies a facility built in 1981. The 18,000-sq-ft two-story terminal was renovated in 2007 and Silverhawk has worked to keep it fresh since. Recent additions include a recliner-equipped pilot lounge with shower. The facility offers a passenger lounge; business center; Wi-Fi; eight-seat, A/V-equipped conference room; crew vehicles; and onsite car rental. A snack area provisioned by an outside vendor provides grab-and-go fare such as sandwiches and salads.

trucks, manned by the location's NATA Safety 1st and Phillips 66 professional line service trained staff. Pumping a million gallons a year, the facility rewards customers with Omaha Steaks for minimum fuel uplifts and charges no landing or facility fees for GA aircraft.

Business for Silverhawk is steady year round, with the usual spikes in traffic around the holidays. It is home to 80 aircraft, 15 of them turbine-powered, ranging from King Air 90s to a Cessna Citation Excel. Silverhawk, which has a staff of 75, maintains its own charter certificate and operates 10 aircraft, split evenly between jets and turboprops, and has a Part 145 repair station that can handle virtually any work on piston aircraft, turboprops and small jets up to the Excel. The company refers anything larger to neighbor Duncan Aviation, which typically returns the favor by sending smaller aircraft Silverhawk's way. The smaller company is known for its King Air expertise and was awarded its

Silverhawk Aviation at Lincoln is home to a variety of turbine-powered business aircraft, and the company has plans to add more facilities to accommodate larger aircraft.

The facility has 50,000 sq ft of hangar space, the majority of it heated, and can shelter jets up to a Hawker 1000. According to company president Mike Gerdes, there are plans to build a hangar large enough for the new crop of big business jets within the next few years. All told, the location occupies 14 acres and, given the length of the runway, it can accommodate virtually anything with wings on its ramp. "You've got all the advantages of a larger airport and you don't really have a lot of traffic that is going to slow you down for in and outs," said Gerdes, who noted that his facility sees typically 50 operations a day.

Located near the center of the country, Silverhawk specializes in quick turns for aircraft traveling coast to coast or anywhere north or south. "That's a key piece of our business," Gerdes told **AIN**. "Pretty much any way you cross the U.S. you are going to be fairly close to Lincoln."

The Phillips 66-branded facility has a 31,000-gallon tank farm served by two jet-A tankers (5,000 gallons and 3,000 gallons) and a pair of 1,500-gallon avgas own STC for engine upgrades on the aircraft. It now claims to have done more such upgrades on the turboprop twin than any other single facility in the world.

If college football is Nebraska's unofficial religion, then the 92,000-seat Memorial Stadium at the University of Nebraska's Lincoln campus is its cathedral. On game days it becomes the state's third most populated city and can attract as many as 70 aircraft to the FBO.

"One time, we had a customer who was forced by weather to land in Lincoln and had no idea it was a Cornhusker game weekend. There were no hotel rooms anywhere to be found," said Gerdes, adding that calls to other towns were also unsuccessful. Rather than admit defeat, the CSR offered the customers the use of her apartment for the night, which was gratefully accepted. "One of our core values is that we do whatever it takes," said Gerdes, who began with the company as a CSR in 2004, and last year—along with director of maintenance and avionics Gene Luce—bought it from former owner and current charter pilot Dan Hinnah. —*C.E.*

PRELIMINARY REPORTS

HAWKER HITS TREES ON A DARK NIGHT APPROACH

British Aerospace BAe 125-800B, June 5, 2016, Neryungri Airport, Russia—The twinjet was landing at Neryungri Airport (NER) in Russia with five passengers and three crew when it hit trees five miles from the airport during the nighttime approach. Visibility was good (more than 5 nm), with wind from the north at four knots. There was a broken layer of cloud at 900 feet agl and an overcast layer at 1,500 feet agl. Thunderstorms were in the area.

The pilots were able to continue the approach to a successful landing on Runway 08; however, post-flight inspection by the crew revealed damage to the wing leading edges and winglets, dents on the number-two engine cowling, and more dents in the flaps and on the right-hand horizontal stabilizer. The damage was rated as substantial.

TVA HELICOPTER DESTROYED ON LANDING

Bell 407, July 11, 2016, Hickory, Ky.—A Bell 407 was destroyed and the pilot killed after dropping from an estimated 100 feet agl and hitting the ground hard on the approach to landing at the Tennessee Valley Authority (TVA) Mayfield customer service center in Hickory, Ky. The helicopter was registered to and operated by the TVA as a Part 91 business flight. It was mid-morning on a clear day and no flight plan was filed. The pilot took off just 30 minutes before the accident and flew the helicopter to Clarksville, Tenn. (CKV), refueled, and then flew to the TVA customer service center to pick up a maintenance lineman. The crew's assignment for the day was inspecting power lines and equipment.

A TVA lineman witnessed the accident. He told the NTSB that there was a light wind from the south/southeast and the helicopter appeared to be making its final approach from the north. He saw no abnormalities in sound or position until the helicopter was 75 to 100 feet agl. He then saw the main rotor abruptly tilt to the right. The helicopter then immediately banked to its right and fell to the ground. He said he never lost sight of the helicopter, and saw it hit the ground hard, with no sliding or bouncing. He saw the rotor blades break apart. He then ran into the building to get help. The helicopter came to rest on its right side, about 220 feet west of the intended landing area in a level, open, gravel-covered storage area for power transmission equipment. All four main rotor blades separated from the main rotor hub during the crash. The tail boom severed from the fuselage, and the tail rotor hub and blades remained attached to the tail boom. The engine continued to run after the accident, and was subsequently shut down by responding personnel.

The pilot had 18,430 total hours of flying experience, according to his second-class medical certificate application. He held a commercial pilot certificate with airplane single-engine land, rotorcraft-helicopter, instrument airplane and instrument helicopter ratings.

The helicopter's fuel system held about 695 pounds of fuel and was not damaged in the accident. All of the essential structural components of the helicopter were found and catalogued at the accident site. A Fadec unit that contained non-volatile memory (NVM) in an electronic control unit controlled the engine and captured the accident sequence. Aircraft maintenance and personnel records were provided to the investigation team and the wreckage is being examined.

FACTUAL REPORT

NO MECHANICAL MALFUNCTIONS FOUND IN MU-2 FATAL

Mitsubishi MU-2, Mar. 29, 2016, Îles-de-la-Madeleine, Quebec, Canada.—A U.S.-registered Mitsubishi MU-2 carrying six passengers and a pilot departed from controlled flight and rolled steeply to the right immediately after the pilot disengaged the autopilot two nm from the end of Runway 07 on approach to the airport at Îles-de-la-Madeleine, Quebec. Despite the steep bank, the airplane hit the ground in a near level attitude with approach flaps and landing gear down. All souls on board perished.

The initial investigation, performed by a team representing Transport Canada, the NTSB, FAA, Mitsubishi Aircraft, Honeywell, Nav Canada and Hartzell Propeller, is complete. No mechanical problems were found with the aircraft, its flight controls, navigation systems, landing gear or engines. Weather at the airport between 9 a.m. and 3 p.m. was reported as visibility varying between 1.5 and 3 statute miles and ceilings varying between 200 and 400 feet agl with northeast wind of 20 to 30 knots gusting to 35 knots.

The commercial pilot had 2,500 hours total flight time, 140 of them in the MU-2. He had participated in the special training required of all MU-2 pilots-in-command by SFAR 108. In the right seat of the airplane was a passenger who held both a commercial pilot and flight instructor certificate, but records indicate no MU-2 experience.

The investigating team determined that the pilot was flying the MU-2 on the approach at a significantly higher airspeed than is typical for the type. Speed before the initial approach fix was clocked at 240 knots, and then 175 knots just past the final approach fix (typical is 150 knots at the initial approach fix, and 125 knots past the final approach fix). The pilot finally slowed below 175 knots and lowered approach flaps and landing gear just 2.7 nm from the end of the runway.

The aircraft was equipped with a lightweight recording system that Canada's Transportation Safety Board is analyzing. ■

KING AIR LANDS IN PUERTO RICO WITH WHEELS UP

Beechcraft Super King Air 200, July 15, 2016, San Juan, Puerto Rico—A Beechcraft Super King Air 200 was substantially damaged after apparently landing without the landing gear extended at Puerto Rico's San Juan-Fernando Luis Ribas Dominicci Airport (SIG). The aircraft arrived from La Romana-Casa de Campo International Airport (LRM) in the Dominican Republic after a short flight. No one was injured in the accident, but both propellers were bent severely by impact with the ground while the engines were turning, and there was damage to the fuselage underside and landing-gear doors.

HOIST SYSTEM OPERATOR FALLS FROM HELICOPTER SKID

Bell 429, July 11, 2016, Georgetown, Del.—The Bell 429 crew was performing emergency response team recurrent rescue hoist training at 6:50 p.m. in day VMC when a hoist system operator in his safety restraint harness fell to his death from the skid of the helicopter. The commercial pilot and two other crewmembers were not injured, and the helicopter, operated by the Delaware State Police, was not damaged.

The crew had been practicing lowering a rescue specialist, via hoist, from the helicopter, and then landing to retrieve the specialist. Each crewmember was rotating among the positions of hoist system operator, rescue specialist and safety officer. On the seventh round of practice, after all restraints were checked and verified secure, the helicopter lifted off and moved to the practice area. The system operator requested permission to step out onto the skid, which was approved. Once he was on the skid he fell. The pilot landed immediately and patient rescue procedures ensued, but were unsuccessful.

The NTSB is examining the hook and restraint system.

RUNWAY OVERRUN PUTS CARAVAN IN DITCH

Cessna 208B, July 21, 2016, Baldwin, Wis.—The aircraft, registered to Desert Sand Aircraft Leasing of Carson City, Nev., and configured for skydiving, sustained substantial damage when it ran off the end of the grass Runway 18 at Baldwin Airport (WI14), Baldwin, Wis. The commercial pilot and 14 passengers were not injured. The flight was being operated under Part 91 by Skydive Twin Cities, of Baldwin, Wis.

The accident happened after the pilot carried the fourth load of skydivers aloft. Rain showers were developing in the area, and after a discussion between an experienced skydiver and the pilot, they decided to try one more jump. Clouds were over the intended drop zone but there was no rain and the clouds were moving away. Fourteen parachutists were loaded into the aircraft and the Caravan took off. Climbing through 3,000 feet msl, the pilot checked in with ATC, which advised the pilot that light to moderate precipitation was in the area. The pilot continued to climb toward the drop zone, but then decided to return to Baldwin to land because of the weather.

After descending, the pilot set up a base leg to Runway 18, and then turned on a two-mile final. The approach was flatter than the standard descent with an empty airplane, according to the pilot. The pilot used flaps incrementally to the full 30 degrees, flared over the threshold and touched down at 65 knots. Using full reverse prop pitch and retracting the flaps during the landing rollout was not enough to bring the airplane to a halt on the 1,950-foot-long grass runway, which was now wet from the light rain shower that had passed while the aircraft was airborne. The braking action was nil, and the high temperature, humidity and full load of parachutists created momentum the pilot was not expecting. Seeing the trees at the end of the runway coming up quickly, the pilot decided against going around. He told investigators he held full aft on the control yoke for aerodynamic braking, stayed in full propeller reverse, and braked as much as possible without locking the wheels up. Just before coming to a complete stop, while moving at about 5 to 10 mph, the airplane rolled into a ditch beside a road beyond the departure end of the runway. The propeller struck the dirt, as did the tail, causing substantial damage to the empennage. The pilot secured the engine and all of the occupants exited the airplane.

TURBINE BEAVER AND CESSNA 210 COLLIDE NEAR RUNWAY

De Havilland Canada DHC-2 Beaver Mk III, Aug. 5, 2016, Wasilla, Alaska—A Cessna 210 piloted by a student pilot and flight instructor and a turbine conversion de Havilland Canada DHC-2 Beaver Mk III with Fly Denali markings (a climber support company) collided in flight near the runway at Wasilla Municipal Airport (PAWS) near Wasilla, Alaska, with both aircraft settling to and then sliding along the 3,700-foot-long asphalt runway. No injuries were reported. It was 1:30 p.m. and VMC was reported at the non-tower airport. Witnesses stated that the Cessna settled onto the top of the Beaver at the far end of the runway and then slid 600 or 700 feet. Witnesses said one aircraft was flying the standard right traffic pattern for the runway, while the other was flying a left traffic pattern.

KING AIR PILOT RECOVERS FROM SPIN; MISSING PARTS FOUND IN FIELD

Beechcraft King Air A90, July 23, 2016, Byron, Calif.—The aircraft, operated by Bay Area Skydiving, was substantially damaged after the pilot lost control while climbing out on a skydiving run near Byron Airport (C83) in Byron, Calif. The pilot recovered from a spin at between 10,000 and 11,000 feet msl, after which all 14 skydivers on board bailed out. The weather was clear with light chop. The pilot flew the airplane back to the airport, but noticed that it was not handling "normally." He managed to land without incident. A witness at the airport saw the aircraft land while missing the right stabilizer and elevator. The parts were recovered in a field a mile south of the airport. ❑

No cause determined for 2014 Westwind accident

by Amy Laboda

In its final report on the crash of an Israel Aerospace Industries (IAI) 1124A Westwind near Huntsville, Ala. on June 18, 2014, the NTSB was unable to identify a probable cause.

With three airline-transport-rated pilots on board (one a pilot proficiency examiner, PPE), the jet departed from Huntsville International Airport-Carl T. Jones Field (HSV), in Huntsville, Ala., on a check ride flight and was seen to dip to the right, wobble then dive sharply to the right and crash into a field immediately after takeoff. The airplane was destroyed by the impact and subsequent post-crash fire, and all on board were killed. The NTSB found partial deployment of the right thrust reverser, along with throttle positioning consistent with a V_1 engine cut exercise the PPE was known to perform during pilot proficiency checks. The airplane belonged to SynFuels Holdings Finance, and was being flown under Part 91.

According to the company's chief pilot, the purpose of the flight was to conduct pilot-in-command (PIC) proficiency checks for two experienced company contract pilots, as required by Part 61.58. The chief pilot told the NTSB in interviews that the in-airplane training was more efficient than flight simulator training in terms of time, indicating that the training program he had used in the past took five days, whereas training with the airplane took only two days. The pilots involved in the accident were all highly experienced ATPs, type-rated in the 1124A.

The chief pilot knew the PPE's check ride routine, reporting that he had been given PIC proficiency checks by the accident PPE in the accident airplane. During those flights the PPE would be seated in the right seat and would give an engine cut after V_1 speed was attained, when the flight was in a positive rate of climb at either 10 to 15 feet agl, or 20 to 30 feet agl. The PPE would reach down to raise the landing gear and then would retard the right thrust lever. He also indicated that since owning the airplane, there had been no issues with the thrust reverser system of either engine.

The airplane was equipped with a Fairchild GA100 CVR designed to record 30 minutes of analog audio on a continuous loop tape in a four-channel format. A sound spectrum study of the CVR recording was performed to determine engine performance and thrust reverser deployment during the previous full-stop landing and during the accident takeoff. The study also included plots with sound analysis data combined with the aircraft's Allied-Signal EGPWS data, which all indicated that the airplane accelerated to about 135 KCAS when a change in radio altimeter depicted a climb and the acoustic analysis indicated the N_2 speed of one engine continued to decrease. The air traffic controller who cleared the flight for takeoff later reported seeing the airplane rotate about halfway down the runway. While climbing 18 feet above the runway and at 148 knots calibrated airspeed (kcas), the pilot commanded gear up. Less than a second later while at 149 kcas and 33 feet radio altitude in a wings-level attitude, a rattling sound began that continued until the end of the recording. Acoustic analysis of the sound indicated it was consistent with thrust reverser deployment. While in a left bank of 0.7 degrees and 147 kcas at 53 feet, the PPE asked what happened, followed by a peak in background noise about 1.5 seconds later. At that same time the acoustic analysis indicated one engine was operating at 96 percent N_2, and the other engine had decreased to 92 percent N_2.

Engine Investigation Reveals No Malfunction

The controller who had cleared the flight to take off stated that when the aircraft was at about 50 feet, he noted, "…the airplane's right wing [dipped] a little but the pilot seemed to correct [for it]." About 11 seconds after the first EGPWS recorded data point there was a right roll of 0.7 degree; the airplane at that time was 83 feet above the runway centerline about 4,650 feet down the runway at 142 kcas. Shortly thereafter, while at 88 feet flying at 139 kcas, in a seven-degree right bank with the landing gear extended, with one engine at about 96 percent N_2 and the other engine at about 91 percent N_2, the pilot asked, "What'd you do? What happened?" The PPE replied, "I don't know." The airplane continued to climb while drifting to the right of the runway centerline.

Seconds later one engine was operating at about 96 percent N_2 and the other engine was operating at about 84 percent N_2 (sound analysis cannot determine which engine), while at 104 feet and a right bank of 8.4 degrees at 137 kcas. In a strained voice the PPE told the PIC to get the gear up; the EGPWS data indicated the landing gear was retracted one second later. The airplane climbed to a maximum altitude of 108 feet while drifting to the right with one engine indicating 96 percent N_2. The right bank angle continued to increase from this point until the end of the EGPWS recording.

Both engines were removed from the crash site, disassembled, bench-tested, CT-scanned and analyzed. The results of the CT scanning of the left thrust reverser actuator revealed the actuator appeared to be in the extended position and the pawls appeared to be extended out over the piston sleeve. The actuator switch moving contacts appeared to be in contact with the lower switch arm. The results of the CT scanning of the right thrust reverser actuator revealed the actuator was in a non-extended position and the pawls were retracted within the piston sleeve. The actuator switch moving contacts appeared to be in contact with the upper switch arm. Also, a crack was noted in the right actuator switch housing. Investigators found no particles or obstructions in either thrust reverser control valve passages, and the moving seals of both thrust reverser control valves were in contact with their respective mating surfaces. The examination of the left thrust reverser actuator revealed indicator lights showing the locking pawls in the locked position.

Operational testing revealed no evidence of pre-impact failure or malfunction. Following bench testing it was disassembled and one end of the retaining ring key was missing. The locking pawls were all in place and had normal wear marks. Examination of the right thrust reverser actuator indicator lights showed the locking pawls were in the unlocked position. Operational testing revealed no evidence of pre-impact failure or malfunction. Following bench testing it was disassembled and the locking pawls were all in place and had normal wear marks.

A typical Westwind has several interlocks and a throttle detent, plus piggyback levers designed to prevent deployment of a thrust reverser in flight. A representative of the airframe manufacturer reported that it knew of no cases of inadvertent in-flight thrust reverser deployment on the 1124A. A review of the NTSB database for accidents and incidents involving the 1124 series from 1982 to the present also showed no accidents where thrust reverser deployment was identified as the probable cause, a factor or finding.

IAI provided the NTSB with its Engineering Report No. 4820/10483, titled "Westwind Model 1124–Dynamic Aircraft Response to Inadvertent Inflight Thrust Reverser Deployment," dated March 25, 1976, showing calculations and analysis performed for takeoff and cruise configurations to predict the airplane's flight behavior and controllability in response to thrust reverser deployment in flight. The analysis concluded that the aircraft's longitudinal and lateral motions were not coupled, and that the lateral motions were affected by thrust reverser deployment only slightly and were readily controllable by the pilot and/or autopilot. Testing was performed at 15,000 feet msl on an aircraft that was modified with a switch to permit deployment of the thrust reverser in flight.

Key to the investigation was the position of the throttle levers in the quadrant found in the wreckage. The left and right thrust levers were three-quarters forward. The left thrust lever was bent to the right, and the piggyback lever was at half travel toward the deploy detent, while the right piggyback lever was in close proximity to the deploy position. A gouge on the right side of the slot of the throttle quadrant associated with the adjacent securing nut correlated with the thrust lever being at two-thirds of its travel.

Looking more closely at the right thrust reverser piggy back lever and adjacent portion of the throttle quadrant, the NTSB found a linear gouge on the right side of the quadrant slightly aft of the deploy detent. The gouge was parallel to the resting position of the piggyback lever. The NTSB was unable to come up with a probable cause for the accident.❑

FINAL REPORT

CITATION BRAVO OVERRUNS RUNWAY AFTER REJECTED TAKEOFF

Cessna 550 Bravo, Sept. 25, 2015, Loftville, New South Wales, Australia—The Australian Transport Safety Bureau determined that a Cessna Citation 550 Bravo overran the runway's end at Lismore Airport in Loftville, NSW, snapping off the nosewheel, when the crew attempted to take off with the parking brake engaged.

The captain and copilot taxied out with an empty airplane, heading from Lismore Airport to Baryulgil, NSW. There were no abnormalities during the taxi and takeoff roll. At rotation speed the captain applied normal backpressure on the control column to achieve a standard rate of rotation, but the aircraft would not rotate. The captain then applied full backpressure and reported that the controls felt extremely heavy. Neither the captain nor the copilot detected any change in the aircraft's pitch attitude or any indication of pitch-up on the attitude direction indicator. The captain rejected the takeoff and applied full braking and reverse thrust, but the aircraft overran the runway. The nose landing gear broke off the aircraft about 150 feet (50 m) beyond the end of the paved runway and the aircraft came to rest in long grass and mud.

The twinjet sustained substantial damage, and the captain and copilot were uninjured.

An investigation determined that the aircraft did not accelerate normally because of drag associated with rolling friction, most likely because of partial brake pressure, possibly from the parking brake remaining on and set during the takeoff run. The parking brake had enough pressure to slow acceleration during the takeoff roll, but not enough friction to prevent the aircraft from reaching its rotation speed.

The nose-down moment generated by the partial brake pressure probably prevented the aircraft from rotating when the captain commanded it, despite normal nose-up elevator deflection. Heat in the brakes caused by partial pressure during the takeoff run may have reduced their effectiveness when the captain rejected the takeoff, contributing to the runway overrun.

This accident prompted the Australian Transport Safety Bureau to issue a safety recommendation to Textron Aviation (Cessna) imploring the manufacturer to take safety action addressing the fact that Citations do not have an annunciator light to show that the parking brake is engaged. More important, the Cessna Bravo pre-takeoff checklist does not include a check to ensure that the parking brake is disengaged. The Australian Transport Safety bureau wants manufacturers to bring such potential configuration problems to the attention of the crew. ■

The material on these pages is based on the NTSB's report (preliminary, factual or final) of each accident or, in the case of recent accidents, on information obtained from the FAA or local authorities. It is not intended to judge or evaluate the ability of any person, living or dead, and is presented here for informational purposes.

Completion & Refurbishment

by James Wynbrandt

Constant Aviation will refurbish the cabins of 10 Embraer Phenom 100s for JetSuite.

Constant Aviation Refurbs JetSuite Phenom Interiors

Cleveland-based MRO Constant Aviation is redesigning and refurbishing the interiors of JetSuite's 10 Phenom 100s. The first of the updated jets, N580JS, has been redelivered to the Irvine, Calif.-based charter operator, and Constant is in the process of revamping the rest of the fleet. The aircraft, originally outfitted with BMW-designed leather interiors, are being updated with recovered taupe and coal leather seats, refinished cabin panels, leather cabin drink rails and "luxury options that will add to [JetSuite] customers' experience," said Stephen Maiden, Constant's president and CEO. The 110V power outlets at each of the four cabin seats and Bose Quiet Comfort headsets will be retained. JetSuite CEO Alex Wilcox expressed confidence that "clients will enjoy the new interiors."

Associated Air Center Shows Plan for ACJ350

While "actively bidding" for new widebody completion contracts, Associated Air Center revealed rarely shared interior design concepts for an ACJ350 completion. The proposed interior features an Italian marble mosaic by Ann Sacks and a Kyle Bunting mural in the master suite. The dining lounge can transform into a multi-purpose retreat for meetings, entertaining or unwinding. "Our design collaborations, along with our extensive in-house engineering, manufacturing and master craftsmanship, bring together a powerful combination that gives our customers the most exclusive, sophisticated, safe and high-technology interiors in the world," said James Colleary, president of the Dallas-based completion specialist.

Mecaer Adds FAA STCs for AW139 Interiors

Italy's Mecaer Aviation Group (MAG) added FAA approval for two more STCs—already EASA validated—for its Leonardo AW139 interiors in response to "growing demand for additional options in the United States for VIP-configured AW139s," said Armando Sassoli, MAG's co-general manager. The STCs cover eight different interchangeable layouts and configurations, ranging from four seats with multiple cabinets and consoles to eight-seat layouts, and can quickly be changed from one seating configuration to another, according to the aviation systems manufacturer.

MAG has customized nearly 200 AW139s with private interiors, primarily in Europe, and expects the new FAA approvals "will assist in a more even distribution" of the installations. MAG's Silens (speech interference level enhanced noise system) and I-Feel (in-flight entertainment enhanced lounge) are available under both new STCs.

Bell Seat Cushions Get EASA Nod

Ramm Aerospace won EASA approval for its Bell 206/407 frameless seat cushions, whose form "provides improved overall comfort and added lumbar support," while reducing maintenance costs, said the company. The Helifab STC eliminates the frame for all forward-facing passenger seats. The STC will be available for all seating positions in the near future, Ramm said. The 206/407 frameless seat cushion covers are available in Naugahyde or Ultraleather.

Augmented Reality Supports Lufthansa Technik Completions

Lufthansa Technik (LHT) introduced a laser-based "augmented reality" interiors installation system to support completions and refurbishments of private aircraft cabins. Augmented reality, unlike virtual reality, provides users information in real time beyond what they perceive. The augmented reality mobile projection system acts as a positioning and alignment aid, allowing installation of components with higher precision and more efficiency than conventional measurements and alignment tools allow, according to the Hamburg-based company. Dr. Severin Todt, head of LHT's CAx Competence Center and Tool & Equipment Solutions, called the tool a "milestone" in "advancing the digitization of industrial work processes."

Lufthansa Technik is using augmented reality to streamline the refurbishment process.

Aviation Clean Air Teams with Greenpoint

Greenpoint Aerospace will distribute and install Aviation Clean Air's (ACA's) air and surface purification systems under a new partnership. ACA's system eliminates pathogens, allergens and odors, and provides surface purification throughout the cabin interior, and can be installed on most business aircraft with little downtime. "Our partnership with Aviation Clean Air allows us to distribute and install these systems at an affordable price," said Greenpoint Aerospace director of sales Steve Bruce.

OmnAvia Interiors and Spectra Interior Products To Market New Interiors Finish

MSI Coatings' Blusky Armor 1027 clear coat, created for interior cabinets and trim, brings a new chemistry to aerospace cabinetry finishing, according to the manufacturer. The photo-polymer formulation cures tack-free within 120 seconds under exposure to UV light to form a thermoset coating. The crosslinked coating is harder, and more abrasion resistant, and exhibits superior weathering to thermoplastic polyurethane and polyester finishes, MSI said. Blusky Armor 1027 will be marketed for aerospace applications by OmnAvia Interiors and Spectra Interior Products of Winston-Salem, N.C. ■

Compliance Countdown by Gordon Gilbert

Within 6 Months

▶ **Sept. 23, 2016** COMMENTS DUE

EASA Proposes Small Aircraft Certification Rewrite

The European Aviation Safety Agency issued its proposed rewrite of certification rules governing light aircraft, putting the new European CS-23 regulation on pace for release later this year. The proposal was issued three months after the FAA had published its proposed rewrite of Part 23 certification. Noting that its proposal is "not fully in line" with the FAA's proposal, the European agency urged comment on the differences between the two documents. Comments are due by Sept. 23, 2016.

▶ **Sept. 30, 2016** COMMENTS DUE

Revamp of European Aeronautical Information Services

Improving the accuracy of the content, dissemination and management of aeronautical information services in Europe is the goal of a Notice of Proposed Amendment from the European Aviation Safety Agency. The specific objectives of the NPA are to ensure that aeronautical information is originated, assembled, edited, formatted, published and provided to end users at the highest level of quality for all phases of flight; and guarantee alignment with the upcoming major amendment to the aeronautical information standards of ICAO Annex 15. Comment deadline extended to Sept. 30, 2016.

▶ **Oct. 1, 2016** NEW

Runway Condition Reporting Changed

On October 1 Takeoff and Landing Performance Assessment (Talpa) standards go into effect, intended to improve the reliability of runway condition reporting to help reduce the risk of runway overrun accidents and incidents at U.S. airports during inclement weather. The FAA started developing the standards after a Southwest Boeing 737 landing during a snowstorm ran off the end of the runway at Chicago Midway Airport and into a city street in December 2005. The accident killed a child in a car. Under the new method, ATC communicates runway conditions to pilots in terms that relate directly to the way a particular aircraft is expected to perform so that an operator has effective information to anticipate braking performance.

▶ **Nov. 26, 2016** REMINDER

EASA TCO Compliance Mandatory

On April 29, 2014, the EU published regulations that set requirements for Third Country Operators (TCO) to fly in EASA airspace. On Nov. 26, 2016, those requirements become mandatory for commercial operations, including Part 135 on-demand operations. Part of the approval process is to have a state-recognized Safety Management System (SMS) in accordance with ICAO Annex 19. While TCO authorization is required for Part 135 operations, it is not required for Part 91K fractional operations.

▶ **Dec. 1, 2016**

Overtime Eligibility Qualification Rules Change

New Labor Department regulations raise the minimum annual salary necessary to qualify for overtime eligibility to $47,476 from $23,660 when the new rules take effect on Dec. 1, 2016. For so-called highly compensated employees the minimum salary level to be considered for overtime will rise to $134,004 from $100,000. Most Part 121 and Part 135 operators are exempt from the overtime pay provisions, according to NBAA. Most Part 91 operators, however, are not exempt under this provision and must either comply or establish that their employees meet a different exemption.

Within 12 Months

▶ **Jan. 1, 2017 and Jan. 1, 2018**

Russia Requires Glonass Equipment

Non-Russian-built aircraft, including those registered abroad, put onto a Russian air operator certificate, weighing more than 12,500 pounds mtow and used for commercial transportation will be required to install Glonass satellite navigation equipment by Jan. 1, 2017. That mandate is Jan. 1, 2018, for general aviation aircraft. The rule imposes new requirements on non-Russian-certified operators, and the Russian Federation says it does not intend to prohibit the use of other GPS constellations in Russian airspace.

▶ **Feb. 2, 2017**

Australian ADS-B Mandate

The Civil Aviation Safety Authority of Australia is implementing new regulations and aircraft equipment mandates to align the nation's operations with global standards set by ICAO. The new rules contain a number of equipment mandates that culminate on Feb. 2, 2017. After that date IFR-rated pilots and aircraft must comply with ADS-B equipment and operational requirements to fly in Australia.

Beyond 12 Months

▶ **Jan. 1, 2018**

Deadline for European 8.33-kHz Spacing

Starting Jan. 1, 2018, aircraft might not be able to operate in any EU member states' controlled airspace unless they are equipped with communications systems that have 8.33-kHz voice-channel spacing capability. Extending 8.33 kHz below FL 195 down to ground level is important, said Eurocontrol, as "Europe has a known shortage of voice communication frequencies." The 8.33-kHz requirement for higher altitudes in controlled airspace has been in effect for some time. According to Eurocontrol, the consequences should this shortage of com frequencies not be addressed are "significant: there will be more air traffic delays; it will be harder to implement safety improvements; and we will lose flexibility in introducing operational enhancements."

▶ **Jan. 1, 2020**

U.S. ADS-B OUT Mandate

ADS-B OUT equipment must be operational starting Jan. 1, 2020, in aircraft that fly in the U.S. under IFR and where transponders are currently required, namely class A, B and C airspace.

▶ **June 7, 2020**

European ADS-B OUT Mandate

The ADS-B OUT retrofit requirement in Europe is June 7, 2020. This date is about six months later than the U.S. ADS-B OUT mandate. The ADS-B OUT requirement in Europe was June 8, 2016, for new aircraft. ❑

The *Citation Jet Pilots Owner Pilot Association* (CJP) appointed **Andrew Broom** executive director. Broom brings a 20-year background of association and industry communications and marketing experience to his new role, having previously held senior roles with Honda Aircraft, the Aircraft Owners and Pilots Association, Hawker Beechcraft, Eclipse Aviation, the General Aviation Manufacturers Association and Embry-Riddle Aeronautical University.

The *Canadian Business Aviation Association* board of directors elected **Rod Barnard** chairman and **Anthony Norejko** vice chairman. Barnard is director of aviation and travel services and chief pilot for Kal Aviation Group, and Norejko is director of travel services and aviation/chief pilot for Walmart Canada.

Baldwin Aviation named **Sonnie Bates** v-p/COO. Bates was most recently IS-BAO program director at the International Business Aviation Council and has also managed Dassault Falcon programs for CAE and held safety and standards roles for a business aircraft operator and the U.S. Air Force.

Greg Cox has joined *AEG* as executive v-p business aviation. Cox spent 23 years with Universal Weather and Aviation, most recently as senior v-p of UVair, Universal's fuel division. He has also served with Osage Aviation and Phillips Petroleum.

Delta Private Jets appointed **Nicholas Portaro** v-p of sales. Portaro, who has a quarter century of sales and leadership experience, was most recently v-p of insights for Information Services Group (ISG) and also spent 14 years with Gartner.

Pentastar Aviation promoted **Doug Levangie** to v-p of maintenance and advisory sales. Levangie, who joined Pentastar Aviation 30 years ago, was director of aviation advisory services and maintenance and avionics sales manager.

Sandel Avionics named **Steve Fulton** v-p of sales and marketing. Fulton, who has 30 years of technical and commercial industry experience, has been a longtime advisor to Sandel, most recently as senior test pilot and PBN advisor for Avilon.

Jim Cannon joined *Argus* to serve as the corporate flight department liaison. Cannon brings 40 years of industry experience to his new role, having held positions that included director of flight operations for Home Depot, chief pilot for several business aviation flight operations, president of Jet Professionals and the IS-BAO program director for the International Business Aviation Council.

Dennis Santare, v-p of sales and marketing for *Aircraft Propeller Service*, was named to the board of directors of the *Cradle of Aviation Museum*, which commemorates Long Island, N.Y.'s contributions to aerospace, science and technology.

Phillips 66 Aviation appointed **R.G. (Greg) Still** general aviation manager; **Smith Underwood** director of sales, general aviation; and **Charlie Schouweiler** coordinator, supply, general aviation. Still has 35 years of industry experience, having most recently served as branded sales manager wholesale. Underwood joined Phillips 66 predecessor company Conoco in 1997 and was most recently manager of data-driven marketing. Schouweiler was previously a rail coordinator for Phillips 66.

FlightSafety International promoted **Robert Standley** to manager of the Seattle training facility. Standley joined FlightSafety at the Tucson learning center in 1996 as a maintenance instructor and was most recently assistant manager of FlightSafety's Dallas learning center.

Final Flights

Robert (Bob) Lewis Emery, a long-time corporate pilot, died June 17 at the age of 76. Born in Abilene, Texas, in 1939, Emery was one of four sons of Lewis and Lourene Emery. He grew up around his father's company, Executive Aircraft Services, which became a division of Cooper Airmotive (now Aviall). Robert Emery became a corporate pilot, flying for Gulf Oil in Houston for 20 years and retiring as chief pilot. He later started his own consultancy, Emery Aviation Services, which adopted the same logo used by his father's company. With deep industry contacts, Emery successfully ran the consultancy for years in Friendswood, Texas, without advertising.

He was preceded in death by his parents and younger brother, William Ralph, who co-founded K-C Aviation with his brother Richard and later founded Aviation Concepts. He is survived by his wife of 52 years, Marion; son Mark; daughter Leslie Emery Perryman; and brothers Richard and Joe.

Janice Barden, the founder of Aviation Personnel International (API) who was well known within the business aviation community for her contributions over nearly six decades, died on July 31.

Born in Cleveland, Barden obtained a degree in industrial psychology from Kent State University and then spent 15 years working for an airline personnel placement firm. In 1971 she decided to start her own business, API, in New Orleans, establishing the first female-owned and -operated personnel search firm dedicated to business aviation. The firm, now run by her daughter Sheryl Barden, has placed thousands of professionals in business aviation.

Barden was actively involved with NBAA, serving eight terms as the local committee chair for the association's annual Business Aviation Convention & Exhibition. She also helped create the annual NBAA Careers in Business Aviation Day.

In 1992, President George H.W. Bush appointed Barden to a presidential blue ribbon panel to research training options to address the pilot and aviation maintenance technician shortage. She was also appointed to the President's committee for the rehabilitation of returning Vietnam prisoner-of-war (POW) pilots.

"In everything she did, Jan always made people feel special and valued. She will be greatly missed," said NBAA president and CEO Ed Bolen.

Barden was the recipient of numerous awards, among them NBAA's John P. "Jack" Doswell Award for her lifelong achievement in support of business aviation and the NBAA American Spirit Award for her pursuit of excellence and service to others in aviation. She also received a National Aeronautic Association Distinguished Statesman of Aviation Award and was inducted into the Ohio Senior Citizens Hall of Fame.

"I am immeasurably proud of the lifelong accomplishments and impact that my mother has made in the lives of professionals working in business aviation," Sheryl Barden said. Along with her daughter, Janice Barden is survived by her husband, Chuck McKinnon, the former head of IBM's flight department.

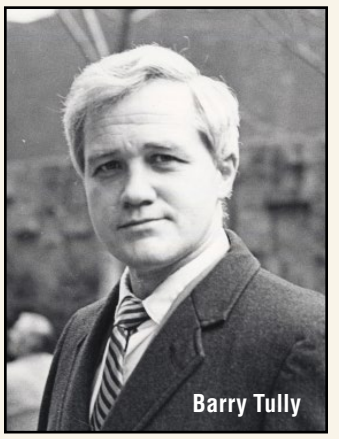
Bart Gault, a long-time corporate pilot known for his expertise in international operations, died in July as he turned 67 following a battle with ALS. Born July 2, 1949, in Chicago, Gault moved to Beverly Hills, Calif., as a young teen and learned to fly there. He enlisted in the U.S. Army in 1967, serving two tours of duty during the Vietnam War. He was an artillery specialist and involved in special forces in operations and intelligence. After the war he worked at Santa Monica Airport in California, where he met his wife, Pam. He ran a charter operation and flew for a number of clients, including Howard Leight. He relocated to San Diego when Leight's company moved there, spent time flying for Jenny Craig in Carlsbad and later moved to Phoenix, where he flew for the owners of the Phoenix Suns basketball team.

Over the past decade he had flown under a number of short- and medium-term contracts. "He successfully managed flight departments in some very challenging environments," his son Travis said, "places folks only hear about in the news after something bad has happened." He spent months working in Nigeria, Egypt, Jordan, India and the UK and flew in Cameroon, Niger, South Africa, Mauritius, Pakistan, Israel, Russia, Peru, Congo and Kenya, among others. Gault, who was Jewish, was caught in the Arab Spring in Egypt for months before his aircraft owner decided to leave the country. "Never afraid…he respected all people and kept friends of all political persuasions," said Caterina Taylor, a long-time friend and industry colleague who is manager of North American business development for Jetex Flight Support.

Gault's symptoms of ALS appeared late last year, bringing his flying to an end. In addition to Pam Boldizar Gault and Travis, he is survived by his sons Gavin and Zach. ■

Barry Tully: Former AIN Senior Editor

Barry Tully—an accomplished aerospace journalist and ad agency copywriter—passed away peacefully on June 21 at the age of 83. Tully was one of three original senior editors in the formation of Aviation International News, working directly with **AIN** founding editor Jim Holahan (1921-2015), from **AIN**'s inception in 1972 through the late 1980s. Tully and Holahan previously worked together at both *Aviation Week and Space Technology* in the late 1950s and at *Business and Commercial Aviation* in the mid-1960s.

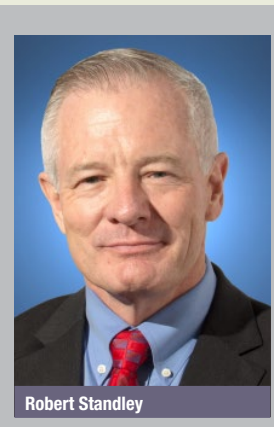

Barry Tully

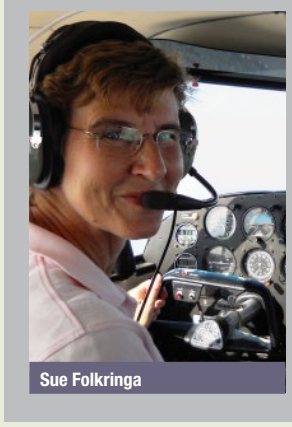
Before starting his aerospace journalism career Tully spent four years as a U.S. Navy pilot, from 1953 to 1957, and remained in the service for 16 years as a reservist, reaching the rank of commander. Tully was a voracious reader, history buff and sports enthusiast/hiker, and in his retirement combined his time in the library with back-packing, and with regaling friends and family with endless tales, the product of his in-depth knowledge of all subject matters, no matter how obscure.

As Bob Hoffman, the other of the three editors in the foundation of Aviation International News, observed of Tully: "I once sent Barry a book to look at. He said, 'Thanks, I'll get to it as soon as I finish Thucydides.' I don't know what volume Barry was on at the time, but indeed we have lost a great one. I just hope St. Peter didn't make the mistake of asking Barry any trivia questions." —*W.S.L.*

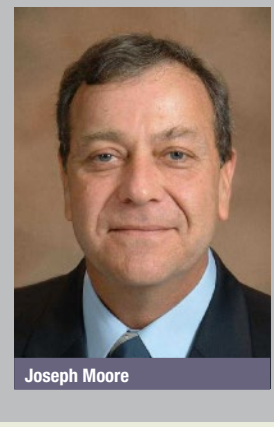

Andrew Broom


Doug Levangie


Robert Standley


Sue Folkringa


Paul Woodard


Joseph Moore

Elliott Aviation hired **Michael Parrish** to serve as senior director of regional sales and business development. Parrish has 25 years of aviation experience with the U.S. Air Force, Global Aviation, McKechnie Aerospace and, most recently, StandardAero.

Paul Woodard has joined *SevenJet Private Travel* as senior director of sales. Woodard has 30 years of business aviation experience, having previously held senior sales and marketing positions with Raytheon Aircraft, Piaggio America and, most recently, Executive AirShare.

Global Jet Capital appointed **Matthias Müller** sales director for Europe. Müller has 25 years of business aviation experience and spent the past 13 years with GE Capital Corporate Aircraft Finance.

James Saia joined *Global Jet Services* as a King Air maintenance instructor. Saia has four decades of experience with airplanes and helicopters, having previously served with CAE and FlightSafety International.

New Flight Charters hired **Mark Baroni** as charter manager. Baroni previously served in the U.S. Air Force for 21 years, as the U.S. presidential travel advance agent, NATO international diplomatic officer and director of the Air Force Wing Flight Safety Program.

Kerry Kunkel has joined the sales team of *Freestream Aircraft USA*. Kunkel has 24 years of experience in the aircraft management, sales and acquisition business and is type rated in various Falcons, Citations, Learjets and King Airs.

Sue Folkringa, an aviation tax specialist for *Wolcott & Associates*, has joined the Florida Aviation Business Association board of directors. Folkringa, who holds an ATP certificate, has worked at Wolcott & Associates for nine years.

Summit Aviation hired **Joseph Moore** to serve as business development manager for government aircraft services. Moore, who retired from the U.S. Army in 2006 after a 28-year career, has since served as director of business performance for Systems Products and Solutions, v-p of Army program/program manager Amcom Express for Belzon and at Boeing as senior manager, business development Army integrated logistics. ❑

Awards & Honors

The Wichita Aero Club awarded $5,000 Edward W. Stimpson scholarships to **Zavier Luciano**, an aviation maintenance technology student at Wichita Area Technical College, and **Talon Michelle Wanless**, an electrical engineering student at Wichita State University. The scholarships are designed to encourage and support students who have demonstrated success in a major course of study and have established a clear aviation-related career path. Luciano, a sport pilot who enrolled in the Airframe and Powerplant program at Wichita Area Technical College in February, has spent much of the past decade as a mechanic at Spirit AeroSystems, Boeing, BE Aerospace, Cessna and United Technologies. Wanless, pursuing her goal of being a third-generation aviation professional, also serves as an avionics and electrical intern at Textron Aviation.

John Mininger, a licensed pilot and active member of several aviation associations, was selected as this year's Phillips 66 Aviation's EAA Young Eagles Leadership Award winner. A participant in Young Eagles for the past 22 years, Mininger has flown 750 children. He has served as the EAA Young Eagles flight coordinator for Quakertown Airport in Pennsylvania. In addition to his involvement with EAA, Mininger has also participated in AOPA and the Quakertown Pilots Association. ■

TORQUED

Continued from Page 18

the day of the crash. In the other, the NTSB found "material consistent with rags used by maintenance personnel during installation of the air inlet barrier system ingested into the engine intake." A third helicopter accident—an Airbus AS350—involved a wrench that had been used on the top of the main rotor head. As the aircraft was flown on the test flight after maintenance, the wrench that had apparently been left on the helicopter damaged "one main rotor blade, the tail boom and the lower vertical stabilizer."

The last two accidents discussed by the NTSB involve airplanes: a Kitfox Series 5 and a True Flight AA-5B. In the former accident, investigators determined that a hardware clamp and a leather work glove had been left "beneath the boot and the tube seat structure and the control column bearing." This impinged on the elevator control and resulted in the pilot losing control of the aircraft and crashing into the Atlantic Ocean. The latter accident involved the aircraft engine losing power because paint chips "obstructed the fuel filter, which led to fuel starvation." The pilot reported to the NTSB that the aircraft had recently been painted.

It seems clear that proper maintenance practices would have prevented all five of these accidents. And while I agree with the importance of the safety alert to mechanics and other maintenance providers, I would expand the warning to include anyone working around aircraft or on the airport. I have seen vehicles of all kinds—motorized and non-motorized—lose pieces and parts on the ramp, taxiway and even runway areas. The most common debris is nuts and bolts that have come loose and fallen off. While ramp workers are supposed to be trained to look out for FOD and dispose of it appropriately, and many airports have numerous signs to this effect, I've seen far too many ramps where attention to FOD could use improvement.

In fact, not too long ago, a baggage handler at London Heathrow forgot a scanner on an engine cowling. The aircraft took off and the scanner was ingested into the engine, causing approximately $6 million in damage. Fortunately the pilot was able to land the aircraft safely. ❑

NTSB on Minimizing FOD

The NTSB's Safety Alert lists actions workers can take to minimize the chances of FOD being left behind to do damage:

- Perform an inventory of tools, personal items and personal protective equipment before working on an aircraft. Take only what is necessary for the specific maintenance task. Consider placing nonessential personal items such as jewelry, coins, keys and PEDs in a secure location instead of keeping them with you during maintenance tasks.
- Prepare the workspace on the aircraft by covering engines, pitot static ports, air inlets, and other areas with protective materials to reduce the likelihood of FOD migration (including residual debris, such as paint chips or metal shavings) to critical flight systems.
- While working in low-visibility areas (ramp/hangar), ensure that proper lighting is used to check for FOD left behind during maintenance.
- Keep hardware and consumables in appropriate containers to prevent them from becoming FOD. Store tools in toolboxes and bags, and organize them so that you can easily recognize if one or more is missing.
- Distractions can cause you to forget things during maintenance tasks. Always follow the maintenance manual/task card and use a checklist. If you get distracted, go back three steps when restarting your work.
- As you perform the maintenance task, clean as you go to reduce the likelihood of leaving any items. Keep a FOD container next to you during the maintenance task for easy FOD disposal.
- Perform a second inventory of tools, any essential personal items, and personal protective equipment (such as safety glasses, gloves and hearing protection) after you have completed the maintenance task to ensure that items have not been left behind. Remove any aircraft protective materials so that they do not become FOD.
- Ask another mechanic to visually inspect your work area for any items that may become FOD. A second set of eyes might see something that you missed.
- Recognize that human factors such as complacency, fatigue, pressure, stress and a lack of situation awareness can contribute to FOD.
- Consider conducting daily FOD walks in areas such as hangars, ramps and runways to identify and remove FOD. ■


Foreign objects on the runway do not need to be big to cause significant damage. Vigilance is key.

News Note

West Star Aviation's Chattanooga, Tenn. facility is performing a major foreign object damage (FOD) repair on a Gulfstream G200. The Atlanta-based aircraft sustained damage when the fuselage was struck above the window line on the left side between the fourth and fifth windows, leaving a crease in the skin. After an initial attempt to cold-work the crease, West Star will replace the entire skin using factory drawings and Gulfstream engineering support.

"This is an exciting major repair," said Rodger Renaud, president, West Star Aviation. "We are proud to be able to continue to service Gulfstream G200s in a major way." ■

AfBAA extends reach, adds Ethiopia

by Kaleyesus Bekele

The African Business Aviation Association (AfBAA) launched its latest chapter in Ethiopia during an August 9 meeting in the capital, Addis Ababa. According to AfBAA executive director Rady Fahmy, the east African country is set to achieve significant growth in business aviation activity.

"It is our belief that it is only a matter of time before Ethiopia becomes a major business aviation hub," Fahmy told the gathering. "Yes, it is inevitable Ethiopia joins, or perhaps leads, African business aviation just like it does in commercial aviation. The speed at which this inevitable prediction becomes a reality rests on you."

KALEYESUS BEKELE

The new Ethiopian chapter of the African Business Aviation Association had its first meeting in Addis Ababa on August 9.

However, for now, Ethiopian business and general aviation remains in its infancy. Today, there isn't a single business jet registered in a country that has just half a dozen small charter operators, which claim to be the victims of unfair competition from foreign rivals.

Impediments to Growth

During the meeting in Addis Ababa, National Airways chairman Dawit Egzabher complained that private operators are discriminated against by state-backed Ethiopian Airlines. Twenty years ago, he founded the country's first privately owned airline, Gosh Air, but now claims that general aviation has made little or no progress over the past two decades.

In his view, the sector is being held back by regulatory restrictions that mean it takes more than 24 hours to get flight permits for charter bookings, as well as by impediments to market access and difficulties getting finance to fund fleet growth.

Solomon Gizaw, managing director of Abyssinian Flight Services, said that capacity issues are a big impediment, with general aviation operators being forced to share the single runway at Addis Ababa Bole International Airport with airline traffic.

Gizaw alleged that Ethiopian Airlines receives preferential treatment from local air traffic controllers at the expense of private charter operators. He complained about difficulties in importing aircraft parts stemming from customs restrictions.

Girma Shiferaw, vice president of corporate strategy, communication and alliances with Ethiopian Airlines, defended the carrier. "There is no discrimination; rather, the problem is related to inadequate facilities at Addis Ababa Bole International Airport. Ethiopian is ready to support general aviation in the areas of training and MRO services."

AfBAA will hold its annual event in Cape Town, South Africa, on November 17 and 18. ❑

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AIN Calendar

See www.ainonline.com for a comprehensive long-range aviation events calendar.

SEPTEMBER

MBAA 5th ANNUAL SCHOLARSHIP GOLF TOURNAMENT…September 8, The International Golf Club, Bolton, MA. Info: (978) 779-1380; www.theinternational.com.

AEA U.S. WEST CONNECT CONFERENCE… September 8-9, Anaheim, CA. Info: (816) 347-8400; www.aea.net/connect.

IRANIAN AVIATION FORUM…September 12-13, Pestana Chelsea Bridge Hotel, London, UK. Info: (305) 767-4707; www.aeropodium.com.

JETNET IQ SUMMIT…September 13-14, Le Parker Meridien Hotel, New York, NY. Info: (972) 439-2069; www.jetnet.com.

NBAA REGIONAL FORUM…September 15, Westchester County Airport, White Plains, NY. Info: (202) 783-9000; www.nbaa.org.

WAI HOSTS SEATTLE REGIONAL CONFERENCE…September 16-17, Museum of Flight and Seattle Airport Marriott, Seattle, Washington. Info: (850) 508-8769; www.wai.org.

21st ANNUAL INTERNATIONAL AVIATION FORECAST SUMMIT…September 18-20, Olympic Valley, CA. Info: (303) 674-2000; www.aviationforecastsummit.com.

CONKLIN & DE DECKER AIRCRAFT ACQUISITION PLANNING SEMINAR… September 20-21, Scottsdale Plaza Resort, Scottsdale, AZ. Info: (928) 443-8676; www.conklindd.com.

AEA U.S. EAST CONNECT CONFERENCE… September 21-22, Fort Lauderdale, FL. Info: (816) 347-8400; www.aea.net/connect.

BUSINESS AVIATION EXPO…September 22, Oakland County International Airport, Waterford, MI. Info: (248) 666-3900 www.oakgov.com.

2016 ACI-NA/WORLD ANNUAL CONFERENCE…September 25-28, Palais des Congrès de Montréal, 1001 Place Jean-Paul-Riopelle, Montréal. Info: meetings@aci-na.org; www.aci-na.org/.

BOMBARDIER SAFETY STANDDOWN…September 27-29, Hyatt Regency Hotel, Wichita, KS. Info: (316) 946-7876; www.safetystanddown.com.

CSR CERTIFICATION WORKSHOP…September 27-28, AirFlite, 3250 Airflite Way, Long Beach, CA. Info: (800) 808-NATA; www.nata.aero/Events/CSR-Certification-Workshop.aspx.

CINCINNATI BUSINESS AVIATION SYMPOSIUM…September 29, Northern Kentucky University (Griffin Hall Digitorium), Highland Heights, KY. Info: (513) 533-7994; www.reynoldsjet.com/news/cbas-2016/.

OCTOBER

AEA U.S. CENTRAL CONNECT CONFERENCE… October 5-6, Kansas City, MO. Info: (816) 347-8400; www.aea.net/connect.

BARRY AMBROSE

NBAA BUSINESS AVIATION CONVENTION & EXHIBITION

Orlando will once again host business aviation's biggest show. The event runs from November 1 to 3, but don't miss educational and professional development sessions taking place before and after, such as a tax seminar and a safety forum. Organizers expect some 27,000 industry professionals and 1,100 exhibitors at the Orange County Convention Center and off-site static display area.

DAVID McINTOSH

DUBAI TO STAGE MEBAA SHOW

The biennial show is one of the final business aviation events on the calendar, marking the close of a challenging year for business aviation. In December, organizers expect some 9,000 visitors and 460 exhibitors at a show aimed at expanding business aviation in the Middle East and North Africa.

ISTANBUL AIRSHOW…October 6-9, Istanbul, Turkey. Info: +90 (312) 446 1294; www.istanbulairshow.com.

6th ANNUAL OFFSHORE AIRCRAFT REGISTRATION…October 10-11, Bermuda. Info: +1 (305) 767 4707; www.aeropodium.com/oar.html.

HELITECH INTERNATIONAL HELICOPTER EXPO & CONFERENCE…October 11-13, Amsterdam RAI, Holland. Info: +44 (0)20 8271 2155; www.helitechevents.com.

AIROPS EUROPE…October 12-13, Cannes, France. Info: +32 2 766 0070; www.ebaa.org/en/news-publications/news/airops-europe-12-13-october-2016-cannes.aspx.

INTERNATIONAL AIRPORT GSE EXPO… October 18-20, Rio All-Suite Hotel & Casino, Las Vegas, NV. Info: (800) 547-7377; www.gseexpo.com.

ERA GENERAL ASSEMBLY…October 11-13, Madrid. Info: www.eraa.org/events-general-assembly-2016.

AEA CANADA CONNECT CONFERENCE… October 19-20, Calgary, Alberta. Info: (816) 347-8400; www.aea.net/connect.

2016 IES ALC AIRFIELD LIGHTING COMMITTEE TECHNOLOGY MEETING… October 23-28, Hyatt Regency Mission Bay Spa & Marina, San Diego, CA. Info: (419) 524-2121; www.iesalc.org.

NBAA TAX, REGULATORY & RISK MANAGEMENT CONFERENCE…October 30-31, Orange County Convention Center, Orlando, FL. Info: (202) 783-9000; www.nbaa.org.

SINGLE PILOT SAFETY STANDDOWN… October 31, Orlando, FL. Info: (800) 783-9000; www.nbaa.org.

54th ANNUAL SAFE SYMPOSIUM… October 31-November 2, Dayton Convention Center, Dayton, OH. Info: (541) 895-3012; www.safeassociation.com.

NOVEMBER

◆ ● **NBAA BUSINESS AVIATION CONVENTION & EXHIBITION**…November 1-3, Orange County Convention Center, Orlando, FL. Info: (202) 783-9000; www.nbaa.org.

AEA SOUTH PACIFIC CONNECT CONFERENCE…November 14-15, Melbourne, Australia, Info: (816) 347-8400; www.aea.net/connect.

INTERNATIONAL AIR SAFETY SUMMIT… November 14-16, Dubai, United Arab Emirates. Info: www.flightsafety.org/aviation-safety-seminars.

BASEL & BUSINESS JETS…November 24, Swiss Conference Center, Basel Airport, Basel, Switzerland. Info: +44 20 8123 7072; www.aeropodium.com/basel.html.

CIAM 2016 11th INTERNATIONAL TRADE SHOW AND CONGRESS…November 30-December 2, JW Marriott Cancun Resort & Spa, Cancun, Mexico. Info: (+52 1) 777 317-64-45; www.expo-ciam.com.

DECEMBER

◆ **MEBAA SHOW**…December 6-8, Dubai, Dubai World Central, United Arab Emirates. Info: www.mebaa.aero.

FEBRUARY 2017

SCHEDULERS AND DISPATCHERS CONFERENCE…February 7-10, Fort Worth, Texas. Info: (800) 783-9000; www.nbaa.org.

MARCH 2017

◆ **HELI-EXPO**…March 7-9, Dallas, TX. Info: www.rotor.org.

AIRCRAFT ELECTRONICS ASSOCIATION… March 13-16, New Orleans, LA. Info: www.aea.net/convention/2017.

INTERNATIONAL OPERATORS CONFERENCE… March 13-16, Atlanta, GA. Info: (800) 783-9000; www.nbaa.org.

APRIL 2017

◆ **ASIAN BUSINESS AVIATION CONFERENCE & EXHIBITION**…April 11-13, Shanghai Hawker Pacific Business Aviation Service Centre, Hongqiao Airport, Shanghai, China. Info: www.abace.aero.

◆ Indicates events at which **AIN** will publish on-site issues or distribute special reports.

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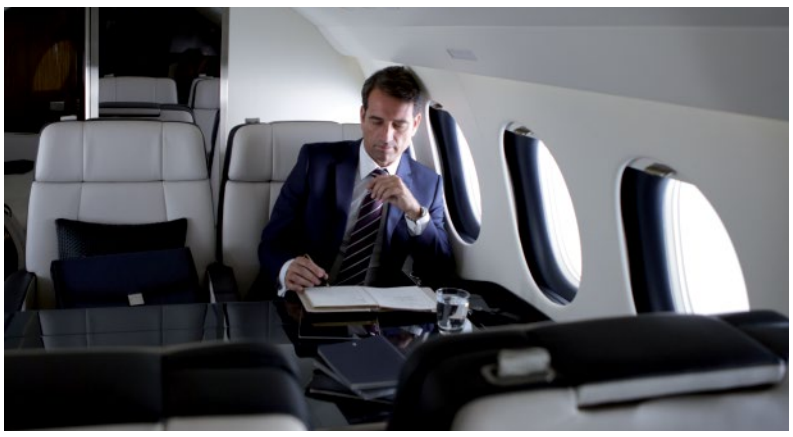

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