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PILOT REPORT

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Edited by William Garvey, Jessica A. Salerno, and Molly McMillin

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Reprints	**Wright's Media** **Nick Iademarco** — niademarco@wrightsmedia.com (877) 652-5295 · Fax: (281) 419-5712

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Penton is an Informa business

BCA - Business & Commercial Aviation (ISSN 0191-4642) is published monthly by Penton Media Inc., 9800 Metcalf Ave., Overland Park, KS 66212-2216. Also the publisher of *Aviation Daily*, *Aviation Week & Space Technology*, *The Weekly of Business Aviation* and *World Aerospace Database*. Single copy: Current and back issues, $10.00 Domestic/Canada/Mexico. $15.00 International. Subscriptions (1 year, 12 issues): United States and Canada, $59.00; all other countries, $79.00. For single copies/back copies call Customer Service at (800) 525-5003 in the United States and (847) 763-9147 for all other countries. Periodicals postage paid at Kansas City, MO and additional mailing offices. Registered for GST as GST #R126431964. Canada Post Publication Mail Agreement Number 40026880. Editorial contributions should be addressed to BCA, 520 Folly Rd., Ste. 238, Charleston, S.C. 29412, editorial address and must be accompanied by return postage. Publisher assumes no responsibility for safety of artwork, photographs or manuscripts. USPS 503-450.

Printed in the U.S.A.

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Postmaster: Send address corrections to BCA - Business & Commercial Aviation, P.O. Box 1174 Skokie, IL 60076-8174. (Present subscribers include label)

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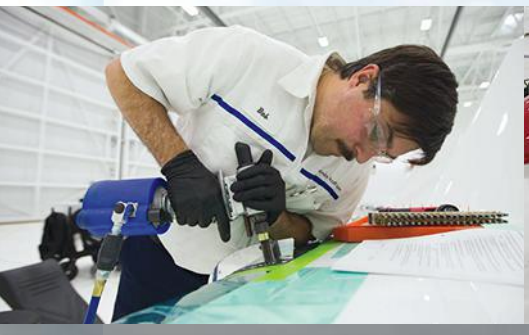

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Paying Partners

Short-sighted money grabs **or actual progress?**

THE MUSKOKA REGION IS A CANADIAN JEWEL, A PLACE THICK with forest, pristine lakes, and vacation homes old and new. It's where lucky Ontarians go to water ski, grill, chill and down cold Molsons fresh from The Beer Store.

My bride's family has had a lake cottage there for the better part of a century, and we'd invade for at least a week every August when the kids were, well, kids. It was a welcome escape, but it came at a price.

The region starts 100 mi. north of Toronto and anyone driving from south of Lake Ontario — a region known as the U.S. — will necessarily join the Queen Elizabeth Way immediately upon crossing the border. Doing so can cause a sunny mood to blacken, especially in a van full of bored, bickering children.

You see, on summer weekends the QEW is Canada's version of Washington's Beltway and New York's Van Wyck, combined. Traffic doesn't flow; it oozes, when it moves at all. It is why Canadians brew Molson. And why they created the 407.

Intended to route traffic north of Toronto, Highway 407 opened around 2000 much to my relief. A limited access, multi-lane roadway, it immediately lowered my stress level and cumulatively shaved hours from my trips north. It does so because the highway didn't seem to have much traffic, a fact I found curious since metro Toronto had grown phenomenally since we began our annual visits.

It turns out that to make the 407 a reality, the provincial authorities leased rights to the roadway to a private group and made it a tollway, which the QEW is not. A brother-in-law who goes to the cottage frequently refuses to use the 407 for that reason, and apparently so do many full-time residents. Meanwhile, the QEW still regularly transforms into a multi-kilometer parking lot.

Such public-private partnerships — aka P3s — are enterprises with a mixed record. The arrangement can produce wonders such as the transcontinental railway system, and put men on the moon. But P3s also brought us Hessian mercenaries, Agent Orange and a stillborn American SST.

Most governments are under pressure to fund public services and infrastructure maintenance but without increasing taxes. P3s present an inviting alternative to government outlay and the concept is very much in the current conversation. An IFR clearance to HOU? That will be $476. Cash or credit? Oh, and traffic calls will be extra.

> [Public-private partnerships] present **an inviting alternative to government outlay . . .**

The latest P3 possibility impacting business aviation came as a total surprise to the Westchester County Airport community. The HPN denizens — along with the county legislature — learned through news accounts that the county executive had been negotiating a deal whereby an investment firm, Oaktree Capital, would take control of the county-owned facility under a 40-year lease in exchange for a cool $140 million.

An Oaktree representative subsequently told a gathering of concerned Westchester Aviation Association members that his firm had a history of investing in transportation infrastructure such as seaports, rail services and airports, the latter including San Juan, Puerto Rico's Luis Muñoz Marín International and London City until its recent sale. While the county's motivation to unload HPN is obvious, the consequences are not. Assurances notwithstanding, what will be the impact of a for-profit entity upon the busy business aviation hub?

More than a decade ago, Hawthorne Municipal Airport (HHR), a Los Angeles reliever, was in a bad way, a financial drain on the city and in serious need of investment. A developer was lobbying hard to bulldoze the place and build a mall or stadium. However, a save-the-airport movement led by Pat Carey, a local Gulfstream pilot, prevailed. The city ultimately arranged a 45-year lease agreement with a local real-estate concern, which reportedly has worked industriously and invested to revitalize the place. Perhaps indicative of HHR's health, Carey now runs a flight-training outfit there.

Self-sustaining airports help to ensure their viability and aviation's overall well-being. Yet there's a troubling trend among public-use airports. Paul Wyatt, my colleague at *Ac-U-Kwik,* cites FAA stats on the matter. There were 5,858 such facilities in 1985 but 5,145 in 2014 — a net loss of 713, or 12%. And while I cheer those now building a business airport in Williston, North Dakota, it will never offset the loss of a facility serving a metro area.

P3s can be the right answer, but all involved need to thoroughly vet every contingency. Just 50 mi. northwest of HPN is Stewart International Airport. It went private in 2000, but the operator threw in the towel six years later and relinquished control to a public agency at a hefty profit — underwritten by user fees, of course. Care for a Molson? **BCA**

Readers' Feedback

An Effective Solution Needed

As always, you wax eloquently and compellingly, even if it is a tale of winter woe **("Rode Warrior," Viewpoint, December 2016, page 7).**

Harvard Business School professor Theodore Levitt claimed there were only four ways to revitalize an economic downturn: Acquire new users and uses, create new attributes or boost turnover frequency.

General aviation has implemented none of these. While the world has changed since the winter came to general aviation a decade ago, the industry has contracted like a turtle into its shell.

I don't need to tell you that FAR Part 135 fleet utilization has shrunk from an average, annual 600 hr. per aircraft, to a paltry 250 hr. Not surprisingly, the manufacturers and servicers of these fine jets have sidelined many of their skilled workers.

However, the raison d'être for general aviation remains. NBAA President and CEO Ed Bolen's theorem is still absolutely true: "It takes three days to attend one meeting via commercial airline. Yet, via general aviation, anybody can attend three meetings in one day!"

Sadly, as you noted, "rode" trips don't offer the swift solution. Do you realize how many of your fellow Americans experience the agony you wrote about, every day? Your terrestrial-bound-trip column was on point and accurate. Most of us are stuck between the rock of the road and the hard place of the airlines.

The airlines are not a real option for travel less than 400 mi. as they require an entire day of transit for the 1 hr. of flight. This is a perverse waste of time and technology. When it comes to the airlines, including commuters and regionals, there is no such thing as an expedient, quick, easy, short commute.

Yes, the regular folk are fed up with the sorry offerings of the airlines, the hassles and time waste imposed by the TSA and the congestion surrounding the airports.

I believe general aviation is the answer, though it is surely a hibernating giant.

Part 135 charter, almost by definition, is by small aircraft that have a passenger count limited to about half-a-dozen. The requested routings are point-to-point.


Viewpoint

Rode Warrior

The comfort of control

Total transit time is usually flight time plus 10 min. on either end. The value proposition is matchless: Save time!

Let me postulate a caveat, and say that if charter were priced at airline prices — not private-jet prices — demand for general aviation's built-in solutions would surge. At present prices, charter is way beyond the reach of most regular folk. The real obstacle to mass adoption and renaissance of demand is price.

To reduce the price of charter, the first necessity is to eliminate all financial risk for the Part 135 charter operator.

This can be achieved by using the internet to enable groups to form for the single purpose of chartering a Part 135 aircraft from their local charter operator. When five or six or seven travelers equally share the total, all-inclusive cost of an appropriate charter aircraft their individual ticket price will approximate the airline price.

A corollary of this process is that it eliminates the problem of the unsold, non-revenue, empty seat. Being a demand-centric sequence, this process is more efficient than the legacy process that sells charter by the seat, which then requires yield management to factor in the consequences of empty seats. Hence, high prices.

As charter becomes more ubiquitous, the charter operators' fixed costs will be amortized across a broader income stream. This, in turn, will influence charter prices down. Levitt's criteria will have been met.

There is a pent-up demand, eager for an effective solution. The aircraft are available now. Some 5,000 alternative and under-utilized airports are open for business now. Most are serviced by Part 135 operators seeking new business. I submit that just by solving the price puzzle, the demand for charter will surge.

General aviation will prosper and demand for new aircraft will surely follow. And, dare I say, summer's good times will be here again.

Ian Becker
San Diego, California

Regular folk are fed up with the sorry offerings of the airlines, the hassles and time waste imposed by the TSA and the congestion surrounding the airports.

Ian Becker, *San Diego, California*

Probably a Visual

It's been quite a while since I've flown into LaGuardia Airport, so correct me if I'm wrong, but I don't recall an ILS to Runway 31; there's not enough room between LGA and JFK. On an ILS to Runway 4 circle to land 31; if you strayed too close to JFK, you would be chastised by approach control.

By the way, I sure do miss Torch Lewis telling it like it is. My dad said always to read his Greenhouse Patter first before you read anything else.

John Forrester
Alexandria City, Alabama

Editor's note: You are quite right and, upon reflection, the passenger/pilot/author thinks it was probably a visual. The view from and approach information in the cabin was minimal, as stated. And we, too, miss Torch every day. RIP, J. Sheldon.

Too Much Control

I read **"Good Luck" (Viewpoint, January 2017, page 7)** and it is easy to see ye are of little faith! The direction of our federal government over the past eight years has not been good for Kerrville, Texas, which now has a lot of empty stores. Mooney Aircraft had to close down and put 600 folks out of work. Nobody's doing well enough to afford

to buy a Mooney airplane.

The Chinese took over the company and now are trying to make two airplanes a month. Trouble is, the FAA still has not certified the New Mooney after more than a year! There's too much regulation to deal with. That holds down business.

I flew for Petroleum Helicopters, but most of the offshore work was shut down by the government. I returned here to fly as a production test pilot for Mooney for three years, but with the continued downturn, I took a job flying a Cessna 337 for a Miller Beer distributor.

I believe President Donald Trump will make a big improvement over the way things have been. More flying folks here are adding ADS-B Out on small planes and we see more general aviation flying. And private companies just might do better than our government in fixing our infrastructure. I sure hope so.

Too much government control of the people and business has not been good for the U.S.

Robert William Grebe II
ATP, CFI Fixed and Rotary Wing
Kerrville, Texas

Clarifications

Editor's note: ViaSat was inadvertently omitted from our IFEC Special Report in the December 2016 issue. For that we apologize. A summary of its products and services follow.

Carlsbad, California-based ViaSat's Ka-band latest satcom shipset, the Global Aero Terminal 5510, which includes ViaSat's airborne antenna, an integrated modem and an advanced power supply, will be available in mid-2017, along with service pricing options. The terminal will enable business aviation users to obtain the highest speed internet access across the U.S., transatlantic and European air routes by connecting to ViaSat's global Ka-band network and satellite platforms.

ViaSat reports its business aviation system is capable of delivering more than five times faster service than any other competing business aviation inflight Wi-Fi system. The new antenna requires only one slot in an aircraft's radome, which enables operators to


Safety

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Keep them in that order!

add or maintain redundant Ku-band connectivity.

According to ViaSat, the new shipset is "future-proofed," with forward and backward compatibility across the ViaSat network, from connecting to today's ViaSat-1 class satellites to ViaSat's imminent ViaSat-2 and upcoming ViaSat-3 platforms.

The company's Ka-band service plans enable users to experience peak data rates up to 16 Mbps on all plans for office-in-the-sky applications, including high-definition videoconferencing, streaming movies, music or other entertainment. Operators can obtain up to 100 GB per month — among the highest committed information rates in the industry. ViaSat's four new service plans offer 30-, 40-, 60- and 100-GB throughput, ranging in cost from $6,995 per month to $24,995 per month for new service users.

The new shipset is available to early access customers beginning in Q2 2017, with full production available in the second half of the year. All service plans will be available through ViaSat's Ka-band Value Added Resellers. Plans coincide with the mid-2017 shipset availability, with best available introductory pricing available through 2018.

ViaSat is partnered with Boeing to build the company's first ViaSat-2 geostationary satellite, slated for a Q1 2017 launch.

Meanwhile, the two companies completed a Preliminary Design Review for the first two ViaSat-3 class satellites on Nov. 16, 2016.

Fool Me Once . . . .

I read your article on **"Normalization of Deviance" (January 2017)** and found a few interesting items that I would like to comment on.

The article states that the crew ". . . had even passed their Stage Two International Standard for Business Aircraft Operations (IS-BAO) safety management system (SMS) certification. So, they were able to fool their instructors and auditors, and that served to reinforce the behavior as normal."

So tell me, what good are the IS-BAO audits and certifications? It seems like a large waste of time and money if the auditors can be "fooled" and you can operate any way that you want. I know of a flight department that has had four incidents/accidents in a one and a half year period but is Stage II certified. I asked our auditor, "If there are two flight departments, one has never had an accident or incident but doesn't have the best IS-BAO paperwork and the other has had all these incidents but does their paperwork perfectly, which one is the better department?" He stated that the one with the perfect paperwork.

Our company is Stage II certified, but the whole SMS system concerns me. Is it making us safer? Can it be simplified to make the paperwork burden easier? If the auditors can be "fooled" what is the point of the audit? I know of many flight departments that are having some heartburn over the SMS program and your article points out very well the pitfalls of the whole SMS system.

Capt. Mark Zakula
Director of Training and Global Compliance
The Duchossois Group
Elmhurst, Illinois

I know many flight departments that are having some heartburn over the SMS program and your article points out very well the pitfalls of the whole SMS system.

Mark Lakula *Elmhurst, Illinois*

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NEWS / ANALYSIS / TRENDS / ISSUES

TAMARACK AEROSPACE HAS RECEIVED an FAA Supplemental Type Certificate for its active winglet system for the Cessna CJ series jets. The validation follows STC approval from the European Aviation Safety Agency (EASA) in 2015. With the authorizations, Tamarack is approved to install its winglets system on the Cessna CJ, CJ1, CJ1+ and M2 in the U.S. and Europe. **According to Tamarack, its winglets give the aircraft increased range, higher initial altitudes, faster climbs, 12%-16% higher single-engine climb gradients, better hot-and-high performance and increased stability.** Tamarack's Winglet system incorporates a wingtip extension, a winglet and load alleviation technology. The former two elements increase the wing's aspect ratio and efficiency, which improves performance and saves fuel, while the third element counteracts and alleviates gust and maneuver loads eliminating the need for wing structural reinforcement, saving weight and installation time. Nick Guida, Tamarack CEO, said, "We have a long list of orders and our customers are actively working with our partner, Cessna, on scheduling installs. With the STC behind us, we expect a significant number of new orders from customers who have waited for certification." The Sandpoint, Idaho company has additional airframe programs under development.

WITH MORE THAN 400 LETTERS OF INTENT (LOI) in hand for its new Model 505 Jet Ranger X, Bell Helicopter is working fast to convert those into purchase orders, after the five-seater was **awarded type certification by Transport Canada** in late December. The light helicopter is manufactured at Bell's Mirabel plant near Montreal. The Textron subsidiary plans to deliver 50 of the new model in 2017 and reach a build rate of 150 aircraft per year by 2018. Some LoIs have already been converted and Bell plans to begin deliveries from its Mirabel plant near Montreal to Canadian customers in early 2017, President and CEO Mitch Snyder says. "We have been working with our suppliers including Garmin and Safran Helicopter Engines to support that rate," said Bell President and CEO Mitch Snyder. The 505 is powered by a U.S.-built Safran Arriel 2R turboshaft and a Garmin G1000H flight deck. Although the commercial helicopter market has slowed significantly, Snyder says there has been "a great response" to the 505. With a base price of about $1 million, the helicopter is "competitively priced" against its main rival, the Robinson R66, he says. Demand is global and from a range of customers from private owners to training schools. Bell is now certifying kits including dual controls, air conditioning and synthetic vision displays. First flown on November 11, 2014, the Model 505 has a cruise speed of 125 kt., range of 340 nm and useful load of 1,470 lb.

IT LOOKS LIKE THE GAP IN EMBRAER'S BUSINESS JET LINEUP – that is, an entry in the ultra-long-range category – won't be filled any time soon. Speaking to an editorial round table of Aviation Week Network editors in Washington in December, Paulo Cesar de Souza e Silva, president and CEO of the Brazilian aircraft maker, said a recent assessment of the marketplace revealed that the **Legacy 450 and 500 "can cover 98.5% of the business jet missions in the world. So, he asked rhetorically, "Do we need longer range?"** To which he answered, "Maybe not." He continued, "I don't think we could afford to invest in a new product for the ultra-long range. That segment was resilient after the market crisis in 2008, but now it's coming down quite sharply, and it's crowded. So we believe we can cover the bulk of the market with the Legacy 450/500. Maybe later a super-midsize would make sense to replace the Legacy 650, but not immediately."

Jet-A and Avgas Per Gallon Fuel Prices

January 2017

Jet-A

Region	High	Low	Average
Eastern	$8.09	$4.10	$5.66
New England	$7.09	$3.43	$4.72
Great Lakes	$7.92	$3.08	$5.14
Central	$7.63	$2.42	$4.26
Southern	$8.14	$3.49	$5.56
Southwest	$8.33	$2.90	$4.89
NW Mountain	$7.07	$2.90	$4.77
Western Pacific	$7.53	$3.57	$5.28
Nationwide	**$7.72**	**$3.24**	**$5.03**

Avgas

Region	High	Low	Average
Eastern	$8.62	$4.60	$6.38
New England	$7.45	$4.40	$5.58
Great Lakes	$9.26	$4.10	$5.92
Central	$7.72	$3.99	$5.30
Southern	$8.70	$3.75	$5.87
Southwest	$6.94	$3.35	$5.30
NW Mountain	$8.43	$4.49	$5.70
Western Pacific	$8.57	$4.45	$6.32
Nationwide	**$8.21**	**$4.14**	**$5.80**

The tables above show results of a fuel price survey of U.S. fuel suppliers performed in January 2017. This survey was conducted by Aviation Research Group/U.S. and reflects prices reported from over 200 FBOs located within the 48 contiguous United States. Prices are full retail and include all taxes and fees.

For additional information, contact Aviation Research/U.S. Inc. at (513) 852-5110 or on the Internet at www.aviationresearch.com

For the latest news and information, go to **aviationweek.com/bcadigital.com**

Piper M600 Earns Canadian Certification

Piper Aircraft has received a type certificate for its single-engine M600 from Transport Canada. The award allows Piper to deliver the aircraft into the Canadian market. The company has received "quite a bit of interest" from Canadian owners and operators for the aircraft, which is equipped with the Garmin G3000 avionics, because of its expanded range, payload and speed, the company said. Aviation Unlimited is Piper's exclusive independent dealer in Canada. It plans to deliver its first M600 soon.

Constant Aviation Adds More AOG Mobile Teams

Constant Aviation has expanded its aircraft-on-the-ground mobile team coverage in the central U.S. region with the addition of Denver and Rifle, Colorado. With peak ski season, the timing is good, the company said. The expansion marks the company's 19th AOG support team in the continental U.S., following additions in Naples and West Palm Beach, Florida.

CANADA-BASED WANFENG AVIATION, part of China's Wanfeng group of companies, has acquired a 60% interest in Diamond Aircraft Industries. **The investment will fund expanded production, sales and service globally and strengthen the company's focus on the U.S. market.** As part of the investment, Diamond Canada has acquired the rights to the DA62, Diamond's largest aircraft, and the DA40 program from Diamond Austria. The transaction also includes the D-Jet Corp. The future of the composite single-engine jet and possible derivative aircraft are subject to ongoing review, the company said. The D-Jet program was put on hold in 2014. Diamond Aircraft Industries GmbH will remain independent and the leadership and key personnel in Diamond Austria are not affected by the transaction, it said. Frank Chen of the Wanfeng group of companies, was appointed chairman, while Peter Maurer will continue as CEO of Diamond Canada. The aircraft will continue to be branded as Diamond Aircraft. Diamond Austria will continue to produce the DA 42.

UK-BASED BBA AVIATION AND GAMA AVIATION have joined their U.S. aircraft management and charter businesses, with a combined fleet of 200 aircraft. The combined entity will be called **Gama Aviation Signature Aircraft Management.** The agreement closed Jan. 1., expands Gama and BBA Aviation's presence in the U.S. and provides each company with a full national presence. Gama Aviation's business is concentrated on the East Coast, while BBA's business is predominantly on the West Coast. The merger is expected to save $2 million over two years. In 2015, BBA Aviation posted profit before tax of $5.5 million for its U.S. aircraft management and charter businesses, while GAMA posted a $4.3 million profit before taxes for its respective U.S. businesses. In February 2016, BBA Aviation acquired Landmark Aviation and its aircraft maintenance and charter services business for $2.065 billion. BBA Aviation CEO Simon Pryce said, "We look forward to working with our partners at Gama Aviation to develop and grow the company in the years ahead." Gama CEO Marwan Khalek said, "The combination diversifies our customer base and extends our network coverage nationally while simplifying the financial arrangements with our U.S. partners." The businesses will be supported by Gama's line maintenance support and BBA's Signature Flight Support's FBO network, although those businesses are not part of the transaction. **BBA Aviation and Gama aviation each have a 24.5% shareholding of the enlarged entity.** The remaining 51% equity interest is owned by a small number of individual U.S. shareholders, including key operational management.

TRIUMPH AEROSTRUCTURES HAS INITIATED LITIGATION against Bombardier to recover $340 million in additional development costs incurred by a redesign of the Global 7000's wing. In response, Bombardier planned to sue Triumph for losses resulting from the program's two-year delay. Triumph maintains that Bombardier directed changes to the original wing requirements and caused "delays, disruptions, acceleration and interference in connection with its contract." **The charges were filed with the Securities and Exchange Commission. "After spending months working with Bombardier leadership to reach an agreement, we have come to an impasse,"** says parent company Triumph Group in a statement. "Triumph Aerostructures seeks fair and reasonable compensation for work performed." The companies are continuing to work together. "Despite the lawsuit, Triumph and Bombardier remain focused on completing certification activities and working to build wings to support the program," Bombardier says. For its part Triumph says it "continues to support the Global 7000 program and to seek a resolution of its disputes." The Global 7000 made its first flight on Nov. 4, 2016, and another three flight-test aircraft are in final assembly. Entry into service is expected next year, Bombardier reports, adding "and this dispute does not impact our ability to do so."

TEXTRON AVIATION IS INCORPORATING GARMIN'S upgraded G1000 NXi integrated flight deck into its piston product line, including the Cessna Skyhawk 172, Skylane 182, Turbo Stationair HDT206, Beechcraft Bonanza G36 and the Beechcraft Baron G58. In addition, the FAA has approved a Supplemental Type Certificate for integration of the system into in the King Air 200; approval for installation in the King Air 300/350 aircraft models is imminent. Textron says its company-owned service centers will be equipped to retrofit for the King Airs with the new G1000 NXi. Weight savings of 250 lb. or more could result. The G1000 NXi features increased processing power for faster map rendering and smoother panning through the displays. It includes wireless aviation database updates using Garmin Flight Stream, enhanced situational awareness with SurfaceWatch, visual approaches, map overlay, standard ADS-B "in" and "out," the ability to view IFR and VFR charts on the moving map, animated Sirius XM weather and other features. According to Garmin, it also supports features such as advanced Doppler and Nexrad weather radar, display of sectional charts, a preview and activation of departure and arrival procedures, among other features.

DASSAULT AVIATION NETTED ORDERS FOR JUST 21 Falcons in 2016, further confirming a sluggish business jet market. In numbers released Jan. 5, the French airframer **said 33 Falcons had been ordered during the past year, but the net tally was weaker due to the cancellation of a dozen Falcon 5X jets**. That program is suffering an almost-three-year delay due to technical issues with its Safran Silvercrest engine. Regarding the low Falcon sales, Dassault said, "the weakness of the order intake reflects a difficult business jets market." Meanwhile, the company delivered 49 Falcons in the year just ended. By contrast, the French planemaker took in orders for 36 Rafale fighter jets. The Rafale orders are those from a contract with India, signed in September. Its backlogs at year-end were for 110 Rafales and 63 Falcons.

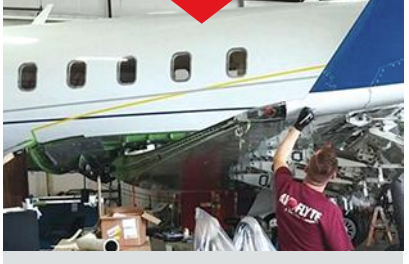
AUSTRO ENGINE GMBH, A DIVISION of Diamond Aircraft Group, has reached 1 million flight hours for its AE300 jet fuel aviation engine. More than 1,500 engines have been delivered for operation since the beginning of serial production in 2008. The four-cylinder, 2-liter piston engine burns Jet A or diesel fuel to produce 170 hp. The manufacturer reports the engine has 45% lower fuel burn than conventional piston aircraft engines running on aviation gas, produces less exhaust emissions and is silent. The engine is produced at the company's factory in Wiener Neustadt, Austria.

ON JAN. 10, THE U.S. SUPREME COURT declined to hear a case involving Flytenow, an online flight sharing service that wanted the high court to overturn lower court decisions that supported FAA's prohibition of the activity. **The agency maintained that such a service violated common carriage requirements. The high court's decision upholds FAA's safety assessment that pilots who offer to transport the general public for money are required to have additional flight experience and safety training.** The National Air Transportation Association welcomed the court's denial, with President Martin H. Hiller commenting "The Flytenow application is nothing more than old wine in a new bottle. As the lower courts demonstrated, neither internet freedom nor the expansion of the share-economy are at risk. Consistent with previous attempts to offer the same service using telephone-based technology, the FAA determined the Flytenow service establishes private pilots as common carriers and therefore requires additional safety certifications for both the pilots and their aircraft." He said Flytenow representatives might now try to lobby the Congress to create an exemption for such web services, but maintained that "It is simply not acceptable to allow the general public to 'ride-share' with private pilots who have potentially little flight time or training for challenging weather conditions. NATA will continue to educate lawmakers on the Flytenow model and the risks it poses to the safety and security of the flying public."

Astronics Enhanced Vision System Earns Certification

Astronics Max-Viz, a division of Astronics Corp., was awarded certification for its Max-Viz 1200 Enhanced Vision System for fixed and rotor wing aircraft. The system detects differences in heat of objects and terrain in the aircraft's environment, which produces a real-time picture of the surroundings in the absence of visible light, the company said. That enables pilots to see when flying in smoke, haze or light fog day or night. The system has been certified to DO-160G standards by the Radio Technical Commission for Aeronautics.

AirFlyte Now Retrix MRO



AirFlyte has changed its name to Rectrix MRO, the company announced. The rebranding is from the 2013 acquisition of AirFlyte by Rectrix. The name change reflects the company's corporate maintenance, repair and overhaul services and presents a united brand to customers, it said. Rectrix MRO is an FAA Part 145. Repair stations are located at Westfield-Barnes Regional Airport, Massachusetts; Sarasota-Bradenton International Airport, Florida; and Worcester Regional Airport, Massachusetts.

Bombardier Delivers CRJ200 to Gulf & Caribbean Cargo

Bombardier Commercial Aircraft has delivered its first CRJ200 Special Freighter to Gulf & Caribbean Cargo, its launch customer. The company does business as IFL Group in Waterford, Michigan. The jets are converted from the passenger version by Aeronautical Engineers of Miami, a Bombardier-licensed third party Supplemental Type Certificate provider. The design includes a 94-in.-by-77-in. cargo door, eight pallet positions and holds up to 14,840 lb. The CRJ 100 and 200 operator base has grown by about 120% over the past eight or nine years, the company said. Bombardier has received commitments for 45 aircraft conversions to date from a variety of operators and expects to convert more than 100 aircraft over the life of the program.

FlightServ Opens at Trenton-Mercer Airport

FlightServ, an independent fixed base operation, opened Jan. 1 at the Trenton-Mercer Airport in New Jersey. The FBO was founded by a team from its sister company, Aviation Charters. The company will provide fuel, contract fuel, ground power units, free Wi-Fi, crew lounge, concierge and other services.

THE FAA HAS ISSUED NEW RULES that make it easier and cheaper for general aviation pilots to gain required medical certifications to fly. Starting May 1, recreational general aviation pilots flying aircraft that weigh less than 6,000 lb. and carry no more than five passengers can use BasicMed as an alternative process to the traditional third-class medical. The latter requires pilots older than 40 to obtain a medical evaluation from an FAA aviation medical examiner every two years, or every five years for pilots under 40. Under BasicMed, pilots with a driver's license who successfully passed a third-class medical in the past 10 years can take an FAA-provided online course on medical issues every two years, and visit a state-certified physician once every four years for a checkup. The checkup will be based on a four-page, FAA-provided checklist that will include health information volunteered by the pilot and an examination by the doctor. The pilot has to keep a copy of the signed-off checklist as a logbook item; the physician does not have to file any paperwork. Student pilots will have to obtain a traditional third-class medical to opt into BasicMed. The reform does not affect second- and first-class medicals, which are required for paid piloting positions in the air taxi and airline industries. However, an exemption that previously allowed flight instructors with a third-class medical to earn revenue will also apply to the BasicMed program. The Aircraft Owners and Pilots Association (AOPA) and Experimental Aircraft Association (EAA), with support from aviation-friendly lawmakers, have for several years pressed Congress to simplify the medical certification process. **"BasicMed is the best thing to happen to general aviation in decades,"** AOPA President and CEO Mark Baker said. However, the Aerospace Medical Association (AMA), an advocacy group for the aerospace medical field, has fought the development for years, calling the reform "not in the best interest of our nation's safety, nor indeed our nation's pilots."

THE FAA IS PROPOSING A DOZEN NEW HIGH-ALTITUDE JET routes along the U.S. East Coast as part of a modernization strategy to replace legacy ground-referenced routes with GPS-supported, performance-based navigation (PBN) routes. Called the Atlantic Coast Route Project (ACRP), the effort is the first phase of agency's plan to deploy new and more efficient PBN routes across the U.S. in five stages, starting with the East Coast. The so-called "Q-Routes," which typically require Required Navigation Performance (RNP) 2, are more precise than the legacy high-altitude jet routes (J-Routes) that are based on the FAA's network of VOR ground stations. An aircraft with RNP 2 capability can maintain its position to 4 nm on either side of a route. The proposed new Q-Routes are primarily north-south, extending from New England to Southern Florida and linking to the Caribbean. "The Eastern Seaboard is an area containing heavily traveled and constricted airspace," the FAA said in the proposed rules. Over time, the FAA plans to reduce the number of VORs and correspondingly phase out the high-altitude airways linked to those stations in lieu of PBN routes. Benefits of the Q-Routes, of which more than 100 already exist in the U.S., include the ability to have parallel routes separated by only 8 nm; higher throughput per air traffic control sector; and with fewer waypoints along a route a corresponding reduction in the number of "choke points" in the National Airspace System. The new routes in the proposed rule are part of ACRP Phase 1, which focuses on the northeastern U.S. and airspace that is controlled by the Air Route Traffic Control Centers in Boston and New York. In Phase 2, the FAA will deploy new routes south of the New York ARTCC's airspace to the Caribbean area through separate rulemaking.

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Air Methods Adds Airbus 145 Helicopters

Air Methods Corp. has acquired three Airbus H145 helicopters for hospital-based air medical transport. The aircraft will replace older aircraft now in service. St. Louis Children's Hospital will receive two of the aircraft, while Virginia Commonwealth University Health System will receive one. Air Methods will own and operate the aircraft for both hospitals. Completion will include interiors that will seat up to four attendants.

JetSuiteX Adds Flights from Santa Monica

JetSuiteX has begun selling seats for charter service to and from Santa Monica, California. Flights begin Feb. 6 to Las Vegas, San Jose and San Diego County. JetSuite, parent to JetSuiteX, recently announced an investment from JetBlue. Fares for the new routes start at $29 each way. JetSuiteX will offer four weekly flights between San Diego County and the Bay Area with a stopover in Santa Monica. It will also connect Santa Monica Airport with Las Vegas McCarran International Airport beginning Feb. 10.

IN DECEMBER, FAA ISSUED its final rule on the **new Part 23 which is intended to reduce the time and cost to certificate aircraft under 19,000 lb.** It does this by replacing outdated and prescriptive airworthiness rules with industry consensus standards that can evolve with technology. The European Aviation Safety Agency is in the process of rewriting its CS-23 rule for small airplanes and other authorities are expected to follow suit. With the U.S. Congress gaining praise for putting pressure on the FAA to act, the new rule has been greeted enthusiastically by a general aviation manufacturing community that has seen many projects founder on the cost and complexity of certification. But the real excitement goes with looking to future technologies that could revitalize — and potentially revolutionize — an industry sector that has struggled in recent years. From its recent peak of almost 2,800 aircraft in 2006, shipments of piston aircraft fell below 900 in 2011 and will barely have exceeded 1,000 in 2016. The industry hopes advances such as electric propulsion and safety improvements will boost demand. To better keep pace with technology, certification procedures had to change, and the new Part 23 allows manufacturers to demonstrate meeting airworthiness requirements using industry-developed consensus standards. The goal is for standards to be agreed upon far more quickly than regulations can be changed, allowing the industry to keep up with technology advances. **GAMA President and CEO Pete Bunce, president and CEO of the General Aviation Manufacturers Association said the new rule "is nothing less than a total rethinking of how our industry can bring new models of pistons, diesels, turboprops, light jets, and new electric and hybrid propulsion airplanes to market, as well as facilitating safety-enhancing modifications and upgrades to the existing fleet."** He says the rewritten rule will reduce the time, cost, and risk involved in certification, "while improving safety for customers."

PIPER AIRCRAFT HAS TAKEN A FIRM ORDER FOR 50 PIPER ARCHER single-engine aircraft from **China Air Shuttle,** its dealer in China said. Deliveries are scheduled to begin in the second quarter of 2017. The aircraft will be built and certificated at Piper's factory in Vero Beach, Florida, and shipped to China for reassembly by China Air Shuttle's affiliate in Rizhao, Shandong Province, Piper said. The facilities in Rizhao will become a delivery center for reassembly, training, maintenance and product support for Chinese customers. **China Air, the approved Piper dealer, will distribute the aircraft to flight schools and general aviation companies in the region.** Ruixiang Flight Academy bought two Piper Seminole twin-engine aircraft in mid-2016, and operates the trainer in its ab initio flight training program. The Archer and Seminole share many common parts, Ruixiang Flight Academy Chairman Zhang Liguo said. Nearly 80% of the parts are interchangeable, which means lower operating costs and higher efficiencies, he said. In addition, the low wing configuration of both models is beneficial because it offers more wind stability. "These factors were the primary reasons that we selected the Piper Archer as the single-engine trainer, and make both aircraft highly marketable to a flight school," Liguo said. More than 45 Piper Seminoles have been sold to Chinese flight training schools. "We are pleased that the Archer will now also be used in flight training academies throughout China," said Jeremy Prost, Piper's Asia sales manager. **A high demand for pilots, the Civil Aviation Authority of China's move to accommodate general aviation,** and infrastructure improvements have spurred the establishment of new flight schools and general aviation companies in China, said Chen Li, chairman of China Air Shuttle, which incorporated in 2015. Piper has almost 150 trainers on order, the company said.

ITALIAN HELICOPTER MAKER LEONARDO-FINMECCANICA is finding eager buyers among the Chinese. The company reports that it has sold more than 180 helicopter of various types to operators there -- most recently signing a deal in December for an additional 30 emergency medical service (EMS) machines. The buyer, Sino-US International Helicopter Investment, had earlier in the year signed for 25 AW119Kx helicopters, which according to Leonardo, paved the way for the largest EMS helicopter program in the country. Sino-US has so far placed orders for over 80 helicopters comprising AW119Kx, GrandNew, AW169, AW139 and AW189 models. The latest group of EMS helicopters, comprising AW139 and AW169 models, are to be delivered this year. They will be operated by KingWing General Aviation. Established in 2006, Shanghai Kingwing has the largest rotary wing fleet in country and has signed air ambulance agreements with a series of hospitals and emergency centers in eight provinces and plans to expand operations throughout the country.

CIRRUS AIRCRAFT HAS LAUNCHED THE G6, the latest upgrade of its SR series of single-engine piston aircraft. The new models feature **Garmin's Cirrus Perspective+ flight deck, "inspired" by Garmin's just announced G1000 NXi** integrated platform and Cirrus-designed wingtips. In addition, the SR20 gets an engine upgrade; it is powered by a 215-hp Lycoming IO-390, allowing the aircraft to fly longer missions and have an increased useful load, the company said. "G6 is the result of the most innovative, capable and feature-rich set of upgrades we have ever applied to the entire SR product line," said Todd Simmons, Cirrus president of customer experience. The Garmin Perspective+ flight deck's processing is 10-times-faster than that of the previous Cirrus Perspective panel, and features animated datalink weather, SurfaceWatch safety protection, payload management, and visual approach capabilities, wireless database uploads among other improvements. The keyboard controller includes a qwerty interface, which allows for a transition from smartphone, tablet or laptop to the aircraft. Cirrus worked with Whelen Engineering to develop the Cirrus Spectra wingtip, which incorporates LED lighting for two times better visibility on landings, the company said. Pricing for the G6 versions of the Cirrus lineup is set at $389,900 for the SR20, $539,900 for the SR22 and $639,900 for the SR22T.

INDICATIVE OF THE COMMUNITY'S GROWING IMPORTANCE to the country, business aircraft operators have joined together to form the **Beijing Business Aviation Association (BBAA).** The national organization has as a goal to serve the development needs of the community in China and promote itself internationally. The organization held its first membership meeting on Dec. 20 at the China World Center in Beijing and elected its inaugural board of directors, with Zhang Peng, the chairman of Deer Jet Co. Ltd., appointed as BBAA's president and Wang FuHou, the president of Minsheng Financial's Aircraft Leasing, named vice president.

THE LENEXA, KANSAS-BASED FRACTIONAL AIRCRAFT provider moved into hangar and office space at Col. James Jabara Airport in northeast Wichita from its previous facility at Wichita Dwight D. Eisenhower National Airport in west Wichita. The larger site includes two hangars totaling 27,000 sq. ft. plus 7,000 sq. ft. of office space and employs 25. Executive AirShare will serve as an authorized service center for Embraer business aircraft at the new location. It operates Embraer Phenom 100 and Phenom 300 aircraft in its fleet. **The expansion is a commitment to the market,** company officials say. With the move, the company will be closer to customers. Jabara Airport is Wichita's main executive and business aviation airport. Jabara Airport is convenient for recruiting trips, said Gregg Marshall, Wichita State University men's basketball coach.

328 Support, Duncan Partner on Challenger 604 Completion

I328 Support Services GmbH and Duncan Aviation have partnered to deliver and certify a full cabin completion on a Bombardier Challenger 604. The aircraft is Finnish registered. 328 Support Services verified all the engineering data involved and certification of the modification with a new European Aviation Safety Agency (EASA) Part 21 Minor Change Approval. Duncan Aviation performed the production, installation and testing at its facility in Battle Creek, Michigan. The project includes a new interior design for the cabin, with new carpet, flight deck crew seats, entry jump seat, new upholstery for cabin and conference seating, and other upgrades.

LifePort Earns FAA Approval for Patient Loading System

LifePort, a Sikorsky company, has received FAA airworthiness certification for its Patient Loading Utility System (PLUS) for Pilatus PC-12/47 and PC-12/47E aircraft. The STC includes an incubator configuration with a utility sled, oxygen shroud and mounting plates for an incubator dual composite oxygen bottle configuration to reduce weight and increase capacity. The system is composed of three elements: a base unit, loading system and AeroSled stretcher.

INTERVIEW BY **WILLIAM GARVEY**

Talaat Captan

Founder & CEO
Air Hollywood
Los Angeles, California

After civil war erupted in 1975, 17-year-old Captan decided to leave his native Lebanon and seek his future elsewhere. Once granted entry to the U.S., he quickly settled in California where he attended Palomar College. Invited by a college friend to assist in his distribution of VHS and Betamax films in 1980, he did so until another distributor offered him a job selling films internationally. Even though "they kept giving me movies nobody wanted," he analyzed the tastes and expectations of his clientele and "was able to sell." That success prompted him to launch his own distribution company and later to make films as a producer and director. Ultimately, he made 22 features and says, "Every one I made was a success." It was while producing a film in 1998 that he came up with a business idea that combined two of his passions: aviation and the movies.

TAP HERE in the digital edition of ***BCA*** to hear more from this interview or go to **aviationweek.com/fastfive**

Questions for Talaat Captan

1 **You have fervor for all things aviation. What's the genesis and how have you responded?**

Captan: As a child I saw a Swissair DC-10 taking off for the first time from Beirut Airport, and the sight took my heart away. Much later I took a couple of flying lessons at Palomar Airport but quickly discovered that much of piloting is, frankly, boring. You sit there waiting for something to happen. But I'm the type of guy who wants to do something, to make things happen. That said, I love to travel and have flown around the world many times. The walls in my office are covered with my boarding passes. When at an airport or in an airplane, I'm alert to everything. I love listening to ATC. Building on that, I made the feature "Ground Control" in 1998 starring Kiefer Sutherland. It was really well done and so technically accurate, Korean Air Lines used it to teach its pilots how to communicate with ATC. However, the difficulty I had dealing with LAX — which ultimately rescinded my permit because they didn't like the script — and shooting inside an airliner convinced me that the movie industry needed a studio dedicated to aviation. That's when I began Air Hollywood.

2 **Were you right?**

Captan: Not initially. The business started slowly. But six months after our open house, 9/11 happened and immediately it became impossible to film inside an airport or an airplane. Period. Just like that, we became the place to go, and we're so good at what we do, we remain so 16 years later.

3 **What's Air Hollywood's shooting record?**

Captan: We've served hundreds of clients, from big-budget feature films to low-budget student films and everything in between, including TV commercials, music videos and magazine and advertising photo shoots. We have worked with every major studio and production company in Hollywood and served productions from New York to Hawaii to Tokyo. Some of the feature films you'd recognize include "Bridesmaids," "Charlie Wilson's War" and "The Wolf of Wall Street" to name a few. For TV, we've hosted the cast and crew of "Pretty Little Liars," "Supergirl," "Twin Peaks," "Lost" and "Castle," and many others. One entire "Grey's Anatomy" episode was filmed here.

4 **Do you have fake terminals and runways and such?**

Captan: We have real buildings — warehouses, actually — with airplanes inside, including cabins and flight decks of a 747, 767, 737 and MD-80. We also have several GIIIs and one GIV and a Learjet, all on 53-ft.-long trailers that we deliver to shooting sites. Our props include ticket counters, gate areas, TSA X-ray machines and security lines, along with all the signage you see at airports. Plus we've got uniforms, food carts, lavatories, evacuation cards, barf bags — you name it. We can create inflight turbulence, lightning, systems failures and PA announcements. The only thing we don't have is flight itself. And none of our aircraft hardware will ever fly again.

5 **Is your pretend world now complete?**

Captan: Hardly. We've added a studio in Atlanta and are planning others in New York and Dubai. Our hugely popular "Pan Am Experience" in which flight attendants serve diners a 1970-vintage, first-class meal and conduct a fashion show aboard our 747 is so popular that we plan to expand to New York or Las Vegas within a year. Our craftsmen now turn aircraft parts into furniture that we sell. And we use our facilities to help kids with autism, service dogs and fearful fliers adjust to and accept the aviation environment. I hope to help deaf travelers as well. That's a lot and there's nothing pretend about any of it. I guess that's why I was born a "captan." **BCA**

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Daher's New TBM 930

Garmin G3000 **for the fastest civil** single-engine turboprop

BY **FRED GEORGE** fred.george@penton.com

Daher's new TBM 930 flagship is the culmination of three decades of enhancements made to the original TBM 700 that was announced at the 1987 Paris Air Show. As with the TBM 900, it can cruise 10% faster and carry 800 lb. more payload with full tanks than its predecessors. Its cabin is far quieter and its systems are more robust and reliable.

The TBM 930 incorporates all of the TBM 900's speed mods, including its computational fluid dynamics (CFD) designed, ram recovery engine air inlet, dozens of drag reduction changes and five-blade composite Hartzell propeller. The TBM 900 and TBM 930 boast more major and minor modifications than all five previous TBM models combined.

With respect to the TBM 900, the TBM 930 has been upgraded with Garmin G3000 touchscreen avionics, including three identical, 12-in. WXGA displays that replace the TBM 900's G1000 with XGA 10.4-in. PFDs and a central 15-in. MFD. The larger size of the G3000 displays and their 30% higher pixel density makes possible full- and split-screen modes on each of the three screens. A pilot might opt to split a screen with an en route chart and an approach chart, or XM satellite NEXRAD weather and a flight plan column, or onboard weather radar imagery and a traffic or terrain display.

In the normal mode with all three screens functioning, the G3000 provides enhanced terrain imagery on its synthetic vision PFDs and crisper systems synoptics on the MFD. The three identical screens also improve reversionary modes because there is more display area to host essential information in the event that one unit fails.

Behind the displays and twin touchscreen controllers, the G3000 has several functions that are new to the TBM line that function as a virtual copilot. Included are electronic stability and protection modes, angle of attack (AOA) indication, underspeed and overspeed protection, automatic emergency descent mode and autopilot coupled go-around/missed approach guidance.

The TBM 930 is priced about $200,000 higher than the TBM 900, and more likely $300,000 more when loaded up with popular options. (The *BCA* equipped

Standard pilot's side door, along with control wheel columns in the instrument panel, make it easy to climb into either cockpit seat.

DAHER (2)

▶ **ASK FRED**
Send your questions about this article to:
fred.george@penton.com

price is $4.1 million.) But the package appears to be strongly attractive. The TBM 930 has been outselling the TBM 900 by a four-to-one margin since initial deliveries began in May 2016. Top U.S. distributor New Avex in Camarillo, California, is doing even better with the new model. The firm is the world's largest distributor of TBM-series aircraft, accounting for one of five or one of six new TBM 900/930 aircraft sold.

Sales director and cofounder Terry Winson says there's been virtually no interest in the TBM 900 among his customers now that the TBM 930 has become available. Virtually all his 2016 orders were for the new model.

Refinements to Airframe and Systems

The TBM 930 shares its structure and systems with the TBM 900, a block point change at serial number 687 that adds several modifications to the 2007 TBM 700N (aka TBM 850). These include a more robust and redundant electrical system, the drag reduction enhancements including winglets and ram recovery engine air inlet, improvements in cabin accommodations, single power lever control and making available the single Pratt & Whitney Canada turboprop's full 850-shp rating for takeoff and go-around.

A follow-on mod adds a five-blade, composite Hartzell prop with aerodynamics that integrate the airflow patterns around the spinner, through the prop and back along the fuselage. The prop also reduces cabin sound levels.

Both the TBM 930 and TBM 900 are powered by the 1,825-tshp PT6A-66D engines that are flat-rated to 850 shp up to ISA+49C, so they can develop full rated power up to FL 270 and 757 shp at FL 310, the aircraft's certified ceiling. The difference between the original TBM's 1,580-tshp -64 engine, flat-rated to 700 shp, and the -66D is substantial. The former could only produce 511 shp at FL 310.

The extra horsepower available for high-altitude cruise and the drag reduction modifications enable the newest version of the aircraft to climb to FL 280 in less than half the time of the original aircraft, and once level, it can cruise up to 37 kt. faster.

The progenitor of the TBM 700 was a turboprop-powered derivative of the pressurized Mooney M301 prototype. But once engineers at Socata, which initially partnered with the Kerrville, Texas, manufacturer, looked at the M301's limitations, they scrapped the derivative and developed a clean-sheet model that took full advantage of the latest computer-aided design tools, a first for this class of aircraft. They borrowed heavily from the design expertise within parent Aerospatiale's research and development group in Toulouse, France, for the new model, including adapting the wing aerodynamics of the ATR 72 regional turboprop. The resulting aircraft, by then a purely Socata project, was substantially larger and heavier than the original concept, but also considerably more capable.

Socata engineers in Tarbes, France, also used modern manufacturing methods they learned from Airbus, including adhesive metal bonding to reduce the number of fasteners and thus assembly hours, along with building secondary structures out of composites. Daher acquired a majority interest in the program in 2008.

The basic TBM 700 has a semi-monocoque, fail-safe design with multiple load paths, and is primarily constructed of high-strength aluminum alloys, along with some steel and titanium. Wing spars, windshield frames and flap tracks are milled out of single piece castings and forgings. Composites are used for the empennage, control surfaces, winglets, fairings and the engine cowl. Stretched acrylic is used for all transparencies.

The airframe is one of the most durable in general aviation, with a basic service life of 12,000 cycles and 16,200 flight hours. Those limits likely will be extended with an enhanced maintenance program as the airframe has been tested to more than 38,000 pressurization cycles and 136,800 landings.

The ATR 42/72's high-lift, low-drag airfoil, albeit scaled down, was adapted to the TBM. It has main and rear

TBM 930 Specifications

***BCA* Equipped Price**	$4,100,00
Characteristics	
Wing Loading	38.2 lb./sq. ft.
Power Loading	8.7 lb./shp
Noise (EPNdB)	77.8
Seating	1 + 5
Dimensions (ft./meters)	
External	see three-view
Internal	
Length	13.3/4.1
Height	4.0/1.2
Width (maximum)	3.9/1.2
Power	
Engine	PWC PT6A-66D
Output/Flat Rating OAT C	850 shp/ISA+49C
TBO	3,000 hr.
Weights (lb./kg)	
Max Ramp	7,430/3,370
Max Takeoff	7,394/3,354
Max Landing	7,024/3,186
Zero Fuel	6,761/3,067
BOW	4,953/2,247
Max Payload	1,808/820
Useful Load	2,477/1,124
Exec. Payload	1,000/454
Max Fuel	1,956/887
Payload with Max Fuel	521/303
Fuel with Max Payload	669/303
Fuel with Exec. Payload	1,477/670
Limits	
VMO	270
PSI	6.2
Climb	
Time to FL 310	18 min.
Climb Rate (fpm)	2,005/611 mpm
Climb Gradient (ft/nm)	970/152 m/km
Ceilings (ft./m)	
Certificated	31,000/9,449
Service	31,000/9,449
Sea Level Cabin	NA/NA
Certification	FAR Part 23 1990

TBM 930 Major Modifications

MOD 70-0188-00	PT6A-66D
MOD 70-0357-71	850 shp for takeoff & landing
MOD 70-0345-61	Hartzell 5-blade composite prop
MOD 70-0232-71	Ram Recovery Engine Air Inlet
MOD 70-0234-24	Electrical System Upgrade
MOD 70-0325-21	Automatic Cabin Altitude selection
MOD 70-0322-00	Aero Mods & LED external lights
MOD 70-0324-00	Single-Power Lever control
MOD 70-0476-00	G3000
MOD 70-0226-00	Synthetic Vision PFD option
MOD 70-0211-57	Increased Usable Fuel capacity
MOD 70-0439-79	Change of Oil Pressure Limits

machine-milled spars, 0-deg. sweep and 6.5 deg. of dihedral.

The single-piece main entry door aft of the left wing is 3.7 ft. wide by 3.9 ft. high. A counter spring system assists with its opening and a geared electric motor closes it. A two-step folding airstair aids in passenger boarding and egress.

There is a separate, forward left-side 2.3-ft.-wide-by-3.1-ft.-high pilot door with its own folding airstair. It formerly was optional, but now it's standard. On the right side of the cabin, there is a plug-design, over-wing emergency exit.

The 6.2-psi pressurization system maintains a 9,350-ft. cabin altitude at FL 310. Most aircraft are configured with two crew chairs and four-chair club seating in the main cabin. But now the aircraft can be ordered with all passenger seats facing forward, which greatly increases seated legroom in the cabin. Up to 220 lb. of baggage may be stowed in a compartment behind the rear seats.

The aft row of seats may be removed to increase cargo capacity to 330 cu. ft. Gear is secured by a nylon-mesh cargo net.

The dual-zone air-conditioning system uses bleed air for heating and heat exchangers, plus a vapor cycle machine with an engine-driven compressor for cooling.

Ice protection is provided by engine exhaust routed through the engine inlet, an inertial separator in the engine plenum, deice boots on wing and empennage leading edges, and electric heaters for the windshields, probes, ports and stall warning vane.

The electrical system has been thoroughly reworked. Both 900-series aircraft have a new 300amp starter/generator, a new 100-amp standby alternator, revised power distribution system and an automatic starter cut-out function. As total electrical load seldom exceeds 85 amps, there is usually no need to shed loads in the event of a main starter/generator failure.

The original TBM 700 prototype had fully enclosed landing gear with outer and inner gear doors attached to the wing. But the inner doors sometimes stuck closed, thus hanging up the landing gear. So, they were removed on production aircraft.

The TBM 900, in contrast, has a second set of doors that are attached to the landing gear, not the fuselage, and they enclose about three-quarters of the tires when the gear is retracted. This reduces drag and increases cruise speed by 3 to 5 kt.

LED lights replace all incandescent bulbs outside the aircraft. High-intensity LED landing lights are mounted behind clear covers in the wing leading edges. LED position, strobe and beacon lights are mounted to the wingtips and new tail-cone fairing.

Flying Impressions

We strapped into the left seat of TBM 930 s.n. 1140, a 2016 model, with Winson in the right seat. Boarding the aircraft and nestling into the cockpit seats is easy in this aircraft because of the pilot's-side crew door and panel-mounted control wheel stalks that clear the footwells. This is the same as in the TBM 900 we flew last year at the Daher plant in Tarbes.

Our first impression was how effectively the G3000 simplifies the instrument panel. The left- and right-side audio control panels, keyboard pad, plus all of the knobs and many of the buttons on the PFDs, have been eliminated. Most of the functions controlled by the knobs and buttons now are incorporated in menu pages on the twin GTC-580 touch-screen controllers mounted below the MFD. But left and right stand-alone baro set knobs for the PFDs have been added alongside the flight guidance control panel below the glareshield.

The G3000's larger display screens squeezed out the TBM 900's 4-by-3-in. L-3 Trilogy ESI-2000 integrated standby instrument above the left PFD. In its place, on the TBM 930 Daher installed a low-profile 2.4-in.-by-5.5-in. Mid-Continent Instruments MD302 standby attitude module with twin screens. The standard package also includes an RVSM data package, GTX33

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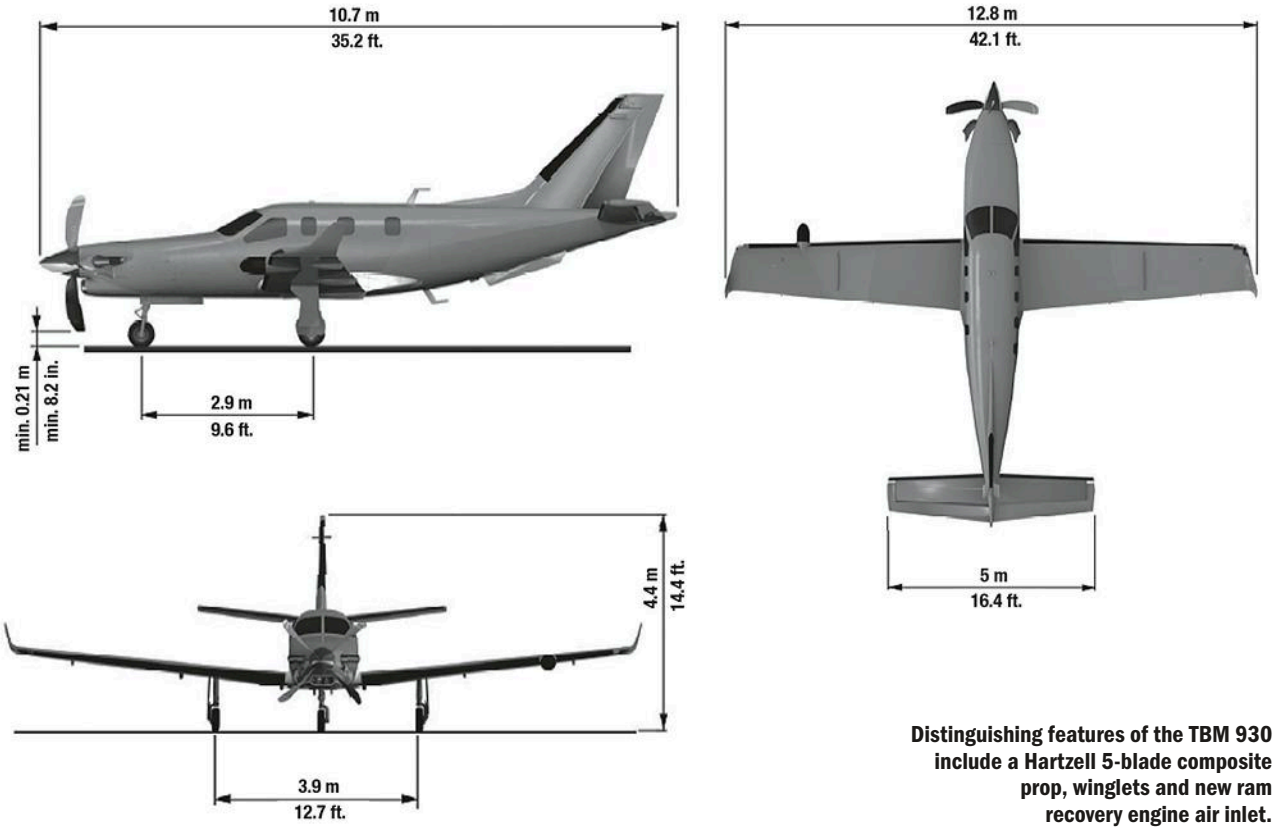


Distinguishing features of the TBM 930 include a Hartzell 5-blade composite prop, winglets and new ram recovery engine air inlet.

Mode S ES extended squitter transponder that meets the upcoming ADS-B requirements, TAWS-B, radio altimeter, GTS820 traffic advisory system, KN63 DME and WX500 lightning detector, electric pitch and rudder trim switch on the copilot's control wheel, and GWX70 40-watt solid-state weather radar. Voice alerts replace simple sounds for stall, overspeed warning, landing gear and cabin altitude.

The single-pilot basic operating weight of the airplane we flew was 5,136 lb., or 307 lb. higher than Daher's quoted BOW in *BCA*'s May 2016 *Purchase Planning Handbook*. Winson commented that his demonstrator is chock full of options, including the deluxe trim package, upgraded leather, ChartView, synthetic vision system, Iridium satcom and XM satellite radio weather and entertainment system.

With two pilots and 1,374 lb. of fuel aboard, ramp weight was 6,710 lb. Based upon a 6,675-lb. takeoff weight, Camarillo Airport's (CMA) 77-ft. field elevation and rounding up to ISA+10C, takeoff distance over a 50-ft. obstacle was just over 2,100 ft.

As with the TBM 900, pre-start checks are short and cranking the Pratt is easy. The improved electrical system features a 300-amp starter generator and 42-amp/hour battery for quick starting, even in cold weather. The TBM 900/930 start sequence is almost twice as fast as that on earlier versions of the aircraft.

In the event that the main starter generator fails, Winson also notes the aircraft's 100-amp standby generator has plenty of capacity to handle all electrical loads, even with ice protection systems in use. No need for load shedding under most conditions.

After engaging the starter, we advanced the power lever to the "low idle" position once gas generator rpm reached 13%. During the sequence and at low idle, bleed air automatically is shut off to prevent thermal stress on the engine. Moving the power lever to the left side of the "h" provides normal power range and prop reverse functions. The prop

DAHER

The Garmin G3000 features three identical 12-in. displays and two landscape-configuration touchscreen controllers.

automatically is governed to 2,000 rpm for all normal operations. As the engine stabilized at 52%, the starter automatically shut off and transitioned to the generator function. With less than 100 amps of electrical load, we switched on the air-conditioning compressor, along with the bleed air and associated cabin airflow controls. We also ensured that the inertial separator was on to prevent the low mounted engine inlet from foreign object damage (FOD).

Using the touch screens, we entered a flight plan from CMA to Fellows VOR, north of Santa Barbara, then back to Oxnard for our first instrument approach. Taxiing the aircraft takes virtually no power increase at moderate weights, as the prop produces ample residual thrust. We frequently moved the throttle aft past the flight idle detent to nudge the beta mode that flattens blade pitch. The flight manual cautions against using reverse thrust during taxi because of the potential for the prop to stir up loose material, resulting in FOD.

Once cleared for takeoff on Runway 26, we advanced the power lever until we saw 90% torque indication. Ram recovery increases torque to about 100% during the takeoff roll. We rotated at 85 KIAS, retracted the gear with a positive rate of climb and retracted the flaps passing 115 KIAS. Before closing the inertial separator door, we had to reduce torque to 85% to prevent exceeding climb torque limits once the door was fully closed. As we've previously reported, the PT6A is long overdue for a FADEC or digital electronic engine control upgrade that would reduce pilot workload.

USB power is provided for EFBs, making possible paperless operations.

Using a 170 KIAS climb speed, the aircraft settled into a 1,950 ft./min. climb. Leveling off at FL 280 in ISA+4C conditions, setting maximum cruise power of 96% and at a weight of 6,450 lb., the aircraft stabilized at 320 KTAS while burning 417 lb./hr. This was within 1 kt. of Daher's cruise speed predictions for this weight, altitude and temperature combination.

As for the manufacturer's claim of a top 330 KTAS cruise speed, look closely at the fine print of the TBM 930 pilot's information manual. That's achievable at FL 280 in ISA conditions, but only at a svelte 5,500-lb. gross weight — final stage of cruise, top of descent, just the pilot aboard and arriving with NBAA IFR reserves.

While the autopilot was coupled, we had time to explore the touch-screen controller functions tied to the main displays, radios, audio levels and aircraft systems. The touch screens use an array of infrared beams rather than pressure or heat sensing so that they respond to finger touches even when the pilot is wearing gloves. While the 14 top-level menus are relatively simple, there are as many as three submenu levels that provide increasingly detailed selections of functions and displays. Similarly, the dozen soft keys at the bottoms of the three main display screens provide up to four layers of menus. Because of the complexity of the G3000 and the expanse of options, the full range of capabilities are best explored and mastered on the ground, with the engine shut down and when the aircraft is connected to ground power, in our opinion. Plan on investing some time studying the 690-page G3000 pilot guide.

We then turned south toward the Pacific Ocean between Santa Barbara and the Channel Islands, descended out of Class A airspace and canceled our IFR clearance so that we could freely maneuver the aircraft. During the descent, Winson commented that the G3000's flight director provides overspeed protection by monitoring indicated airspeed when the pitch hold, vertical speed, vertical path tracking or altitude capture modes are active. Approaching redline, a flashing "maxspd" annunciation appears in the PFD and the flight director starts to pitch up to correct the overspeed condition. The "maxspd" annunciator disappears when the aircraft slows below redline.

Overspeed protection is one of the many "electronic copilot" features built into the G3000. With the autopilot engaged, the automatic emergency descent mode dives the aircraft from high-altitude cruise to 15,000 ft. if cabin pressure is lost. But it's up to the pilot to adjust the power to avoid triggering overspeed protection during the descent or stall protection with too little power after level-off.

The aircraft also has optional electronic stability and protection (ESP) modes that are activated or deactivated through four layers of menus on the touch-screen controllers. ESP uses the autopilot servos to help return the aircraft to stable flight if specific pitch,

roll, speed or AOA limits are exceeded. The servos provide control wheel force feedback that delivers tactile evidence of ESP functioning. The force feedback increases in proportion to the amount of the exceedance from the limit.

ESP can be temporarily disabled by pressing the control wheel steering or autopilot disconnect button on the control yoke. For example, pressing down on the red autopilot disconnect button enables the pilot to perform steep turns without triggering roll stability engagement if the aircraft exceeds a 45-deg. bank angle. ESP roll protection doesn't disengage until bank angle is reduced below 30 deg.

AOA protection is one of the most useful benefits of the system, in our opinion. The TBM 930's high-performance airfoil doesn't have gentle stall characteristics, particularly in the wake of the prop. The TBM 930 has both a dedicated AOA indication and a green doughnut approach speed reference bug on the PFD's airspeed tape, so it's easy to fly the aircraft at optimum AOA during approach. Just as importantly, ESP provides plenty of stall warning and recovery assistance. The first sign of an impending stall is the appearance of a pitch limit indicator on the PFD. When the pitch attitude equals the pitch limit indication, an aural "stall" warning sounds and the pitch servo engages to apply a pitch force to reduce AOA. The force is progressive, sufficient to give the pilot unmistakable warning of the impending stall. When stall break finally occurs, it's been preceded by many warnings.

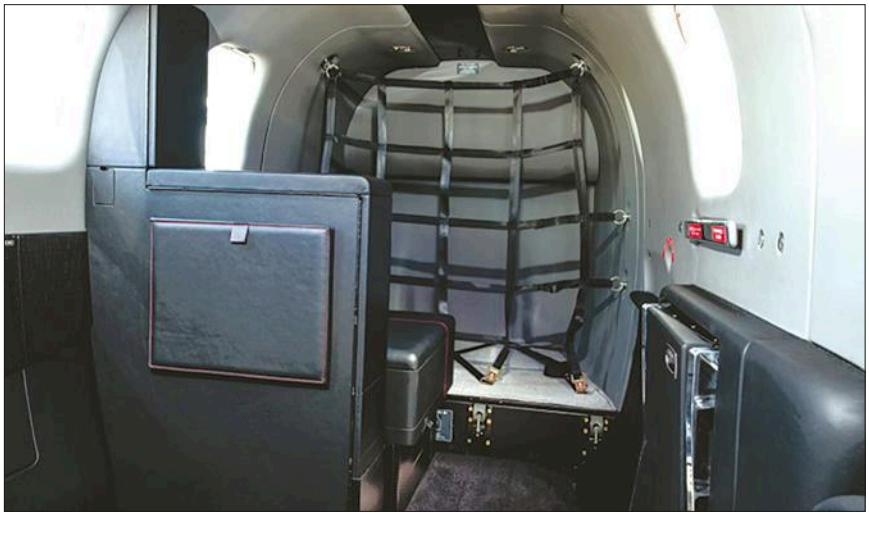
Our first approach was the RNAV (GPS) Runway 25 that we would fly with the autopilot coupled. This aircraft has the optional Jeppesen ChartView system with moving aircraft indicator, a feature we believe is well worth the investment. Garmin also offers its own FliteCharts package, displaying images similar to AeroNav Services terminal procedures charts.

The LPV has a 250-ft. decision altitude at which we planned to execute a coupled go-around. We flew the approach with gear and flaps extended at 80 KIAS. Our computed landing distance at a landing weight of 6,250 lb. was 2,165 ft. (without reverse), even though we didn't plan on touching the tires to the pavement.

At minimums, we pressed the go-around button on the throttle, advanced the power lever and let the autopilot fly the aircraft. As the gear and flaps retracted, we noted the need to reselect heading, nav arm, airspeed hold and altitude preselect on the flight guidance panel in order to program the automation to fly to the missed approach fix. The flight guidance system and autopilot will fly the correct holding pattern entry and remain in the pattern until reprogrammed.

Not far into the missed approach, though, we turned downwind to position the aircraft for the RNAV (GPS) Z Runway 26 approach back at Camarillo. We flew the approach by hand, landed and taxied back to the New Avex ramp.

A capacious cargo door provides easy access to the main cabin, plus luggage bay behind rear seats



The TBM's 930's cabin may be configured with club seating (shown) or all forward facing chairs. Options include a compact lavatory for the aft cabin (bottom photo).

Conclusions

Inarguably $300,000 is a hefty premium to pay for upgrading from the TBM 900 with Garmin G1000 avionics to the TBM 930 with a G3000 flight deck. The latter model is no faster, higher flying or longer legged than the TBM 900, and yet most buyers are apparently opting for the upgraded model.

Quite clearly, the TBM 930 is the most capable TBM produced in the program's 26+ year history. Similar to the TBM 900, it can fly four occupants between most East and West Coast U.S. cities with one fuel stop, assuming seasonal winds. In summer months, it can fly between Fort Lauderdale, Florida, and Seattle in less than 10 hr. including a leisurely stopover for lunch and refueling. It can beat some VLJs and single-engine jets in a coast-to-coast trip because it only has to make one fuel stop while they have to make two.

And even though the TBM lacks the twin-engine redundancy of most VLJs, proponents note that, according to Transport Canada, the inflight shutdown rate for the PT6A now is better than one per 100,000 hr.

Garmin's G3000 provides a raft of innovative standard and optional features, including optional Iridium satcom voice and text messaging, 170-channel SiriusXM satellite radio entertainment, AC-U-KWIK airport directory and maintenance schedule reminders. Other features include choice of absolute or relative terrain imagery, displaying highways and local roads, railroads, rivers, state borders and various sizes of towns according to range selection, airways, jetways, special-use airspace, Class A/B/C/D altitude labels, and various classes of waypoints. It can even be programmed to remind the pilot of an anniversary or birthday.

The G3000 pilot guide actually is longer than the TBM 930 pilot operating handbook, attesting to the system's impressive capabilities, if not its myriad intricacies. Most of the aircraft we've flown with this level of avionics sophistication require pilot type ratings. While no TR is required to fly the TBM 930, initial G3000 transition training is provided by Simcom in Orlando, Florida, and we believe it will take every minute of that course to master the G3000's full potential. **BCA**

ATC Privatization — Pro

Will the airlines **take control of ATC** in the **U.S.?**

BY **DAVID ESLER** david.esler@comcast.net

Ed Bolen believes that total control of the ATC system is the force majeure behind the airlines' long-held wish to create and dominate an air traffic control corporation supported by user fees.

"For several decades now, some of the big airlines have tried to seize control of the ATC system and the revenues that fund it," the NBAA president and CEO told *BCA*. "We believe that they want to use that control for their exclusive benefit."

This compulsion to control the infrastructure of the National Airspace System (NAS) came into the public eye as far back as 1997 during testimony in a U.S. House of Representatives Transportation Committee hearing. When the major airlines claim ATC privatization is "modernization," the CEO of a struggling startup carrier said then to think "economic domination," because the airlines want to run the ATC system for their exclusive benefit.

Twenty years later Bolen, recalled that surprisingly candid admission: "We are very concerned that they would use that control to increase their access to airports and airspace and decrease

& Con

ours," he said. "This will impact small towns and rural communities that depend on business and general aviation for access to the marketplace."

Efforts to rend the air traffic control function from the FAA seem to track with those who hold that anything which cannot be provided exclusively by the government belongs in the private sector. There exist many examples of Air Navigation Service Providers (ANSPs) operating in the private sector across the globe.

Previous attempts to float ATC privatization as riders to FAA reauthorization bills have failed — as have user fee proposals — primarily due to the effectiveness of lobbying efforts by general aviation advocacy groups and supporters in Congress. But as the debate ramps up toward the Sept. 30, 2017, expiration of the current FAA operational authorization amid a new political climate tilted in favor of unrestrained free market economics and smaller government, the fate of an FAA-operated NAS appears ever-more doubtful. It would seem that the separation of air traffic — and who will pay for it — has become red meat for congressional budget battles.

Main Course

Meanwhile, 2016 was a nexus for studying the structure and funding of U.S. ATC. During the year past, reports from the Government Accountability Office (GAO) and the Department of Transportation's Office of Inspector General (OIG) highlighting the pros and cons of ATC privatization joined audits and studies commissioned by members of Congress.

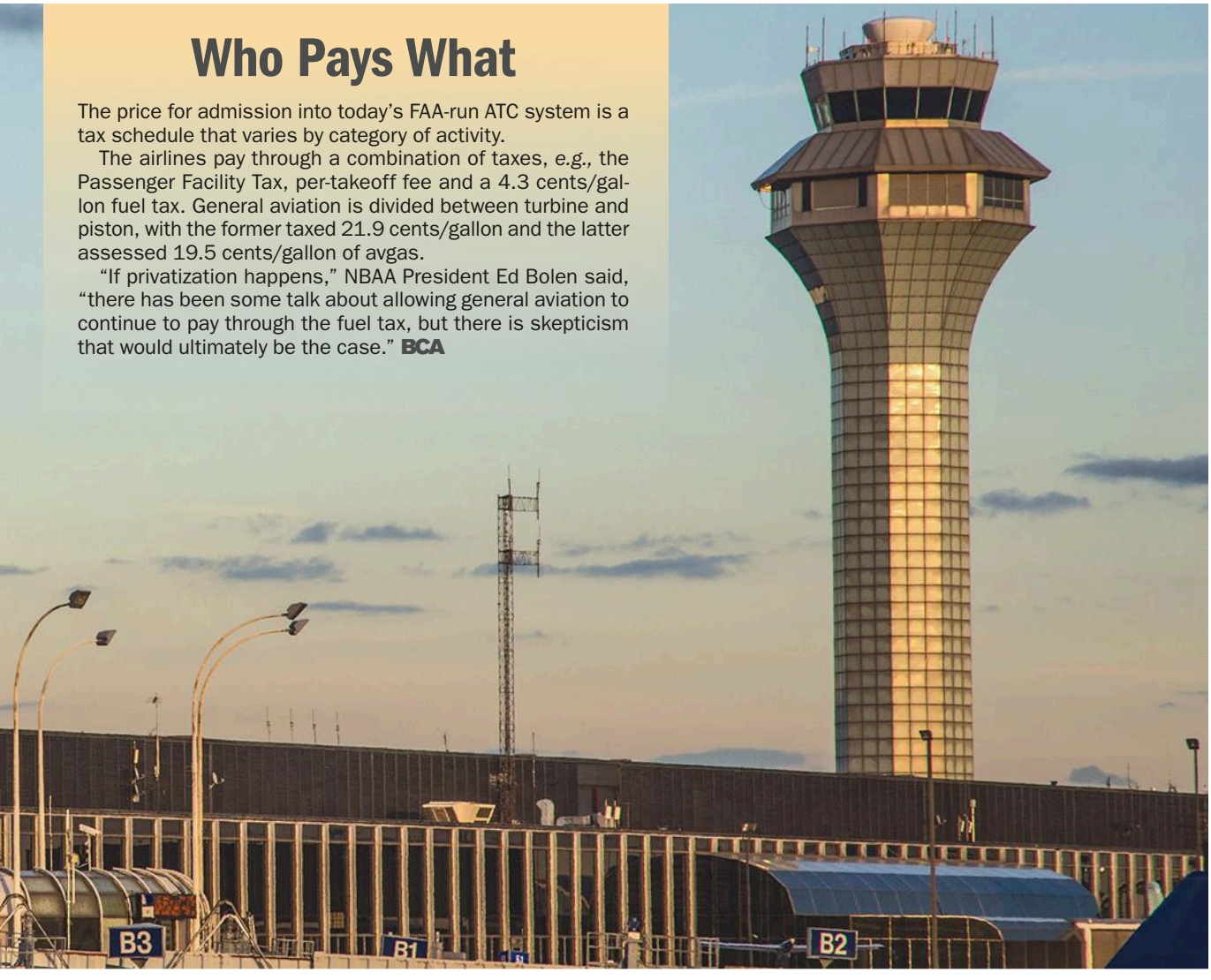
Among the issues raised were cost overruns and schedule drift in the NextGen ATC infrastructure modernization plan. As of last fall, the FAA had spent $7.4 billion on NextGen since the program's implementation in 2004 and yet claims it needs an additional $14.8 billion to complete the six-phase system modernization — that's a $2.6 billion increase from the agency's last estimate in 2012. Further, completion has slipped from 2020 to an undetermined date in the 2030s. (See "Business Aviation and PBN" [*BCA,* December 2016, page 51] for a discussion of the FAA's latest strategy for completing NextGen.) Then, too,

Who Pays What

The price for admission into today's FAA-run ATC system is a tax schedule that varies by category of activity.

The airlines pay through a combination of taxes, *e.g.,* the Passenger Facility Tax, per-takeoff fee and a 4.3 cents/gallon fuel tax. General aviation is divided between turbine and piston, with the former taxed 21.9 cents/gallon and the latter assessed 19.5 cents/gallon of avgas.

"If privatization happens," NBAA President Ed Bolen said, "there has been some talk about allowing general aviation to continue to pay through the fuel tax, but there is skepticism that would ultimately be the case." **BCA**



REX WHOLSTER/ISTOCKPHOTO

questions have arisen about the reliability of the ADS-B system and lagging operator equipage numbers.

Perhaps it shouldn't be surprising. NextGen is essentially a huge public works project, and those often fail to track to promised schedules or budgets. And, too, political partisanship, sequestration and government shutdowns have had their deleterious effects on the ATC modernization program, pushing progress deadlines ahead and wasting money.

So in the midst of all this interest in whether or not to privatize ATC, in February 2016, Rep. Bill Shuster (R-Pa.) and Frank LoBiondo (R-N.J.), House Transportation and Infrastructure Committee chairman and Aviation Subcommittee chairman, respectively, co-introduced H.R. 4441, the "Aviation Innovation, Reform and Reauthorization Act." A six-year FAA reauthorization bill, it called for the creation of a nonprofit, self-financed, non-share air traffic control and modernization corporation modeled after Nav Canada. Ultimately, H.R. 4441 was blocked from reaching the House floor for vote, but it is generally accepted as a template for ATC reform that meets the conservative litmus test. Expect it to reemerge in some form in 2017.

The federally chartered ATC corporation H.R. 4441 proposed would be governed by a board "representing the aviation system's users and the public interest." As a possible prototype for a U.S. privatized system, it is revealing to look at Nav Canada's governing board, which is composed of four directors representing the nation's airlines; one director representing business and general aviation, elected through the Canadian Business Aviation Association; three directors representing the Canadian government; two directors elected by employee unions; and four independent directors elected by the overall board. The Nav Canada board hires a president/CEO to manage the corporation, and that person then also serves on the board.

H.R. 4441 was to preserve the FAA's regulatory and enforcement functions under the federal umbrella but would have, among other reforms, "streamlined" the agency's aircraft and equipment certification process. The ATC corporation was to be set up on debt financing (Nav Canada was required to purchase all of the country's ATC infrastructure as a stipulation of its charter) and operated on user fees. But most significantly, the Shuster/LoBiondo legislation would have, in one fell swoop, removed 30,000 civil service employees from the federal payroll, contributing significantly to conservatives' goals of reducing the size of government and the federal deficit.

But considering its service to the public, much like a public utility, should ATC be removed from federal control at all? Should such a service provider be tossed to the vicissitudes of the free market where it could be exposed to labor actions, economic downturns, bankruptcies and such? How do you guarantee continued service during bad times no matter what? These and other questions frame the privatization debate.

"The public airspace should be operated in the public's best interest," Bolen insists. "So we think the best way to ensure that is to have final authority resting with the public's representatives, not special-interest groups. Our concern is that we could turn the system over to this combination of special interest groups dominated by the airlines."

Citing what he characterized as "the world's largest and best system of airports, the best ATC system," Bolen maintains that the challenge to the U.S. "is how to continuously improve and enhance our air traffic system and still ensure it operates for the public's best interest. So, we've been offering targeted solutions to immediate problems whereas the airlines are saying, 'Just turn everything over to us, and trust that it will be OK.'"

Message to Business Aviation

BCA asked airline lobbying group A4A's Sharon Pinkerton if she had a message for business aviation regarding ATC privatization. Her response:

"It is in business aviation's interest to evaluate and understand that the status quo could be improved through reform and that, when you look around the world, there's a better way of doing business."

Airline Angst

The most powerful advocate for ATC privatization is Airlines for America, or A4A, the principal lobbying group for commercial aviation in the U.S. since 1936. Formerly called the Air Transport Association of America, its nine members and their affiliate carriers account for 90% of U.S. passenger and cargo traffic. At a National Press Club event last fall, A4A announced its intention to fully support ATC privatization during the current reauthorization debate.

A4A's current airline membership roster includes Alaska, American, Atlas Air, FedEx, Hawaiian, JetBlue, Southwest, United and UPS, with Air Canada as an associate member. Notably absent is Delta Airlines, which as of 2013 was the U.S.'s largest carrier by passenger count; it left A4A in October 2015.

"In recent years, Delta and the trade group had not been aligned on several key issues, including the growing harm of government-subsidized carriers in the Middle East and the effects of the Export-Import Bank on U.S. airlines," Delta spokeswoman Elizabeth Wolf explained to *BCA*.

"A4A also has advocated for the nation's air traffic control to be separated from the FAA and put into a private organization — a move long opposed by Delta," Wolf continued. "The main reason is essentially that we haven't seen compelling data to show that spinning off ATC would result in any improvements or efficiencies in the system, and we are concerned that the transition would be a distraction that could slow down progress on NextGen implementation."

So, do the airlines united in A4A really want to control ATC and, thus, access to the NAS? "This is a red herring," an exasperated Sharon Pinkerton exclaimed. She is senior vice president, legislative and regulatory policy, at A4A. "The rhetoric doesn't match any reality," Pinkerton continued. "If we did want to take control of the system, we wouldn't have supported Shuster's proposal."

According to Pinkerton, A4A believes "the real issues with business aviation are around funding, but we really don't understand their [the NBAA's] strident opposition. When you look at the rest of the world, their concerns are misplaced, as there is no evidence that reformed systems limit access."

Instead, Pinkerton maintains, it is the status quo that limits access, "that and policymakers who want to come in and try the latest ideas. I think the status quo is the biggest threat to business aviation in that we're not making progress in increasing capacity in the system and the way it's funded. The opportunities

for improvement are legion."

But Bolen maintains that privatized ANSPs have exposed inherent flaws. "We have seen it in various parts of the world and seen a lot of problems with it," he said. "For example, in Australia, commercial flights have priority, so we have heard from our members about sitting on tarmacs for up to 5 hr. waiting for departure clearances. In the U.K., their system went bankrupt and [its management] had to turn to the government for a payout."

Bill Deere, executive vice president at the National Air Transportation Association (NATA), noted that proponents of "corporatizing" air traffic control often hold up the number of such ATC systems around the world as "proof" that privatization is the better solution. However, "if one looks at those countries, the systems and investment are significantly smaller than those of the U.S. system, and in some places corporatization has allowed only for the creation of minimal levels of surveillance where none had previously existed," he said. "In the case of Canada, Nav Canada was created to address a budgetary crisis in the Canadian government.

"A 2015 DOT Inspector General report clearly demonstrates these international air traffic control systems are much smaller and less complex than our own," Deere continued. "Also reported by the IG, these air traffic control providers, unlike the FAA, 'do not embark on large, comprehensive modernization efforts such as NextGen transformational programs or conduct extensive aviation research and development.' Instead, as the report notes, these air traffic providers, including Nav Canada, rely on small, incremental changes using off-the-shelf technology."

A4A: FAA's ATC Is Inefficient

The airline industry's argument for privatization is built primarily around increasing capacity and efficiency in the system, and the lagging NextGen program especially sticks in its craw.

"We support privatization because of the lack of progress of the nation's biggest infrastructure project, NextGen," said A4A's Pinkerton. "And while it may look fine, the fact is that the FAA has released a report that shows that the inefficiencies of the current system cost the economy — mostly passengers, in terms of lost time — $30 billion a year due to unnecessary delays in the system."

This could be addressed with quicker progress completing NextGen, A4A believes. "An airline flight between DCA [Reagan Washington National Airport] and any New York airport used to be scheduled for under an hour and now takes anywhere from 15 to 20 min. longer, with a total segment time of 180 min. 20 years later," Pinkerton noted. "In an age where we supposedly have better technology and faster planes, the ATC system is not keeping pace. The impact on passengers of delays in the system is the number one problem."

Closely tied to ATC modernization is the funding of the system, which Pinkerton maintains is "completely broken. We have an annual appropriations process that starts with the Office of Management and Budget setting the budget based on FAA proposals. That process is driven by other built-in constraints that have nothing to do with running ATC, everything from concerns about the federal deficit to coming up with the federal budget. Part of what we're advocating for is an independent system that is not dependent on the federal government for contributions and one in which you can do planning in a long-term manner — NextGen should be planned according to a five-, 10- and 20-year outlook."

So the essence of the A4A campaign is "governance and funding reform," Pinkerton explained. "On the governance side, we are advocating for an independent nonprofit organization. Some people call it a co-op, as the board of directors is made up of aviation stakeholders including the government, labor and general aviation community. There are different examples of this across the world. In Germany there is an independent government corporation. And there's Canada's model, which we like and which has worked very well — and could work for the U.S. The funding model in the rest of the world is basically user fees."

There is nothing inherently governmental about ATC and the provision of its services, Pinkerton maintains. "Government shutdowns have nothing to do with ATC either. The idea is to remove ATC from politics and the budget process. In 2013, we had a partial shutdown of ATC with controllers furloughed, not a shortage of funding, as we had $5 billion in the Aviation Trust Fund. At the end of last year, we had $7 billion. Despite having a surplus in the Aviation Trust Fund, we are still subject to an annual appropriation process, which isn't good for the system, the controllers, NextGen or the traveling public. Or, I will venture, good for business aviation, either."

Another criticism of the present government-operated system is that sporadic funding has drawn out the NextGen schedule to the point where newer technologies like satellite-based ADS-B are leapfrogging those to which the U.S. program is already committed, such as ground-based ADS-B.

By a two-to-one majority Americans are opposed to privatizing ATC, Bolen claims, based on a 2015 poll. "There are conservative and consumer groups, a lot of people who have expressed concern or opposition to this idea," he said.

NATA: Privatization Doesn't 'Fit' Here

The NATA's Deere says his organization disagrees with A4A's privatization push "because it doesn't fit the American

CONTROLLERS AND PRIVATIZATION

During an ATC privatization attempt 13 years ago, the National Air Traffic Controllers Association staunchly opposed the move.

In the current campaign, it seems the union has changed its stance to support a privatized system as reflected in Rep. Bill Shuster's H.R. 4441 from 2016. When *BCA* inquired, a NATCA representative declined an offer to be interviewed but did provide this statement:

"NATCA's primary objective remains the same: to achieve a stable, predictable funding stream for the National Airspace System. NATCA will review any new proposal and evaluate it based on whether it protects workforce rights and benefits, maintains safety and efficiency as the top priorities, creates funding certainty, and maintains service to all segments of the aviation community." **BCA**

system. It discourages investment and erodes general aviation's access to airspace and airports. No country has what we have: a highly complex national system that serves all entities. As a country, we make it a policy that there is national access to highways and broadband, and that also applies to the National Airspace System and airports."

The NATA also believes that privatization puts that system at risk. "If you're going to run ATC as a business," Deere said, "it injects risk into the national system. If you're going to run it as a business, you will not invest equally in all areas. But in the government-operated system, we've made it national policy to invest everywhere, even in rural America."

Deere said the NATA supports making the FAA a more efficient operation, but its FAR Part 135 members balk at committing to a reformed ATC when its funding structure is so-far unknown. "What will be the cost to operators?" he asked. "Last February, the House Transportation and Infrastructure Committee floated a proposal singling out FAR Part 135 as the only entity that would pay user fees, while other general aviation entities, like Part 91 business aviation operations, would continue to pay the gas tax. Now, while we don't know what the navigation fees will be, we do know that one segment of GA was singled out to pay them."

An ATC corporation inserts "significant uncertainty" into the Part 135 community, Deere claimed. "Typical for many small businesses, the overwhelming majority of Part 135 operators have 25 or fewer employees and less than $5 million annual revenue." In response to Shuster's H.R. 4441 proposal last year, the NATA released this statement: "The Corporation's proposed leadership structure provides major airlines the confidence they seek to control a future air traffic control system primarily for their benefit. Absent congressional oversight, this proposed construct risks unconstrained cost increases being passed along to other users of the system."

Are NATA members paying their way to use the current ATC system? "Yes," Deere said. "Like other members of the aviation community, NATA members contribute to the Aviation Trust Fund through fuel and excise taxes. In fact, Aviation Trust Fund revenues comprise the overwhelming share of FAA spending, over 97% in fiscal year 2015 alone."

So, the question is not one of funding, Deere maintains, but rather whether the current budget process should be amended to ensure the revenues are being fully utilized for the intended purpose.

"That does not require the A4A policy prescription, the establishment of a corporatized air traffic control system," said Deere. "In fact, a recent GAO report requested by the NATA confirmed our long-held belief that not all aviation

Documenting the Divide

What's the FAA's proper role?

Three recent government reports — one commissioned by the architects for FAA change and two by the stalwarts of the status quo — will fuel battles over ATC privatization efforts likely to be included in a multi-year FAA reauthorization bill in 2017.

A push in early 2016 by two key House Republicans — Transportation and Infrastructure Committee Chairman Bill Shuster of Pennsylvania and Aviation Subcommittee Chairman Frank LoBiondo of New Jersey — to create a non-profit, non-share air traffic control corporation modeled after Nav Canada failed to gain traction. The bill was replaced by a funding extension that kept the FAA in its current form at least until the end of this fiscal year.

During an Airlines for America (A4A) summit in Washington, D.C., in September 2016, American Airlines CEO Doug Parker launched the first volley in what is sure to be a contentious attempt to split the FAA's roles. "We need to get this ATC reform thing done," Parker said during a keynote speech at the event.

The National Air Traffic Controllers Association (NATCA) also favored Shuster's bill, which called for an ATC corporation to be run by an 11-member board of directors (and a 15-member advisory board) that would fund ATC and modernization through user fees levied on commercial operators. Currently all U.S. operators, whether airlines or general aviation, pay for ATC services through various passenger charges and fuel taxes, which Congress can supplement through a General Fund contribution.

Proponents for trimming the FAA's role to primarily one of safety and certification might have new grist for the upcoming debate in the form of recent reports by the Government Accountability Office (GAO) and the Transportation Department's Office of Inspector General (OIG).

In an audit request by Shuster of the FAA's spending and schedule for NextGen — its National Airspace System (NAS) modernization program — the GAO noted that the scheduled completion has slipped out past 2030 from the original completion date of 2025. The program is largely based on six key infrastructure improvements, including automatic dependent surveillance broadcast (ADS-B), system-wide information, data communications and the NAS voice system. NextGen also requires users of the system to largely pay for their own equipment modernization, an upgrade the FAA estimates will cost $15.1 billion.

The FAA has spent in excess of $7.4 billion since the program launched in 2004 and figures it will need another $14.8 billion more to finish — a $2.6 billion increase from its 2012 estimate. The latest total is higher, says the GAO, because the FAA did not include the cost of maintaining the infrastructure in its 2012 numbers. Overall, the GAO says the new forecasted total of $22 billion is "within the range" of the FAA's 2007 estimate of $15 billion to $22 billion to complete NextGen.

Less flattering is a Nov. 10 audit by the OIG requested by Sen. John Thune (R-S.D.), chairman of the Senate Committee on Commerce, Science and Transportation, and its ranking member, Sen. Bill Nelson (D-Fla.). Both Thune and Nelson were opposed to splitting the FAA, although Thune in a hearing last February called the measure "an innovative

taxes are being deposited in the Aviation Trust Fund."

Too Big to Privatize?

Defenders of a federally operated ATC system often claim that the U.S. system is just too large and complex to privatize. Bolen: "In the U.S., we have something unique — the size and magnitude of our ATC system is beyond compare, and we have a collection of airports that is among the largest in the world, too. And we are very concerned about trying to take the largest, most complex and safest ATC system in the world and modeling it after that of a country that may have a tenth of what we have. [An oblique reference to Canada.] Most ATC systems need to break even, so if there is a turndown, they have to raise their rates at a time when operators can least afford fee increases."

Too big to privatize? "Oh, that's just not true," Pinkerton at A4A exclaimed. "[The NAS is] divided up into smaller pieces of airspace — we are not talking about the delivery system but the structural tie to the government and the funding that will enable us getting out of the annual budget cycle [i.e., reauthorization]. It has nothing to do with how complex a TRACON is."

Could the privatized, Nav Canada-influenced model in H.R. 4441 work in the U.S., given the landmass, sheer size of the operation, and growing demand for all forms of air transport?

"On the topic of privatized ATC in the U.S., I really could not say whether or not it would be a success," Rudy Toering, president and CEO of the Canadian Business Aviation Association, told *BCA*. Taxation, rules and regulations, even how airports are run and financed in Canada are quite different from their counterparts in the U.S., Toering explained. "This all goes hand in hand with our privatized Nav Canada that has been extremely successful in Canada for the last 20 years. So in short, it works very well in Canada. Will it work the same way elsewhere? No one knows for sure."

In the meantime, the NATA's Deere thinks we'll see "some good old-fashioned lobbying" this year along with a vigorous debate about whether the country is willing to abandon nearly a century of government-provided ATC in favor of privatization. As this went to press, the Trump administration's position on privatizing ATC was unknown. Shuster, however, told the Associated Press that he had discussed the subject with President Trump before and after the election and "he generally liked the idea. . . ."

On the other hand, as Deere pointed out, we now have a president who has relied on business aircraft — both fixed- and rotary-wing — to help him succeed in business and, most recently, in politics. **BCA**

approach" to solving the agency's perennial NextGen cost and schedule overruns.

The latest OIG report, which proclaims the costs, schedules and benefits of NextGen to be "uncertain," is contested by the FAA. Key issues include that the agency had not fully identified the "end state" for any of its six major NextGen infrastructure elements, including how long it will take to complete them or what capabilities they will ultimately deliver.

"As program requirements continue to evolve for the six programs, the efforts represent open-ended financial commitments with uncertain end states," the OIG cautioned. "The FAA has not adjusted expected program benefits, and many benefits remain broad, unquantified and potentially difficult to achieve."

For example, on the FAA's ADS-B Out program, the OIG says there is "considerable uncertainty" over whether operators "will be able or willing" to meet a January 2020 mandate for having the equipment installed and operational. As of August 2016, the report states that 9% of commercial aircraft (651 of 7,000) and 10% of general aviation aircraft (15,657 out of 160,000) had equipped with ADS-B Out.

Furthermore, the OIG reported FAA data "shows that almost 5,000 aircraft (both commercial and general aviation) are not properly transmitting the ADS-B signal due to installation or other issues."

In response, the FAA noted that all ADS-B ground systems are in place, and airlines, under the auspices of the NextGen Advisory Committee, have agreed to commit to the 2020 mandate. The agency did not comment on supposed issues with the 5,000 installed ADS-B units.

And as of Dec. 1, the agency said the number of properly working ADS-B units in fixed-wing general aviation aircraft had increased to 18,292 — a figure that did include 4,235 units that were installed but are not performing correctly.

An earlier GAO report prepared for Rep. Peter DeFazio (D-Ore.), ranking member of the Transportation and Infrastructure Committee, and Rep. Rick Larsen (D-Wash.), ranking member of the Aviation Subcommittee, was somewhat more evenly divided on benefits versus problems of splitting the agency. Last year, DeFazio and Larsen were both "strongly opposed" to Shuster's bill. The report was a continuation of work started in 2014 to interview experts and stakeholders on potential benefits and issues with splitting the FAA's functions. The upshot of the 2014 study was that "most stakeholders agreed that separating ATC operations from the FAA was an option," the GAO reported.

In the newer study, the GAO reached out to 32 experts and 20 stakeholders in interviews and surveys. Key results include:

▶ Eight of 13 experts said separating ATC operations from the safety regulator could have a "positive effect on the safety regulator," but seven of 13 experts said such a separation would have "large negative impact" or "small negative impact" on different aspects of the safety regulator including staffing levels and expertise.

▶ Nine of 20 aviation stakeholders felt that a separation could negatively impact the safety regulator's ability to hire and retain talent.

▶ Seventeen of 18 experts said a user fee system should be implemented to fund a new ATC entity, but only eight of 20 aviation stakeholders supported the idea of user fees. **BCA**

— ***John Croft***

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CRJ Freighter Downed in Sweden

Failed IRU key to upset

BY **RICHARD N. AARONS** bcasafety@gmail.com

On this night, Air Sweden 294 was a Bombardier CRJ-200 (CL-600-2B19) configured for commercial freight hauling and operated by West Atlantic Sweden AB. The pilots lost control while at FL 330 due to several things but most particularly to confusing EFIS information following the failure of the left-side inertial reference unit (IRU).

The Swedish Accident Investigation Authority (SAIA), though working with an international team of airframe, avionics and regulatory air safety investigators, was unable to determine why the system failed. Even so, the SAIA was able to piece together what happened on the flight deck that night and make recommendations for new training standards and cockpit resource management (CRM) callout procedures.

The accident occurred in Swedish airspace on Jan. 8, 2016, during a commercial mail-cargo flight from Norway's Oslo/Gardermoen Airport (ENGM) to Sweden's Tromsø/Langnes Airport (ENTC). The pilot-in-command (PIC) and the copilot had flown ENTC-to-Harstad/Narvik Airport (ENEV) in Evenes, Norway, and ENEV-to-ENGM legs earlier in the evening with the same aircraft. Their flight duty started at 1810.

The IFR flight plan filed for the 1-hr., 43-min. flight called for a route that was basically direct from origin to destination at FL 330. The night was clear but moonless; weather was good with no risk of icing, turbulence, precipitation or lee waves.

Departure was planned for 2300. The airplane had been fueled and loaded within weight and balance limits. The cargo load had been anchored in sections, each section surrounded by vertical nets designed to withstand a longitudinal load of 9 Gs.

At 2224, the flight crew agreed that the PIC would be the pilot flying (PF) and the copilot would be the pilot monitoring (PM) on the leg. The crew requested and received their clearance, ran appropriate ground checklists and moved to the deice ramp where the aircraft was serviced.

A two-step deicing was performed at 2301 with deicing fluid Type I to remove ice, frost and snow, and Type II (to avoid refreezing). The airplane's wings, and horizontal and vertical stabilizer were treated. During the deicing procedure, the copilot read all the items of the "deicing" checklist, which were acknowledged by the PIC. The crew performed a flight controls check of ailerons, spoilerons, rudder and elevator. At 2304, an engine run-up was performed immediately before takeoff to clear the engines from residual deicing fluids.

The takeoff (at 2309), departure, climb and cruise phases were all unremarkable. At 2337, the airplane was established in level flight at FL 330. The flight crossed the border and entered Swedish airspace. The pilots were expecting a descent and circling approach to Runway 01 at Tromsø.

What follows is largely from the SAIA's analysis of the digital cockpit voice recorder (CVR) and digital flight data recorder (FDR).

At about 0018, the PIC asked the copilot if he was ready for a briefing, and the copilot acknowledged. Investigators said that there was no indication control of the airplane was handed over to the copilot before the briefing. The briefing took about a minute and covered all the relevant items for the Tromsø arrival.

The CVR indicates that all conversations between the pilots were conducted in English. There were conversations both of operational and of private nature, and all conversations were conducted without any evidence of misunderstandings between the pilots.

As the briefing played out, the airplane was in level flight at FL 330 on a heading of 14 deg., with an IAS of 275 kt. and a groundspeed of 422 kt. The autopilot and the yaw damper were engaged. All recorded FDR parameters had been stable with normal values to this point during the cruise phase.

The upset was sudden and events occurred rapidly in the cockpit. Because of this, the SAIA created a "t" timeline in seconds beginning at "t0;" it was 19 min., 20 sec. past midnight.

FDR data indicate an increase of the pitch angle at t0, during the approach briefing. From a constant value of about 1 deg. the angle increased to 1.7 deg. The rate of pitch angle increase was approximately 6 deg. per second during the following 6 sec. The trouble was that the airplane was maintaining level flight at this moment — there was no real-world pitch up.

The recorded pitch angle emanated from the airplane's inertial reference system One (IRS-1), which, with normal settings in the cockpit, also fed the left pilot's primary flight display (PFD-1) with the same information.

At t2 — 2 sec. into the event — the PIC exclaimed "What [!]". The recorded pitch angle had now increased to approximately 15 deg., but the recorded altitude, speed and angle of attack (AOA) remained unchanged. (The AOA is not displayed to the crew.)

Immediately thereafter, the autopilot disconnect aural warning (cavalry charge) activated. The autopilot disconnect is confirmed by FDR data. Bombardier said the autopilot was most likely automatically disconnected due to differences in the pitch servo commands. The aural warning remained active for the next 18 sec.

At t3, an aural caution single chime sounded. FDR data indicate that both left and right elevators moved to a position that causes the airplane to pitch down. The AOA recorded from vanes on the airplane's left and right sides changed to negative values. FDR data also indicate that the moveable horizontal stabilizer trim was manually activated from the left control wheel trim switch for 19 sec. During this period, the right control wheel trim switch was also activated for 3 sec. The left control wheel switch has priority over the right switch. The trim position initially

increased at a slow rate toward nose down, from the initial recorded value of -0.9 deg. (airplane nose up).

At t5, the recorded (and left PFD displayed) pitch angle exceeded 30-deg. nose up, which meant that, by design, red chevrons pointing down were displayed on PFD-2 and any displayed miscompare indications were removed (a function called declutter). The speed of the stabilizer trim change increased from that time and reached 1.7 (airplane nose down) at t12.

The airplane started to descend with vertical acceleration values momentarily reaching -1 G. At the same time the CVR recorded irregular sounds for a period of about 5 sec.

At t9, after a few seconds with negative G-load, the airplane's warning system was activated with a triple chime. Immediately thereafter, the CVR recorded "strong expressions" from both the copilot and the PIC, followed by an audio signal (synthetic voice) "engine oil" for low oil pressure in the engines. According to engine manufacturer General Electric, the warning was due to the negative G-load.

At t11, the stabilizer trim movement clacker sounded indicating that the stabilizer position movement had been sensed at a high rate for more than 3 sec. In this case the stabilizer movement was due to manual trim switch command. Immediately thereafter, a triple chime sounded again and was interrupted by two audio warnings of "bank angle," which meant that the airplane's roll angle had reached at least 40 deg. At the first "bank angle" warning the copilot said, "Come up." At the second "bank angle" warning the copilot said, "Turn right" and the PIC simultaneously said, "Come on, help me, help me, help me."

At t17, the maximum operating speed (V_{MO}) of 315 kt. and the maximum operating Mach number (M) of 0.85 were exceeded almost simultaneously. The overspeed clacker activated and the vertical acceleration returned to positive values. The overspeed warning continued to sound until t72. The PIC asked for help again, which was answered by the copilot saying "Yes, I am trying." When the vertical acceleration turned to positive values, the CVR recorded irregular sounds again during a period of more than 2 sec.

At t20, the audio signal from the autopilot disconnect warning ceased and simultaneously a "bank angle" warning was sounded. The copilot now said, "Turn left" three times, followed by "No" and simultaneously two single chime audio cautions sounded.

At t23, the recorded indicated airspeed reached 364 kt., corresponding to Mach 0.91, which meant that maximum dive Mach (MD) was exceeded.

At t30, the copilot transmitted a distress call, "Mayday, Mayday, Mayday, Air Sweden 294," which was

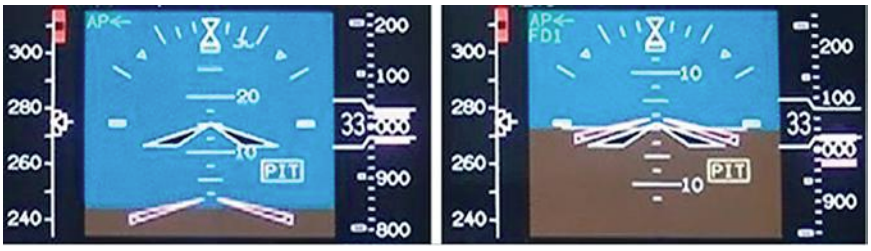

Figure 1. **IRU fails**
A failure of the left Inertial Reference Unit (IRU) generated the display on the right — two seconds into the start of the incident. The failed IRU was sending the same false nose-up information to the DFDR. The PFD image at the right was correct and was probably showing on the right side.

Figure 2. **Four seconds into the incident**
At t4 the pitch angle on the left PFD reached 30 deg. and the unit went into declutter mode, which means that the pitch caution (PIT) and the Flight Director symbol disappeared and that a red chevron appeared. The right unit was still displaying information without declutter as before. Almost simultaneously the audio warning Single Chime was activated with a delay due to the autopilot disconnect warning that had priority. No verbal acknowledgement from either pilot was heard on the CVR recording.

Figure 3. **Start of diverging Roll Angle at t9**
At approximately t13 the pitch angle on the right-side PFD reached -20 deg., which meant that the declutter mode now was activated on this side (see Figure 4 below). The copilot exclaimed the first operational callout "Come up."

Figure 4. **Declutter mode on right PFD at t13.**
The situation presented the crew with two contradictory attitude indicators with red chevrons pointing in opposite directions. At the same time none of the instruments displayed any comparator caution. Neither of the pilots verbally referred to the standby horizon. This can be explained by the complex situation facing the flight crew due to variations in G-load and a great number of audio and visual cautions and warnings. This probably further contributed to cognitive tunnel vision and focus on each on-side attitude indicator.

acknowledged by ATC. Then the copilot transmitted another emergency call, and at the same time two single chime cautions sounded. The copilot then stated an intent to call ATC back, "We call you back, Mayday, Mayday."

By now the recorded indicated airspeed had increased to 400 kt., corresponding to the airplane's maximum design speed (VD), and the recorded altitude was about 24,000 ft. The horizontal stabilizer trim was activated once again from the left control wheel switch and was reduced to 0.3 deg. airplane nose down. Immediately thereafter, the left control wheel pitch trim disconnect switch was activated. The PIC said "Mach trim," which was answered by the copilot with "Trim, trim a lot."

At t40, an ATC call to the flight was heard but was not acknowledged by the flight crew. Another single chime sounded; thereafter, the engine thrust was reduced to idle. Audio warnings of "bank angle" were sounded continuously until the end of the event.

The recorded FDR value for indicated airspeed shows a continuous increase to 508 kt. The recorded vertical acceleration indicates positive values peaking at approximately +3 G. FDR data further indicate that the airplane's ailerons and spoilerons were mainly deflected to the left during the event. The flight crew's dialogue by now mainly involved different opinions about turning directions. The crew also expressed the need to climb.

At t57, another single chime was recorded.

The airplane collided with the frozen desolate terrain near Oajevágge, Norrbotten County, Sweden, at 2,370 ft. ASL in an inverted position at t80, or 1 min., and 20 sec. after the start of the event. Radar recordings and the position of the accident site indicated that the airplane's trajectory had changed by 75 deg. to the right during the event. The accident was not survivable.

The 42-year-old command pilot had amassed 3,365 flight hours, of which 2,208 were in type. He had flown 130 hr. in the previous 90 days in type and had 93 landings. He held an ATP license.

The 33-year-old copilot held a commercial license and had accumulated 3,232 hr., of which 1,064 were in type. He had flown 130 hr. in the previous 90 days, and logged 94 landings.

SAIA Analysis

Sweden's investigation team looked at similar aircraft, flew the accident profile in simulators, interviewed management and other CRJ pilots, and spent months with specialists looking at IRS component failure history and modes. The team determined that the crew, airplane and mission had been appropriately readied and planned. The cargo was secure and there had been no cargo shift. The weather was not a factor other than the dark night conditions. All components and systems other than the left-side IRS were functioning normally. Ultimately, the SAIA published an in-depth analysis and discussion of causal factors. What follows are the high points.

During the flight, a malfunction occurred on one of the airplane's inertial navigation units (IRU-1); however, the internal continuous self-test system accepted the attitude parameters as valid, thereby providing the erroneous information to both left-side PFD and FDR.

The SAIA and the manufacturer of the IRU searched for similar malfunction events but found none. The manufacturer performed hardware and software tests but was unable to reproduce the scenario. During the investigation the SAIA discovered that fault reporting from the field, that is, from flight crews, sometimes is written without details, such as "This thing is busted," rather than, "This system generated the following false

Accidents in Brief

Compiled by Jessica A. Salerno

Selected Accidents and Incidents in December 2016. The following NTSB information is preliminary.

▶ **December 29 — About 1844 PST, a** Cessna 182P (N52388) crashed near Dabob, Washington. The private pilot and three passengers were killed in the accident and the airplane was heavily damaged. The Cessna was registered to and operated by the pilot as a personal flight under FAR Part 91. Visual and instrument conditions prevailed in the vicinity of the accident site at night. A flight plan was not filed for the cross-country flight that originated from Boeing Field International Airport (BFI), Seattle, Washington at 1816 with a planned destination of William R. Fairchild International Airport (CLM), Port Angeles, Washington. After losing radio and radar contact with Whidbey Island Naval Air Station Approach Control the accident airplane became the subject of an Alert Notice (ALNOT) issued by the FAA. A search was conducted by the U.S. Navy and a Washington State search and rescue team. The airplane was located the morning of December 30, 2016. The wreckage was located about 1.5 mi. south of Dabob in steep, heavily wooded terrain. A witness located at his residence, about 800 ft. to the southwest of the accident site, reported that he heard the airplane flying southeast then east and that the engine was loud. Review of radar data revealed a primary target, consistent with the accident airplane, was traveling on a northwest heading climbing to about 2,800 ft. MSL before descending and oscillating between 2,500 ft. MSL and 2,000 ft. MSL. The radar target then depicted three left 360-deg. turns to a northerly heading, while continuing to oscillate between 1,700 ft. MSL and 1,100 ft. MSL before descending to its last radar target. The last radar target was about a half mile northwest of the accident site at an altitude of 1,675 ft. MSL. The closest weather reporting station was located at Bremerton National Airport (PWT), Bremerton, Washington, located about 20 mi. to the south of the accident site. A review of the weather revealed that conditions deteriorated after 1615 with an overcast ceiling of 800 ft. AGL. A further review revealed that at 1835, 9 min. prior to the accident, the station disseminated an automated observation, that reported, in part, wind calm, 10 mi. visibility, overcast ceiling at 600 ft., temperature 5C, dew point 4C, altimeter 30.15 in.

▶ **December 27, 2016 — About 1840**

indications. . . .” This situation, said the SAIA, should be corrected because it can lead to information about faults not being correctly identified by component workshops.

This failure mode meant that the PIC’s PFD indicated a sharp increase in pitch angle although the airplane was in level flight. Moreover, this led to the automatic disconnection of the autopilot. At the same time, the copilot’s PFD displayed information that was consistent with the airplane’s actual attitude. The left seater — the pilot flying — saw the pitch-down command and immediately responded with a nose down control movement. The malfunction occurred when the crew was performing the approach briefing, the SAIA noted, which meant that their attention was divided between two tasks. According to the report, “This probably contributed to the surprise effect [and immediate PIC control input].”

While pilots are trained to respond immediately to large attitude excursions, the SAIA said perhaps procedures should be developed to slow down that reflex a second or two so the crew can evaluate what’s really happening.

The aircraft was equipped with three independent attitude indicators, one of which indicated incorrect values. The standby attitude indicator and the copilot’s PFD were working properly. If noticed, these instruments could have given the crew the correct attitude information to operate the aircraft safely. “However, this requires that the crew can identify the malfunction and rationally evaluate the situation,” the report continued.

The crew was subjected to an unexpected change in the aircraft’s automation level with automatic disconnection of the autopilot, which occurred during a flight phase where pilots normally do not expect any changes, said the SAIA. The situation, it said, indicates that the pilots initially became “communicatively isolated” from each other. A contributing factor was the lack of regular training of procedures for unusual attitudes. Nor were there any clear rule-based behaviors to fall back upon. Therefore, the situation evolved into problem solving and improvisation, thus a knowledge-based behavior.

The SAIA acknowledged that the rapid change of the pitch angle indicated on PFD-2, the severe changes in G-loads to which the crew was subjected and the large number of audio and visual warnings probably contributed to the pilots focusing on their onside PFD units.

In the 3-sec. period between t2 and t5, the PIC faced an increase of the displayed pitch from 15 deg. to more than 30 deg., an autopilot disconnection and a PFD declutter with the display of red chevrons requesting pitch down inputs to exit the displayed unusual attitude in pitch.

Within those 3 sec., from a visual point of view, the PIT (pitch) symbol was only displayed at most four times. (A PIT symbol is displayed with a pitch miscompare between IRUs.)

The PIT miscompare indication on the PFD displays — supposed to inform the crew about the miscompare between PFD-1 and PFD-2 — was probably activated, said the SAIA, but was displayed on PFD-2 for a very short period of time. By design, the miscompare indication, along with other information considered secondary, disappears at unusual attitudes to allow the crew to focus on a more limited set of information.

The crew began to communicate operatively with each other after 15 sec.; however, after another 2 sec. the maximum allowable speed was exceeded. At t23, the airplane’s speed and attitude were far outside the design envelope, which in combination with the spatial disorientation of the flight crew meant that the possibilities to regain control of the aircraft were limited.

CST, a Piper PA22-108 (N5499Z) hit a power line and terrain near Piedmont, Missouri. The private pilot was not injured and the airplane was substantially damaged during the accident. It was VFR at the time. The pilot reported to the FAA inspector that he had performed several touch-and-go landings. Then as he approached the runway for the third landing, the engine did not respond, when he added throttle. The airplane continued to descend and the airplane’s wing impacted a power line. The airplane then impacted terrain, coming to rest inverted. Substantial damage was noted to the airplane’s fuselage and wings. Fuel was present on site.

▶ December 26, 2016 — About 1602 eastern standard time, a Cessna 182H (N1839X) was destroyed when it collided with mountainous terrain during descent for landing to Gatlinburg Pigeon Forge Airport (GKT), Sevierville, Tennessee. The private pilot and two passengers were killed. It was IFR, and no flight plan was filed for the personal flight that departed Keystone Airpark (42J), Keystone Heights, Florida, about 1300. Preliminary information from the FAA revealed the airplane was receiving VFR flight-following services and was at 9,500 ft. when the pilot requested a descent for landing at GKT. At 1554, the controller approved the descent and issued an altimeter setting. Radar data depicted a descent on a ground track of about 340 deg., directly toward GKT, between 130 and 150 kt. groundspeed. At 1558, about 20 mi. from GKT, the airplane descended below the minimum vectoring altitude of 8,000 ft. It continued its descent on the same ground track and about the same speed. At 1602, the radar target was at 5,400 ft., and abeam the peak of Mt. Conte (elevation 6,500 ft.) when the radar target disappeared. At that time, the controller issued the airplane a radio frequency change to the GKT common traffic advisory frequency and terminated radar services. No reply was received from the accident airplane and no further attempts to contact the airplane were made. The wreckage was located by helicopter at an elevation of 5,400 ft. in steep, mountainous terrain about the same position as the last radar target. The pilot held a private pilot certificate with a rating for airplane single-engine land. He was issued a third-class medical certificate on December 3, 2013, and he reported 12 total hours of flight experience on that date. The pilot was issued his private pilot certificate on April 1, 2014, with 45.3 total hours of flight experience. On April 27, 2016, the pilot reported to his insurance carrier that he had accrued 272 total hours of flight experience, 219 hours of which were in the accident airplane.

▶ December 23, 2016 — About 1145 EST, a Piper PA-28-161 (N31202) was heavily damaged after it hit trees and terrain during the initial climb from Middlebury State Airport (6B0),

Possible Solutions?

"The erroneous [left-side PFD pitch] indication . . . must be considered so unusual that one cannot anticipate and prepare for the specific malfunction," said the SAIA. "However, it is possible to foresee that unusual and unexpected events of various kinds can occur. For this reason, it is essential that flight crews use systematic and well-rehearsed procedures for handling unusual and unexpected situations."

The current flight operations system lacked essential elements that are necessary, said the investigators, and "In this occurrence, a system for efficient communication was not in place.

"The safety of commercial air transport over the years has gradually increased through the introduction of various procedures and training. In recent years focus has been on unreliable airspeed indication and upset prevention and recovery training [UPRT]," the report continued.

Event	Action	Callout
Autopilot automatic disconnect	Cancel warning Take control	"Autopilot off" "I have control" with confirmation from other pilot
EFIS COMP MON caution	Cancel caution	"Master Caution" "EFIS COMP MON" with confirmation from other pilot
Pitch increase indication on PFD	(Compare attitude if not confirmed)	"Nose high" with confirmation from other pilot
Stall at high altitude	Take control	"Stall, I have control" with confirmation from other pilot

"Since it is not possible to anticipate all possible scenarios, it might not be effective to introduce a new specific training like, for example, unreliable attitude indicator. General methods should be in place to be able to solve unpredictable situations.

"With this background in mind, the SAIA [believes] a general system of initial standard calls for the handling of abnormal and emergency procedures and also for unusual and unexpected situations should be incorporated in commercial aviation.

"This means a system of initial standard calls for clear, precise and bidirectional communication between the pilots. The table below gives a few examples to clarify the SAIA's suggestions.

When all was said and done, the SAIA made these findings, along with observations pertaining to causal factors.

- The crew was qualified to perform the flight.
- The airplane had a Certificate of Airworthiness and valid Airworthiness Review Certificate.
- The crew actions were according to

Accidents in Brief

Middlebury, Vermont. The private pilot was fatally injured. It was VFR and no flight plan was filed for the local personal flight. According to a witness, the airplane was not flown during the past 2 months. The pilot cleared off snow from the airplane's wings the morning of the flight and preheated the airplane. He then performed a preflight inspection and sumped the fuel tanks. The pilot taxied the airplane to Runway 19 and departed. During the initial climb, about 150 ft. AGL, the airplane's wings "wagged," the engine "skipped," and then the engine sound "went back to normal." The airplane continued to climb, it made a slight right turn, and then entered a left turn. When the angle of bank was about 45-deg., the airplane "stalled," and "rapidly" descended until it struck trees. Another witness stated the engine "sputtered" several times, and that after the airplane struck the ground, a post-impact fire erupted. According to FAA records, the pilot held a private pilot certificate with a rating for airplane single-engine land. The pilot was issued a third-class medical certificate on August 6, 2009, with no limitations. At that time, he reported 750 hr. of total flight time, of which 54 hr. were within the previous 6 months. In addition, the pilot held an A&P certificate with an inspection authorization. According to airplane maintenance logbooks, an annual inspection was performed on June 16, 2016, at a total time in service of 8,582 hr. The airplane hit trees, the ground, and came to rest in an upright position about 300 ft. from the departure end of Runway 19. The fuel tanks were breached; the left fuel tank exhibited thermal damage, and the right fuel tank was heavily impact damaged.

▶ December 15, 2016 — About 1500 Alaska Standard time, a ski-equipped Piper PA-11 airplane (N5028H) sustained substantial damage following impact with rising snow-covered terrain about 40 mi. south of Aniak, Alaska. The private pilot and sole passenger sustained fatal injuries. The airplane was being operated by the pilot as a visual flight with no flight plan. The flight departed the Aniak Airport, Aniak, about 1400 destined for an off-airport ski strip near Marvel Creek located about 40 mi. south of Aniak just below the accident location. On December 16, a phone call was received by the Alaska State Troopers from concerned family members stating the airplane had departed from Aniak about 1400 on December 15 for a flight to Marvel Creek and failed to return. Concerned, they departed Aniak in another airplane on December 16 to search for the overdue airplane. They located the wreckage on the southwest side of Marvel Dome at an elevation of about 2,000 feet above ground level (AGL) and observed no signs of life from the wreckage.

▶ On December 17, the NTSB investigator-in-charge (IIC) along with an Alaska State Trooper, arrived at the accident site about 1400 AST. The airplane impacted the southwest side of Marvel Dome in a near wings level attitude and came to rest inverted, about 20 ft. uphill from the first piece of noticeable debris. Due to recent snowfall, no ground scars were visible. The propeller was separated from the engine at the propeller flange and located uphill about 80 ft. The remainder of the wreckage was contained at a single location with the fuselage coming to rest on top of the left wing. The closest weather reporting facility was at

standard operating procedures (SOP) until the beginning of the event.

▶ The airplane's flight control system operated normally.

▶ IRU-1 produced erroneous parameters (pitch, roll and heading) without any indication of a fail message.

▶ The erroneous recorded parameters from IRU-1 were displayed on PFD-2.

▶ After autopilot disconnect, the airplane remained in level flight until the elevators commanded the airplane pitch down.

▶ The airplane was aerodynamically and structurally intact at least until VD and MD was exceeded.

▶ No evidence of an inflight breakup has been found.

▶ Information about declutter, unusual attitude and chevrons concerning the PFD units could only be found in the manufacturer's pilots reference manual.

▶ Information about the removal of comparator cautions in declutter mode could not be found in any manual.

▶ The declutter function, concerning the comparator cautions, was different between the simulator and the airplane.

▶ No callouts were found in the operator's manuals for the abnormal procedure EFIS COMP MON, nor are such callouts prescribed by regulations.

▶ There are no regulatory requirements for standard callouts for abnormal or unusual situations.

In addition, the SAIA found:

"The accident was caused by insufficient operational prerequisites for the management of a failure in a redundant system." And it cited the following as contributing factors:

▶ The absence of an effective system for communication in abnormal and emergency situations.

▶ The flight instrument system provided insufficient guidance about malfunctions that occurred.

▶ The initial maneuver that resulted in negative G-loads probably affected the pilots' ability to manage the situation in a rational manner.

It said risk factors that could lead to problems in the future if uncorrected include: "The fact that fault descriptions regarding an aircraft and its components are reported in a less-detailed manner might imply that the faults will not be identified and corrected in an efficient way. This can in turn lead to a flight safety issue as, for instance, intermittent faults cannot always be detected by general tests."

The SAIA sent to the European Aviation Safety Agency (EASA), Transport Canada, Bombardier, the FAA and operators recommendations for the development and implementation throughout the commercial air transport industry of "a general system of initial standard calls for the handling of abnormal and emergency procedures and also for unusual and unexpected situations."

Also, avionics manufacturers and regulatory agencies received recommendations that they "Ensure that the design criteria of PFD units are improved in such a way that pertinent cautions are not removed during unusual attitude or declutter modes." **BCA**

the Aniak Airport, Aniak, Alaska, about 40 mi. north of the accident site. At 1456, a weather observation from the Aniak Airport was reporting, in part: Wind, 110 deg. (true) at 7 kt.; visibility, 10 sm; cloud and sky conditions, clear; temperature, 30F; dew point, 30F; altimeter, 30.07 in.

▶ **December 21, 2016, about 1020** EST, a Cessna Model 175C (N8381T) was heavily damaged during a forced landing following a loss of engine power on approach to Runway 27 at the Holmes County Airport (10G), Millersburg, Ohio. The pilot sustained a minor injury and the passenger was not injured. The airplane was registered to and operated by private individuals. It was VFR and no flight plan had been filed for the flight that originated from the Davis Airport (W50), Laytonsville, Maryland, about 0700. The pilot reported that the engine lost power while the airplane was on a one-half mile final for Runway 27 at 10G. His attempts to restore power were unsuccessful and he executed a forced landing to an open field east of the airport. The airplane came to rest adjacent to a wire mesh fence. The nose landing gear separated, the left main landing gear collapsed, and the engine mount and fire-wall were deformed during the landing. The right wing was partially separated from the fuselage at the aft spar attachment. The right wing also exhibited a leading edge dent consistent with impact to a fence post. The left wing was deformed upward near the wing tip consistent with ground contact due to the collapsed landing gear.

▶ **On December 12, 2016, about 0537** mountain standard time, a Quest Kodiak (N772RT) impacted powerlines shortly after takeoff from the Canyonlands Field Airport (CNY), Moab, Utah. The pilot (sole occupant) was fatally injured and the airplane was destroyed. The airplane was registered to Lease Air LLC, and was operated by Aerowest Aviation doing business as Redtail Air, as an FAR Part 135 relocation flight. VFR conditions prevailed at the time of the accident and a VFR company flight plan was filed. The flight originated from CNY at about 0536 and was destined for Salt Lake City International Airport (SLC), Salt Lake City, Utah. A security camera video revealed the airplane took off uneventfully, the pilot made a right turn and it appeared as if the airplane started to descend slightly. Suddenly the airplane entered a rapid descent before it contacted powerlines and impacted the ground. At 0553, the weather at CNY was reported as wind from 330 at 4 kt., visibility 10 sm, clear skies, temperature 1C, dewpoint -2C, and an altimeter setting of 29.59 in. The airplane has been recovered to a secure location for further examination.

▶ **On December 11, 2016, at an** undetermined time, a Cessna T210M, N761SZ, landed off airport in rough terrain near Mecca, California. Aspen Flying Club was operating the rented airplane. The commercial pilot sustained serious injuries; the airplane sustained substantial damage. The cross-country personal flight departed Colorado Springs, Colorado, about 1200 PST (1400 CST) with a planned destination of Thermal, California. It was VFR and no flight plan was filed. The pilot reported that he had to adjust his route of flight due to weather. About 100 mi. from the destination airport, he switched fuel tanks, and the engine began to run rough. About 12 mi. from the destination, he switched fuel tanks, and the engine lost all power. He could not glide the airplane to the airport, and touched down hard in hilly desert terrain. The pilot was on the ground for an undetermined time trying to find his cell phone to alert first responders of the accident. **BCA**

NextGen Technician Training

A new school opens its doors, offering **a fresh start** for **the future**

BY **MIKE GAMAUF** mgamauf@yahoo.com

Once a young person decides that fixing airplanes is their life's calling, the next decision is learning how to do that. Some choose the military; others enter line service and work as repairmen; and still others enter an FAR Part 147 technical school. For the vast majority of maintenance technicians, earning the Airframe and Powerplant (A&P) certificate is the key that opens the door to a career that is both challenging and rewarding. The certificate confirms the holder has acquired basic knowledge and skill but does not guarantee landing that all-important first job.

For those aspiring to become professional aircraft maintenance technicians (AMTs), the path to good pay and satisfying work will inevitably involve time — and lots of it. Choosing the military option means a minimum commitment of several years in uniform. If you can find work as a repairman, you'll need to put in at least 18 months of hands-on effort before becoming eligible to take the A&P test The quickest path to begin a career is through a Part 147 A&P school where you can prep for the certificate exam in as little as one year. However, not all programs are equal. Some teach the minimum standard to earn the certificate but leave the technician lacking in technical knowledge.

Regardless of the course chosen, there's a problem with earning an A&P. Unlike the rest of the world, where licensing requirements have evolved with the state of the art, the FAR Part 65 and 147 rules and guidance have seen only minor changes in decades, virtually ignoring huge technological leaps in the way aircraft are operated and maintained. Modern technician curricula in other developed countries include subjects on electronic control systems, computerized diagnostics and safety management systems, while in the U.S. tech students still sew modified seine knots on fabric to get that Curtiss JN-4 "Jenny" airborne again.

The initial classes at Cape Cod Community College are a diverse mix of young and old, some with experience and others with just a dream and a hope for their future.

"The FAA A&P student curriculum requirements are very outdated. They don't even touch on aspects of a modern aircraft, such as data buses, modern avionics or composites," said Heath McDaniel, aviation director of maintenance for Michelin North America in Greer, South Carolina. "However, many FAA schools do offer additional certifications for some of these components for a modern aircraft. I would highly recommend that any student acquire at least an avionics certification. I would also recommend general computer skills.

"Today's aircraft are very integrated with technology and are basically a flying computer," he continued. "We are now mainly troubleshooting with a laptop computer, or the aircraft's onboard diagnostics."

Without additional skills and training, he says, the prospective maintenance technician does not have a clear path to getting that first job.

A Fresh Start

Today there are several programs changing the way new technicians are trained. One familiar to me is offered at Cape Cod Community College (CCCC) in Barnstable, Massachusetts. In an environment where many A&P schools are closing or suffering low attendance, CCCC administrators are investing in a new state-of-the-art program for prospective techs.

"A problem facing new AMTs just out of school is the void between the current required curriculum established by the FAA and the expectations of employers," said Bob Gould, an aviation safety and management consultant for western Massachusetts-based Bravo Golf Aviation.

An aviation professional with over four decades in maintenance, management and safety, Gould notes a reluctance among maintenance managers to send brand-new technicians out for more advanced training, and yet the need for entry-level technicians is usually very low.

"On-the-job training is beneficial for newly hired technicians but is not considered business efficient — it is costly for the employer," said Gould. "New aviation maintenance technician training programs such as Cape Cod Community

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College's are designed from scratch but are still restricted by FAA guidelines. Their equipment and core courses are up to date and can take advantage of new training methods and instructional techniques."

By using industry input to address the subjects and training that are most valuable, as well as receiving grants and donations, CCCC's tech training program is off to a bright start. The first class of students has just begun and we were invited to get a first-hand look at what could be a new trend in tech training and education.

Investing a year or more to learn antiquated skills to earn a certificate that really does not prepare you for the job you want seems like institutionalized folly. And yet the need for qualified AMTs continues. This is where the CCCC faculty saw a need and took action to fill it.

"About four years ago the college president, along with Cape Air and a couple of other local companies, got together and started lobbying for money to get this program going," Miles Tranchina, student retention specialist at CCCC, told *BCA*. Cape Air is a large regional carrier with operations in New England, the Caribbean and Micronesia and headquartered in Hyannis, Massachusetts; its fleet includes 83 Cessna 402s, four Britten-Norman Islanders and two ATR-42s.

Tranchina went on to explain that NASA and the Massachusetts Institute of Technology together donated $300,000 in tech scholarship funds, money that will be apportioned to students in the first several classes. In addition, he said, the college received nearly $6 million in state, federal and Department of Labor grants, covering all program costs, including faculty payroll, to 2018.

The facility, complete with training aids, aircraft and classrooms, is up and running. The plan going forward is to have three classes a year (fall, spring, summer) with 24 students in each and following a 12-month curriculum in preparation for their certificate exams. The program is concentrated and fast paced to meet the FAA required 1,900 classroom hours, while still providing a technically contemporary and meaningful education. While the CCCC program has been approved by the FAA, the school will evaluate how well it works and make adjustments as it matures.

The second class launched in January and interest is building for summer semester enrollment. In addition to the A&P certificate, students can earn an associate degree in applied sciences with an additional 23 credits. Those who pursue the latter — and many in the initial classes are doing so — will upon graduation have an A&P certificate and an associate degree, and will be halfway toward a bachelor's degree. CCCC's academic class credits transfer to any other state college or university.

CCCC's equipment and core courses are up to date and can take advantage of new training methods and instructional techniques.

Betting on a Brighter Future

The initial classes are a diverse mix of young and old, some with experience and others with just a dream and a hope for their future.

"For the first couple of classes we have a few high school kids, a few guys in their fifties plus, and then everything in between," Tranchina said.

Aside from potential students, the program is also drawing interest from local maintenance departments, including those at NetJets, JetBlue and, of course, Cape Air. Bombardier and Gulfstream have made contact and expressed interest in job fair dates and helping with the curriculum and training.

"These companies want to implement their equipment into our curriculum, and they want to do scholarships. They also want to decorate the hangar with their logos," Tranchina said, adding, "As far as employment opportunities, definitely they're in the loop."

While pursuing the FAA certificate puts constraints on the curriculum, CCCC is exposing its students to as much modern technology as practicable. Computer-based systems and training are applied wherever possible. For example, the workings and logic of full authority digital engine controls and autopilots are closely examined. Employing modern training aids and actual aircraft parts helps with the hands-on lab work by keeping it relevant to current aircraft. Tranchina noted that while some traditional schools had their tech students use "pencil, paper, ruler, so forth" to create technical drawings, "we're doing it on our computers." The key is to give the students as much exposure to contemporary technology within the mandatory class hour limits. In addition to A&P training, CCCC has incorporated elements of the Aircraft Electronics Technician certification requirements to help students obtain their AET as well. Observed Tranchina, "We're definitely above and beyond the norm, so that's something cool."

CCCC President Dr. John Cox agrees. "Four years in the making, with a shared vision among faculty, staff, business and community members, our aviation maintenance technology program has begun!" he said. "With our first cohort of students, we're at full throttle, creating opportunity and a trajectory of success toward graduation."

He went on to salute "the many motivated public leaders and donors who have supported our students through this new program. And I appreciate the faculty and staff who have made major changes in their lives to commit to Cape Cod Community College and the education and the hard work of our students. I look forward to supporting our students as they successfully secure their FAA license and build their careers."

The controversy over A&P certificate qualifications and training is a long-standing one and seems unlikely to be resolved any time soon. Sadly, there seems insufficient vision or leadership within the aviation maintenance community to cause meaningful change to the status quo even though aircraft are getting ever more technologically sophisticated. The minimum tech standards need to keep pace and there needs to be more emphasis on preparing new technicians for the real workplace, not one that predated the NDB.

Until the day comes when aircraft maintain themselves, the skilled and knowledgeable technicians will be vital members of the aviation community. Programs like that at CCCC can help them be their best. **BCA**

Finding A&P Programs

The best place to find an FAA-approved training program is at the FAA website. Many programs claim to be "approved," but it is always better to verify before you put down your hard-earned cash. Visit **http://av-info.faa.gov/MaintenanceSchool.asp**

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The not-so-secret **professionals** who **facilitate movement** from A to B

BY **KIRBY HARRISON** kirbyjh12@hotmail.com

In the world of business aviation, getting there safely and efficiently is the product of many partnerships, most notably those comprising schedulers, dispatchers and pilots. That's the team that arranges successful flights long before launch, and the one that solves unexpected problems on the fly.

A recent incident at Honeywell Flight Operations is a case in point. The schedule called for a flight from Baltimore to JFK International Airport in New York where the passenger was to transfer to an airliner and continue on his journey. However, an IFR ground stop was imposed, threatening the connection. At that point, said Chief Pilot John Tuten, Manager of Dispatch Brett Ferrucci recommended they fly the traveler to Honeywell headquarters in Morristown, New Jersey, where he could continue on to JFK aboard Honeywell's AgustaWestland AW319 helicopter in time to catch the commercial flight. They did, and he did.

A trip from Fiji to Australia by another flight department hit turbulence when it was discovered en route that the CEO did not have the required entry visa. A quick-thinking scheduler was able to obtain the visa through the American Airlines SABRE scheduling system and faxed it directly to the aircraft prior to landing.

"One of the best things my director ever said to me was how much he likes knowing that he's not alone when he's flying; that scheduling is standing by to help in any way possible when the unexpected happens," said Ann-Marie Smith, aviation administration supervisor for Steelcase Aviation.

Schedulers and dispatchers are the primary contact between passengers and the flight department for arranging trips and also serve as the conduit through which information related to that trip flows. Craig Hanlon, chief pilot for DuPont Aviation, describes them as critical to the communications process. Schedulers and dispatchers there handle everything from trip setup and logistics to weather and liaison with professional trip planners such as Universal Weather & Aviation and UAS International Trip Support.

According to Gary Martin, master mission advisor with Universal Weather, virtually all of his business aviation trip planning involves schedulers and dispatchers.

Not long ago, Steelcase's Smith conducted a survey of schedulers and dispatchers, asking them their responsibilities. The final list topped out at more than 100 primary or secondary duties, ranging from crew assignment to accounts payable, from wing-walk marshaling to contract negotiations.

Schedulers and dispatchers are the primary contact between passengers and the flight department for arranging trips and also serve as the conduit through which information related to that trip flows.

But what schedulers and dispatchers actually do on a daily basis evokes a lot of answers, said Smith. "Some don't do pilot scheduling, some don't do catering and some don't make crew overnight arrangements. Some are the primary finance and legal authority in the department. Others do only logistics. And some have dozens of people they manage."

And then there are people like Holly Pendleton, at the Columbus, Georgia, headquarters of insurance giant Aflac. She has been in the flight department for slightly more than 30 years, is now flight operations coordinator, and is involved in rewriting job responsibilities for the NBAA.

FAA-licensed dispatchers are not required in an FAR Part 91 flight department, but they are mandatory in a Part 135 operation. Nevertheless, there are many schedulers with 20 years or more of experience working for a corporate operator who handle the responsibilities more commonly expected of a dispatcher.

With education and training, said Smith, a scheduler or dispatcher is better equipped to fill the logistic and administrative role. "Whether it helps us more fully comprehend operational situations, or provides soft science insights regarding stress, communications or leadership," she observed, "in order to be a trusted and knowledgeable member of the department, the scheduler or dispatcher has to be allowed the opportunity for growth."

It is not usual for schedulers and dispatchers to participate in familiarization flights with pilots, to understand firsthand the operational demands in flight and the ease and quality of services on the ground. Similarly, it's not uncommon for pilots to shadow schedulers and dispatchers to better understand their challenges and concerns.

As with thousands of jobs in today's world, computers and instant, real-time communications capabilities have impacted the roles of schedulers and dispatchers, mostly for the better. Where once they used to labor under mounds of paper, they can now manage a hundred times more information with the help of a rapidly growing

array of services — including Ac-U-Kwik and the Air Charter Guide.

Among the latest digital tools available to schedulers, dispatchers and pilots are FltCtrl, a communications platform, and FltCheck, which provides users with on-the-go tracking of important tasks and checklists. According to London-based IT solutions specialist FltCtrl, its two new offerings are notable in that team members can collaborate simultaneously to accomplish tasks more quickly and with ease.

Also new are sandstorm and dust storm forecasts that will become part of ARINCDirect's flight planning tools, allowing business aviation operators to fly more safely in arid regions such as the Middle East and North Africa. Integration is now in beta testing and was demonstrated at the 2016 Middle East Business Aviation Association convention in Dubai.

Jo Damato, director of operations and educational development at the NBAA, recalls when she was in dispatching, there was very little of the current digital, high-speed technology available. Today's instant messaging, smartphones, tablets and internet connectivity, she said, enable schedulers and dispatchers to be more proactive.

And yet, according to all involved in the scheduling and dispatching process, communication among themselves is critical. For Honeywell's Tuten, "Proactive and open communication on any potential issues," is a must.

"It's all about open lines of communication," he said. "The other night, we had multiple helicopter flights scheduled, but weather was moving in and the freezing rain would ground the helicopter. About 20 min. before the passenger showed up for the last helicopter flight, the manager who had been monitoring the weather contacted the pilot and the passenger was rescheduled for the same flight on the company's Challenger 300."

Pendleton noted that at Aflac, "We do a preflight briefing with the pilots, and a post-briefing when the pilots come home. We talk about what we could have done differently, and what we should have done differently, and what we've learned so it doesn't happen again. I've got their back, and they have mine."

While some may perceive that the relationship between schedulers, dispatchers and pilots is contentious, Steelcase's Smith maintains that's a mischaracterization of the relationship generally, though it may have more to do with a particular company's culture overall.

"In a company where professionalism and teamwork is a top priority, schedulers, dispatchers and pilots enjoy and embrace their interactions and work together to make it happen," she explained.

There are also differences in work experience, often reflected in lifestyles that are sometimes difficult to understand. "To a scheduler," she said, "a pilot only experiences the benefits of travel, financial reward and the acknowledgement of passengers and clients. It is easy to forget the missed family events, long and often boring days, stress of the mission, and the cost and effort required to become a pilot."

Conversely, she noted, "To pilots, schedulers get to regularly sleep past zero-dark-hundred and their careers aren't in jeopardy every time they take a physical."

Smith went on to note that two things have been key to forging strong bonds within her own flight department. One is the importance of the mission to everyone involved. "Anything short of a safe and seamless mission reflects on all of us, not just the crew."

There is also the necessity of a sincere effort to understand the pilot's point of view and limitations. The fact is, she pointed out, we don't know what we don't know. "Pilots, a majority of whom are essentially highly skilled trade workers, don't have the foundation to understand some of my challenges, any more than I do theirs."

Mutual trust is everything, concluded Smith. "In order for the continued success of our department, our employees and passengers need to trust that we will complete the mission. In order for our mission to be successful, the crew needs to trust the information and tools they are given. In order for me to play my part in that, I need to trust that my contribution is relevant." **BCA**

The S&D Show

Of all the resources available to schedulers and dispatchers, those provided by the NBAA may be among the most valuable.

This year's Schedulers & Dispatcher's Conference, Feb. 7-10 in Fort Worth, is the most visible, and perhaps the most valuable in terms of networking and information exchange. It is expected to draw more than 2,800 schedulers, dispatchers, pilots and exhibitors.

Some 500 exhibitors will be on hand representing services including international trip planners, caterers, FBOs, fuel service providers, inflight high-speed internet specialists, airports, charter operators, hotels and ground transportation services. And this year, there will be a new presence on the exhibit floor: Cuba Handling, a ground service and trip planner for business aircraft visiting the island.

Recognizing that the number of FAA-approved dispatchers is growing, the show will actually open on Feb. 6, with day-one of a two-day Licensed Dispatcher Recurrent Training program.

In addition, the NBAA's Certified Aviation Manager (CAM) program will be spotlighted.

According to the association, more than 325 professionals have completed the CAM training or recurrent training requirements. Those earning the recognition include schedulers, dispatchers and pilots, of course, but also a good number of others ranging from maintenance techs to safety officers and financial analysts.

At this year's event, more than 30 educational sessions are planned, and attendees can earn up to three CAM points and training acknowledgements, said Tyler Austin, NBAA project manager of professional development.

According to Mike Michols, association vice president for operational excellence and professional development, the show is meant to help schedulers and dispatchers perform their jobs better, as well as provide an opportunity to grow and increase their value to their flight departments.

The annual event rotates among different cities to increase access to attendees and exhibitors alike. The 2018 show is scheduled for Feb. 6-9 in Long Beach, California. **BCA**

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Aviation Guru

The **disappearing** but all-important **uber mentors**

BY **JAMES ALBRIGHT** james@code7700.com

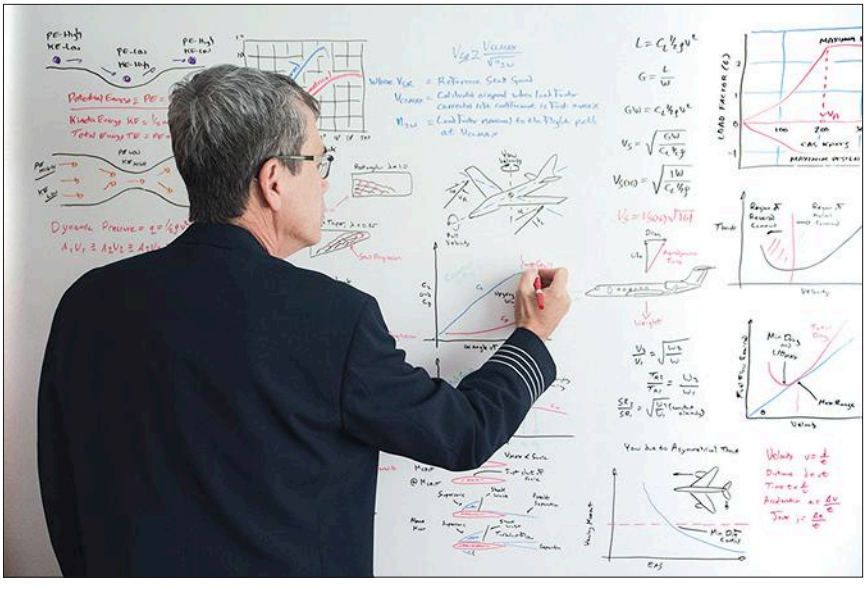
You've heard we're on the cusp of a pilot shortage of unprecedented magnitude. Half of today's major airline captains will be retired in 10 years. Business aviation captains are getting older and it is no longer unusual to run into pilots having to worry about age 65 restrictions in some countries. That's good news for the next generation of pilots; right?

Maybe. But consider this: Experienced pilots once destined to mentor the next generation of aviators are too busy flying to instruct. Some pilots coming of age as captains today will never have heard a "There I was" story from the days when engines routinely blew themselves apart. The growing pilot shortage has led to a shortage of the highest level of aviation mentor.

"Mentor." The word speaks volumes to just about any aviation professional. The job at hand is so complex that it would be next to impossible to achieve professional status without a little help along the way. Becoming a qualified pilot, engineer, mechanic, dispatcher, flight attendant, or anyone involved in aviation, is not something any person can accomplish solo. But anyone can be a mentor. What we need is the highest level of mentors: the aviation guru.

"Guru." The word seems almost out of place in an aviation context. And yet many of us know a few aviators who deserve the title. These are the "go-to" experts who seem to know more about the airplane than those who built it, more about the steps needed to fly than those who wrote the procedures, and more about the ins and outs of aviation than just about anyone else. But being an "aviation guru" is far from what the metaphysical connotations of the word would imply. It is more about learning and instructing; an aviation guru is an aviation mentor on steroids.

If you've never been a mentor, this might be lost on you. But anyone who has spent any amount of time in the mentor role will tell you that the mentor gets just as much from the relationship as the "mentee." The act of teaching forces the teacher to up his or her game to ensure everything taught is accurate. We should all attempt to learn what it takes to become an aviation guru. The act itself will make us better aviators. Becoming an aviation guru is an excellent way of giving back to a profession that has given us so very much. So, let's do that. Along the way we can examine the careers of a few aviation gurus to better understand what makes them tick and to figure out how we can all assume the mantle as the next generation of gurus.



JAMES ALBRIGHT/BCA

Knowledge alone, does not a guru make.

What Motivates Most Gurus

We all get our start as novice aviators and then apply varying amounts of effort and zeal trying to remove the novice tag from our resumes. Typically that involves a lot of training, note taking and investigation. For all mentors-turned-gurus, there comes a time when the role of question answerer overtakes that of question asker.

For Chris Parker the role of "Mister Answer Man" was a natural fit. "I've always been curious, and with aviation I really tried to dig into the manuals not only to find out the 'what' but the 'why' behind it. I felt that once you know the 'why,' you can better understand and, if need be, debate the 'what.'"

Fascinated with airplanes, helicopters and blimps as a child, Parker got his start as an "airport bum" hanging around Torrance Airport in Southern California as a teenager, trying to soak in all things aviation. He was mentored early on by a cadre of ex-military aviators and learned how to fly the "Air Force way." Coming up as a flight instructor, he expanded into aerobatics and soon found his way into all things Challenger, from the early 600 series to the latest Bombardier 605s. He continued to wear his instructor hat in the corporate aviation world and soon realized he was becoming the go-to person in his circle of Challenger pilots for all matters from the aircraft to regulatory and international operations.

His desire to share started when he was a young flight instructor presenting safety seminars to other pilots as part of the FAA's safety program. Next

Capt. Chris Parker alongside a Cessna T-37

he ventured into writing for the Aircraft Owners and Pilots Association's *Flight Training* magazine. But it was his article "Are Part 135 Line Checks Necessary" in *BCA*'s May 2004 issue that brought him prominence in the business jet world. Soon he was fielding questions from across the country and his role as aviation guru began in earnest.

When a pilot graduates from learning for one person (him or herself) to fielding questions from a cadre of other professionals, the need for accuracy increases dramatically. "Once I realized other pilots were calling me for advice," said Parker, "I became even more motivated to learn and obtain accurate and timely information. It was a responsibility I did not take lightly."

Most aviators struggle to keep up-to-date in an industry where constant change is the norm. An aviation guru has the added burden of always wanting to know more, to expand the knowledge base. This has been made easier with the internet, of course. Parker makes liberal use of technology, but he isn't at all hesitant to engage the experts one-on-one.

"There were always the usual suspects: civilian aviation books, military training books, training providers, manufacturer's manuals, the alphabet groups, conferences, other pilots, etc. But I would have to say some of the best nuggets I found came from people, and sometimes at unexpected places," said Parker. "I managed to visit San Francisco ARINC, Los Angeles Center and LAX tower. At a routine maintenance event at an MRO I would have a quick conversation with a maintenance tech and learn more in 5 min. than in 5 hr. buried in a maintenance manual. Or even a phone call to the friendly FAA TERPS man in Oklahoma City. What I've found is that almost anyone is willing to share their struggles and point of view if you are genuinely interested in what they have to say."

Looking at Parker's curriculum vitae can be a bit intimidating for a younger pilot thinking about the uphill knowledge climb ahead. How does one take that first step to becoming more than just a pilot?

"Nurture your passion. If you don't have it, you won't put in the time to become a true professional. And take notes. Someone much smarter than me said, 'The weakest ink is better than the strongest memory.' I agree. Taking notes, putting pen to paper, has a tendency to cement what you've learned," Parker advises. "And finally, share what you know. Sharing helps you take responsibility for the accuracy of your knowledge, because others may rely on it."

How Most Gurus Get Their Start

There is a common theme among many aviation gurus that begins with their first days in aviation. It all starts with a desire to become a better pilot, mechanic or other aviation professional. These men and women become known as meticulous note takers, and tireless researchers. They all have a compulsion to share. It is only a matter of time before they become the go-to resources for the rest of the community.

Some aviation gurus appear to be a bit introverted and most have a quiet modesty that may disguise their true identities as "uber gurus." Robert Hare, a retired Challenger, Gulfstream, and Falcon pilot, admits to the introversion and I can attest to his modesty. His path to the road to becoming an icon in the Gulfstream IV world may sound familiar to many future aviation gurus.

"I was one of those obnoxious students who asked all the detailed questions because I wanted to understand the inner workings of the systems and procedures," Hare readily admits. He says his instructors were very good and knew their subjects cold. He took copious notes, hoping to review everything prior to each recurrent. "But my notes were so hard to read after that passage of time, I rarely got much out of them."

With the advent of word processors, Hare was able to transcribe his notes after every training session. He folded later notes into the previous versions and organized everything into easily referenced chapters. The notes became so expansive, he applied extra effort to make sure they were accurate.

"My goal was to aid my mediocre memory. And like the old saw that says, 'Chop your own wood and it will warm you twice,' this process of repetition and organizing added to the value of the notes for me," he said. After a while his peers noticed and his notes proliferated.

Capt. Robert Hare in a Falcon 900 simulator

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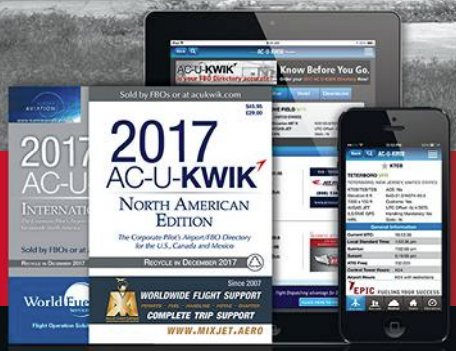

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Gulfstream pilots who had never met him began using his notes as study materials. He had arrived as an aviation guru. The effort not only made him a better pilot but also raised the bar for the entire industry.

Most every mentor got his or her start from another mentor. "Associating with people way smarter and more capable than myself helped to guide and motivate me," Hare said. "Fear of failure motivated me to minimize the chances of failure. He who teaches, learns. I would sponge up every bit of operational experience I could. I never minded saying I didn't know an answer, but as time went on, I had to say it less."

Hare spent many years as an instructor for both FlightSafety International and CAE SimuFlite, broadening his impact on the industry and providing the time and experience to hone his guru "chops." But not all gurus have this type of formal teaching background. In fact, most gurus come from the trenches.

The Operational Guru

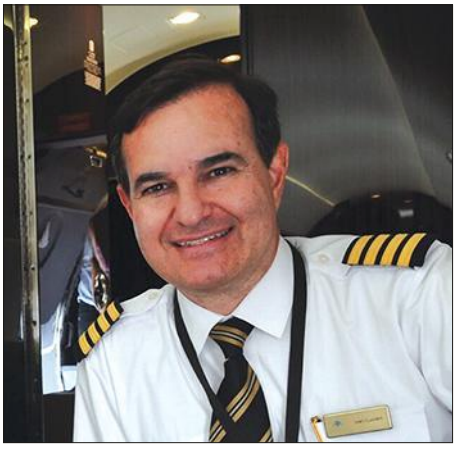
Ivan Luciani admits that his life was defined early on. He was an eight-year-old kid watching the U.S. Thunderbirds perform in F-4 Phantom IIs for the first time, and that was it — he was hooked. He would become a pilot. From the beginning of his flying career he realized the key to success was in his attitude toward learning.

Luciani's path took him to Hong Kong where he became the flight training manager for a 25-aircraft company flying everything from a Citation Sovereign to a Boeing Business Jet. As a pilot he relied on detailed written notes to break down complex subjects into more easily understood lessons. The word soon spread and those notes became required reference material.

I first heard of Luciani when reading his thoughts on how to best conduct a functional check flight. His notes on the procedure became my lesson on how to best write easily understood test profiles.

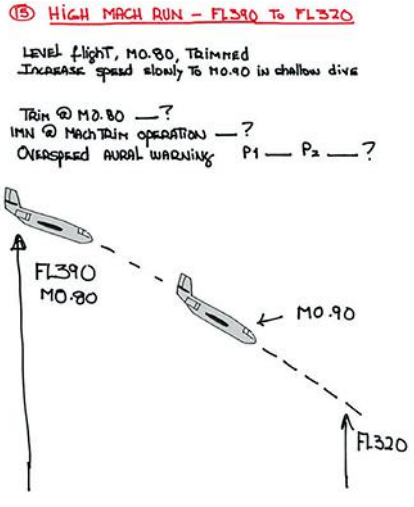
Luciani believes good instructors can turn any flight into a training exercise. A flight evaluation can become the best teaching moment; the students are bound to pay attention. "During line checks my ultimate goal is to provide meaningful feedback that would help make these pilots better, individually and as a crew," he said.

Along the way to becoming an aviation guru, Luciani learned one of the fundamental truths of being a professional pilot: The best way to learn is to teach. Teaching forces you to get it right. "Being able to recite limitations, aircraft systems and procedures is just not good enough," he advises. "I want to understand the background behind the limitations and procedures, how the systems work and evolved over the years and, most importantly, how each separate system/component integrates with everything else to form the whole."



Capt. Ivan Luciani

Another responsibility of elevating one's status from mentor to guru is the need to get it right. According to Luciani, "This is super critical as incorrect or inaccurate information can adversely affect others, not to mention destroy your own credibility. If it is not supported by a recognized source, such as Gulfstream or FlightSafety International, I don't use it. I am very critical of pilots who think they know better than the manufacturer and implement procedures that deviate [from or] contravene those developed by the manufacturer. The exception would be cases where the manufacturer provides guidelines to help operators develop their own procedures."



An example of Capt. Luciani's function check flight notes

Many aviation gurus adopt the instructor position or have it formally assigned; it is part of their job and they fully embrace their role to teach others. But not all gurus are former instructors; some fill that teaching role as purveyors of information.

Another Path: Find a Need and Fill It!

While many pilot gurus tend to get their start specializing in a specific aircraft type and then branch out to specific operational aspects of their profession, some pilots like to paint with a broader brush. Much broader.

Mark Zee

Mark Zee may have the broadest brush of them all. He got his start as an air traffic controller, and moved on to become an airline station manager, a flight dispatcher, and then an airline pilot for a major carrier.

Through these experiences he realized that there are few more challenging aspects of aviation than international operations. These challenges are made even tougher because they are changing faster than anyone can really catalog with less than a full-time cadre of gurus. Zee couldn't find a "one-stop" location for the information he needed, so he invented it.

He started with The Airline Cooperative (**http://www.airlinecoop.org**), a group

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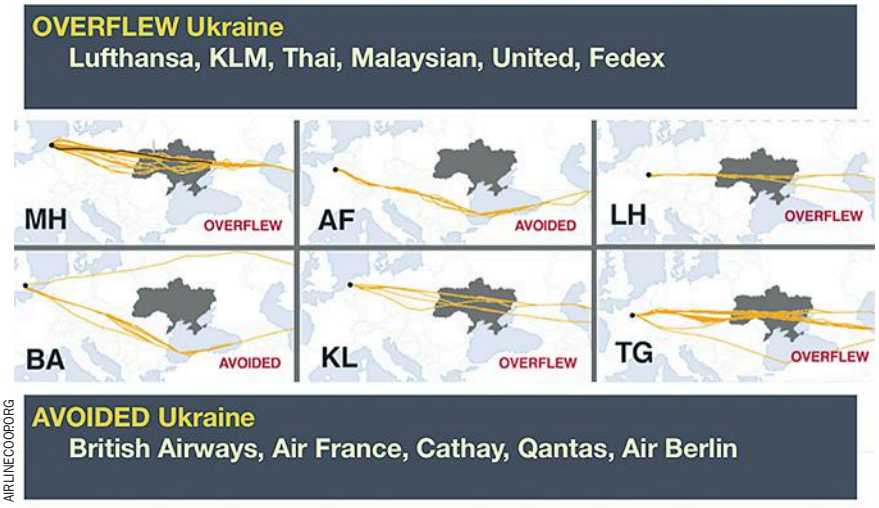

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Malaysia Airlines Flight MH17 wasn't alone overflying hostile airspace prior to its shoot down.

of 220 airlines that work together as peers to share knowledge and improve safety, security and efficiency. The idea is simple. On July 17, 2014, Malaysia Airlines Flight MH17 was shot down while overflying the Ukraine; however, several other airlines knew well enough to avoid the area. That's one of many reasons the organization was created.

From The Airline Cooperative followed the Flight Service Bureau (**http://www.fsbureau.org**), an international flight operations partner available to all within the business aviation community, as well as the airlines. I am a member and have found it the best way to keep on top of all international flight operations. And in 2016, Zee unveiled OpsGroup (**http://www.opsgroup.com**), a platform for pilots, controllers, dispatchers and managers to ask questions, provide answers and learn from peers.

These organizations provide answers to the most-recent vexing questions, all without a sales spiel or push to buy something. Their websites provide a platform for sharing accurate knowledge.

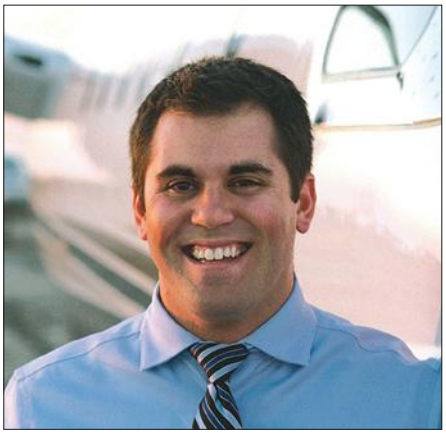
"The more you learn, the more you realize you don't know," said Zee. "Early on, I always thought there was a finite amount of knowledge for a specific area of aviation, and that when I had finally learned everything, I'd be able to call myself a pilot, a controller, a dispatcher. Now I see a 180-deg. reversal in my thinking. I don't make it a secret if I'm not sure of something. The most dangerous people in aviation are the ones that pretend to know it all. Everyone is winging it to some degree. So, if I can make it easier for people to ask questions, and feel OK doing so, then I think I've achieved something."

There is no question that Zee is having a worldwide impact, but he got his start in more humble beginnings. And that leads us full circle to our final example.

The Next Generation of Gurus

Like each of the aforementioned gurus, Jason Herman understands he needs to stay in the "learn mode" and will never have all the answers. His efforts to become a better pilot and his passion to share knowledge promise to elevate his status from mentor to aviation guru.

Herman earned his pilot's license at the age of 17 and earned his first advanced licenses at the Purdue University Department of Aviation Technology. He is now the lead captain of a Cessna Citation CJ4 account and works on several NBAA committees. But he got his start on the road to becoming an aviation guru by simply picking up the phone. He became a de facto go-to person for many colleagues on all matters pertaining to the CJ and FAR Part 135 compliance.



Capt. Jason Herman alongside his Cessna Citation CJ4

"As is often said during primary training for a check ride or qualification event," said Herman, "you don't necessarily need to know everything, but you should at least master the fundamentals and be very familiar with where to find answers to the remaining questions within your available resources."

What separates an aviation guru from someone who is very knowledgeable and otherwise gifted with systems and procedures is a passion to share that knowledge and those gifts. Herman started with one-page reference sheets he found useful for many aircraft procedures, but he didn't stop there. His written notes and procedures became laminated documents and spread through the community. He and like-minded colleagues used secure internet file-sharing websites to ensure resource documents and other training materials got to those who needed them.

While he is still young, 26, and will be building upon his experiences in the years to come, he is well on his way to becoming an aviation guru.

The Aviation Guru Shortage

The pilot shortage is real and growing and that means the professional pilot force is "out there," doing the job at hand. It would be tragic if the best and brightest of those were too busy flying to mentor the next generation.

We all have a little of what makes each of the gurus cited here the kind of go-to resources so vital to keeping things safe. Sometimes all we need is the motivation and a little knowledge on how to take it up to the next level:

(1) Study all available resources.

(2) Dig deeper. Sometimes a maintenance manual will shed light on what a pilot manual glosses over.

(3) Edit your notes. A second or third look can turn idle scribble into gems of knowledge.

(4) Share. There was a generation before you and there will be a generation that follows.

Technology can turn us all into brilliant technical writers and illustrators. It has never been easier to become an aviation guru. Why not you? **BCA**

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Road Warrior

How a small jet operator **meshed highway** and **airway SOPs**

BY **FRED GEORGE** fred.george@penton.com

Dan Rice, chairman of Transystems LLC, a family owned bulk commodities transportation company and Citation M2 operator, doesn't believe in accidents. Rather, in his view, mishaps are actually preventable results of human error that can diminish productivity, balloon operating costs and, in the most extreme, jeopardize people's lives. And it's preserving life that matters most.

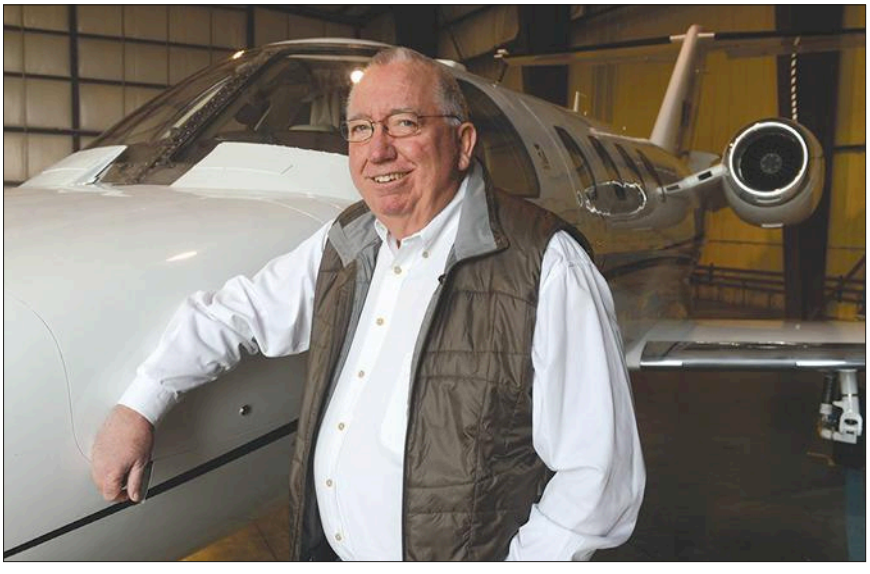
Rice's company motto is telling: "Safety . . . Families Depend on It."

"Everything is foreseeable, if you look far enough ahead," he says. As a result, Rice has instituted the Transystems' Safety Management Program (SMP), a comprehensive system of policies and procedures that covers every aspect of company transportation, including operation of its 325 Class 8 trucks, cargo loading equipment, company-owned automobiles and, of course, its light jet aircraft.

Founded by John Rice in 1942, Transystems has a management policy that focuses on work quality, integrity and professionalism. Safety, respect and trust are among the Great Falls, Montana, company's core principles. Its SMP is a tangible extension of those fundamental values.

Cost reduction is a secondary benefit of its SMP, according to Rice. Recognizing the impact of the program, Transystems' insurer slashed the company's annual workers' compensation premiums by 29%, based on earning a relatively low workers' compensation modification rating. Its crash rating, a measure of accident probability, has plummeted to the 18th percentile. In short, employees at Transystems are considerably less likely to be involved in an injury or non-injury accident than the average transportation services company.

As for the M2, Rice describes it as "just a different, more expensive company vehicle." The Citation is viewed as a shuttle vehicle available to anyone in the company based upon transportation needs and benefit to the company's bottom line. It's a winged bus and not a royal barge. It's intended to move people out and back on company business in "reasonable time" rather than being a total substitute for commercial airline transportation.



Dan Rice, chairman of Transystems LLC and the company's Cessna Citation M2.

The business jet mainly provides service between the company's headquarters and business destinations in Billings and Sydney, Montana; Twin Falls and Boise, Idaho; plus Fargo and Grand Forks, North Dakota. Occasionally, it flies between Great Falls and Edmonton, Alberta.

The aircraft operates year round, normally pausing only for scheduled maintenance inspections that typically are performed by Textron Aviation service centers. It is enrolled in the Cessna ProAdvantage and Williams International Total Assurance fixed cost per flight hour maintenance programs. Rice acknowledges that the company pays a premium for such services, but he's unwilling to take chances with the safety of his employees by opting for second-tier maintenance.

The weather around Great Falls and Transystems' regular destination airports varies considerably over a 12-month period. During summer months, thunderstorms are common and there is the constant need to consider weight/altitude/temperature limits when departing hot-and-high airports. In the winter, ice, slush and snow can contaminate or even clog runways. Storm systems often create icing hazards at stopover airports.

Transystems' flight operations SOPs are an outgrowth of the SOPs used for its truck and company car operations. As those ground vehicles operate in the same conditions, Rice is able to use many of the same risk mitigation and hazard elimination measures for air and ground activities.

One notable exception is payload. On the ground, the White Freightliners haul feed stocks, equipment and supplies. In the air, the Citation carries company managers, sales staff and technicians. Rice actively tasks aircraft passengers to take personal responsibility for their own safety by adhering to applicable sections of the aircraft SMP.

Air Shuttle SOPs

To have the most impact, an SOP document has to have the endorsement of the company's top management. Transystems' air shuttle SOPs don't just have Rice's signature on them. They originated in his office. The document largely was created by Rice's son, Curran, who has master's degrees in industrial psychology and English and serves as the company's technical writer. In undertaking the task, he asked himself about the purpose of and audience for the document. Accordingly, he focused on lean writing, making the document clear, not muddying it with gratuitous verbiage. That concern led to elimination of technical jargon to facilitate ready understanding by all company employees.

The finished document is only 26 pages, providing easy guidelines and links to more comprehensive references needed by certain stakeholder groups. In keeping with the company's safety philosophy, the SOP tasks the pilot, passengers and company with specific actions to mitigate risk.

Rice believes in metrics. The company's M2 is operated by a single pilot who is required to complete recurrent FAR Part 142 simulator-based training at FlightSafety International every 12 months. Formal winter weather operations recurrent training is required every autumn and structured warm weather training must be completed each spring. Other knowledge-based online training courses offered by FlightSafety may be included.

As part of preflight preparations, the pilot must use both the Cessna CLCalc loading calculator and CPCalc performance calculator to ensure the aircraft remains within the center of gravity envelope and that there are adequate performance margins. Computed results from CLCalc and CPCalc are recorded and kept on file for audit purposes.

Transystems' flight operations SOPs are an outgrowth of the SOPs used for its truck and company car operations. The photos to the right are from their simulator training.

The pilot is given full responsibility and authority for safety of flight and has the final word regarding dispatch approval, including loading, deferred maintenance items and weather delays or cancellations. In flight, the pilot has final authority on deciding whether it's safe to proceed to the destination or divert to an alternate.

Managing passenger expectations is a key part of the SOPs. The pilot is expected to inform passengers regarding weight and outside air temperature limitations when departing warm weather airports, and, before departure, about possible weather delays or diversions.

Rice says that passenger safety and comfort are top priorities. While it's important to control costs, that is secondary to focusing on passenger needs. If weather or maintenance issues require route deviations or unscheduled overnight diversions, Transystems doesn't hesitate to pay the additional costs that result.

"It's so essential for the passengers to have confidence in the pilots. We don't

chase fuel burns. We'll plan flights with weather and turbulence in mind."

The shuttle manager and pilot also are charged with assessing all aspects of FBO conditions and services, including overnight hangar and rental car availability, ramp condition and traffic volume, ice/rain/slush accretion and availability of deicing services, if required.

Scheduled calendar-, hourly and cycle-based maintenance should be performed at Textron Aviation service centers, according to the shuttle SOP. The allowable window for each type of inspection is published in the shuttle SOP, providing operating flexibility while complying with inspection requirements. This provision inside the document enables passengers to anticipate periods when the M2 will be out of service for required maintenance.

Airplanes, though, do break. In the event of an AOG event that requires the aircraft to be pulled out of service unexpectedly, the shuttle manager first must notify passengers of possible delays, then contact Textron for maintenance support. Factory support for remedying unscheduled maintenance snags is preferable, but factory authorized Part 145 repair stations may be used when needed.

In accordance with the aircraft's comprehensive minimum equipment list, non-critical maintenance snags may be deferred. But the shuttle SOP also recognizes that piling up deferred squawks until the next scheduled inspection point can cause the aircraft to be out of service for a prolonged period. So, it cautions against deferrals that could have a negative impact on aircraft availability.

Transystems' shuttle program manager also is tasked with providing semi-annual training for passengers. The company has specific procedures for how passengers must approach and depart the aircraft on the ground, how they must board and disembark, how carry-on and stowed baggage is handled and what may be carried or consumed on the aircraft.

Parts of the procedures are carried over from its Class 8 truck SMP. An analysis of injuries suffered by truck drivers indicated that many involved attempting to enter or exit the cabs while people were carrying beverages, packages or briefcases. When the company instituted a both-hands-free and one-foot-at-a-time entrance/egress protocol for truck drivers, the associated accident rates were significantly reduced. The procedure was carried over to aircraft operations. Passengers are instructed to hand their bags and beverage containers to people on the aircraft before setting foot on the boarding ladder. That frees the passengers to use both hands for support.

Passengers also are advised to avoid ice buildups on airport ramps during winter months. In extreme cold storm conditions, they're also provided with ice crampons to fasten to their shoes for better traction.

Occasionally, all passenger seats in the M2's main cabin are filled and it's necessary for the pilot to put a passenger in the copilot's seat. Transystems has strict rules for such passengers, including zip-lip sterile cockpit procedures below 10,000 ft., how to spot and advise the pilot of proximate air traffic, how to use emergency equipment and what not to touch.

Some passengers may be new to riding on the Citation. The SOPs provide for a lead mentor passenger who functions as a safety-conscious gate agent and flight attendant. The mentor passenger not only instructs new passengers on SOPs and safety procedures, he or she also is responsible for emergency egress from the cabin should it be necessary.

The SOPs contain specific risk rating limitations that add up terrain, weather, visibility, load, density altitude, runway length, runway condition, key senior managers onboard and crew duty day factors, among others. The limitation on the number of key managers aboard assures that company operations will continue without interruption in the event of a catastrophic accident.

The risk assessment tool also recognizes that the University of North Dakota conducts intensive flight training at Grand Forks Airport (GFK). The high student pilot traffic volume is included in the risk assessment tool.

Once the risk level reaches a specific cautionary level, the flight must have approval from either the company's vice president of safety or Dan Rice prior to dispatch. If the risk level reaches a specific warning level, the flight will not be approved for dispatch.

Top to Bottom Safety Culture

Rice sets the tone for the overall Transystems SMP, shuttle SOP and safety culture. He embraces change and encourages suggestions from all employees, as well as sources outside the company, that can improve the effectiveness of the programs.

(As an aside, when he asked *BCA* to review the shuttle SOP and offer tips for improvements, he responded by saying eight changes went into the document within 10 days as a result.)

He won't let safety tips languish in the "dark hole" of a suggestion box. "Anyone can identify a risk," he says, "but it must be submitted to a supervisor with a suggestion as to how to fix the problem. The supervisor must act on that suggestion in 48 hr."

Rice personally meets monthly with the pilot for a candid two-way conversation. It's clear and convincing proof that the chairman sets policy for flight operations. He alone takes complete responsibility for safety of flight.

Transystems also follows up with its "TransTopix" quarterly newsletter that leads off with a safety summary written by Scott Lind, president and COO. Rich Carl, vice president of safety, also has a regular column. Most of the safety topics focus on ground activities, including driver training and formal qualifications, plus loss reporting, but they reinforce the safety culture that permeates all aspects of company operations. Various forms of the "S" word, such as safe, safety, safely and unsafe, appear as many as six dozen times in the 20-page newsletter.

Rice believes that people are Transystems' most valuable resource. The width and depth of the company's SMP, including its shuttle SOPs, are testimonies to his commitment to the well-being, peace of mind and quality of life of his team. **BCA**

Transystems' Safety Improvement Philosophy

- **LEAD:** Take action and respectfully address unsafe acts and conditions.
- **LISTEN:** Seek information, listen to others and share their ideas.
- **OWN:** Choose to stay above the line and always ask, "What else can I do?"
- **INNOVATE:** Explore and share your ideas.
- **UNLEASH POTENTIAL:** Be eager to learn. Be eager to teach. Be eager to grow.

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Fred George
Senior Editor
fred.george@penton.com

Embraer Legacy 650

High value in a **transatlantic cruiser**

FOR AS LITTLE AS $10 MILLION, YOU CAN buy a Legacy 650, an aircraft that can fly 8 passengers from London to New York, Beijing to Moscow, Singapore to Sydney or Sao Paulo to Miami. It offers a three-zone cabin, a large aft lavatory with windows and a 240-cu.-ft., full-time access, aft baggage compartment, by far the largest in its class. And it's got another 46 cu. ft. of carry-on luggage room in the cabin.

The Legacy 650 can fly 500 nm farther than the Legacy 500 because it carries 2,430 lb. more fuel, mostly in new aft ventral tanks and an increased capacity center wing fuel tank. The aircraft also has dozens of other improvements, including 13% more powerful and fuel efficient Rolls-Royce A3007A2 engines with new wide-chord fans, upgraded refueling and fuel transfer systems, stronger glass windshields, more robust rolling stock, reinforced wings with a higher full flap speed, improved wiring harness and updated Honeywell Primus Elite avionics with standard flat-panel displays, coupled VNAV and RNP 0.3 guidance, plus optional FANS-1/A, CPDLC, WAAS LPV and XM satellite radio weather. But the cockpit is dated by current standards, lacking an edge-to-edge attitude indicator, synthetic vision, full-feature MFD and a HUD.

The three-zone, 13-seat cabin typically is configured with a four-chair club section up front, four-seat conference grouping with credenza in the center and a semi-enclosed aft stateroom with three-seat sofa sleeper plus two facing chairs. Unlike other aircraft in this class, the Legacy 650 has a shallow dropped aisle rather than a fully flat floor. And the fuselage cross-section is leaner than most other long-range business aircraft, about the same as a Citation Longitude. Still, the 42-ft. net interior length and large number of cabin windows give the interior a spacious feel. In addition, subtle aerodynamic improvements and acoustical insulation reduce interior sound levels 3 dBA compared to the Legacy 600.

Most aircraft are fitted with a forward galley with wet sink, microwave oven, power outlets for small appliances, storage compartments and tableware. Some aircraft have an optional forward crew lavatory, in addition to the main aft lavatory. Flight attendants say the forward lavatory compromises needed storage volume. Standard equipment also includes Airshow 4000, inflight entertainment system and front and rear 17-in. flat-panel monitors. Inmarsat Swift Broadband 432 and Iridium satcom systems are available.

True to its roots as a work-a-day regional airliner, it initially climbs into high thirties or up to FL 410, its certified maximum altitude. Maximum cabin altitude is 8,000 ft. It cruises at Mach 0.74 on long range missions. Embraer says to plan on 9+30 block times and an 18,409-lb. fuel burn for a 3,900 nm equivalent still air distance missions. Operators can bank on 400-kt. block speeds for shorter trips and 420-kt. block speeds for long-range missions.

On shorter trips, operators can push it up to Mach 0.78, but fuel consumption increases considerably. Redline is a modest Mach 0.80, but V_{MO} is 320 KIAS so you can keep up with jetliner traffic while descending on arrivals.

The aircraft has a relatively stiff wing structure, thus its ride in turbulence can be rather crisp. Pilots love its systems redundancy, reliability and handling qualities. It's no Falcon jet, but its control forces are considerably lighter than on vintage Gulfstreams.

Most purpose-built business jets have better runway performance, but the Legacy 650 can comfortably depart most airports with 6,000-8,000 ft. of pavement at MTOW. The aircraft is not weight restricted when departing *BCA*'s 5,000-ft .elevation/ISA+20C airport.

Although it's not the top performer in class, the Legacy 650 is ideally suited to charter operations because it has unsurpassed dispatch reliability, 6-month scheduled maintenance intervals and low operating costs. All up, you can fly this aircraft for less than $3,000/hr., including fuel, Rolls-Royce Corporate Care, Embraer Executive Care, hangar, crew and insurance, says Lenny Alava, a senior charter captain for a U.S. east coast firm.

While the aircraft is reliable, Alava cautions buyers to look carefully for corrosion during pre-buy inspections. He also says that Embraer Executive Care is not available after 10 yr. from delivery and that replacement parts prices can be dear. If an air cycle machine must be replaced, for instance, plan on spending $200,000. The top level EEC is expensive but worth every penny, says Alava.

The Legacy 650's main competitors are purpose-built business jets, including Dassault Falcon 2000LXS with better performance, but a much shorter cabin; Challenger 650 with slightly more range, but a shorter cabin and restricted tanks-full payload; Gulfstream G450 with better performance, a shorter cabin and higher operating costs; and Dassault Falcon 900LX with higher performance and a smaller cabin.

The Legacy 650, though, has relatively low direct operating costs and airline-spec dispatch reliability. Resale values for these aircraft, though, have plummeted, according to Penton's *Aircraft Bluebook* price digest. When new, retail prices ranged from $30- to $32-million, plus options. But now, early 2010 models sell for as little as $10 million and 2015 models only command $17 million.

If you're a charter operator in the market for a transatlantic range aircraft with rock-bottom operational costs that accommodates 12+ passengers and virtually all the baggage they can bring along, the Legacy 650 is a strong contender. **BCA**

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Edited by Jessica A. Salerno *jessica.salerno@penton.com*

News of promotions, appointments and honors involving professionals within the business aviation community

▶ **GE Aviation, Services, Evendale, Ohio,** Air 7, Camarillo, California, announced that **Cherie Hecker** has joined the company as vice president of operations, where she is responsible for oversight of operations efficiency, client engagement and leadership.

▶ **C&L Aerospace, Bangor, Maine,** announced that **Tim Bueschen** has joined the company as regional sales manager. Bueschen joins the company's Bangor office to cover the Southern U.S., Caribbean Central and South American regions.

▶ **Constant Aviation, Cleveland, Ohio,** announced the addition of **Stan Younger** to the company's senior leadership team. Prior to joining Constant Aviation he was vice president of all Service Centers for Bombardier and also spent 20 years at Cessna Aircraft eventually earning the title of vice president of Service Facilities.

▶ **Corporate Concepts International, Inc. (CCI)** announced that **Chris Zarnik** has been certified as a senior aircraft appraiser by the American Society of Appraisers. He server international and domestic clients from CCI's regional office in Raleigh, North Carolina.

▶ **Dassault Aviation, Teterboro, New Jersey,** named **Damien Farret** director of customer relations and field service at,. Farret replaces **Eloi Dufour,** who was named director of aircraft delivery and pre-owned management. In his role, Farret will lead the company's customer support organization for Europe, the Middle East, Africa and India. He joined Dassault in 2002 and most recently served as director of technical engineering.

▶ **Duncan Aviation, Lincoln, Nebraska,** announced that **Chris Jordan** has joined the turbine engine service sales team at its Mesa, Arizona, location where he will focus on TFE731, HTF7000 and Pratt & Whitney engine services. Jordan joins Duncan after 19 years at Honeywell Aerospace. **Bob Hazy** has assumed the role of manager of Duncan Aviation's Sacramento and Hayward, California, satellite shops. **Wayne Sand** has assumed the role of manager of Duncan's Denver and Broomfield, Colorado, satellite shops.

▶ **Esterline Corp., Bellevue, Washington,** appointed **Pierre Rossignol** has been appointed president of Advanced Sensors Group of companies, comprised of five manufacturing and aftermarket facilities. Rossignol replaces **Charlie Johnston**, who is retiring at the end of this year.

▶ **Farsound Aviation, Romford, United Kingdom,** has appointed **Gary Horobin** to the newly created position of vice president of business development Asia at. Horobin, based in Japan, most recently served as program controller for Rolls-Royce in Tokyo, where he oversaw procurement and supply chain functions, including supply chain design and implementation.

▶ **Flight Safety Foundation, Alexandria, Virginia,** announced that **Kenneth Hylander,** chairman of the Flight Safety Foundation's Board of Governors, was named chairman of a National Academies of Sciences, Engineering and Medicine ad hoc committee on aviation safety assurance. The committee's mission is to create a national research agenda to develop tools needed to support a prototype for a safety monitoring and assurance system to prevent safety problems in the national airspace system.

▶ **GE Aviation, Services, Evendale, Ohio,** named **Jean Lydon-Rodgers** president and CEO. **Tony Mathis** was promoted to president and CEO of GE Aviation, Military Systems. Most recently, Lydon-Rodgers served as president and CEO of GE Aviation, Military Systems. Mathis joined GE in 1997 and most recently served as the senior account executive for GE Aviation at Boeing Commercial Airplanes in Seattle.

▶ **Global Jet Capital, Boca Raton, Florida,** appointed **Ben Murray** as senior managing director of Asset Management responsible for developing, implementing and managing the company asset management strategy identifying which of the company's post-lease aircraft can be re-deployed as net earning assets. Murray joins Global Jet from Landmark Aviation where he was president of aircraft management and charter for four years.

BEN MURRAY

▶ **Honeywell, Morris Plains, New Jersey,** announced that **Darius Adamczyk,** president and COO has been elected to the company's board of directors. Earlier this year, the company announced that Adamczyk would succeed CEO **Dave Cote,** beginning March 31, 2017. Cote will continue as executive chairman until April 2018. Adamczyk's election to Honeywell's board is an important step in his transition to CEO, the company said.

▶ **LMI Aerospace, St. Charles, Missouri,** appointed **Jay Inman** president of Engineering Services, a role he has held on an interim basis since September. **Keith Schrader** has been named vice president of operations at LMI, overseeing the company's aerostructures operations and support functions.

▶ **Lufthansa Technik, Hamburg, Germany,** announced that **Andreas Tielmann,** 47, is the new CEO of Lufthansa Technik Logistik Services, taking over the role from Dr. Christian Langer who is moving to Lufthansa Technik as head of Digital Fleet Solutions.

ANDREAS TIELMANN

▶ **Pentastar Aviation, Waterford Michigan,** announced that **Calvin Ford** has joined in the position of Client Relations — Emerging Markets, reporting to **Brad Bruce,** executive vice president of maintenance and sales. Most recently, Ford served as marketing manager for Ford Motor Co.'s Lincoln Navigator.

▶ **Priester Aviation, LLC., Wheeling, Illinois,** named **Ted Pietrolaj** vice president of charter sales for a charter company based in Wheeling, Illinois. Pietrolaj previously served as owner services executive for the company.

▶ **Solairus Aviation Petaluma, California,** announced that **Eric Wildt** has been promoted to vice president of marketing and communications.

▶ **Textron Aviation, Wichita, Kansas,** reported that **Ralph Heath** has been elected to Textron's board of directors. **BCA**

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Products & Services Previews

By Jessica A. Salerno jessica.salerno@penton.com

1. Jet Aviation Geneva Completes First GV Heavy Check

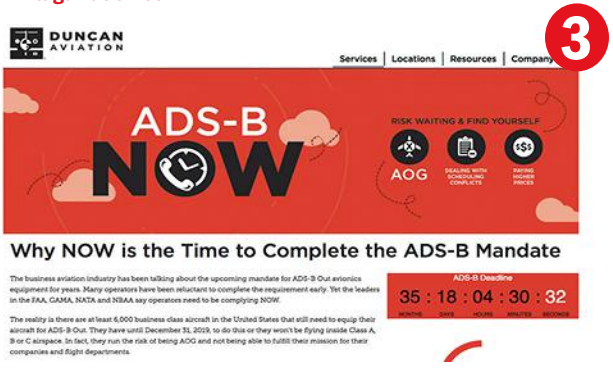
Jet Aviation's maintenance center in Geneva has completed its first 192-month, ultra-heavy maintenance check on a Gulfstream V. The inspection was performed along with a number of service bulletins and a water line ribbon heater upgrade. Maintenance included extensive overhauls of all major aircraft systems and structures, including removal of the cabin and cargo compartments, both engines and the APU, opening of the floor for fuselage skin and floor structure inspection, testing of the landing gear and a structural inspection of the wing panels. To reduce downtime, the facility formed a special team of sheet metal engineers to work three shifts.

Jet Aviation
www.jetaviation.com

2. TAG Farnborough Maintenance Expands Services

TAG Farnborough Maintenance Service, along with Zodiac VIP Business Aircraft Interiors, has expanded its business aircraft interiors capabilities with smart repairs, cabinet refurbishments and minor interior modifications. Products range from furniture, carpets, seats and cabin periphery. Developing its repair capabilities is a logical addition to its suite of services, the company said, and including refurbishment is a natural evolution of the business. The Zodiac facility is located inside the aircraft hangar at TAG Farnborough.

TAG Farnborough
www.tagaviation.com



3. Duncan Aviation ADS-B Straight Talk Book

Duncan Aviation has updated its Straight Talk book on the NextGen initiative Automatic Dependent Surveilance-Broadcast (ADS-B). There are still several thousand owners and operators who need to make the necessary equipment upgrades to their aircraft prior to midnight December 31, 2019. Originally written in 2015 and updated in 2016, the book is intended to provide practical information about all aspects of ADS-B.

Duncan Aviation
www.duncanaviation.aero/resources/straight-talk/ads-b
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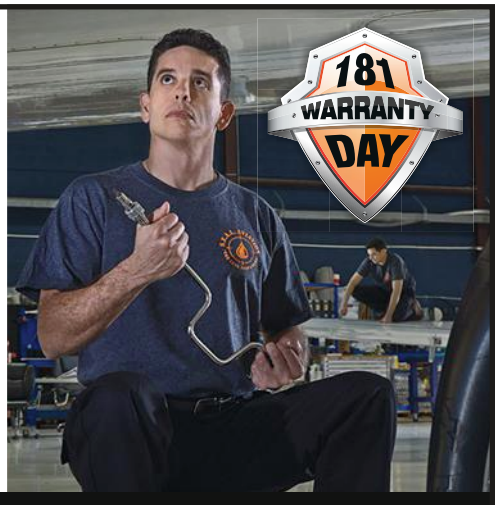

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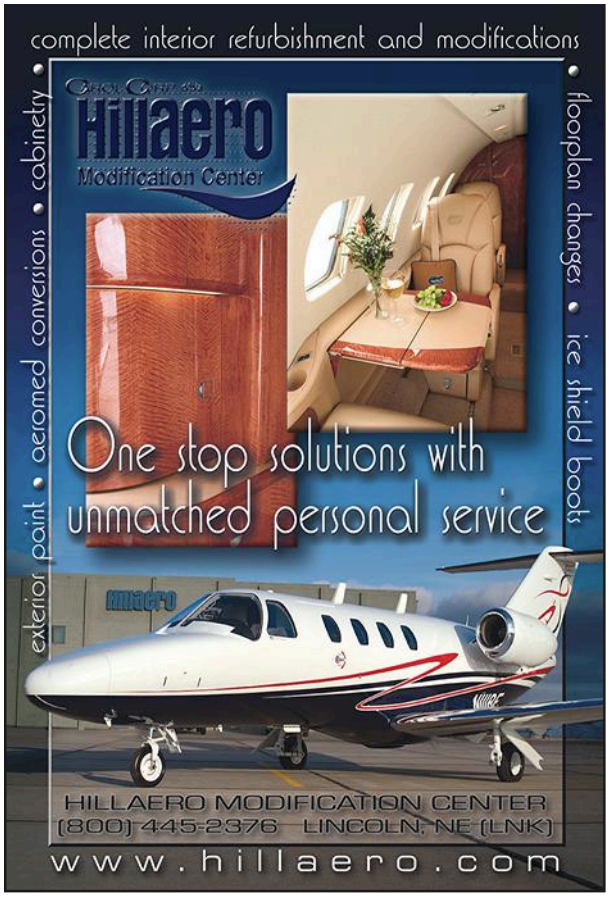

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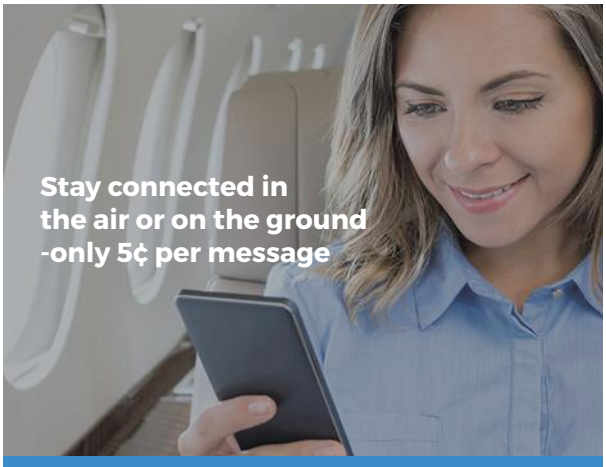

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Advertisers' Index

February 1967 News

In the closing weeks of 1966, three successive items appeared in influential papers damning **private and business aviation for freeloading** on the U.S. taxpayer. **"Fly now, pay never,"** was how the New York Times reported it. — *BCA*

Edited by Jessica A. Salerno *jessica.salerno@penton.com*

The third item appeared in the liberal and authoritative New Republic. It simply said that corporate aircraft received $5,000 per plane in "free Federal service."

Early forebear of the 1967 Cessna 210 is this 1927 model. In post-WW II era, Cessna lost faith in full-cantilever high-wing, dropping it entirely with the Model 195 in 1954.

Supersonic business jets? A supersonic Falcon? Why only five years ago we were churning around in revamped Lodestars. Pilots interviewed by *BCA* said they believed the actual fly-away price of a business SST would be closer to $10 million and that they expected them to be in the post-Gulfstream generation (1975-1980 era).

Worldjet (PD-808) Certified. Joint venture of Douglas Aircraft (design and consultation) and Piaggio of Genoa (manufacture), business plane formerly called the "Vesperjet," offers useful load of over 8,000 lb., seven to 10 places, and a max range of over 1,250 mi. Speeds of over 470 kt. are reported.

In 1966, the starting rate for a licensed (A&P) mechanic was $2.44/hr.; high rate was $3.50/hr. An apprentice mechanic was earning about $1.50/hr. with a high of $2.50/hr. Line service personnel were receiving between $1.26- $2.34/hr. Electronics technicians and TV service shop technicians earn $2.94/hr. to $3.90/hr. FBOs may have a labor crisis.

Lear Jet Industries will now sell direct from factory to dealers instead of (as in the past) through distributors. In New York area, company will be its own dealer. Prior to change, LJI had six distributors and 12 dealers.

Automotive industry nemesis, Ralph Nader, author of *Unsafe at Any Speed,* is turning his attentions to aircraft safety, primarily as it concerns the airlines. Because of the tempest this individual raised in the auto industry, aviation people are not passing Nader's statements off as idle prattlings. Some feel he is making soundings for a possible follow-up to his best seller – this one on aviation safety. **BCA**

THE ARCHIVE

Though the turboprop Gulfstream has become a legend in its time, Grumman has shown little haste bringing it into the jet age. Perhaps space/military-committments were a factor, but the Gulfstream II comes as one of the latest business jets to seek FAA certification, as well as one of the most expensive ($2.1 million). There is a waiting line of customers to testify that the cost, and wait, are well worth it. The II offers a 54,000-lb. max gross and such performance features as a MMO of 0.085 and operating ceiling of 41,000 ft.

An interesting name for an instrument — GARMI. It's an ADF, VOR and Mag heading all on one instrument. Allen Aircraft Radio (AAR), based in Elk Grove Village, Illinois, claims that whether you fly VFR or IFR, it will be easier and safer with a Garmi at a price of $795.00.

When they added the new M600 to the corporate stable, productivity jumped. Wait. The logical next step after a jet is a turboprop? Go figure: The average business jet flies around 400 hours a year, spending 300 hours on regional trips that could easily be made with a Piper M600 at 70% lower cost. Hey, flight department – congratulations on your promotions. Don't let the competition see this: **piper.com/M600**.

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*Comparison of overall annual operating costs of a Cessna XLS+ with those of a Piper M600, using the Conklin & de Decker Aircraft Cost Evaluator.

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