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Business & Commercial Aviation

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Challenging Airports

Attentiveness and
competence are key

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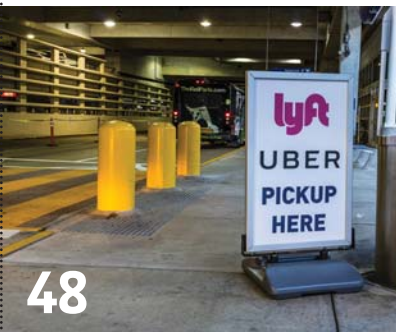
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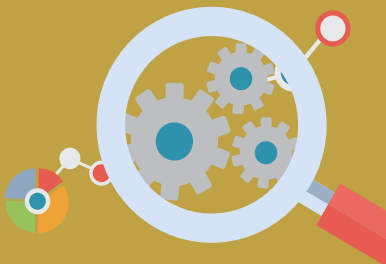
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Editor-in-Chief William Garvey — william.garvey@informa.com
Executive Editor Jessica A. Salerno — jessica.salerno@informa.com
Senior Editor/Chief Pilot Fred George — fred.george@informa.com
Safety Editor Richard N. Aarons — bcasafety@gmail.com
International Operations/Features Editor David Esler — david.esler@comcast.net
News Editor Molly McMillin — molly.mcmillin@informa.com
Art Direction Lisa Caputo — lcaputo@aviationweek.com
Art Department Colin Throm — colin.throm@aviationweek.com
Associate Producer Theresa Petruso — theresa.c.petruso@informa.com
Copy Editor Scot Greenan — sgman124@gmail.com
Contributors James Albright — james@code7700.com
 Mal Gormley — malgormley@gmail.com
 Kent S. Jackson — kjackson@jetlaw.com
 Ross Detwiler — rossdetwiler.com
 Patrick Veillette, Ph.D. — jumpsaway@aol.com
 Ringston Media — info@ringstonmedia.com
Editorial Offices 520 Folly Rd., Ste. 238, Charleston, S.C.
 (520) 638-8721 • (843) 718-2458

Publisher Frank Craven — frank.craven@informa.com
 Phone: (913) 967-1729
Managing Director, Business Aviation Intelligence/Data Services Anne McMahon — anne.mcmahon@aviationweek.com
 Phone: (646) 291-6353
Director of Sales, Business Aviation Elizabeth Zlitni — elizabeth.zlitni@informa.com
 Phone: (913) 967-1348
Advertising Production Coordinator Kara Walby — kara.walby@informa.com
 Informa, 9800 Metcalf Ave., Overland Park, KS 66212
 Phone: (913) 967-7476 • Fax: (913) 514-7303
Senior Audience Development Manager Tyler Motsinger — tyler.motsinger@informa.com
 Phone: (913) 967-1623
Head of Business Aviation Fleet Data Nigel Prevett — nigel.prevett@aviationweek.com
 Phone: 407-314 7403
Head of Valuations, Business Aviation Chris Reynolds — chris.reynolds@informa.com
 Phone: (913) 967-1956
Subscription Information **BCA Customer Service:**
 (800) 525-5003; +1 (847) 9147
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President, Aviation Week Network Gregory Hamilton — hamilton@aviationweek.com
Managing Director—Civil Aviation Administrative Offices Iain Blackhall — iain.blackhall@aviationweek.com
 605 3rd Ave., New York, N.Y. 10158

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Frank Craven

Publisher

frank.craven@informa.com

Garvey Living Legend

Red carpet and a gold medal



LIVING LEGENDS OF AVIATION

WILLIAM GARVEY, EDITOR-IN-CHIEF OF BUSINESS & COMMERCIAL AVIATION (BCA) was inducted into the “Living Legends of Aviation” in Beverly Hills, California on January 16. Along with other Class of 2020 inductees including Apollo 13 Commander Jim Lovell, Gulfstream’s Larry Flynn and Sergei Sikorsky, Bill was introduced by the evening’s host, actor/pilot John Travolta. The ceremony is produced annually for the Kiddie Hawk Air Academy, which is dedicated to sparking children’s interest in aviation.

The list of past recipients includes over 100 men and women from every corner of aerospace. Astronauts, titans of aviation manufacturing, fighter pilots, inventors and celebrities, among them. They have included Neil Armstrong, Buzz Aldrin, airline pilots Al Haynes and Chesley “Sully” Sullenberger, celebrity pilots Harrison Ford and Morgan Freeman, and general aviation’s Jack Pelton, Brian Barents and Clay Lacy. Now, Bill has been honored, too, celebrating his long and storied career in aviation journalism.

For the past five years I have been honored to work alongside Bill. His writing never fails to amaze me, and his knowledge and innate understanding of our industry is unparalleled. Plus, he’s just the nicest guy you could ever meet. Our time together in the office, at aviation conferences, and at trade shows all

over the world is a joy, because he is simply the best storyteller I know. His writing reflects his personality...you can hear his voice when you read him in print or online.

During his acceptance speech for the Legends, Bill touched only briefly on his aviation adventures, including his flights in a Sukhoi 29 aerobob, twice piloting the Goodyear blimp, formation flying with the Skytypers in SNJs over Long Island, sailplaning in a Schweizer in upstate New York, and splashing down on Lake Meade in a Grumman Albatross.

He also acknowledged the help and support of his beloved wife, Tamara, whom he credits with fostering his career success and enabling him to pursue his lifelong love of all things aviation.

Bill has been the top editor for *Flying* and *Professional Pilot* magazines, along with *BCA*, and has written for many other prominent outlets including *Reader’s Digest*, *National Public Radio*, *Smithsonian Air & Space*, *The New York Times* and, of course, *Aviation Week & Space Technology* and *Aviation Week Television*. He has also received “Lifetime Achievement in Journalism” awards from both the NBAA and Aerospace Media organization. NATA granted him an “Aviation Journalism Award,” and he has earned an “Aerospace Journalist of the Year” award as well. In 2018 he was named a “Distinguished Statesman of Aviation” by the National Aeronautic Association.

Outside of his journalism gig, Bill is a dedicated family man. One of seven siblings, he likes to share the experience of that hectic home life with wife, Tamara, who is also one of seven. Together, they’ve raised four remarkable children, two of whom went on to become military aviators.



LARRY GRACE/LIVING LEGENDS OF AVIATION

If you have not yet had the pleasure of meeting Bill, when you do, you’ll find him extremely gracious and eager to talk to you about anything that flies or drives. Ask him about his classic BMW M Coupe! I often see him get stopped at tradeshow, in the airport, and on the street, and without exception, he always makes the time to connect.

However, if you want to hear about his induction as a “Legend,” you’ll need to raise the subject; Bill’s focus is on others, not self. I learned that even his closest colleagues had no idea he was receiving this prestigious award until after the event itself.

That is why I’m telling you about it now.

Congratulations, Bill. Well deserved! **BCA**



ADVERTISING SALES

Publisher

Frank Craven – frank.craven@informa.com
(202) 517-1061

Director of Sales

Elizabeth Zlitni – elizabeth.zlitni@informa.com
(913) 967-1348

NORTH AMERICA ADVERTISING SALES

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Miguel Ornelas – miguel.ornelas@aviationweek.com
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Canada

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FBO ADVERTISING SALES

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Is a new air age dawning?

EARLIER THIS YEAR MY BRIDE AND I WERE KILLING TIME STROLLING through an industrial area near Los Angeles International before an evening party. In the doing, we came upon a nondescript building with the unlikely sign above the door declaring it to be the Automobile Driving Museum.

What greeted us within was an amazing array of cars going back more than a century — everything from a Packard Phaeton and three-wheeled Morgan, to a Studebaker Avanti, Edsel Ranger and DeLorean with muscle and sports cars and oddities aplenty — including a custom Plymouth town car for Franklin Roosevelt. I salivated over many and here's the thing, the museum says all of them run, and lets you pop the doors and slide behind the wheel of most.

One of the verboten rides, however, had a tiller rather than a wheel and sparked my imaginings. It was a working replica of an 1886 Benz Motorwagen, regarded as the world's first production automobile. It was developed by Karl Benz, but financed by his wife, Bertha. Later, unbeknownst to him, she famously (and illegally) drove it, along with their two teenage sons, on a 60+ mile, day-long journey making history in the effort and gaining tremendous publicity for the vehicle. An excellent recreation of this, the very first road trip, can be seen here: <https://tinyurl.com/y5omgdmdb>

It's easy to envision the thrills attendant to that period of discovery and invention in what became a global transportation industry. And I wonder if another chapter in motorized movement is aborning right now.

The research effort, formidable sums of investment dollars, design and fabrication work, chemistry, programming, experimentation and on-going international partnerships and flight trials, along with the breathtaking predictions and ambitious timelines involving drones, electric vertical takeoff and landing (eVTOL) aircraft, autonomous flight and urban air mobility (UAM) machines is unlike anything I've ever known. The excitement of those involved is palpable and the energy of the movement is seemingly unstoppable and inexhaustible.

Some of the things these backers — Boeing, Airbus, Embraer, Toyota and Hyundai, among them — envision include fleets of pilot-less vertical-takeoff-and-landing air taxis operating from and within city centers; front step delivery by drones of food, clothing, drugs and toilet paper ordered on line hours earlier;

island hopping in hush-quiet, battery-powered flivvers; tracking suspects (or innocents) and communicating with same; remotely inspecting bridges, towers, tracks and turbines; shuttling documents and personnel to ships offshore; recording car wrecks, rushing vaccines, pinpointing victims of natural disasters — the mission possibilities go on and on.

It's easy to get caught up in the tidal wave of it all. But for most of its history, civil aviation has advanced incrementally, with demonstrated safety of flight its pacing item. And in the view of Brian German, that will continue with this emerging aerial generation as well.

An aerospace engineering professor at Georgia Tech, director of its Center for Urban and Regional Air Mobility, and a member of the AIAA Aircraft Electric Propulsion and Power Working Group, Dr. German is intimately familiar with the efforts and challenges involved in the dawning new air age. And while he says advances are assured — “This is coming. It's not a question of ‘if’ but ‘when’ and ‘to what extent’” — he maintains the ultimate test will be earning certification and producing vehicles and a support structure economically.

It is that last point that draws Richard Aboulafia's focus and signature skepticism. Vice President of Analysis at Teal Group in Washington, D.C., he says creating the aircraft, technologies, services and infrastructure needed for urban aviation will require billions of dollars in investment. And save for “an awful lot of technological magic, or pixie dust” the collective effort might never turn a profit. His dark prediction: “Most UAM companies will suffer grievous fates, destroying millions in investor cash.”

We'll see. The fact is drones are operating commercially. Soon Wisk, a Boeing-backed outfit, will be carrying Kiwi commuters autonomously in its two-place, pilot-less Cora air taxi. Meanwhile, Joby, a developer in which Toyota recently led a \$594 million investment round, has applied for FAA certification of its S4 eVTOLer. All of that and much more supports Dr. German's observation.

It's worth noting that along with Bertha's Motorwagen and 100+ other classics in the Automobile Driving Museum's collection, all but two were powered by internal combustion engines — a 1922 Detroit Electric and a 1975 Sebring-Vanguard CitiCar. While neither was particularly successful, their concept had merit, as pixie dusted Tesla more recently confirmed. **BCA**



Readers' Feedback

Remembering Murray

I thought the "Yesterday's News" tribute to Murray Smith, the late founder and publisher of *Professional Pilot* magazine, (**Viewpoint, February 2020**) was very thoughtful, heartfelt and totally accurate. It was nice of you to acknowledge him.

Al Higdon

*Retired co-founder,
Sullivan Higdon Sink Advertising
Wichita, Kansas*

Your salute to Murray Smith (**Viewpoint, February**) was beautifully said. What a man, what a legacy. I'm proud to have known him.

David M. Bjellos

*Aviation Manager
Agro Industrial Management, Inc.
West Palm Beach, Florida*

More of This

I may have missed this last year, but congratulations on this year's "Dubious Roll Call" (**Viewpoint, January 2020**) and using your bully pulpit to call out the losers. There should be more of this.

Kenneth E. Gazzola

*President
Four Stars Aviation, Inc.
McLean, Virginia*

Thank You, Murray

Having read your *Viewpoint* (**February**)

"He was a fixture a business aviation gatherings, but much more than that, Murray was a force within the community. He was passionate about business aviation, its tools, record and people."

William Garvey, BCA, Editor-in-Chief

2020) as I normally do, I'm not sure many people will likely understand your "thank you" to Murray Smith, but I do!

I never knew Murray personally but many years ago I dropped him a line to express my displeasure of his magazine enlisting what I thought to be the help of a "could have been" bad guy from World War II days. He respectfully and poetically put me in my place. In hindsight, I deserved it and learned tremendously from that lesson he taught me. From your words, I suspect you must have learned a lot from Mr. Smith as well.

I've been around business aviation for over four decades and for the past three have been flying for one of the largest corporations in America. I encourage the "new guys" to read the magazines that gentlemen like Murray and you produce (*BCA* and *Pro Pilot*). They may be able to learn more than

just what the printed words say . . . I have.

A sheynem dank, William

Joe Loewenstein
Cincinnati, Ohio

EIC Garvey's response: While working nearly eight years with Murray, I learned the true meaning and importance of resilience, independence, accuracy, relevance, friendship, and how to recognize and tell a really good story. He was a dear friend, a passionate advocate for and practitioner of business aviation, an indefatigable pitchman/promoter/salesman, a master of the overlong shaggy yarn and a mensch of the highest order. I owe him a lot and will miss him forever.

If you would like to submit a comment on an article in BCA, or voice your opinion on an aviation related topic, send an email to jessica.salerno@informa.com or william.garvey@informa.com

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EDITED BY **WILLIAM GARVEY,**
JESSICA A. SALERNO AND
MOLLY MCMILLIN
william.garvey@informa.com
jessica.salerno@informa.com
molly.mcmillin@informa.com

NEWS / ANALYSIS / TRENDS / ISSUES

▶ **WORRIES OVER THE CORONAVIRUS** impacted business aviation show-going in a big way. On Feb. 7 the National Business Aviation Association (NBAA) announced the cancellation of the Asian Business Aviation Convention & Exhibition (ABACE) planned for April 16-18 in Shanghai because of health concerns about the spreading virus and the special challenges it would bring



for participants. The show, cohosted by NBAA and the Asian Business Aviation Association, typically attracts 9,000 attendees from 50 countries, 165 exhibitors, 35 aircraft and about 300 members of the press. ABACE 2021 is scheduled to take place April 13-15, 2021. Meanwhile, as global alarm over the deadly viral outbreak grew, several North American companies, including Bombardier, Gulfstream, Textron Aviation, CAE, Stemme and General Atomics Aeronautical Systems decided not to attend the Singapore Air Show, which ran from Feb. 11-16. Each company attributed its withdrawal to concerns about the health of their employees and customers. The show, held every two years, drew more than 54,000 attendees from 147 countries in 2018, up 12% from the previous show in 2016. The U.S. had the largest international presence with more than 170 exhibitors in 129,000 sq. ft.

▶ **THE PILATUS PC-24 BUSINESS JET** received full rough-field certification for takeoffs and landings on grass, wet earth and snow. The award by the European Aviation Safety Agency was announced in early February. The aircraft received certification for operations on dry sand and gravel in 2018. Pilatus began a post-certification test campaign throughout 2019 to certify the aircraft for operation on unpaved runways and in differing conditions. Tests were conducted at locations in the U.S. and Europe.

▶ **BOMBARDIER IS STRENGTHENING ITS EUROPEAN** customer support network with the expansion of its London Biggin Hill Service Center. The company has begun construction of a new, nearly 250,000-sq.-ft. maintenance and refurbishment facility which will double the size of its existing hangars. The facility is scheduled to be operational by mid-2022. It will be large enough to support an increase of Bombardier business aircraft, including as many as 14 Global 7500 business jets at the same time. The expansion will introduce capabilities such as installations including component painting and interior refurbishment, component repair and overhaul workshops and training rooms. It will also include a new parts depot. Employment will grow to more than 250 workers over the next several years. Bombardier opened the London Biggin Hill service center in 2017.



▶ **THE EMBRAER PHENOM 300E** is undergoing an upgrade with improvements in performance, comfort and technology as well as an optional new refined interior. The company announced the improvements in late January. Alvadi Serpa, director of product strategy, said the upgrades followed input by customers, adding, "As long as you listen to your customers, you will know exactly what needs to be done."



The new interior features black seating, mirror black tables and cabinetry, gold-plated accents, fold-down monitors, invisible eyeball vents and other touches. Certification is expected at the end of the first quarter, with first deliveries in May. List price is \$9.65 million, up from the list price of \$9.45 million for the previous version. The black interior is a \$150,000 option, and a connectivity package costs about \$160,000 more.

Jet-A and Avgas Per Gallon Fuel Prices February 2020

Jet-A			
Region	High	Low	Average
Eastern	\$8.57	\$4.17	\$6.08
New England	\$7.56	\$3.71	\$5.18
Great Lakes	\$7.98	\$3.18	\$5.36
Central	\$7.36	\$3.37	\$4.86
Southern	\$8.02	\$4.30	\$5.89
Southwest	\$6.90	\$3.02	\$5.26
NW Mountain	\$7.86	\$3.21	\$5.32
Western Pacific	\$7.27	\$4.35	\$6.06
Nationwide	\$7.82	\$3.66	\$5.50

Avgas			
Region	High	Low	Average
Eastern	\$8.44	\$4.75	\$6.47
New England	\$7.45	\$4.90	\$5.82
Great Lakes	\$8.50	\$4.59	\$6.04
Central	\$7.59	\$4.51	\$5.44
Southern	\$9.28	\$4.30	\$6.17
Southwest	\$7.19	\$4.12	\$5.66
NW Mountain	\$8.46	\$4.69	\$5.84
Western Pacific	\$8.52	\$5.15	\$6.44
Nationwide	\$8.19	\$4.63	\$5.99

The tables above show results of a fuel price survey of U.S. fuel suppliers performed in February 2020. 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.

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Piper Begins U.S. Tour of M-Class Products



Piper Aircraft is launching an extensive product demo tour throughout the U.S. to showcase its M-Class line of products, including the M600 SLS with the HALO Safety System that includes Garmin's Autoland. The M600 SLS product demo team will leave the Piper factory in Vero Beach, Florida, in early February. Over the next two months, members will visit each U.S. Piper dealer's headquarters. Its first stop is scheduled for Des Moines Flying Service in Des Moines, Iowa, followed by stops in Kansas, Texas, the Northeast, Mid-Atlantic and Southeast states. They will then make multiple stops through the Southwest, California and Pacific Northwest.

Frigge New Hartzell President

J.J. Frigge has been promoted to president of Hartzell Propeller. He assumes the role previously held by Joe Brown, who will become chairman. Frigge joined Hartzell in 2011, most recently serving as executive vice president and general manager of the Piqua, Ohio-based company. He previously spent 10 years as a finance manager at Procter & Gamble. He also serves on the communications committee of the General Aviation Manufacturers Association.

▶ **ORDERS FOR GULFSTREAM** business jets in 2019 were the highest in more than a decade and the second highest ever, buoyed by demand for its new models, according to parent company General Dynamics. Gulfstream's new-aircraft book-to-bill ratio for the fourth quarter of 2019 was a hefty 2:1, compared with 1:4 for the year, boosted by the launch in October of the ultra-long-range, ultra-large-cabin G700. Excluding the G700, book-to-bill for 2019 was still above 1:1, General Dynamics CEO Phoebe Novakovic told analysts on Jan. 29. "The order activity [at Gulfstream] was stellar in the quarter," she said. "Orders for all of 2019, in dollars and units, were 54% higher than in 2018," boosting Gulfstream's funded backlog by \$2 billion to \$13.3 billion, up 17.4% year-on-year. She noted that orders for the G700, which is to enter service in 2022, have not come at the expense of its current flagship, the G650. "The G650 backlog has increased," said Novakovic, adding that the G700's introduction has clarified the product offering and increased demand for the G650. Gulfstream is still proceeding with plans to reduce G650 output through 2020-21 as it ramps up production of the new large-cabin G500 and G600. Novakovic says this will balance production with the backlog and reduce the order-to-delivery wait time for a G650 to a more normal level. Full-year revenues at Gulfstream were up 15.9% year-on-year to \$9.8 billion, on higher aircraft deliveries. The company shipped 114 large-cabin aircraft (up from 92 in 2018), 33 mid-cabin aircraft (29) and 17 pre-owned aircraft (seven). The forecast for 2020 is 150 aircraft and \$10 billion in revenues.



▶ **TEXTRON AVIATION EXPECTS DELIVERIES** to remain flat in 2020, as the ramp-up in production of the Citation Longitude super-midsize jet is offset by a reduction in demand for legacy aircraft. Handover of the first 13 Longitudes in the fourth quarter of 2019 helped push Textron Aviation to 206 business jet deliveries for the year, up from 188 in 2018. Segment revenues grew 11% in the fourth quarter on Longitude deliveries, but profits slid 22% on higher production costs for the initial aircraft. Deliveries of turboprops declined slightly in 2019, with Caravans falling to 83 from 92 a year earlier and King Airs slipping to 93 from 94. Piston aircraft deliveries declined to 218 from 227 in 2018. Overall, Textron Aviation's revenues grew slightly year-on-year to \$5.1 billion, boosted by the Longitude. In 2020, revenues and profits are expected to increase as the Longitude ramps up and production moves down the learning curve, Textron CEO Scott Donnelly told analysts on Jan. 29. Factoring in a continued soft market for legacy Citations, revenues of \$5.4 billion are projected for Textron Aviation in 2020. Donnelly expects 2020 deliveries "to be fairly flat on units, but with a lot more Longitudes." Textron Aviation ended 2019 with a backlog of \$1.7 billion, down from \$1.8 billion a year earlier. Demand for the Longitude remains good, Donnelly said, but is "flat to down" for legacy aircraft.



▶ **MAVERICK HELICOPTERS, A LAS VEGAS-BASED** tour operator, has signed a contract with Airbus Helicopters to retrofit its fleet of 34 EC130 B4s with the Airbus Crash Resistant Fuel System. Maverick operates a fleet of 49 Airbus helicopters and carries 250,000 passengers a year to sites in Las Vegas, the Grand Canyon and Hawaii. Airbus has received European Aviation Safety Agency (EASA) certification on the crash-resistant fuel system and expects FAA certification in the next few months. It is available on the AS350 B3 variant for retrofit. The CRFS is standard on all H125 aircraft produced in its Columbus, Mississippi, production facility. It will now come standard on all new H125s built worldwide, Airbus says.



► **WHEELS UP AND DELTA AIR LINES** have closed on a transaction that combines the private aviation provider with Delta Private Jets. The partnership pairs Wheels Up membership programs and its digital platform with Delta's private jet division, creating a fleet of nearly 200 aircraft ranging from the King Air 350i turboprops to large-cabin business jets. Financial terms were not disclosed. Wheels Up has more than 8,000 members and customers. Under the partnership, Wheels Up members will be eligible to earn Delta Medallion Status, accrue miles in Delta's SkyMiles loyalty program and use their Wheels Up Fund program balances to pay for private and commercial flights. Delta Private Jet customers will be able to access the Wheels Up



fleet and membership offers. "Together, Wheels Up and Delta will democratize the industry to make private flying and the private flying lifestyle accessible to significantly more individuals and businesses around the world," Wheels Up Founder and CEO Kenny Dichter said. "By adding Delta Private Jets and partnering with Delta, our membership platform has evolved to one that can fulfill a vast range of flight needs on a very large scale." Over the next year, Wheels Up and Delta will introduce additional cross-platform benefits and features.

► **THE HELICOPTER CRASH THAT KILLED** basketball player Kobe Bryant and eight others was not caused by an engine fault, NTSB investigators have confirmed. In their first published preliminary update into the Jan. 26 crash near Calabasas, California, investigators said it was still unclear what caused the Sikorsky S-76B — registered N72EX — to crash into the hills above the town during a flight from Santa Ana/John Wayne Airport to Camarillo Airport. NTSB Chairman Robert Sumwalt said his team had developed a "substantial amount of evidence" from the crash scene. "We are confident that we will be able to determine its cause as well as any factors that contributed to it so we can make safety recommendations to prevent accidents like this from occurring again," he said. The 1991-model S-76B helicopter was not equipped with a flight data recorder or cockpit voice recorder, nor was it required to be for the ill-fated flight. Investigators have, however, secured the flight management system computer to check for data stored in its memory. Two flight control computers, four gyros, and the standby attitude indicator also are being examined, the report states. Several personal electronic devices also were recovered from the wreckage and will be examined for any relevant data, the report states.

► **GULFSTREAM AEROSPACE HAS LAUNCHED** a world tour of its new G700 cabin mockup, which includes the Symmetry Flight Deck with active control sidesticks, touchscreen technology and other features. Gulfstream announced the G700 large business jet in October at the National Business Aviation Association Convention & Exhibition. The G700 will have a high-speed range of 6,400 nm at Mach 0.90 and a long-range cruise of 7,500 nm at Mach 0.85. Maximum operating speed is Mach 0.925. The tour begins in Monterey, California, then proceeds to Palm Beach, Florida, and will return to Savannah, Georgia, before embarking on a European tour of Switzerland, France and the U.K. in the spring.



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Airbus Increases Alternate Gross Weight on H135



Airbus Helicopters has announced a new Alternate Gross Weight on the latest version of its H135 suite of helicopters. The new AGW has an amplified 265-lb. (120-kg) takeoff weight and useful load. This increase extends the range by up to 75 nm or endurance by up to 40 min. The new AGW is expected to be FAA and European Union Aviation Safety Agency certified this year and can be retrofitted on H135s with Helionix.

Honeywell Upgrades Leonardo AW139 Helicopters



Honeywell is providing Leonardo helicopters with significant upgrades to its AW139 helicopters, including Honeywell's Primus Epic 2.0. It will add more enhancements, such as better maps, improved situational awareness at night and in marginal weather, and easier access through wireless connectivity. It is track-based, meaning navigation follows the helicopter's actual path and accounts for wind and other factors. Features include the SmartView synthetic vision system and a user-friendly iNAV map visual interface, among others.

Bell Signs With Alameda Sheriff's Office for Bell 505



Bell has signed a purchase agreement with the Alameda County Sheriff's Office Air Support Unit in California for a public safety-constructed Bell 505 Jet Ranger X. Some features include a Trakka-beam TLX searchlight, an AEM 300-watt Loudhailer system, Wescam MX-10 camera, PS engineering PA45 digital audio system with pilot and co-pilot audio controllers and Aero-Dynanix NVG cockpit lighting.

West Star Expands Services

West Star Aviation, an engine and airframe repair and maintenance company, has nearly doubled the size of its Aircraft on Ground and Maintenance and Repair technician crews. The crews, available around-the-clock, focus on customer service, ensuring nationwide coverage for customers, including recently added services in the Atlanta and Tampa, Florida, areas. In addition, West Star has been granted approval for its aircraft maintenance technician apprenticeship program by the U.S. Department of Labor as a registered program in Illinois. West Star's program currently includes 37 apprentice AMTs. The approval allows for federal grants, such as the Aviation Workforce Development Grant recently approved by Congress, and will allow West Star to expand its workforce.

▶ **FAA ADMINISTRATOR STEVE DICKSON** has hinted of a new regulatory regime around aircraft certification leaning on lessons learned from the ongoing Boeing 737 MAX debacle. Speaking to members of the British aerospace community in London Feb. 6, Dickson said that the current certification processes has "consistently produced safe aviation products and service for many years," but once beyond issues with the MAX, future certification processes may have to move "toward a more holistic versus transactional item-by-item approach." He called for a "coordinated and flexible information flow and data throughout the oversight process," and suggested that human factor considerations needed to be considered throughout the design process, as aircraft become more automated and their systems more complex. "We will certainly take some of the lessons learned from the MAX and apply them to airplanes currently in development," he added.

▶ **PRIMEFLIGHT SERVICES, BASED** in Sugar Land, Texas, has acquired the assets of International Aero, an aircraft cleaning and maintenance company in California. International Aero operates at Long Beach Airport, California; Savannah/Hilton Head International Airport, Georgia; Van Nuys Airport, California; and Tucson International Airport, Arizona. It will retain its interior, engineering and machine shop in Los Angeles. "The acquisition furthers our growth in the aircraft cleaning space, boosting our expertise and helping us to become the premier aircraft cleaning provider in the general aviation industry," said Dan Bucaro, PrimeFlight president and CEO. It is PrimeFlight's second acquisition in two months. In December, PrimeFlight acquired Appearance Group, a Wichita, Kansas-based aircraft cleaning and maintenance company.



▶ **ROBINSON HELICOPTERS SAW** deliveries drop by over a third in 2019, compared to the 316 aircraft handed over the year before. The final tally of 196 units delivered was well below the 300 the company had originally hoped to achieve in 2019. The count included 19 R22s, 54 R66s and 123 R44s. "We saw a slowdown," acknowledged company President Kurt



Robinson. He added "there are a lot of different explanations," for the falloff in numbers, the majority of which are usually sold internationally. "There are a lot of weird political things going on that I don't want to be any part of, so I don't know how that affects sales in all the different countries," he said. "We export over 70%, so depending

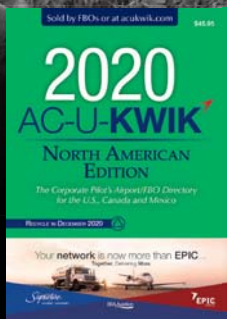
on how various countries are doing, it can really impact our sales one way or the other." However, he said 2020 is showing signs of being significantly better. "For whatever reason we've gotten off to a really strong start and we are seeing it in particular in the R66," he said. "We're optimistic this is a chip shot, but you never know." Based on the recent sales uptick, the current production rate is six units per week as compared to eight per week in 2017. "We are sold out for the first six months for the R44 and R66, and that's something that we didn't do last year," Robinson said, noting that the 1,000th R66 delivery milestone will be passed sometime over the next three months. To avoid laying off employees and preserving the company's skill set, Robinson has diverted some workers from the production line to a new 37,000-sq.-ft. repair facility which opened last July. "It is dedicated to component inspection and teardowns. We understand most people that operate our helicopters make money with them and they don't want them down on [the] ground," Robinson said. The facility, located in the company's original production site in Torrance, California, is designed to perform overhaul and repair of all airframe and engine components.



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**AVIATION
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Training for Garmin-Equipped Citation Excel, XLS Training



FlightSafety Textron Aviation Training Learning Center in Wichita has been selected as the exclusive training provider for Cessna Citation Excel and Citation XLS aircraft equipped with Garmin G5000 avionics. Pilot and recurrent training courses are now offered at the site. Differences training is also available using a Garmin G5000 training kiosk. A Garmin G5000-equipped Level D simulator will be added later this year. The Garmin G5000 retrofit replaces the Honeywell Primus 1000 avionics. The Federal Aviation Administration (FAA) is accepting applications from U.S. citizens interested in becoming air traffic controllers from Jan. 24-27.

Clay Lacy Aviation Opens Dallas-Fort Worth Office

Clay Lacy Aviation has opened an office at Fort Worth Meacham International Airport in Fort Worth. The new office will provide local aircraft management services and support for owners and corporate flight departments as well as charter services. Clay Lacy Aviation manages 120 business jets in 26 U.S. cities. The Fort Worth facility will be led by Chris Broyhill, senior vice president of Part 91 operations and Texas Regional Development.

► **UBER IS LAUNCHING A THREE-YEAR,** “multimillion-dollar” community engagement plan to pave the way for the anticipated start of commercial urban aerial ride-sharing services in its pilot cities of Dallas, Los Angeles and Melbourne, Australia. A key part of the plan will be test flights of a prototype electric vertical-takeoff-and-landing (eVTOL) vehicle over a city this year to measure noise levels and gauge public reaction. Uber has not yet said where and when the flights will be conducted, or with which vehicle. “Never surprise the community. Give them plenty of time and data,” advises Mark Moore, head of aviation for the Uber Elevate urban air mobility (UAM) initiative. **“We have got to be three years ahead to socialize that [these vehicles] will be a good neighbor.”** When it comes to community engagement, “noise is a large part of it,” Moore told the Vertical Flight Society’s Transformative Vertical Flight conference in San Jose, California, on Jan. 10. Designing eVTOLs for low noise is a “necessary condition” for public acceptance, he said. To get to the number of daily flights per vertiport required for urban air taxis to be economically viable, Uber is targeting a 15 dB reduction in vehicle noise level from existing light helicopters. “Noise is tightly coupled to the economics the vehicle can achieve,” Moore said. While not identifying the eVTOL that will be used for the test flights, Moore says it will be piloted and will not carry passengers. Of the eight vehicle partners so far announced by Uber, only one — Joby Aviation — has so far unveiled a flying, piloted prototype eVTOL.

► **LEONARDO HELICOPTERS WILL TAKE OVER** fledgling Swiss rotorcraft manufacturer Kopter Group in a \$185 million deal. The deal, announced Jan. 28 and unveiled at the close of business on the Italian stock exchange, will see Leonardo acquire 100% of the company from its current owner Lynwood. Additional payments linked to certain milestones over the life of the program could also be earned. Leonardo says Kopter will continue to operate autonomously and in coordination with the Italian parent.



The deal is expected to close in the first quarter of 2020. The agreement provides additional security for the development of Kopter’s SH09 single-engine light helicopter and gives Leonardo a new member of its product line. Leonardo’s single-engine product line currently consists of the AW119Kx Koala, a derivative of which was selected in January as the U.S. Navy’s new rotary-wing trainer. Gian Piero Cutillo, managing director of Leonardo Helicopters, said, the SH09 “complements perfectly our existing product portfolio, adding a promising rotorcraft that will greatly benefit from our industrial know-how, service and training experience and commercial network.” Kopter has also secured a future site for final assembly in Lafayette, Louisiana. In addition, it has agreements in place with Korea Aerospace Industries to look at potential marketing and final assembly opportunities in South Korea. The aircraft has already secured more than 70 firm orders and around 120 letters of intent, securing the first three years of production. Certification of the SH09 is expected in 2020.

► **THE FAA HAS PROPOSED AMENDING ITS CERTIFICATION PROCEDURES** so that it can issue design approvals for some unmanned aircraft systems (UAS) as a “special class” of aircraft. The agency’s current Part 21 rule, requires that applicants for type certification, or design, approval of a new aircraft show that it complies with existing airworthiness standards for normal or transport categories of airplanes or helicopters. The agency amended the rule to add requirements for obtaining type certificates for special classes of aircraft, including gliders and airships, that would be eligible for airworthiness approval “but for which certification standards do not exist due to their unique, novel or unusual design features.” In a policy notice published in the *Federal Register* on Feb. 3, FAA seeks comments on treating some UAS as special class aircraft under the Part 21.17(b) provision, which would allow it to tailor the certification basis for each new drone design. Among the UAS affected by the policy would be drones used for package delivery, the agency say.

► **INNOVATIVE SOLUTIONS & SUPPORT**, based in Exton, Pennsylvania, has signed a multiyear agreement to supply the ThrustSense autothrottle and protection system as standard equipment on new aircraft. The patented control system provides improvements in in-flight safety, reduced pilot workload and engine protection. It also manages engine power while protecting the engine against damage and automatically manages the power from takeoff roll through climb, cruise, descent and landing approach phases, among other safety features.

► **A NEW EUROPEAN HELICOPTER SHOW** is being established through a partnership of the European Helicopter Association (EHA) and the European Union Aviation Safety Agency (EASA). The European Rotors event, planned to take place in Cologne, Germany, on Nov. 10-12, has secured the backing of European helicopter manufacturers and will also integrate EASA's annual Rotorcraft and VTOL (vertical takeoff and landing) symposium. The establishment of the new European show was announced in the lead-up to Heli-Expo 2020 in Anaheim, California. It comes after the major manufacturers and the EHA pulled their support from the organizers of the Helitech events held in London and Amsterdam. The last Helitech event was held in Amsterdam in 2018. A new event, the Vertical Flight Expo, was run by Helitech organizers at a new venue in Farnborough last November. But it failed to attract the support of the OEMs and organizers have not yet announced future dates for the event. **"The new gathering for the industry marks an important milestone in our endeavors to promote the social and economic value of rotorcraft operations for European society,"** said Peter Moller, chairman of the EHA. "Europe is the world's largest helicopter market, a benchmark for other emerging economies enhancing their helicopter services or even introducing all new ones," said Roberto Garavaglia, senior vice president for strategy at Leonardo Helicopters. "That is why Leonardo believes a new, strong dedicated exhibition is needed, allowing all the relevant players to meet, assess the state of the industry and define the next steps."

► **BOMBARDIER HAS RECEIVED FAA** certification for an avionics upgrade for Garmin G5000 avionics on board Learjet aircraft. The upgraded G5000 will be incorporated on new Learjet light jet deliveries, Bombardier says. It will be a standard feature on the Learjet 75 Liberty model expected to enter service in mid-2020. A retrofit for in-service Learjet 70 and Learjet 75 aircraft will be available in early 2020. The upgrades include workload-reducing improvements, including climb, cruise and descent vertical navigation, enhanced takeoff and landing performance calculations and more. FANS 1/A+, which allows access to the most efficient and favorable routes, will be offered as an option. It will also ensure readiness for modernized airspace requirements and reduce direct operating costs. It also includes two-way flight plan transfers between compatible apps and avionics available through Garmin's Flight Stream 510. "The latest Garmin G5000 avionics suite is one of many reasons to love Learjet," said Peter Likoray, Bombardier Business Aircraft senior vice president of worldwide sales and marketing. "With a steady stream of acclaimed enhancements and the entry-into-service of the new Learjet 75 Liberty, Bombardier is making the world's best light jet an irresistible choice for more operators than ever before."



► **MILANO PRIME TRAFFIC HAS INCREASED** significantly in 2019, with the growth rate registering 16.8% at Linate airport and 34.8% at Malpensa airport in December. The opening of the new Milano Prime last July generated an increase of business and general aviation flights of 85.5%. The figure includes about 5,300 movements that were protected in the new Malpensa general aviation terminal (GAT) during the three-month closure of Linate airport.

NASA Orders Three Airbus H135 Helos For Space Center



NASA has ordered three Airbus H135 Signature helicopters to replace its current fleet of three Huey 2 aircraft. The helicopters, to be based at Kennedy Space Center in Florida, will be used for security during rocket launches, emergency medical services and passenger transport. Airbus and NASA announced the order at HAI Heli-Expo 2020, sponsored by Helicopter Association International, held here Jan. 27-30.

Airwolf Picks True Blue Power Batteries for STC Kit

Airwolf Aerospace has chosen True Blue Power's ultra-lightweight, fast-charging batteries for a series of new lithium-ion battery Supplemental Type Certification (STC) kits on 18 turbine helicopter models. Airwolf's STC kits include the True Blue Power lithium-ion-main ship battery, mounting hardware, simple wiring harness and a Magic Button that combines the digital computer, annunciator and batter warm-up switch. Certification and battery kit availability are expected in the first quarter of 2020. Certifications by other regulatory agencies and phase two STCs for the Bell 204, 205 and 212, the UH-1 and Leonardo AW139 will follow later this year, the company says.



John Cudahy

President & CEO, International Council of Air Shows (ICAS)
Leesburg, Virginia

An association management maven, Cudahy spent 13 years with the Institute of Packaging Professionals before assuming his current position running ICAS in 1997. He is the air show community's primary interface with the military, local and national elected officials and federal regulators. In addition, he has helped conceive and lead an industrywide effort to improve the safety record of air show performers. A straight-and-level private pilot, he admits to resisting any aerobatic impulses, "and should probably keep it that way."



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

Questions for John Cudahy

1

How significant are air shows as a business?

Cudahy: There are approximately 300 air shows annually in North America and these are attended by 10 to 12 million people. It's difficult to put an exact revenue measure on them since some shows are quite small, but we estimate that altogether they generate about \$600 million per year. Our members represent some 200 of those events including all the big ones. They begin in February and continue through November in North America, which is where the activity is most prominent. However, thanks to global media coverage, international participation is growing. In fact, at our recent convention in Las Vegas, there were four dozen non-U.S. participants, which is the most ever.

2

What are the big draws?

Cudahy: Pricing, water and fun. The average admission fee – and there are none at military bases – is \$25. That means a family of four can attend a day-long show for less than the price of one NBA ticket. And they do come as families. Nearly half of the adult attendees bring their kids. The biggest shows tend to be near a lake or river, bay or ocean. And everyone loves the performances, the louder the better. Our demographic is aging – lots of attendees are over 60 – and that's troubling. But it's one shared by most spectator events including NASCAR racing and professional sports.

3

Could concerns about safety be a factor? Some awful images have become indelible.

Cudahy: When something bad happens at a show, the video immediately hits CNN and Fox news and other outlets and gets shown again and again. It's the nature of media these days. And based on that, the average human would believe that the safety record is bad. They'd be surprised to learn that for the past 30 years, air shows result in an average of two fatalities annually. Now, even one is terrible and we're trying to get to zero, but the safety record has improved tremendously. FAA came to us in 1990 when shows were averaging 12 fatalities per year and asked for our help. We provided it, and the accident rate plummeted.

4

What did you do?

Cudahy: We took over the job of qualifying the performers. Applicants submit paperwork for our close review, and we have 52 evaluators across the country who observe the applicant's piloting expertise. Once we're satisfied with the applicant's information and capability, we submit that to the FAA for consideration. If it is satisfied, it issues a "Statement of Aerobatic Competency" with restrictions regarding the aircraft used, the maneuvers performed and the performance altitude. A new performer is restricted to an 800-ft. deck, which, after a number of shows, can be reduced to 500 ft., then 250 ft. Finally an "unlimited" waiver is granted, like those given Sean Tucker and Patty Wagstaff.

5

ICAS has been intimately involved in a major event scheduled for May 8 in Washington, D.C. What's coming?

Cudahy: On that day, the 75th anniversary of the end of World War II in Europe – VE Day – some 100 allied planes of every type from that conflict will fly south down the Potomac River, turn left at the Lincoln Memorial, fly past the World War II memorial and up the Mall. The flight will be led by five C-47s, four of which participated in D-Day, and then those that follow will come in waves – P-51s, Lancasters, Mosquitos, B-17s, Spitfires, Corsairs, and on and on – all at 1,000 feet and 169 knots. From beginning to end, the Arsenal of Democracy flyover will take 100 minutes. For this to happen, they're temporarily closing National Airport and opening the most restricted airspace in the country. And all this is to salute the war's veterans and those at home who sacrificed in their behalf. It should be a day, a spectacle and a purpose everyone can embrace. **BCA**

A stylized illustration of a man with a beard and sunglasses, wearing a dark blue suit jacket, a red vest, a white shirt, and a blue and red striped tie. He is standing with his hands in his pockets. The background is red with faint gear and airplane icons.

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Challenging Airports



They are not necessarily dangerous, but they **test piloting competence and attention to detail**

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

The premise behind business aviation is the freedom to fly when and where business calls, unchained from the exigencies of the airlines. This means that operators often are required to access airports that call upon the best of their crews' airmanship.

These challenges could include:

- ▶ The siting of the airport, perhaps in a narrow valley surrounded by mountains.
- ▶ Congestion, requiring long fuel-guzzling holds and waits for takeoff.
- ▶ Airspace restrictions, necessitating careful maneuvering to avoid violations or incursions.

▶ Complex, difficult procedures with no latitude for error.

▶ Weather considerations, especially in cases where conditions can change rapidly and unexpectedly.

▶ Curfews, slots, complex noise controls or environmental considerations.

All of these demand thorough pre-flight research on the destination airport so as to know what to expect, a flexible understanding of approach and departure procedures, and good crew coordination and cockpit communication.

Here is a selection of challenging airports based on reputation and

recommendations of pilots and *BCA* readers:

▶ **Teterboro (KTEB), New Jersey.** Along with White Plains (KHPN), New York; Chicago Executive (KPWK) at Palwaukee, Illinois; Van Nuys (KVNy), California, in the San Fernando Valley just north of Los Angeles; and "Charlie Brown," or Fulton County (KFTY), serving Atlanta, Teterboro is synonymous with business aviation.

Located in Bergen County and owned by the Port Authority of New York and New Jersey, Teterboro Airport essentially serves New York City



Aspen-Pitkin County (KASE) is “down in a hole” in the Rocky Mountains at 7,820-ft. elevation surrounded by peaks up to 14,000-ft. One pilot confessed that Aspen “checks all the risk boxes.”

DAVINCIDIG/ISTOCK PHOTO

and northern New Jersey as a general aviation airport. A haven for business aviation operators — scheduled airline service is banned from the field — more than 140 aircraft, 116 of which are jets, are based there, and the field is served by four executive-level FBOs. Teterboro has two well-used asphalt runways: 1/19, 7,000 by 150 ft. and 6/24, 6,013 by 150 ft. Both are equipped with arrester beds, one of which successfully stopped a Gulfstream IV that overran the end of Runway 6 on Oct. 1, 2010. Runways 6 and 19 have ILS approaches.

A 24-hr. facility, KTEB averaged 488

movements per day in 2017, so right off the bat, we can see that it’s a busy place, even congested at certain times of the day. Other factors to consider when operating into KTEB include tight airspace, as the airport is wedged in by the controlled airspace of nearby Newark Liberty International, LaGuardia and JFK International airports; at least one complex and potentially hazardous approach involving visual maneuvering around obstacles at low altitude; a nighttime “voluntary” curfew; and a clearly byzantine noise-abatement policy.

Concerning that last item, just like baseball, three violations of KTEB’s mitigation policy within a two-year period — or strikes against you — and you’re out; in this case, banned permanently from operating at the airport. That’s a pretty harsh penalty, but the airport management wants operators to know how seriously it is maintaining its relationship with local residential areas. Runway 24 is the most noise-sensitive, and violations are slapped on operators that exceed the daytime (0700-2200 local) limit of 90 dbA by 1 dbA. Further, there is a nighttime (2300-0600) “voluntary ban” on all “nonessential operations” — in effect, a virtual curfew — and the noise limit for Runway 24 is reduced to 80 dbA. Also, if for any reason Runway 19 is closed (by NOTAM), the noise limit for Runway 24 is raised to 95 dbA for the duration. For current information on Teterboro’s noise policy, go to <https://whispertrack.com/airports/KTEB>.

Next to consider is KTEB’s congestion and its proximity to LaGuardia (KLGA), only 5 sm to the east. Occasionally, especially when KLGA is landing aircraft on its Runway 13, ATC will institute flow control at KTEB. This results in decimating everyone’s outbound schedule, as engines can’t be started until the conflicting traffic thins out. Thus, monitor the ATIS obsessively. As “Captain Eddie,” BCA contributor James Albright’s alter ego on the code7700.com website, has said of KTEB, “You need to have your act together for this airport.”

While Circling to Land

And that includes the infamous “ILS Runway 6, Circle to Runway 1” approach. The aircraft descends the ILS 6 glideslope and — in VFR conditions and at published circling minima for the aircraft category or higher (at pilot’s discretion) — breaks off the approach,

banks right and commences an extended “S” turn to Runway 1. What makes this challenging is the requirement to hook the subsequent left turn so that MetLife Stadium, south of the airport, falls inside the turn, then line up for the approach to Runway 1 — hence, the “S” shape of the maneuver. All this, while staying within the airport traffic area.

Captain Eddie advises that turning inside the stadium’s location (i.e., with the stadium to the right of the aircraft) “makes a stable approach impossible.” Starting the second (left) turn just outside the stadium (with it to your left), “you roll out exactly where you need to be for a stable approach, 1.57 nm from touchdown at 500 ft. above the runway.”

It’s even more demanding when there’s a crosswind from the northwest. “It isn’t the crosswind landing that is particularly dangerous at Teterboro, however,” Captain Eddie warns, “it is the crosswind during the circling maneuver to get from the approach path of one runway to the next that can be particularly challenging. When the winds make the landing on Runway 6 too risky, the same wind can make the final turn onto Runway 1 even more so.”

On the “Teterboro Circling Conundrum” page of the code7700.com site, Albright details how to set up for the circling phase of the approach. Using several computer-generated graphics, he shows the unintended effects of cutting corners resulting in unstable approaches. On both this page and the previously cited one on Teterboro Airport, he consistently emphasizes the importance of the stabilized approach and when to have the aircraft fully configured to land so as not to be distracted at critical points along the circling flight path. This advice, of course, applies to any complex instrument or VFR procedure at any airport.

On May 15, 2017, a Learjet 35A executing the circle-to-land maneuver at Teterboro departed from controlled flight and struck a commercial building approximately one-half nm from the end of Runway 1, killing both pilots aboard the aircraft.

According to the NTSB synopsis of the accident, the crash occurred on the crew’s third flight of the day; the crew demonstrated poor preflight planning and cockpit resource management; failed to properly set navigation equipment for the procedure; had become distracted on the circling approach to Runway 1; “improperly executed the



Business aviation haven Teterboro (KTEB) is highly congested both on the field and in surrounding airspace shared with Newark International (KEWR) and La Guardia (KLGA) Airports. Its demanding ILS Runway 6, Circle to Runway 1 approach is a means test of knowledge, competence, and crew coordination.

vertical profile of the approach,” crossing fixes “hundreds of feet above the specified altitudes of the approach procedure;” and nevertheless continued the approach, allowing the aircraft’s velocity to drop below the required approach speed, precipitating a stall that caused the crash.

“Collectively, procedural deviations and errors resulted in the flight crew’s lack of situational awareness throughout the flight and approach to [K]TEB,” the NTSB concluded. The lesson: A crew needs to have its act together for ops into Teterboro.

► **Aspen-Pitkin County/Sardy Field (KASE).** Teterboro is a means test for Aspen — maybe. KASE is so risky and has hosted so many accidents one wonders if it should exist at all. “The only way I would have ever gone into Aspen is VFR,” a highly experienced business aviation pilot who ended his career captaining a Gulfstream IV told BCA.

This airport is located in a valley in the Rocky Mountains at an elevation of 7,820 ft. and is surrounded by peaks rising as high as 14,000 ft. Its single runway, oriented 15/33, measures 8,006 ft. in length, is 100 ft. wide and is equipped with R/NAV (GPS), LOC/DME and VOR/DME approaches.

“Aspen is down in a hole,” notes Katha House, a Falcon Jet captain currently working for a charter/management company.

Checking All the Risk Boxes

Richard Arrington, chief pilot for Dillard’s retailers, described Aspen as “the most challenging airport in our system.” KASE “checks all the risk boxes,” he continued: “dangerous terrain, congestion during ski season, complex and dangerous procedures, and rapidly changing weather conditions.”

House concurred: “I’ve had 3.5 years

of flying in and out of Aspen twice a week, often in the winter — 132 approaches in all. The weather moves to the mountains and is pushed up quickly. You might have to hold if it’s coming in from the west. We were holding once at FL 220 in a Falcon 50. A Learjet got in, then a commuter, which did a missed approach because of ‘lightning in all quadrants.’ Meanwhile we held for 45 min. to watch the show!”

Her advice: “Wait out the weather — in winter, it flurries in that hole all the time and then moves out quickly. It changes so fast, you can wait [hold] for 5 min. and it will change.

“Start your approach at 16,000 ft.,” she continued, “then cross the Red Table VOR, descend to 13,000 ft., and then ‘drive’ down [descend] 5,000 ft. at Ref+10. Be fully configured for landing at Red Table VOR. There are mountains all around. I shoot two approaches and then, if it still doesn’t look right, I go to the alternate. No second guessing at this field.”

Indeed. Arrington said he can recall three accidents at Aspen that influenced the operations of his flight department. “In 2001, a Gulfstream III crashed into the bluff just to the right of the final approach course. I remember passing the debris and scorch marks not long after. That was the first time I could so clearly see a fatal accident site from the cockpit. In 2012, I was parked on the ramp waiting for passengers when a Learjet landed, and inexplicably, to me, just veered off the side of the runway. I had never witnessed, first hand, an accident right in front of me. In 2014, I was instructed to hold just after a Challenger exploded into a ball of fire on the runway. My passengers saw it from the [FBO] lobby.”

The controllers at Aspen-Pitkin County do an “excellent job,” Arrington said. “It is a high-risk airport, and I

tell all my guys, no matter how well-informed you are, you are surely not alarmed enough.”

► **Chicago Executive Airport (KPWK)** is one of the Windy City’s oldest and most popular business aviation airports. Opened in 1925 and named Palwaukee for the intersection of Palatine Road and Milwaukee Avenue in Chicago suburb Wheeling, the airport has been associated with the Priester family since 1953, when George Priester bought the field and developed it, adding paved runways, hangars and other infrastructure.

Over the years, his son Charlie founded FBO, charter and aircraft management service Priester Aviation and, in 1986, negotiated the sale of the airport, now Chicago Executive, to Wheeling and Prospect Heights. In 2001, Charlie sold the FBO to Signature Flight Support and three years later turned leadership of Priester Aviation over to his son Andy, marking three generations involved in the operation.

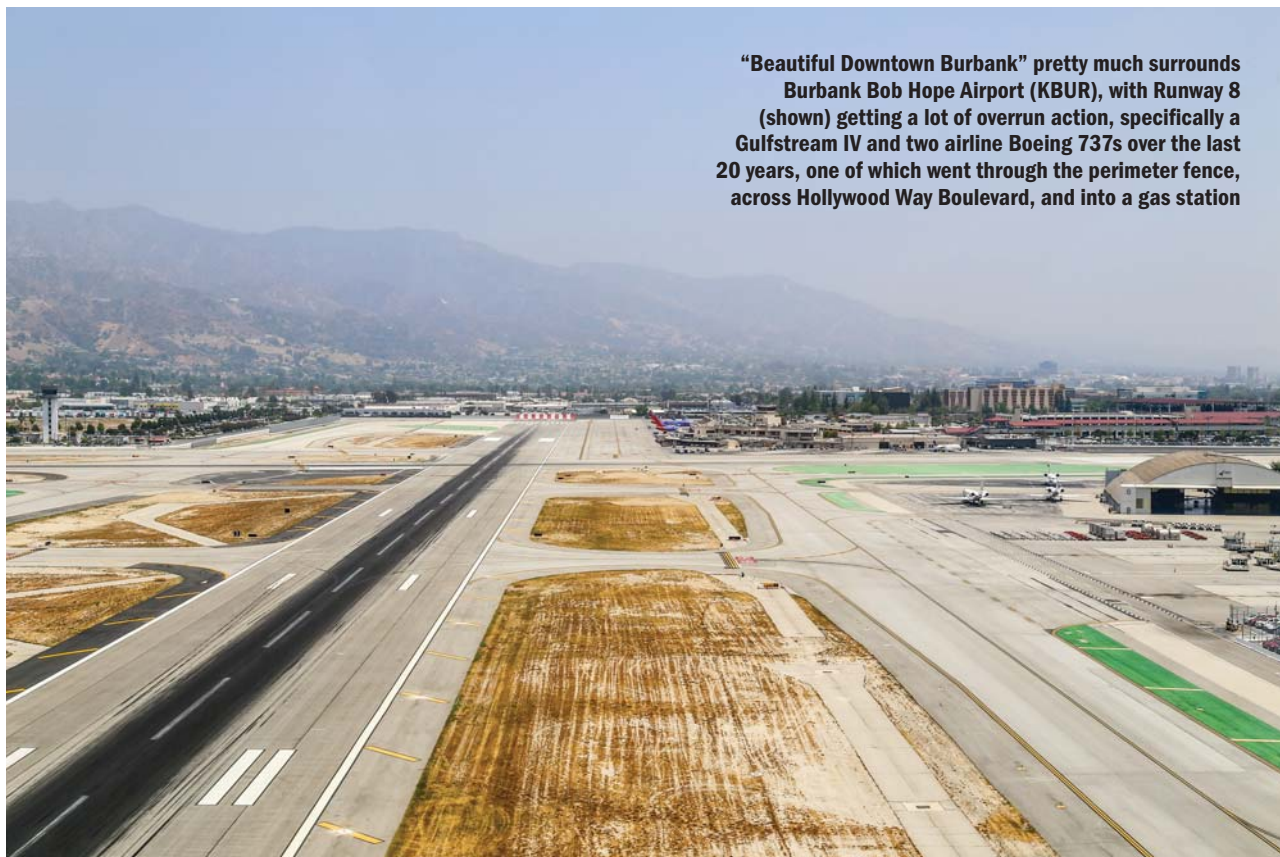
At an elevation of 684 ft., the airport has three runways: 16/34, 5,001 by 150 ft.; 12/30, 4,415 by 75 ft.; and 6/24, 3,677 by 50 ft. The airport chalks up close to 80,000 movements a year distributed between FAR Part 91 and 135 operations. In 2017, 194 aircraft were based there, 62 of them jets. In addition to Signature, Atlantic Aviation and Hawthorne Global Aviation Services operate FBOs on the field.

Like many older airports in U.S. metro areas, Chicago Executive is tightly enclosed by surrounding residential and business communities and by controlled airspace of a larger international commercial airport, in this case, O’Hare (KORD), the nation’s busiest airdrome, equipped with eight constantly busy runways. This comes into play mostly on departures from KPWK’s longest and widest runway, 16/34, accessed by most jets. “On the instrument departure,” retired business aviation captain/av manager and BCA contributor Ross Detwiler explained, “you do a hard-right climbing turn within 1 nm to avoid O’Hare International’s Runway 4/22, completing the turn to the assigned heading north of the 058 radial out of the DuPage (DPA) VOR while maintaining 3,000 ft. or the assigned altitude.

It Comes Up Fast

“Let’s say it’s a GIV,” Detwiler continued. “You lift off, begin the turn within 1 nm — which you can miss in the blink

“Beautiful Downtown Burbank” pretty much surrounds Burbank Bob Hope Airport (KBUR), with Runway 8 (shown) getting a lot of overrun action, specifically a Gulfstream IV and two airline Boeing 737s over the last 20 years, one of which went through the perimeter fence, across Hollywood Way Boulevard, and into a gas station



MIXMOTIVE/ISTOCK PHOTO

of an eye. So you're busy and heavy with fuel. You have to pull the power back, too, to maintain the Class B speed of either 200 or 250 kt. [depending on whether you're in or below the Class B airspace]."

For the visual departure (which most jets won't fly), he advises, "Make the climbing turn to the northwest, maintain 2,400 ft. to remain below the 3,000-ft. floor of Class B airspace overlying Chicago; max airspeed there is 200 kt." Meanwhile, the approach to Runway 16 has high minimums, a 284-ft. DH.

Years ago, Runway 16/34's width was a narrow 75 ft., allowing little latitude for error on takeoffs and especially landings. "Once you got down and stopped, then you had extremely narrow taxiways, and really crowded ramps — too many airplanes parked in too little space," Detwiler reminisced. Since then, 16/34 has been widened to its present 150 ft. But parking is still at a premium, "so call ahead and try to reserve a space," he advised. "It's so crowded we often had to be marshaled off the ramp. There's now a new FBO area on the east side of the airport that should make it easier."

► **Burbank Bob Hope Airport (KBUR), nee**

Glendale-Pasadena-Burbank Airport, nee Hollywood-Burbank Airport, nee Lockheed Air Terminal, is a Southern California icon. It was, for a period in the 1930s, the company airport for Lockheed Aircraft, and before that, dating from 1930, the Los Angeles-area's terminus for United Aircraft & Transport Company, owned by Boeing Aircraft and United Airlines, which founded the airport.

Today, Burbank is a major regional airport in the Los Angeles megalopolis, accessed by airlines and business aviation alike. In the 90 years since the airport was founded, however, it has been encompassed by both residential and industrial development with no buffers between its operating area and perimeter fences. (For decades, it was the site of Lockheed Aircraft's main factory and headquarters. It was here that the P-38 and F-80 fighters and Constellation airliners were built.) Furthermore, its two runways, originally surveyed to accommodate piston-engine airliners, are relatively short, allowing no slack for overruns: 15/33, 5,886 by 150 ft. and 8/26, 5,801 by 150 ft. Runway 8, which is often favored by the local wind patterns, tends to get a lot of action.

In March 2000, a Southwest Airlines

Boeing 737 overran Runway 8, crashed through a thrust diverter, then the perimeter fence, and wound up on Hollywood Way with its nose protruding into a gasoline station. Luckily, no one was hurt, but a few more feet and a disaster could have ensued. The Southwest cockpit crew paid for their faux pas with their jobs. After that one, EMAS arrester beds were installed at the end of Runway 8, which successfully stopped a Gulfstream IV overrun in October 2006 and another Southwest B737 on a rainy morning in December 2018. In both cases, no injuries were reported.

"It's so tight, there's no place to go," Detwiler noted. "Generally, they land you on Runway 8, but what gets dicey is if you have to do the missed approach, as you have to head toward the [San Gabriel] mountains. You climb to 1,800 ft. and bend it around in a right turn to miss the terrain, rising to 4,000 ft. above the San Fernando Valley and 10,000 ft. farther east at Mount Baldy.

"If you land on 8," he continued, "you're right at the terminal when you roll out, and there is no taxiway, just a line painted on the ramp. You have to make a left turn to get away from the ramp, and that takes you to Taxiway

ISTOCK PHOTO



Nevis Island Amory International (TKPN) in the Caribbean's Lesser Antilles sports a single runway (10/28) just under 4,000 ft. long with a displaced threshold landing west end, as seen, high terrain to the south. Elevation of the runway is just 13 ft.

D. Now you're going west and have to hold short of Runway 15/33; cross that, and then make your way to the FBO. It's very busy, so stay alert." Good advice, at Burbank or anywhere else.

► **Nevis Island Vance W. Amory International Airport (TKPN).** Heading down Caribbean-way, this field on the tiny island of Nevis might be in the destination box of your flight plan if your principal wants to spend some time at the Four Seasons hotel there. Nevis and its nearby neighbor, St. Kitts, are members

Vance W. Amory International Airport has one runway, 10/28, 3,996 by 98 ft. with a displaced threshold landing to the west. Elevation of the airport is 25 ft. and the runway is at 13 ft. "It's right on the edge of the water with higher terrain to the south," reports House, who's operated into the field. "A Global crashed there some time ago by dragging a wing." Jeppesen notes on the approach plate specify "Hurricane Hill with 273-ft. hazard light is located 4,800 ft. west of displaced threshold." Bone up on the airport and its obstacles before going there the first time.

ISTOCKPHOTO



Cali Alfonso Bonilla Aragon International (SKCL) is located deep in a valley at 3,162 ft. elevation with mountain ridges rising to 15,000 ft. and 17,000 ft. on either side. Thus, maneuvering to sole Runway 1/19 is limited, as the valley constricts, and spatial orientation is crucial.

of the leeward chain of the Lesser Antilles, which form the eastern boundary of the Caribbean Sea. Together, the two islands constitute one country, the Federation of St. Kitts and Nevis. (The scores of other islands, islets and cays in the chain are divided between the U.S. and British Virgin Islands.)

Nevis is of historical significance to Americans as the birthplace of Alexander Hamilton, one of the republic's founders and first secretary of the Treasury, and to the British as the birthplace of naval hero Horatio Nelson.

► **Cali Alfonso Bonilla Aragón International Airport (SKCL)** is located in Palmira, 12 sm or about a 20-min. drive from Cali, Colombia. Its elevation is 3,162 ft., and its sole runway, 1/19, is paved in concrete and measures 9,842 by 148 ft. On the ground, arriving aircraft are directed to a dedicated general aviation ramp for parking, and crew and passengers are bused to the airline terminal for CIQ. Security at the airport is rated as high.

When considering operations in Colombia, it is important to note that the country's interior is characterized by a

series of north-south mountain ranges. Furrowed into them are two main valleys where the country's capital, Bogotá, and third largest city, Cali, are located. Going into either, "you have to be extremely careful," a business aviation pilot with considerable experience in the country warned. "The terrain is always in the back of your mind. Ground 'prox' [radar] is a wonderful lifesaver."

The long north-south valley containing Cali International, he notes, "starts to constrict as you go in. Watch for the rising terrain, as it's a fairly tight canyon." The valley is not a complete box, but turning to the east, the Andes "really go up high. Spatial orientation is really critical; use your modern cockpit aids," he advises.

Straight-Ins Not Advised

The terrain on either side of the valley varies between 15,000 and 17,000 ft., and given the field elevation at Aragon International, a lot of altitude has to be lost in a short time and distance going in. A straight-in approach is not advised. Instead, operators advise to fly a procedure turn, crossing over the VOR at the airport southbound, then come back in to lose the altitude and line up. Remember that no matter what vectors ATC assigns, the flight crew is still responsible for knowing where dangerous terrain is located.

One cannot speak of Colombia and aviation in the same sentence without remembering the December 1995 crash of an American Airlines Boeing 757 into a mountaintop on approach to Cali in which only four occupants of 163 people on board survived. While several factors contributed to the nighttime mishap, the principal one was confusion and spatial disorientation on the part of the crew. The accident stands today as an iconic statement of the perils implicit in operating jet aircraft in and out of airports situated in mountainous terrain like the High Andes of South America.

► **Tegucigalpa Toncontin International Airport (MHTG)**, serving the ancient capital of Honduras, lies high in the mountains of this Central American country. While Tegucigalpa is the most popular destination in Honduras, its Toncontin International Airport has ranked among the most dangerous airports in the world for jet aircraft due to its relatively short Runway 2/20, the fact that the city is built right up to the perimeter fences, and short final to one end of the runway took aircraft dangerously close to the top of a hill.



(The airport features in one of the most-viewed postings on YouTube, depicting an American Airlines Boeing 757 bent over in a steep-banked left turn from base to final approach, practically scraping the crest of the hill as sightseers throw themselves to the ground and the Boeing plummets to Runway 2/20 below. It slams onto the asphalt with clouds of rubber smoke emanating from the tires, the engines immediately engaging full reverse thrust, then rolls all the way to the end of the runway. It's just another day at MHTG.)

Since 2007, however, part of the hill-top has been shaved, making the Runway 2 approach, which favors prevailing winds, a less nail-biting affair. Nevertheless, in 2008, a TACA Airbus A320 overran the runway, plunging down a 65-ft. embankment, breaking up and killing eight aboard.

The single strip measures 6,631 ft. by 148 ft. — with only 5,459 ft. usable for the Runway 2 approach to accommodate even the lowered hilltop. Making things more interesting is the fact that field elevation is 3,297 ft., and the city is surrounded by mountains. (In 2011, a Lot-410 Turbolet operated by Central American Airways went down 12 mi. from the airport while on approach in high terrain, killing all 14 aboard.) Only a VOR-DME approach is available.

There is no FBO at Toncontin. Crew and passengers are escorted by customs personnel to a passenger terminal to clear; handlers are permitted to accompany to help expedite the process. Fuel is readily available at good prices. For ground transportation, it is recommended to use only prepaid taxis. In

addition to being the second poorest country in the Americas (behind Haiti), Honduras is also one of the most dangerous — on the streets as well as operating into its capital's airport.

► **Paris Le Bourget Airport (LFPB).** As BCA reported in our September 2019 issue,

approaches. It is in no way dangerous, like a few of the other facilities noted in this report, but its airspace is congested and overlaid by traffic corridors serving nearby Charles De Gaulle International Airport (LCDG) and, thus, can be challenging, especially to first-time visitors.

Tegucigalpa Toncontin International (MHTG) is ranked as one of the most dangerous airports in the world due to its constricted layout, relatively short Runway 2/20 (6,631 ft.) with no overrun, and a hill just before the Runway 2 approach, shortening the useful length to 5,459 ft.

world. So if you're going to Europe to conduct business, chances are you'll be visiting Le Bourget.

LFPB is a modern and well-equipped airport with three runways, the latest nav aids and clean



Paris Le Bourget (LFPB) is limited solely to business aviation (except during the Paris Airshow) but located in close proximity to Charles De Gaulle International (LCFG). Consequently, operators accessing it must deal with some of the most congested airspace in Europe.

Paris Le Bourget ranks as Europe's premier airport exclusively dedicated to business aviation — except for one month in odd-numbered years when it hosts the Paris Air Show, and the rest of aviation shows up from around the

In 2017, it recorded 53,686 movements, the highest for a business aviation airport in Europe, and essentially all were turbine-powered, as light piston-engine aircraft are diverted to small general aviation airports ringing Paris.

Addis Ababa Bole International (HAAB) is a high-elevation (7,625 ft.) airport with “a lot of mountainous terrain around it”, including a 10,500-ft. obstacle just north of the field, “and thus a CFIT risk.” Watch out for “slam-dunk” (i.e., late) descents from ATC on the ILS approach to Runway 25L.



STELLA/EM/ISTOCK PHOTO

Le Bourget is a 24-hr. airport with no slot control, a luxury in busy Western European cities. Field elevation is 218 ft. and the aforementioned runways are: 3/21, 8,743 ft. by 197 ft., asphalt; 7/25, 9,843 ft. by 148 ft., concrete (middle 5,774 ft. grooved); and 9/27, 6,053 ft. by 148 ft., asphalt.

Nav aids include ILSes for Runways 7/25 and 9/27 and a VOR-DME located on the field. Approach and departure control for La Bourget is handled by LCDG, whose controlled airspace overlays the smaller airport. Flight crews approaching Le Bourget should be constantly aware that they are entering some of the most congested airspace in Europe. Pilots interviewed by BCA universally stressed the importance of understanding the proximity of LCDG and the “do not overfly” zone to the south of its south runway complex — and furthermore, that Le Bourget’s Runway 7 missed approach demands good crew situational awareness.

No Sightseeing!

And another point relevant to situational awareness: In clear weather, curb the sightseeing! That is, whether you arrive or depart at night or during the daytime, Paris will be laid out below like a (visually distracting) carpet

of jewels, so keep your eyes in the cockpit and pay attention to the procedure you’re flying.

At 200 nm out, the crew should inquire about the arrival to be expected by ATC. As one captain observed, “If you don’t, they will either assume you know — bad idea — or will issue the arrival right before the initial arrival fix.” On the other hand, approach control has been known to change things at the last minute, or in the middle of one arrival, switching to another, so keep your knees bent and be ready to accommodate changes.

Coming in, Charles de Gaulle Radar is the initial approach control and arrivals are straightforward. Landing to the east, expect ILS Runway 7 with vectors to final. Landing to the west, Runway 27 is preferred, again generally, with the ILS approach. In both cases, RNAV (GNSS) approaches are available on request.

Flight crews new to Le Bourget or returning after long absences are urged to consult the French State Rules and Procedures as part of their preflight planning. And as most, it is important to always use standard ICAO phraseology on the comm and avoid using U.S. ATC slang.

On the ground, things can get complicated, too: There are seven FBOs at

Le Bourget — certainly the most of any airport in Europe — and four repair stations, three of which are aircraft type service centers. Thus, it’s a good idea beforehand to coordinate with your handling agency exactly where you want to go on the ramp to be prepared when ground control asks for your parking destination.

► **Addis Ababa Bole International Airport (HAAB)** serves Ethiopia’s capital and is so named for the Bole neighborhood in which it is situated 3.7 sm southeast of the city center. It is a modern field equipped with parallel asphalt runways: 7L/25R, 12,467 ft., and 7R/25L, 12,139 ft. Both are 148 ft. wide and 7R/25L is equipped with an ILS.

What flight crews should keep in mind, according to a Gulfstream 650 captain with extensive international experience, is that Bole is “a high-elevation airport, with a lot of mountainous terrain around it, and therefore a CFIT risk. Often, you will be operating at high weights due to the fuel load to get back to, for example, Europe — so that equates to high weight, high temperatures, and performance limits, especially on takeoff.”

The captain described a recent visit to Addis Ababa from a European departure point, starting with route planning through a “politically

sensitive” region. “We didn’t want to overfly Sudan or Libya, so our choices were to go west and south of Sudan or through Egypt,” he recounted. “As we looked at it, it appeared that the Egypt and Saudi Arabian routing presented better options for alternates.”

Loss-of-Separation Issue

On that trip, coming in from the east, the captain reported, the flight passed a waypoint on the Djibouti FIR where on previous trips there had been a loss of separation by Djibouti ATC, “so you had to maintain your own separation,” he continued. “On the same trip, we were in their airspace and they handed us off to Addis Ababa control, and there didn’t seem to be good coordination. Those kinds of issues . . . we see that frequently in Africa.”

The message is to expect such lapses in the region and to be vigilant at all times, even broadcasting the aircraft’s position on the African guard channel. (Farther south in Central Africa, it is possible to fly for hours without any contact with ATC, so aircraft often radio their positions to each other, maintaining their own separation.)

Then, in Ethiopian airspace, “they gave us a late descent. On the ILS for 25 Left, there are three fixes where the speed limit is 185 kt.” The challenge is to maintain them after what the pilot termed “a slam-dunk descent” from cruising altitude. Until recently, one of the two parallels at Bole was closed and temporarily used as a taxiway. “During daytime operations, you had to make sure to align with the correct runway. Both runways are open now, but still use care that you’re headed for the assigned one,” he cautioned.

As noted, there is very high terrain around the airport. Field elevation is 7,625 ft., MSA is 14,000 ft. and the highest terrain, just north of the approach track, is 10,500 ft. Thus, constant situational awareness is essential.

► **Johannesburg-Lanseria, South Africa (FALA)** is yet another field sited near high terrain. The airport is relatively young, having been founded by two private pilot/owners in 1972 as a grass strip. Local municipalities purchased it the same year, converting the field into a commercial airport with a paved runway and bringing in airline service. In 2012, the field was again sold, this time to a consortium of South African public support organizations.

Field elevation at Lanseria is 4,521 ft., which, combined with southern hemisphere summertime temperatures, can result in performance issues. Fortunately, FALA’s single Runway 7/25 is 9,996 ft. long to accommodate those conditions. And while the strip is 148 ft. wide, according to one pilot who’s been there recently, it appears — for some unexplained optical reason — to be narrower than that. It’s fine for large business jets, but in the pilot’s words, “you have an

South Pacific island airport that international operators may visit, either as a destination or tech stop. Pago Pago (pronounced “Pango”) — known as Tafuna Airport to locals — dates from World War II, when it was built to accommodate Marine fighter and torpedo-bombing squadrons. Today, it hosts two runways, 5/23, 10,000 by 150 ft., and 8/26, 3,800 by 100 ft., both asphalt, and is served by several airlines and often accessed by the U.S. military.

And another point relevant to situational awareness: In clear weather, **curb the sightseeing!** That is, whether you arrive or depart at night or during the daytime, **Paris will be laid out below like a carpet of jewels, pay attention** to the procedure you’re flying.

increased ‘pucker factor.’” Further, the runway has a 1.5% gradient, sloping toward its southwest end; due to prevailing winds from the north, the preferred approach is to Runway 7.

Additionally, first-time visitors should be aware that there is high terrain 5.5 sm west of the airport, and so noted on the airport chart. “So, good situational awareness is necessary,” the pilot opined.

But interestingly, the real challenge at Lanseria is the main ramp. “If you come in internationally,” the pilot said, “you have to park on the main airline ramp for CIQ clearance, and it is steeply sloped. So you have to taxi uphill, and there is a risk of the aircraft rolling back once you stop. Then you have to leave the aircraft to go inside to clear immigration, so always leave one crewmember in the cockpit — do not leave the aircraft unattended.” Also, use parking brakes and chocks “judiciously.”

After CIQ clearance, the obstacle course continues: “You reposition to the ExecuJet FBO, but the taxiway is narrow, and there is a security gate that they will open, but make sure you are on the centerline of the taxiway and have wing walkers if you are operating a large aircraft like a G650.”

► **Pago Pago International Airport (NSTU)**, American Samoa. OK, we were assigned to describe 10 challenging airports, but here’s a bonus point: a

As House describes it, the long runway is distinguished by its 32-ft. elevation, “so that when wind blows out of the south in the spring — the south-erlies — it picks up spray and casts it across the runway. It rolls on and it rolls off, and now you see it [the runway] and now you don’t.

“So, be aware of that,” she warned. “It’s like landing in the rain — you follow the localizer in and land. You’ll get spray on one side of the aircraft and nothing on the other.” All in a day’s work for the typical international business aviation flight crew, which has to take these things as par for the course.

OK, these 11 choices of challenging airports were ours plus recommendations from a brain trust of international pilots we often tap for information and opinions. Readers are invited to submit their choices, reasons and personal experiences, too. We’ll publish them in future issues, or on our website, or if there’s enough interest, organize them into a subsequent report.

And here’s a further tip we forgot to mention earlier: Sometimes the best authority on a challenging airport you haven’t visited is someone who’s been there and knows the issues. So use your contacts and resources like the NBAA International Feedback Database, Ops Group and pilots who might be based at the airport for which you’re headed. **BCA**

Into the Black Void

The airplane **plunged into the Caribbean Sea** less than a mile off the end of the runway

BY **ROGER COX** rogerdodger62@gmail.com

There comes a time in every pilot's life when upon rotating the airplane for takeoff, all that can be seen is total darkness. The airplane is accelerating, the pilot's senses are signaling furiously, the brain insisting a need for prompt, orderly tasks to be done. Yet the view out the windshield provides no information whatsoever — utterly nothing.

The visual movement of ground and cloud that usually helps to complete the climb feedback loop is just missing. At that point, it's all too easy to lose orientation and, in a matter of moments, lose control of the airplane. That is what happened to the crew of a Shorts SD3-60 departing the island of St. Maarten (also known as St. Martin) on Oct. 29, 2014.

The aircraft plunged into the Caribbean Sea less than a mile off the end of Runway 28 at Princess Juliana Airport

(TNCM), St. Maarten, Dutch Antilles, Kingdom of the Netherlands. The two pilots aboard, a 49-year-old captain and his 26-year-old first officer (F/O), were killed, and the airplane wreckage sank 65 ft. to the bottom of the sea. The flight, SKZ 7101, was operated by SkyWay Enterprises (SWE) on an FAR Part 135 cargo flight from Princess Juliana Airport to Luis Munoz Marin International Airport (TJSJ), San Juan, Puerto Rico. The airplane had taken off at night and in rain.

The captain had observed the cargo loading and provided a cargo manifest to the ramp agent. The flight started engines at 1817 (local time), taxied at 1828 and was cleared for takeoff at 1838. The tower ATC clearance was to maintain heading 230 deg. after takeoff until passing 4,000 ft. Airport security video recordings showed normal airplane

lighting patterns as the SD3-60 rolled down the runway. At 1839, the tower gave the crew their takeoff time and revised their clearance to maintain heading 230 until passing 3,000 ft.

At 1840, the tower controller observed the airplane descending visually and on radar; he called the flight on tower and guard frequencies, but received no response. After the data block disappeared from radar, the controller immediately notified emergency services, and at 1900, a Coast Guard vessel was dispatched to the scene of the accident. At 2125, the Coast Guard Search and Rescue team notified the tower that airplane debris had been found offshore.

A preliminary playback of the local ATC radar data showed the airplane had reached a Mode C readout altitude of 200 ft. However, data from a handheld GPS device later found in the



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submerged wreckage showed the airplane had reached a maximum GPS altitude of 433 ft. and 119-kt. groundspeed at 1839:30.

The official weather observation at the time of takeoff showed the winds were from 230 deg. at 10 kt., gusting to 20 kt., varying from 200 to 270 deg. There were light showers and rain, the ceiling was a broken deck at 1,300 ft., and there were towering cumulus clouds in all quadrants.

Cargo loading personnel said when interviewed that there were light to moderate rain showers during loading. One ramp agent stated, "When the airplane was ready to taxi, there was some heavy rain and it was pitch black to the south with clouds. The aircraft taxied to the east; the rain eased a little. The aircraft held to the east waiting for another aircraft to clear and then taxied on the runway where I lost sight of him. The next time I saw the aircraft is when he took off in some heavy rain." Two other agents confirmed the existing weather at departure and stated, "There was heavy rain that eased off and afterward started heavy again."

Princess Juliana Airport is located

on a strip of land that separates Simpson Bay Lagoon from the mainland, and both runway ends are bounded by water. A low mountain range runs through the center of the island. There is one runway (10/28), and because of prevailing winds from the east, over 90% of takeoffs and landings are on Runway 10. VMC conditions must exist to land on Runway 28 and all night landings must use Runway 10. There is no visual landmark past the shoreline when taking off from Runway 28.

Visibility at the time of takeoff was 4,000 meters, which was less than published takeoff minimums of 300-ft. ceiling and 4,500 meters of visibility for Runway 28. However, SkyWay FAA Operations Specifications allowed a lower takeoff minimum based on the lowest authorized straight-in Category 1 IFR landing minimums.

The wreckage was found 0.8 nm from the far end of Runway 28 about 35 deg. to the left of runway centerline. A Puerto Rico National Police diving team obtained underwater photos and videos of the wreckage. The aircraft had broken up and fragments were scattered about the sea floor. Components

of the nose, left and right wings and tail surfaces were found, confirming the location of all four corners of the airplane. The main landing gear hydraulic actuators were in the full up position and the flaps appeared to be fully raised as well. The fragmented wreckage was not consistent with an attempted ditching.

The Investigation

The St. Maarten Civil Aviation Authority conducted an investigation in accordance with ICAO Annex 13. It was assisted by investigators from the U.S. NTSB and FAA, representatives of the U.K.'s Aircraft Accident Investigative Branch and Shorts Brothers PLC, and from Canada's Transportation Safety Board, Transport Canada and Pratt & Whitney Canada (P&WC). The operator, SkyWay Enterprises, declined to participate on investigative groups but cooperated in the investigation.

SkyWay Enterprises Inc. was originally certificated as an air carrier in 1979 in Detroit. Operations were moved to Kissimmee, Florida, in 1990, where the company is now based. It was authorized by its operations specifications to

Accidents in Brief

Compiled by Jessica A. Salerno

Selected accidents and incidents in January 2020. The following NTSB information is preliminary.

► **January 28 — About 1503 CDT, a** Piper PA-60-601P Aerostar (N6071R) crashed while on an instrument approach to Abraham Lincoln Capital Airport (SPI), Springfield, Illinois. The airline transport pilot, 2 passengers and a dog were killed in the accident. The Piper was destroyed during a post-impact fire. The airplane was owned by LKJ Properties, LLC, and operated under Part 91 on an IFR flight plan. Day instrument meteorological conditions (IMC) prevailed at the accident site. The personal cross-country flight departed Huntsville International Airport (HSV), Huntsville, Alabama, at 1301.

The airplane impacted a harvested cornfield about 7.3 mi. southeast of the

Runway 31 threshold. The wreckage debris path measured about 200 ft. and was oriented on a 248 deg. heading. According to FAA records, the 69-year-old pilot held an airline pilot certificate with airplane single-engine land, airplane multiengine land, and instrument airplane ratings. The airplane single-engine land rating was limited to commercial privileges. The pilot also held an expired flight instructor certificate for single and multiengine airplanes and instrument airplane. The pilot reported having accumulated 5,500 total hours of flight experience and 60 hr. within the previous 6 months.

A doorbell security camera located about 300 ft. north of the accident site captured video and audio of the final seconds of the flight. A review of the camera footage revealed that the airplane descended toward the ground in a left wing down, slightly nose-down attitude. All three landing gear were observed to be extended before impact.

A second doorbell security camera, located about 0.6 mi. south of the accident site, captured audio of the

final seconds of the flight. The sound spectrums of both doorbell cameras were analyzed to identify any propeller sound signatures that were consistent with the propellers rotating under engine power. Both sound spectrums exhibited a relatively constant propeller noise signature until about two seconds before impact. The results of an acoustic analysis were consistent with the airplane's propellers rotating at 2,500 rpm before a sudden reduction in propeller speed to about 1,200 rpm about two seconds before impact.

► **January 27, — About 1524 MST, a** Cirrus SR22T (N288WT) descended under the canopy of a Cirrus airframe parachute system (CAPS) and impacted trees and terrain near Woody Creek, Colorado. The instrument rated private pilot and his passenger were uninjured. The airplane sustained substantial damage. The Cirrus was registered to Noel Development LLC and was operated by the pilot as a Part 91 personal flight. It was IFR in the area about the time of the accident, and the flight was operated

serve the U.S., Canada, Mexico, Central America and the Caribbean Sea, including the islands/nations and the Havana FIR. SkyWay's primary business plan was to provide cargo service within the Caribbean from operating bases in Miami (KMIA) and Puerto Rico (TJSJ) and Rafael Hernandez Airport (TJBQ) in Aguadilla.

SWE obtained the accident airplane, an SD3-60, from American Eagle Airlines in 2000 and converted the interior to a cargo configuration. At the time of the accident, the airplane had 25,061 flight hours and 32,824 cycles. It was not equipped with a flight data recorder (FDR) or cockpit voice recorder (CVR). SkyWay Enterprises was authorized to operate under Part 135, Part 119.21 (a) (5) On Demand 135 for Cargo only. As such, the FAA airworthiness requirements for passenger aircraft did not apply, and as a result the recorders, GPWS, radar altimeter, one attitude gyro and TCAS were removed. The autopilot was also removed.

The accident captain had been employed by SWE for about four months and had been assigned to the San Juan operation for three weeks. He had

previously flown the SD3-60 and the Britten Norman BN-2 Islander in the Caribbean area for other operators. According to his fiancée, he had moved to Puerto Rico from Germany to fly. He had an ATP certificate, Airplane Multiengine Land, with type ratings in the SD3, the Cessna 500 the BA-3100 Jetstream, the Hawker 125 and the Learjet — the last three for second in command (SIC) only. He had completed a Part 61.157 type rating check ride at Flight-Safety International on June 9, 2014. Based on SWE and FAA records he had 5,318 total flight hours, 361.8 hr. in the SD3 and was current in the airplane, with 50.3 hr. in the previous 30 days and 213.8 hr. in the last 12 months. He had flown from TJSJ to TNCM and back on the two days before the accident and had gotten normal rest at home between trips.

The first officer had been employed for about 13 months. He had previously flown light aircraft for the Civil Air Patrol and had received SWE in-house SIC training. He had a Commercial Pilot certificate, Airplane Single and Multiengine Land, Instrument Airplane, and an SD3 type rating with SIC privileges

only. He had 1,040.9 total flight hours, 510.9 hr. in the SD3, and he was current, with 32 hr. in the previous 30 days and 456 hr. in the previous 12 months. He resided at his home in Puerto Rico and had flown the same trips as the captain in the two days before the accident. He had received normal rest in the previous three nights.

The wreckage was recovered from the sea and examined by technical representatives. The fractured ends of both the left and right outer wing boxes showed marked ductile overload failure in downward bending. The damage to the wings was symmetric. X-ray imaging of the cockpit caution and warning light bulbs by the U.K. Royal Navy Lab did not show any filament deformation, indicating there were no systems warnings. GPS data from a handheld battery-operated unit found in the wreckage was downloaded by the NTSB Vehicle Recorder lab, and the unit provided date/time, latitude/longitude, altitude, groundspeed and true course at sequential time intervals. Examination of the flight control pushrods, cables and bell cranks did not reveal any fatigue fractures or mechanical dislocations, and

on an activated IFR flight plan. The flight originated from the Aspen-Pitkin County Airport/Sardy Field (ASE), near Aspen, Colorado, about 1520 and was destined for the Eagle County Regional Airport, near Eagle, Colorado.

According to initial information from the FAA, the airplane's pilot reported an airspeed failure indication. The pilot lost ground contact and requested vectors back to ASE. The pilot later reported that he activated the CAPS chute and subsequently reported that the airplane was on the ground. The airplane's empennage separated from its fuselage during the impact.

At 1453, the recorded weather at ASE was: Wind 350 deg. at 10 kt., gusting to 15 kt.; visibility 3 sm; present weather haze; sky condition overcast clouds 900 ft.; temperature -2C; dew point -5C; altimeter 30.02 in. of mercury; remarks snow ended at 1449.

► **On January 25, 2020, about 1715 EST**, an unregistered experimental, amateur-built Mustang II, was destroyed when it crashed near Big 'T' Airport

(64GA), Senoia, Georgia. The airline transport pilot and passenger were killed in the accident. The personal flight was conducted under Part 91. VFR conditions prevailed and no flight plan was filed for the local flight that departed 64GA about 1655.

According to witnesses and video recorded from a witness, the airplane had been flying over the local area for about 15 min. when it then performed a barrel roll. Shortly after the barrel roll, the canopy opened and struck the vertical stabilizer and right horizontal stabilizer. The airplane subsequently descended nose-down and impacted terrain about 0.5 mi. south of 64GA.

The owner of the airplane stated that he purchased it from a Canadian citizen about one week prior to the accident. The owner further stated that the accident pilot was a good friend and fellow airline pilot. The accident pilot accompanied the owner to receive the airplane. The owner only had about 15 min. of experience in the airplane and the accident pilot had about 55 hr. of experience in the same make and model as the accident

airplane. The owner further stated that the canopy latch was not intuitive, and the accident pilot had to show him how to operate it. A knob had to be rotated approximately 180-deg. clockwise to secure the latch, and then rotated 180-deg. counterclockwise to release the latch. The accident pilot was allowed to use the airplane when he wanted, and the accident flight was a local pleasure flight.

The pilot's most recent FAA first class medical certificate was issued on Oct. 24, 2019. At that time, he reported a total flight experience of 11,000 hr.

The two-seat, low-wing, fixed tailwheel airplane was assembled from a kit in 1980. It was powered by a Lycoming IO-360, 180-horsepower engine, equipped with a two-blade, constant-speed Hartzell propeller. Review of maintenance records revealed that the airplane's most recent annual inspection was completed in Canada on May 29, 2019. At that time, the airframe had accrued a total time of 1,379.5 hr. and the engine had zero hours since major overhaul.

The wreckage came to rest nose down in a wooded area. All major components

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the pushrod failures were ductile, consistent with a high energy impact with the sea.

Both engines were recovered and sent to Pratt & Whitney Canada Service Investigation Facilities in Canada for teardown, examination and lab testing. The damage on both engines was characteristic of propellers striking with a sudden stoppage and with engines producing power at the time of the strike. However, FAA observation of the overall poor engine condition resulted in action to rescind SWE's authorized 12,000-hr. TBO and to set limitations to 6,000 hr. in accordance with the current P&WC Service Bulletin.

The bulk fuel supply and the supply from the truck that serviced the accident airplane were tested and met quality standards. The airplane carried 10 boxes of cargo for FedEx that weighed 435 lb. Weight and balance documents showed the airplane was well within limits.

Investigators met with and interviewed SWE officials at Kissimmee and FAA officials at the Orlando FSDO, where the principal operations inspector (POI) was based. The government agency officials said it was difficult to

oversee Caribbean operations because of travel and budgetary limitations. The POI was not type rated on the SD3-60, had not observed the company's training or performed any company en route observations, and was not aware of handheld GPS use in the cockpit.

In addition, the company had no formal safety reporting system and the cockpit resource management (CRM) training required by Part 135.330 was said to be "one on one" and most of it was on CD and video. The pilot training manual showed unusual attitude recoveries, wind shear/microburst, and lower than standard takeoff minimums were to be trained by briefing rather than flight training. Although the FAA rated SWE as "low risk," the former FAA principal maintenance inspector described his relationship with company officials as "difficult." He said any time he would make a proposal to the company he was challenged with "tell me why" or "show me the regulation."

Investigators learned that the accident crew had experienced a runway overrun in the same airplane at the same airport two days prior to the accident. Although the captain asserted

he had experienced hydraulic failure, an inquiry by the director of operations determined that the captain had inadvertently shut off the engines by taking the fuel condition levers too far aft of the detent during landing.

Findings

The investigative authority found the cause of the accident was: "the PF [pilot flying] experienced a loss of control while initiating a turn to the required departure heading after takeoff. Flap retraction and its associated acceleration combined to set in motion a somatogravic illusion for the PF. The PF's reaction to pitch down while initiating a turn led to an extreme unusual attitude and the subsequent crash. PM [pilot monitoring] awareness to the imminent loss of control and any attempt to intervene could not be determined. Crew resource management (CRM) performance was insufficient to avoid the crash." Contributing factors were "environmental conditions including departure from an unfamiliar runway with loss of visual references [black hole], night and rain with gusting winds."

Accidents in Brief

of the airplane were accounted for at the accident scene, which the exception of the canopy, vertical stabilizer, and outboard section of the right horizontal stabilizer, which were located about 0.25 mi. north of the main wreckage. The canopy latch was retained for further examination. Additionally, the witness video was forwarded to the National Transportation Safety Board Vehicle Recorders Laboratory, Washington, D.C., for further examination.

► **January 24 — About 1000 PST, a** Stinson Vultee V-77 airplane (N50249) was destroyed when it collided with terrain about 3/4-mi. northeast of Auburn Municipal Airport (AUN), Auburn, California. The commercial pilot and pilot-rated passenger were fatally injured, and the private pilot was seriously injured. The airplane was registered to and

operated by the pilot under Part 91 as a personal flight. VFR prevailed, and no flight plan was filed for the local flight. The airplane departed AUN about 0945.

Several witnesses reported that they heard the airplane's engine "backfiring" and "stuttering" and subsequently heard the engine quit. Additionally, a witness at the airport, who was monitoring the airport's Unicom frequency, stated that he heard the pilot of the accident airplane make a distress call reporting that he had lost his engine and shortly thereafter heard the pilot radio that he was going down in the trees.

Examination of the wreckage by the National Transportation Safety Board investigator-in-charge revealed that the airplane struck tall trees and subsequently came to rest in rocky wooded terrain, located near the top of a hill. All major components of the airplane necessary for flight were located at the accident site. The airplane was recovered to a secure location for further examination.

► **January 23 — About 0853**

coordinated universal time, a Cessna S550 (ZS-CAR) crashed in mountainous terrain under unknown circumstances while conducting aerial surveying operations near George, South Africa. The two crew members and one passenger were fatally injured in the accident, and the airplane was destroyed. The airplane was operated under the pertinent civil regulations of the government of South Africa. The investigation is under the jurisdiction of the Government of South Africa.

► **January 20 — About 1220 CST, a** Cessna 150G (N4763X) was substantially damaged during a collision with guy wires about 8 mi. northeast of Cherokee County Airport (JSO) Jacksonville, Texas. The pilot was fatally injured. The airplane was registered to and operated by the pilot as a Part 91 personal flight. Visual meteorological conditions prevailed for the local flight and no flight plan was filed. The flight originated from JSO at 1200.

A preliminary review of radar data revealed that the airplane's last depicted altitude at 1220:14 was about 577 ft.

The investigation also expressed concern about the company's safety culture and the extent and effectiveness of FAA oversight. Management did not provide any method to communicate safety issues or a voluntary safety reporting system. By removing safety equipment required for passenger airlines, the company obtained weight reduction and cost savings but exposed crews to fatigue and errors in a high air traffic environment. No flight data monitoring program was possible and without a TCAS, inflight collision risk increased. Manufacturers' Safety Bulletins were not complied with unless they were FAA mandated. There were no provisions for crew rest facilities during crew wait times.

The report stated "Training of the next generation of young pilots and maintenance engineers is seriously challenged in this environment. It can be a breeding ground for the learning of bad habits. As aviation activity and complexity continues to grow, understanding and managing these challenges and developing a more proactive safety culture encompassing modern SMS concepts will become the imperative for all Part 135 operators."

AGL. Physical evidence indicated that the airplane initially impacted a set of guy wires that were secured to the top of a 1,586-ft. television tower, located about 1,100 ft. east from the airplane wreckage. About 5 ft. of the outboard section of the airplane's left wing, was located about 468 ft. south of the tower. Additionally, impact marks and stripped paint found on the separated wing piece were consistent with the imprints and paint transfer from the wire. With the exception of the outboard section of the left wing and the portion of the right fuel tank, the entire wreckage was located within about a 50-ft. radius of the main wreckage site.

► **January 17 — About 1533 EST, a** Piel Emeraude CP-301 airplane (N4120) was destroyed when it crashed shortly after takeoff near Oakwood, Ohio. The pilot was seriously injured. The airplane was registered to and operated by the pilot as a Part 91 personal flight. VFR conditions at the time of the accident, and the flight was not operated on a flight plan. The local flight was originating at the time of the accident.

The investigation found that the FAA appeared to have difficulty accomplishing its surveillance responsibilities. Rather, its priorities went toward passenger-carrying operations. Risks associated with cargo operations were not given needed resources.

The St. Maarten Civil Aviation Authority made two recommendations to the FAA as a result of the accident. The first was to evaluate the facts, analysis and conclusions of the final report of this loss of control accident and similar cases of CRM breakdown during loss of control. The second was to, within one year, publish a Notice of Proposed Rulemaking (NPRM) to extend the current Part 5 SMS rule to all Part 135 operators.

Night takeoffs into turbulent, overcast conditions can be difficult even for experienced pilots. A somatogravic illusion results from rapid acceleration, causing the pilot to sense the airplane is pitching up more than it really is. Turns immediately after takeoff and accelerations associated with changes in configuration can compound the unusual sensations that can lead a pilot to accept false cues from his inner ear. Two

A witness reported after takeoff the airplane climbed to about 90 ft. above ground level. He subsequently heard a "pop" or "sputter noise," and the airplane immediately entered a left turn. He heard two more "pops" before the airplane "fell right to the ground." He subsequently responded to the accident site to assist the pilot.

The accident site was located in an agricultural field about 1/4-mi. northeast of the departure airstrip.

► **January 16 — About 0806 Alaska** standard time, a Beechcraft B200 King Air (Lifeguard N547LM) received substantial damage when it impacted the waters of the Bering Sea while departing from the Thomas Madsen Airport (PADU), Unalaska, Alaska (Port of Dutch Harbor). The airplane was being operated by Aero Air, as a Part 135 IFR air ambulance flight when the accident occurred.

The airline transport pilot sustained minor injuries and the flight paramedic, and flight nurse were uninjured. VFR prevailed at the departure airport, and

important countermeasures to these sensations are a disciplined instrument crosscheck and another qualified pilot monitoring the actions of the pilot flying and calling out excessive pitch and bank, under- and over-speeds, and failure to reconfigure at the appropriate time. A radar altimeter and a GPWS also would have been extremely useful in this situation if they had been installed.

The F/O had not reported the captain's misadventure shutting off the fuel levers on landing two days previously, very likely due to differences in age, experience and command authority and a lack of a reporting system. How likely was he to correct the captain in a demanding flight situation? If the F/O was flying, how much skill and experience did he have to cope with an illusion? Without recorders, we'll never know for sure.

One thing seems certain, though. When you keep reducing the safety margins, eventually you will have an accident. **BCA**

Author's Note: While at the NTSB, I participated in this investigation as the technical advisor for operations to the accredited representative from the U.S.

company flight following procedures were in effect. The flight departed Thomas Madsen Airport (PADU), Unalaska, Alaska (Port of Dutch Harbor), about 0756 destined for Adak, Alaska.

According to the pilot, after checking the weather on the AWOS, he completed the before takeoff check list, back taxied for a Runway 31 departure and initiated the takeoff roll. He said he recalled the winds being reported as 100 deg. at 9 kt. As the airplane accelerated down the runway, he said the airspeed was about 75 kt. at midfield and increasing.

When the airspeed reached about 90 kt., he applied back pressure to the control yoke to initiate the takeoff and noted a brief positive rate of climb, followed by a sinking sensation. The airspeed rapidly decayed, and the stall warning horn sounded.

In an effort to correct for the decaying airspeed, he lowered the nose and immediately noticed the airplane's lights reflecting off the surface of the water. He pulled back on the airplane's control yoke and leveled the wings just before impacting the ocean waters. **BCA**

Three Fundamentals for When Things Go Wrong

How **to survive** the unsurvivable



JAMES ALBRIGHT

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

There is no doubt about the fidelity of today's latest generation flight simulators: They are fantastic. We long ago figured the physical problem of fooling our inner senses to believe we are in flight: through simulator-delivered sounds, visuals and motion. We still cannot simulate sustained G-forces, but since most flight is performed at 1 G, this is hardly worthy of complaint. We simulate things that happen regularly during flight as well as those things buried deep inside the emergency procedures of our manuals. But still there is a problem.

Before we get to that, let's consider the root of it. Very few pilots have ever died in simulators. I only personally know of one. He was a Gulfstream GV simulator instructor who had a heart attack sitting at the operator's panel. Then, too, another instructor and two pilots were killed in October 2014 when a King Air crashed into the FlightSafety International facility during takeoff from Wichita Dwight D. Eisenhower Airport (KICT).

But for those of us up front, no matter how many engines are "burning and not turning," we know that eventually a gantry will lower and we will walk away from the simulated wreckage. You cannot realistically experience fear and are unlikely to

panic. I've seen pilots get rattled in simulators, but not an "I am about to die" sort of panic. So, that's not the problem.

The problem is that after training through a laundry list of synthetic emergency procedures, we convince ourselves that we (a) have the fortitude to deal with it all, (b) know what we are doing and (c) have been trained to deal with whatever happens. But the truth is we don't know how we are going to perform until the day something really wrong happens to us in the real world. If you have been under fire and managed to keep it together, chances are you'll probably do OK. If you have struggled with sudden duress, or never been so tested, there are ways to improve your odds in the future.

Having witnessed a fair amount of panic in cockpits over the years, I know that dealing with it is something that cannot be trained by simply listening to a lecture, reading an article or practicing in a full-motion simulator. I once lost an engine at V1 in a U.S. Air Force Boeing 707 (EC-135J) during takeoff from Dallas Love Field (KDAL). To make matters worse, the engine indications on the three turning engines were erratic. There wasn't much to do but point the airplane to the nearest long



U.S. Air Force "Thunderbird"
T-38 Talon

stretch of runway and land, which is what I did. After the flight, the rest of the crew admitted to everything from full panic to "genuine concern." But everyone calmed down once a decision was made and we all got busy with the task at hand.

With this experience and others, I had developed a philosophy but never really articulated it in a way that is really helpful. I recently took a check ride from a training captain who works for a major foreign airline that has a fleet of very large airliners flown by a cadre of very young first officers. He worries about them a lot. How will they react when things go sour in the cockpit? He has put into words the philosophy I have been trying to articulate for many years. His airline was recently named one of the world's safest, so I think he is onto something.

He tells his charges that when things are not going as they should: (1) don't get busy, (2) don't get smart and (3) do things for a reason. What makes his words impactful, however, are the emotional stories behind each. That is key. You need to have a personal connection, either you or someone you know, that relates to each of these fundamental ideas. With that kind of emotional connection, your subconscious mind is more likely to remember what to do (and not to do) when the time comes to face your next inflight emergency.

Don't Get Busy

I learned early on the value of taking a breath to think things through while I was in Air Force pilot training. I was assigned to Williams Air Force Base near Chandler, Arizona, to fly the Cessna T-37 and the Northrop T-38. The first jet was considered the more docile of the two. It even had a cartoonish name: the "Tweet." The second jet, the "Talon," was the ride of choice for the Air Force Thunderbirds that year.

As it turns out, the T-37 wasn't so docile. Between its introduction in 1956 and 1979, the year I flew it, we had lost 111 of them, killing 23 pilots. The T-38 came out four years later but had a higher loss rate, 132 aircraft and 51 pilots. With these kinds of losses, it was easy to get into a hyperactive mindset when something went wrong: I need to do something!

If you have ever attended one of those T-38 air shows, you might have heard the airplane had a roll rate of 720 deg. per second. In other words, you could do two aileron rolls in a second. The procedure for an aileron roll in most airplanes requires you raise the nose a few degrees first. But in the T-38

you just moved the stick left or right and it was over before you knew it. It was quite the machine.

During my year in the jet we were told half the fleet had an aileron actuator pin installed upside-down and if it came loose the actuator would spring load down, turning the airplane into a corkscrew. (These days the fleet would be grounded and every aircraft inspected. Back then, you soldiered on.) A few weeks later, we almost lost an airplane because an electronic yaw damper commanded full rudder and that turned the airplane into a . . . wait for it . . . corkscrew.

The aileron pin failure would theoretically happen so fast that if you didn't immediately eject, the lateral forces and disorientation would prevent you from doing so. The yaw damper gave you about a second to turn it off if it failed, but if you didn't, you were probably too late. A classmate of mine was piloting a cross-country flight with his instructor in the back seat when they both felt the airplane roll suddenly. "Aileron pin!" they shouted simultaneously. Luckily, they were flying over a remote area of Utah and let ATC know they would be doing a controlled bail out. Both pilots ejected and made it to the ground without injury.

The student had to brief our class on what had happened. I asked him, "When did you realize you made a mistake?" He said that after he checked his parachute canopy above him, he shifted his eyes down and caught a view of his empty T-38, flying perfectly wings level in what appeared to be level flight. As it turns out it was in a slight dive and impacted the desert below, still wings level. So, what happened? We think that as he was flying the instructor hit the stick in one direction and he immediately corrected in the other. They were fighting each other but since the cockpit is tandem, neither saw that the other was on the stick. The lesson learned, we were told, was to always know who has control of the jet. But I took away another lesson.

Both pilots have a direct view of the ailerons and a view of the rudder through mirrors. If one of the aileron pins had come undone that aileron would have been full down and the opposite would be normal. Had they taken a moment to look they would have realized that. The student was allowed to return to the class while the instructor spent the next month briefing everyone in the wing on how to avoid his mistake. After he briefed us, the lead instructor had some wise words to add.

"Two-part question! First, what's the first thing you have to do in the event all hell breaks loose and you don't have a clue



TransAsia Flight 235's final moments, as caught by an automobile's dash camera, from the Republic of China Aviation Occurrence Report, Feb. 4, 2015

what's going on? Second, when do you do that?" After none of us gave an answer he provided his own. "The first thing you have to do is nothing! And you should do that immediately!"

But is that really true? Aren't there moments where doing nothing is the worst thing you can do? An engine failure, fire, control problem on takeoff before V1? Yeah, that requires immediate action. A rapid depressurization at high altitude? Yes. A cabin fire? Yes. Anything else? I guess it depends on the airplane. Modern airplanes are smart. In many cases so smart that doing nothing is the best thing you can do. In those cases, if you want to survive the problem, then don't get busy.

Have a reason for doing something before you do it. Don't just do something because you think you must. Take a moment to analyze the situation, consult with the crew, make a command decision, communicate that decision, and then execute it. Nowhere is the "don't get busy" fundamental more important than when flipping switches, pressing buttons or moving levers,

especially when close to the ground. Case in point: TransAsia Flight 235.

On Feb. 4, 2015, the world's confidence in passenger carrying aircraft was shaken by what should have been an easily handled engine failure. TransAsia Flight 235, an ATR 72, had just departed Taipei Songshan Airport (RCSS) when the right engine automatically feathered as the airplane climbed through 1,200 ft. The left engine automatically increased its power, a cockpit indication announced the fact that the right engine had flamed out, and the autopilot applied the necessary yaw corrections. There were no indications of fire and no real reason to do anything other than fly the aircraft.

However, the captain disconnected the autopilot and announced, "I will pull back engine one throttle." The first officer said, "Wait a minute, cross check," but it was too late because the captain had already pulled it back. The first officer then busied himself with the procedures needed to shut down the wrong engine as the captain busied himself by ignoring the need to keep the airplane in coordinated flight. The stick shaker went off just as they completed the No. 1 engine feather.

As the airplane banked to the right the pilots attempted and failed to engage the autopilot. Fifteen seconds later, the first officer realized both engines were shut down. Five seconds after that the captain directed "restart the engine," and 11 sec. later the No. 1 engine began to show signs of life. Just as the airplane started a bank to the left, it stalled again, and 10 sec. later the left wing collided with a taxi on an overpass. Moments later the airplane plunged into a nearby river inverted.

It would be tempting to classify this as a simple wrong engine shutdown, but that would be generous to the pilots. The aircraft was doing a fine job of handling the situation and even presented the pilots with the proper checklist below the engine instruments. Yes, the captain failed to identify which engine had auto-feathered and immediately pulled back the operating engine. The first officer could have saved the day by being more assertive but succumbed to the desire to "do something, anything" and the captain's rushed decision gave him "anything" to do. Both pilots were presented with a stressful situation and I think panic compelled them to do something. In short, they wanted to get busy. That is a natural human inclination, but there are many such inclinations we pilots must train ourselves to resist.

Sooner or later things don't go as planned in the cockpit, things break, or the system breaks down and we learn the wisdom behind that instructor's admonishment: "The first step in

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any emergency is to do nothing. And you should do that immediately.” If you want to survive as a pilot, don’t get busy.

Don’t Get Smart

For most pilots, there comes a time in the progression from novice to professional when everything starts to make sense. We start to believe we know everything we need to know and there is little left to learn. If we are lucky, we get mildly embarrassed to find out just how wrong we were and realize the learning never stops. If we are unlucky, bad things happen.

In a previous lifetime I was a pilot for the 89th Airlift Wing at Andrews Air Force Base. You may have heard members of the wing call themselves SAM Fox. SAM is short for Special Air Missions and many years ago they appended their call signs with a slash Foxtrot, to denote a special air mission foreign. Over the years the emphasis was placed on special and 89th pilots tended to think of themselves as a cut above all others. If you remember the scene from the movie “Men in Black,” you will have the right idea.

An interview candidate expressed the desire to be “the best of the best, sir!” We had a lot of those types at Andrews. That, of course, is a problem. We Air Force pilots are issued specially reinforced egos and when you add to that ego you are asking for trouble.

I was once flying one of those foreign missions from Washington, D.C., to various parts of Africa with a U.S. ambassador on board. I was paired with an examiner who would trade legs with me and evaluate everything I did. He flew the first leg into Lajes Field, Azores. The aircraft for this mission was a Gulfstream III and we were landing simply to refuel.

As we came within VHF range I found out we had a 40-kt. crosswind. The maximum demonstrated value was only 21 kt., but the Air Force established a limit of 30 kt. I knew we had enough gas to continue on to Portugal where the winds were more favorable. The examiner — I’ll call him Karl — saw me pull out the charts for Lisbon and told me to put them away. I asked him about the 30-kt. limit and he reminded me that we

89th Airlift Wing Gulfstream III, C-20B



MIAT BIRCH/VISUAL APPROACH IMAGES

were SAM Fox pilots and the limits didn’t apply to us. His landing was flawless.

Most of the trip through Africa went well and our last stop before returning to the U.S. was Madrid. It was my leg and we were at 45,000 ft. crossing the Mediterranean when I noticed the outside air temperature was -75. Later Gulfstreams would allow this, depending on your speed, but the limit on the GIII was -70. I asked Karl to request a lower altitude and he simply said, “We’re not doing that.” I said, “What about the limitation?” He said, “It’s waived.” I asked, “By whom?” and he responded, “By me.”

At top of descent, the ambassador himself asked Karl if it would be OK for the missus to have the jump seat for landing, and Karl said that would be fine. We were at around 8,000 ft. when I asked for the first notch of flaps. Karl moved the flap handle and nothing happened. One of the other things about being a SAM Fox pilot back then is we had the emergency procedure checklists memorized. Yes, we did. We practiced them a lot and I had done several no flap landings without reference to the checklist. I could see Karl attempt to actuate the emergency flap system without success. He moved his airspeed bug to the zero flaps setting and said, “your Vref is posted.”

So, there I was flying a no flap approach on a White House mission with Mrs. Ambassador in the jump seat. We had accomplished the flap failure and zero flap landing checklists from memory and as I pulled the throttles to idle the smug voice in my head was saying, “Well done, Mister S. Fox, well done.”

However, as the wheels kissed the runway and I brought the reversers out, all hell broke loose. We got a reverser unlock warning horn, a flaps-up whistle and a few other noises I had never heard before. Karl reached cross-cockpit to pull several circuit breakers and then back to his seat to move a few switches and by the time we were at taxi speed things were quiet again.

When we got back to Andrews, our squadron commander asked about the trip and I told him about all our mistakes. He laughed and said he suspected as much, but the SAM examiner and instructor force was very tight-lipped about such things. He told me that in his experience, if you think you know it all, there is at least one thing you are wrong about.

I hear the good folks at the 89th are better these days and guys like Karl, and me for that matter, have been purged from the system. It has been

Air France Airbus headed for the forest following an airshow fly-by.



JOURNAL OFFICIEL DE LA REPUBLIQUE FRANCAISE, APRIL 24, 1990, PAGE 26

my experience that pilots who think limitations apply to everyone except themselves are too smart to be flying airplanes and we would all be better off if they found something else to do. So, it appears that Air Force pilots belonging to “select” or “special” units are at higher risk for being too smart to be safe. Another such category is air show and air demonstration pilots.

In the summer of 1988, the Airbus A320 was brand new and its launch customer, Air France, was rightfully proud of it. Flight Capt. Michel Asseline was given the honor of flying a low-level fly-past for an air show at the Habsheim Aeroclub in eastern France with 130 dignitaries on board. Asseline was a bit of a rock star at Air France and had flown several such air shows. He was certainly qualified. But things didn’t go as planned.

The flight was planned for an overflight of the airport’s paved runway with clear ingress and egress zones. French regulations stipulated that the fly-past could be done no lower than 170 ft., but Air France rules allowed 100 ft. In any case, Asseline had flown the maneuver before at 100 ft. As the crew first caught sight of the airport, they realized the air show crowd was set up abeam a grass runway, not the paved runway. What to do?

Of course when you are a very smart and accomplished pilot, you adapt. The crew flew their fly-past over the grass runway. Of course it would be easy to excuse the crew because, what can go wrong? Well, the first thing that could go wrong is Asseline dipped quite a bit lower than 100 ft.; video evidence would suggest he got as low as 30 ft. He said, after the fact, that the radio altimeter was too hard to read and he was probably right. At the time he believed it was time to add go-around thrust, the engines did not respond.

This very smart captain destroyed the airplane, but incredibly only three of the 136 on board were killed. Asseline was sentenced to prison for flying too low, too slow, and adding thrust too late. There is a lot of evidence that the flight data recorder and other evidence were tampered with and that France was too quick to condemn the captain in an attempt to clear the airplane. In my opinion Asseline did fly too low and too slow, but I think he attempted to add power as he said. I do think France was eager to get this Airbus on the market with a flawless safety record and this captain was the scapegoat. So, let’s cover the too low, too slow, and adding thrust too late charges.

Too low. Is the radio altimeter too hard to read? Yes, I agree that it is, especially in the likely buffeting in the fly-past maneuver. But I’ve flown many fly-past maneuvers in the Boeing 747 and I think you should be able to tell the difference between 100

ft. and 30 ft. Of course, there will be a depth perception problem doing the fly-past over the wide grassy area as opposed to a narrower paved runway. So, the very smart captain was not smart enough to realize this in the moment.

Too slow. We don’t often fly at such low altitudes, other than when intending to land, and when we do so our attention is necessarily glued outside. But something magical happens at one-half wingspan above the surface that improves airplane handling: ground effect. A smart captain can be forgiven for not realizing the stick and rudder feel would mask the lower speed of the airplane, but the very smart captain should have known better.

Too late power addition. The plan was to execute the fly-past at Alpha Max, the airplane’s maximum angle of attack, which is close to but above 1-G stall speed. Small turns are possible and the airplane is controllable. A smart captain knows that if anything more than modest maneuvering is needed the airplane should be accelerated. What Asseline didn’t realize was that at 30 ft. and in ground effect, a higher Alpha Max was possible and his aircraft’s higher angle of attack would have increased engine spool-up times.

Asseline has collected many defenders who argue the airplane did not behave as expected and that the French government pressured investigators to clear the new airplane quickly before sales were harmed. They might be wrong or right, but in either case the very smart captain wasn’t smart enough to execute the fly-past maneuver in such an ad hoc manner.

You can be the smartest pilot in your circle and you can be the smartest pilot to have ever flown your aircraft type or for your operator. But aircraft are complicated and situations are unpredictable. In aviation as with many hazardous endeavors, if you want to survive, don’t get smart.

Do Things for a Reason (No Reason = No Action)

My first stint as an instructor was in a small Air Force Boeing 707 (EC-135J) squadron where we grew our instructor force “in house.” That is, an instructor took you through a syllabus, you flew several practice flights, took a check ride, and you became an instructor. The Air Force didn’t like this approach and encouraged us to attend a real course at our first opportunity. Since the service didn’t have a formal EC-135J schoolhouse, they sent me to the closest match, the Strategic Air Command’s

Central Flight Instructor Course flying the KC-135A Stratotanker.

Since I wasn’t responsible for knowing the airplane or the mission, and having been an instructor for over a year, the formal course was easy. My instructors were looking for ways to throw curve balls and that led to my day flying several single-engine approaches on a four-engine airplane. I asked my instructor, “Are we really allowed to do this?” The answer was, “Nothing says we can’t.”

Almost predictably, the one engine that was never simulated as failed managed to fail on us in a spectacular fashion. During a touch and go landing, it seized with such force the airplane shook for a few seconds while I

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got the other three back up to thrust. We brought the airplane home and I listened outside the squadron commander's office as my instructor was getting the proverbial riot act read to him. At one point I heard my instructor say, "I was thinking . . ." and his boss countered with, "No, you weren't."

A week later I became a formally blessed instructor pilot and have reprised that role in many other airplanes since. Like my unthinking KC-135A instructor, I too have searched for imaginative ways to impose stress on my students. But having seen the ad hoc method fail, I tended to stick to the lesson plan more closely than most. During an emergency procedure, simulated or actual, the aircraft manufacturer's guidance will have a lot of intellectual horsepower behind it, certainly more than you can muster in the moment. If you are doing something without a well-thought-out reason, you probably shouldn't be doing it at all.

Of course, losing an engine on a training flight is child's play compared to what is possible in the operational world. The crew of Alaska Airlines Flight 261 on Jan. 31, 2000, for example, was set up. Their MD-80 was designed without a fail-safe mechanism on the horizontal stabilizer. The lubrication, inspection and replacement intervals on the components of the horizontal stabilizer had been extended, and the jackscrew on this particular airplane was found by one mechanic to be beyond tolerance, but his judgment was overruled by the next.

On a flight from Puerto Vallarta, Mexico, to San Francisco, the airplane's horizontal stabilizer froze in a slightly nose-down direction while the autopilot continued to fly using the elevator only for over 2 hr. While climbing through 28,557 ft. at 296 kt., the crew received an out-of-trim condition warning light. They understood the horizontal stabilizer was jammed and spent the next 1 hr., 22 min. hand-flying the airplane with between 10 and 50 lb. of pulling force, all the while troubleshooting.

As it turns out, the jam was caused by threads from what is called an Acme nut preventing the jackscrew mated to that nut from spinning. There were three methods of trimming the horizontal stabilizer: a primary trim motor activated by switches on the pilots' control wheels, an alternate motor activated by the autopilot, and by mechanical trim wheels. The stabilizer was moved with the primary trim motor during the initial climb and then by the alternate motor using the autopilot until the stabilizer jammed. The pilots ran their emergency procedure checklist, trying both primary and alternate trim systems. After several attempts of both primary and alternate systems, it appears the torque finally overcame the jam, sending the airplane into a dive. They managed to regain control at a lower altitude and speed and did a controllability check demonstrating the airplane was controllable with flaps and slats. They then cleaned the airplane up.

At this point the captain proposed trying the trim system again but the first officer disagreed, saying, "I think if it's controllable, we oughta just try to land it."

As they again deployed the flaps and slats, the air loads on the horizontal stabilizer overcame what was left of the stop of the jackscrew and the forward portion of the horizontal stabilizer let go. At this point the pilots no longer had pitch control of the airplane, though they fought it all the way down.

There is speculation that they tried the trim system again, but it is more likely that the cumulative stress on what was left of the Acme nut was just too much. In either case, the NTSB said that their use of the autopilot while the horizontal stabilizer was jammed was not appropriate and that crews dealing

“with an inflight control problem should maintain any configuration change that would aid in accomplishing a safe approach and landing, unless that configuration change adversely affects the airplane’s controllability.”

It is easy to point blame at pilots who don’t survive an accident — they are not able to defend themselves. But in the case of Alaska Airlines Flight 261, their specific situation wasn’t covered by their manuals and there was pressure, albeit self-imposed, to get the airplane to its planned destination where maintenance was available. Their troubleshooting went above and beyond their manuals and perhaps that is worth noting. Their stabilizer inoperative checklist told them to not use the

autopilot (which would have activated the alternate trim motor) and to consider the stabilizer jammed. At this point they didn’t have a valid reason for reattempting the primary and alternate trim systems. (No reason = no action.)

And If All That Fails . . .

Our newest generation of simulators are an excellent tool for training, but they are only as good as their programming. There are times when an immediate action is called for and you should have those down cold in the simulator. For other problems, if you remember not to get busy, you should be able

to harness the procedures in your manuals and the resources made available by your crew. If you stick to those known procedures, and don’t “get smart,” you should arrive at known outcomes.

Perhaps most importantly, we aviators need to realize that our aircraft and flying environments are just too complicated to attack problems on an ad hoc basis. If you don’t have a valid reason for your action, don’t take the action. When things go wrong in an airplane, these ideas are fundamentals for survival. **BCA**



An Alaska Airlines MD-80, same model as the accident aircraft

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Learning From Test Pilots

A case study: Challenger 604's mega-wake upset

BY FRED GEORGE fred.george@informa.com

More than 20 years ago, Robert Agostino and David Ryan, then of Bombardier's flight operations department, started an annual safety seminar in Wichita with the intent of teaching the company's flight demonstration team pilots lessons learned from its flight test department. The Safety Standdown became an internal success and in 1999 Bombardier opened it to outside flight departments whereupon it grew into an industry-wide model.

While many subjects have been added to the Safety Standdown over the years, including fatigue management, cabin safety, water survival, flight physiology and high-altitude meteorology, the core focus of the program remains understanding the nuances of how test pilots probe the limits of aircraft performance and why understanding this process is essential to all pilots.

"The job of a test pilot is to eliminate risks," says Agostino. "If specific risks cannot be eliminated, they must be identified, investigated and mitigated as much as possible." That risk elimination/mitigation strategy, he says, is key to the safety of business flight operations.

But identifying operational risks is difficult or impossible if pilots don't know what they don't know. Test pilots, for instance, probe the high-altitude flight envelope by performing a series of wind-up turns at various speeds, Mach numbers, altitudes and operating weights to determine a jet's Mach buffet boundaries. This becomes relevant when operating at high cruising altitudes in turbulent air.

At high cruise altitudes, high-speed Mach buffet occurs when the local flow over the wing separates from the

surface due to a Mach-induced shock wave. Low-speed Mach buffet occurs when the wing is operated at too high an angle of attack (AoA), accelerating the local flow over the wing to a Mach number that causes a shock wave strong enough to induce airflow separation.

The Mach buffet boundary diagram, also known as a buffet onset envelope chart, shows the indicated Mach numbers for various operating altitudes at which the wing has the highest spread between the low-speed and high-speed Mach buffet boundaries. The gist is that Mach buffet margins decrease at higher cruise altitudes and operating weights. But the optimum indicated Mach number for buffet resistance remains relatively constant regardless of altitude or aircraft weight.

Some flight departments print out the Mach buffet boundary diagram and include it as part of the dispatch release. They require their pilots use the chart together with forecast and real-time weather data during the mission to determine the highest altitude at which the aircraft can be operated safely in smooth air and also in varying degrees of turbulence.

Clear air turbulence gust loads easily can push a heavily loaded aircraft beyond its Mach buffet boundaries during high-altitude cruise, causing loss of stability, if not momentary loss of control. That's an unnecessary risk that needs to be eliminated, says Agostino.

The buffet onset envelope chart shows pilots the maximum load factor the aircraft can experience without encountering Mach buffet at specific operating weights. In calm air or light turbulence, for example, the crew might choose to descend to an altitude where the aircraft has at least a 1.3 G load

factor available before Mach buffet at the optimum indicated Mach speed. In moderate to severe turbulence, it might be prudent to descend to an altitude where the aircraft has a 2.0 G load factor margin to Mach buffet.

Agostino cites one west to east mission in the continental U.S. where the optimum initial cruise altitude for fuel efficiency was FL 470. However, there was an exceptionally strong subtropical jet stream flowing over the southern Rocky Mountains, potentially causing moderate to severe turbulence at high altitude downstream of the ridgelines.

That day, actual turbulence due to mountain wave east of the Rockies was considerably stronger than forecast. Thus, after crossing the Rockies and first encountering turbulence, Agostino elected to descend to FL 290 where the aircraft had a 2.0+ G load factor margin to Mach buffet and where he found smooth air.

He credits using the aircraft's Mach buffet boundary chart in making the decision to descend, rather than attempting to climb above the turbulence. At FL 490 to FL 510, he might have found smoother air, but the aircraft's Mach buffet boundary load factor margins would have been razor thin.

Professional Training From Test Pilots

Flight Research Inc. (FRI) in Mojave, California, is one of very few flight test organizations that offer formal classroom and flight training programs for business pilots that emphasize high-altitude aerodynamics, including stability and control characteristics, as well as high-altitude upset recognition and

Mantra: Pitch, Power, Roll, Recover. In the case of this nose-high attitude, left-wing down attitude — pitch to unload, power to max, roll to near 90 deg. to allow nose to drop below horizon and then recover by rolling wings level, along with adjusting power and pitch, to establish normal flight attitude and airspeed.

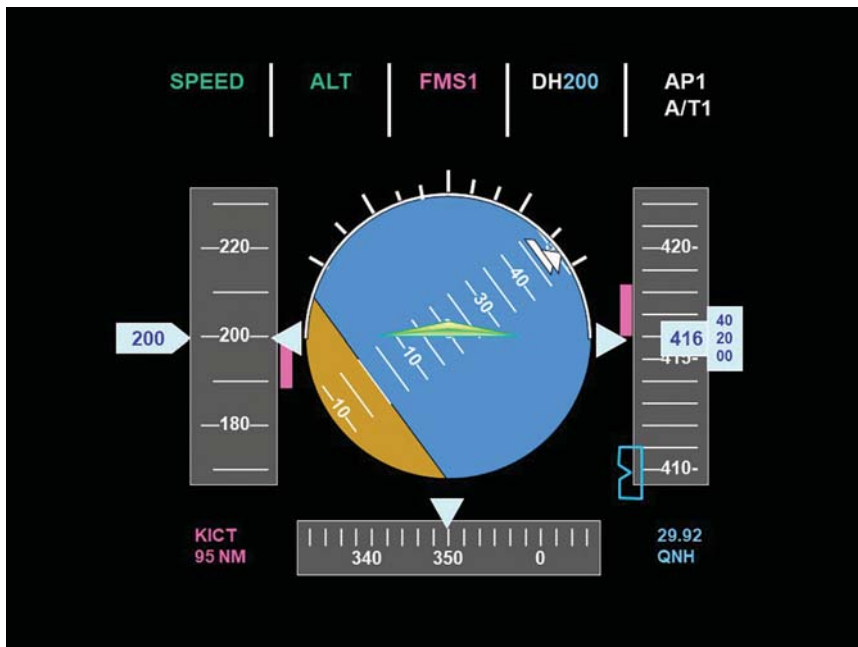
recovery training (URRT) in jet aircraft flying in the stratosphere. In contrast, several firms offer URRT in lightly wing-loaded, piston-engine airplanes at low altitudes where there is no opportunity to experience Mach effects or other high-altitude aerodynamic phenomena.

It's the difference between finessing a 48,000-lb. intercity bus over an icy winter road and tossing around a 2,400-lb. sports car on a dry asphalt track at Laguna Seca. That's one reason FRI teaches business pilots about Mach buffet boundaries, among other high-altitude flight regime topics.

Says Scott Glaser, Ph.D., FRI's senior vice president of operations, "Airplanes like to fly. That's the 'how' and 'why' airplanes are designed. We, as pilots, may get into trouble because we may ask an airplane to do something it doesn't want to do." Professional jet pilots seldom intentionally exceed flight envelope limits. But it's not difficult to exceed those limits inadvertently, if you're not trained to recognize and mitigate the risk of high-altitude upset caused by weather or wake turbulence.

Glaser cites the near loss of a German-registered Bombardier Challenger 604 that encountered severe wake turbulence from an Emirates Airbus A380 that crossed 1,000 ft. overhead while the business jet was over the Indian Ocean in early January 2017. The wake turbulence from the 1.1-million-lb. mega jet caused the Challenger to roll more than 40 deg. to the right and then more than 30 deg. to the left, followed by vertical accelerations of 1.6 G to -3.2 G, according to flight data recorder information cited by the Flight Safety Foundation. Lateral acceleration reached 0.94 G and pitch attitude plummeted from 9-deg. nose up to 20-deg. nose down. Airflow distortion caused the left engine to overtemp, prompting the crew to shut it down.

After plunging 8,700 ft. and rolling at least three times, the crew regained control of the aircraft at FL 250, restarted the failed engine and diverted to Muscat, Oman. One passenger suffered severe head injuries and a broken rib. Another passenger suffered a fractured vertebra. The other four passengers and



flight attendant incurred minor injuries. The Challenger 604 was so severely damaged that it was written off as a total hull loss. Fortunately, all nine occupants aboard the aircraft survived the encounter.

Glaser notes that wingtip wake turbulence from jumbo jets can persist for several minutes. Elapsed time is no guarantee the wake turbulence has dissipated. The only sure defense is to recognize the threat and ensure your aircraft has generous altitude separation above the larger aircraft and/or ample lateral separation. The 1,000-ft. separation afforded in RVSM airspace provides no protection from wake turbulence when aircraft cross in opposite directions.

FRI officials note that the leading cause of fatalities in aviation is loss of control in flight, a risk that causes 25% more fatalities than controlled flight into terrain (CFIT) accidents and more than four times the deaths of midair collisions. They claim that loss of control accidents result in large part because few civilian pilots of high-performance aircraft receive URRT. As with the German Challenger 604 wake turbulence accident, a large part of URRT is identifying and steering clear of the upset risk, rather than simply reacting to the upset and making the appropriate power and control inputs to recover.

FRI's four-day course includes comprehensive academics in ground school. But Glaser says it's simplified because the course is designed for professional

business pilots, not test pilots. This contrasts with high-altitude aero ground school sessions at the first Bombardier Safety Standdowns that included esoterica such as Buckingham Pi theorem for determining lift and drag coefficients, the nuances of Reynolds numbers, determining pounds of drag due to Mach-induced shock waves and examining the oscillating superstall characteristics of a Saab SK-35 Draken fighter. However, business pilots in attendance told Bombardier they weren't interested in enrolling in a test pilot school, so the hard science academics were toned down.

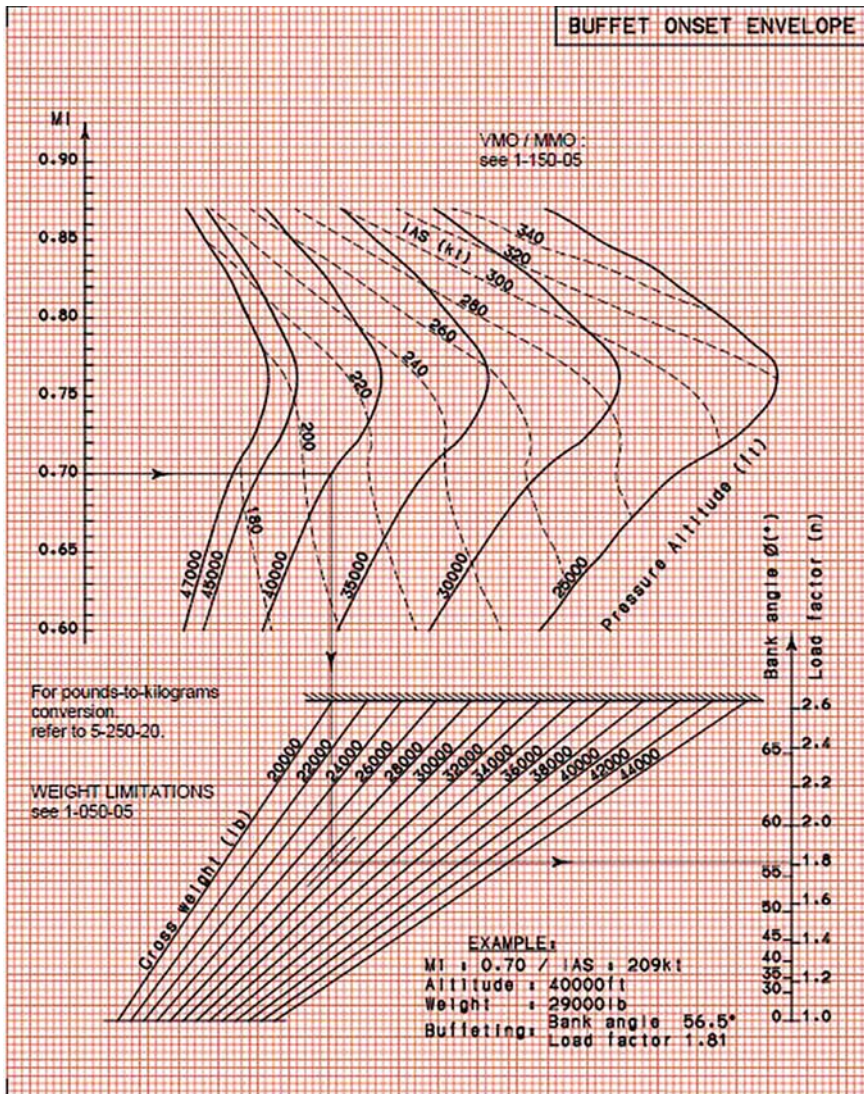
For the business pilot URRT program, Glaser shelved the complex test pilot school equations and non-relevant military aircraft aero review in favor of what's most important in everyday business aircraft operations.

Five of the most relevant topics are AoA management, awareness of lift vector, aircraft stability characteristics above Mmo, high-altitude performance and stability degradation and maneuvering speed limitations, says Glaser.

Compressibility at high altitude, for instance, decreases stalling angle of attack while increasing the indicated airspeed at stall. Indicated airspeed (IAS) at MMO, though, decreases with altitude increase. The higher the aircraft flies, the lower the spread between IAS at stall and MMO. Where the two slopes converge is known as the "coffin corner" in the flight envelope.

Virtually no current production business aircraft have such "coffin corners"

DASSAULT FALCON JET



Falcon Buffet Onset Envelope, also known as Mach Buffet Boundary chart, shows that aircraft has slimmer buffet boundaries at higher cruise altitudes. But, for all altitudes, this Falcon 2000's peak buffet boundaries occur at Mach 0.76.

Yet, when in a nose-low stall recovery pitch attitude, it's critical to be aware of Mach buffet boundary limits. If the maximum load factor is exceeded when pulling up to a nose-level pitch attitude, the crew risks encountering a secondary stall.

Glaser says that's not the only aspect of high-altitude performance degradation of which pilots need to be aware. Aerodynamic pitch, roll and yaw damping are far less at high altitude than at sea level because air densities are 80-85% lower than at the surface. This makes it much more challenging to hand-fly the aircraft. In addition, RVSM altitude holding requirements all but mandate use of autopilot in cruise, denying pilots opportunities to practice their flying skills in thin air.

At high altitude, some aircraft, for example, exhibit impressively divergent lateral-directional oscillation (aka Dutch roll) characteristics when the autopilot is turned off and if the yaw damper fails. Others will exhibit divergent long-period pitch damping at high altitude, while they're well damped in pitch at low altitude. Those oscillations may be difficult, if not impossible to dampen with manual control inputs. Extending speed brakes and descending into denser air may be the only option.

The relationship between maximum operating speed and Mach number, maximum speed and Mach number for stability characteristics, and maximum demonstrated dive speed and Mach number are important to understand, especially in the context of high-altitude upset caused by turbulence gust loads, inadvertent control inputs, passengers moving about the cabin or other factors. The MMO speed limit is set to provide positive pitch stability and adequate control margins up to Mfc, the maximum speed for stability characteristics. Speed increase up to Mfc must be accompanied by a linear, increasing push on the stick. In other words, speed increase above trim speed must be accompanied by a push to maintain the higher speed and a speed decrease must be accompanied by a pull to maintain the lower speed.

For most transport category aircraft, MMO must be at least Mach 0.07 below Mdf, demonstrated dive Mach. Generally, aircraft are required to have

in their flight envelopes. But the low- and high-speed limits of the diagram are calculated for smooth air operations. Real-world high-altitude turbulence can increase load factors, thereby momentarily squeezing together the low- and high-altitude IAS slopes. Gust-induced load factor effectively creates a "coffin corner" that's not illustrated in the AFM flight envelope diagram. Effective AoA management only is possible by perusing several parts of the AFM, including the Mach buffet boundary chart and flight envelope diagram, along with the stalling speed chart that shows the effects of weight, load factor and high-lift devices.

AoA management is key to upset prevention. AoA reduction is crucial for stall recovery. It's critical to be aware of stall hysteresis. Stall occurs as the wing reaches its maximum lift coefficient, an AoA where airflow is fully separated from the wing. But airflow will not reattach to the wing until AoA is reduced

substantially below stalling AoA because of hysteresis. Some studies indicate that airflow will not reattach to the wing until AoA is reduced 40% below stall, depending upon the airfoil design. It's critical to dump the nose, wait for the aircraft to accelerate and then nurse pitch attitude back to the horizon.

Moreover, most turbofan engines only produce 20-25% as much thrust at high altitude as they do at sea level, thus there's no way to "power out" of a stall at altitude. The only effective way is to immediately reduce AoA, push up the throttles for what that's worth and allow gravity to accelerate the aircraft to a safe stall recovery speed. Notably, it's nearly impossible for line pilots to push precisely to a 0.5 G load, even though that's recommended in some URRT syllabi. Instead, if pilots push until they're light in their seats and dust starts to rise on the flight deck, they know they're expediting stall recovery.

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positive pitch stability all the way to Mdf. But stick force can decrease to neutral between Mfc and Mdf. As Mfc can be as little as halfway between MMO and Mdf, in some aircraft, stick force above Mfc can become uncomfortably soft with a speed increase as little as Mach 0.035 above MMO. And if you exceed Mdf, there's no assurance that shock-induced flow separation won't result in a sudden aft shift in the center of pressure over the wing, causing the Mach tuck effect from which it may be impossible to recover.

Bottom line? Regard MMO as a hard speed limit. If you inadvertently exceed it, make appropriate pitch, power and high-drag device inputs to slow the aircraft below MMO to assure adequate stability and control margins.

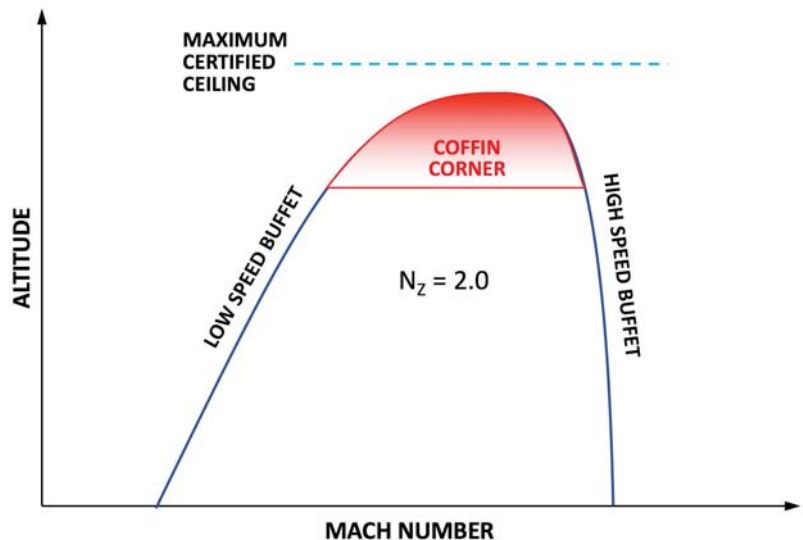
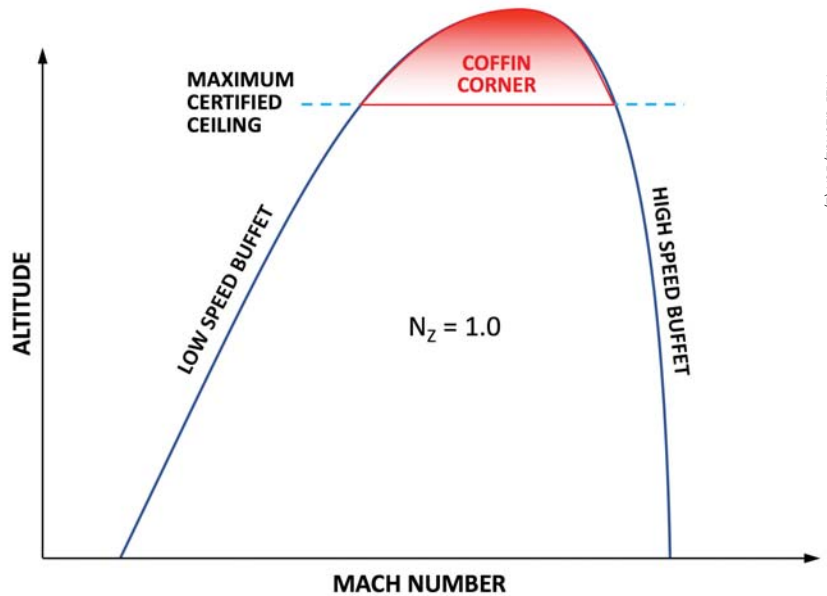
Glaser's program also includes a discussion of Va maneuvering speed. Some pilots believe that any control inputs they make below the VA limit will not cause structural damage. But as the American Airlines Flight 587 Airbus 300 accident during climb-out from JFK International Airport in 2001 proved, multiple full control inputs in one axis or simultaneous full control inputs in more than one axis can cause serious or fatal structural damage even though ultimate vertical load factor never exceeds 2.5 G. Cyclic rudder inputs, for instance, easily can overstress a vertical fin, even up to the point of structural failure.

The FRI ground school covers other aspects of aircraft certification and how the flight envelope is defined, providing an understanding of limitations of test procedures required for airworthiness approval.

Flight Experience in Three Aircraft

FRI's flight training program begins with test pilots first demonstrating, then client pilots practicing, URRT basics in a T-67 Slingsby Firefly aerobatic basic trainer. It's useful for learning how to recognize and react to unusual attitudes and how to apply "push-power-roll-recover" attitude and speed correction techniques.

Clients then make the transition to the North American NA265 Sabreliner, an aircraft that has the high-altitude performance, wing loading, polar moments of inertia and control responses of a typical turbofan business aircraft. Flying the Sabreliner affords opportunities to experience high-altitude upset and practice recovering without



Top: Few, if any current production civil aircraft, have "coffin corner" convergence of low- speed and high-speed buffet boundaries below their certified ceilings. **Bottom:** But, high-altitude turbulence can squeeze together the low- and high-speed buffet boundaries thereby creating a "coffin corner" at the most efficient cruise altitude and well below the certified ceiling.

exceeding Mach buffet boundary, VMO or MMO limits. The Sabreliner also enables clients to sample the reduced static and dynamic stability and spongier aerodynamic damping characteristics when hand-flying a business jet in the stratosphere.

The final two flights are in the Aeromacchi MB-326 Impala, a tandem-seat military trainer in which clients can experience full stalls, inverted flight, high G-load aerobatic maneuvers, and spin entries and recoveries. The flights in the Impala expose clients to high-performance maneuvers well in excess of what they would see in a business aircraft and are intended as confidence builders.

The take-away for professional business pilots is clear. Test pilots carefully, precisely and momentarily probe corners of the flight envelope to determine the aircraft's structural and aerodynamic limits, thereby enabling designers to define safe operating speeds, Mach numbers and load factors that provide adequate margins if such inadvertent excursions are encountered. Inadvertently or intentionally exceed the aircraft's limitation and you risk becoming an accident statistic. Fly within the limits and you'll prolong the aircraft's service life as well as provide the safest, most comfortable ride for all occupants. **BCA**

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Road Warrior Worries

They face a litany of threats to their safety and security



MEMORPHORS/ISTOCK

BY **PATRICK VEILLETTE** jumpraway@aol.com

As a business aviation professional much of your career is spent in environments where lurk threats to your personal safety and security. While it is impossible to protect oneself absolutely, travel security experts recommend measures to lessen the likelihood of becoming a prime target for theft . . . or worse.

One of the most common security threats out there is the pickpocket, some of whom have sophisticated skills. Their prime hunting grounds are crowded areas where pedestrians bottleneck — escalators, subways, at turnstiles, or at the doors of packed buses or trains as people get on and off. Groups of tourists are at risk when their attention is focused on something. For example, street performers have been known to work in concert with thieves by holding their audience's attention while pickpockets do their thing.

In public places such as airports, train stations, bus stations and markets, you should exercise special care in safeguarding valuables against such thieves. Your money, credit cards and forms of ID should be in a secure place, such as

in a money belt, knee wallet or bra wallet that is worn close to your body.

Be wary of strangers who approach you and be especially alert if using ATMs. When traveling with others, look out for one another's security and constantly use good security-conscious practices.

"Don't make yourself the weakest gazelle in the herd" is a protective philosophy recommended by security services. In other words, thieves will target the person in a crowd exhibiting the least protective measures against theft.

Are you carrying a bag, backpack, hip pack or purse? Wear a shoulder bag over both the head and shoulder and in the front, not at the side. Never let your bags out of your sight. You might be tempted to hang your purse on the back of your chair at a sidewalk café or set your bags down at your feet. This isn't a good idea because your attention is going to be attracted to the new sights around you. Keep your bags in your lap or at the front of your feet under the table, with the straps wrapped around your leg. If you have your purse strap or bag straps wrapped around your leg,

you'll trip over it getting up, and it will anchor the item against a quick "snatch and grab." Always look back when leaving to prevent leaving things behind.

If you do want to carry a bag, carry only enough cash in a fanny pack or over-the-shoulder bag to cover expenses for one day, and be sure the bag zips. If your backpack's zippers are protected by a zipper lock, a pickpocket will likely be deterred to find a more vulnerable target in the crowd.

Leave the Bling at Home

Don't bring anything you would hate to lose or have stolen. This includes valuable jewelry, irreplaceable family objects, all unnecessary credit cards, your Social Security card, library card and similar items you may routinely carry in your wallet.

It might be tempting to wear your favorite gold chains or fancy pilot watch for a night on the town or take your new, expensive camera out to capture the new sights around you, but in the interest of your safety, don't. If you are dressed to the nines, you're announcing

to potential thieves that you are a worthy mugging target. Keep your attire and accessories simple and appropriate for the place you are visiting, which generally means dress modestly. Forgo anything that draws attention. Do not advertise any expensive shopping trips. Hide your camera in a case when you aren't using it.

Ties are standard attire for most professional pilots, but grabbed by someone meaning us harm, they can serve as a choke handle, putting us off balance and on the ground in a flash. While sartorial purists might scoff at the idea, from a security standpoint, a clip-on tie is a much better choice.

Documents

You need to carry important documents with you when traveling abroad. This list might include your pilot credentials, itinerary, medical insurance card, passport, plane tickets, insurance and visas.

Create an electronic backup of these before you leave. You can email the file to yourself and keep it in your inbox so you can access the information with your smartphone should the paperwork be lost or damaged. Likewise, you should make copies of the front and back of your debit and credit cards, especially with the customer service phone numbers that can be accessed from abroad.

Notify your credit card companies that you will be traveling (their fraud checks will "pop up" upon seeing foreign purchases).

If you lose your passport or other identification documents while overseas, get in touch with the nearest embassy or consulate immediately. Having copies of your documents will expedite the replacement process.

Don't Carry Everything Together

Before your trip, document your valuables. Photograph your camera, personal electronics, jewelry and other valuables. Note serial numbers and other information for possible insurance claims.

Pack light so you aren't bogged down with having to carry a bunch of items. Use small combination travel locks on your bags. Once through airport security the bags should be locked, especially while riding on trains and buses. Even a small daypack should be kept locked, and sadly, this includes while



ANYABERKUT/ISTOCK

Mobile Devices

Almost everyone stores a lot of personal and sensitive information such as photos, contacts, text messages and online activity on their mobile phones, tablets and laptops. Keep track of your devices at all times. Due to their compact size, they're easy to lose or to have stolen. By their very nature, they are prime theft targets for bad players to steal your personal information.

Users should download all security updates for their operating systems, making sure their firewall is turned on, and virus and malware protections are up to date. Don't install apps that require revealing your location.

Choose secure networks when using Wi-Fi or Bluetooth and disable those services when not in use. Make it a practice to use virtual private networks (VPN) that encrypt all information, making your communications more private. Using a paid Wi-Fi service has some value as this offers an added layer of protection.

Smartphones are also prone to sidejacking attacks when the device switches from a carrier to a wireless hotspot. It is recommended that you go into the settings on your phone and turn on the encryption. Don't pay bills, use credit cards or conduct financial transactions at public Wi-Fi hotspots.

Protect your mobile phone with a screen lock such as a strong PIN, password, complex swipe pattern or fingerprint lock. Enable remote wiping, which allows you to erase vital information if the phone is lost or stolen.

Do not access or store work data on your personal device. Regularly back up information on your phone so that if it is stolen, lost or damaged, you still have your information. **BCA**

on your business aircraft. While you're up front piloting, bags left in back are accessible to the passengers and that could prove inviting to the wrong types. I know that because some former colleagues were flying a young person, likely on his way to an exclusive drug rehabilitation center, only to discover after they had delivered him to his destination that all their cash and credit cards, which they had left in the bags stowed in back, were gone.

A side note for business pilots: The frequent mayhem attendant to the loading of passenger bags is another prime time in which your own luggage could be directly outside of your control. If FBO

workers move the baggage to the aircraft, make sure yours is among them. It wasn't until yours truly was unloading my passenger's boxes that I realized my two bags were missing. After several panicked phone calls, I located them sitting behind the receptionist's desk at the FBO from which we'd departed. Evidently, the rampers had placed them there to make room for more passenger baggage and pocketing a generous tip for the doing. After calling the assistant chief pilot to let him know that I wouldn't be able to fly my scheduled flights until reuniting with my wallet, which contained my pilot and medical certificate, I convinced him that the company should

pay for a hotel room until I could make that happen. Of course, I filed an ASAP report for inadvertently conducting a flight without the proper documents and was later admonished by the company to “remain more cognizant of my bags” in the future.

And while it might be tempting to keep all of your cash, credit cards, identification and traveler’s checks in your wallet while traveling, don’t. Keep any money, credit cards, IDs and checks unneeded for a day’s excursion locked in your hotel room safe. This precludes

you losing everything should somebody steal your wallet. Similarly, do not keep anything of value in your back pocket, including your wallet, hotel room keys . . . anything! Don’t be an easy target for the swift hand of a pickpocket.

You might consider carrying a “dummy” wallet, filled with small bills and the fake credit cards that come with mailed solicitations. If confronted by a robber, hand over the bogus wallet, which the thief won’t realize until he is long gone and you are safely away. Once you’re out of danger, proceed to

the nearest consulate or appropriate authority to report the incident.

There is another reason to carry a dummy wallet or at least not keep all of your cash in one location on your body. After all, there are places in the world where satisfying a thug or teenage narco-terrorist holding an AK-47 in one’s face — been there and don’t care to repeat the experience — is to surrender a wad of \$1 bills wrapped with a double sawbuck. The goal is to satisfy the thug’s immediate desire for cash and to get them to leave. It worked for me.

Opening the Hotel Door to Smoke



Of all the nights you have stayed in hotels during your flying career, how often have you truly looked at the fire evacuation recommendations on the back of the hotel door? Going forward, read them since they could save your life.

Be sure you know where the nearest fire exits and alternate exits are located. Safety experts recommend counting the doors between your room and the nearest exit since you may have to crawl through a smoke-filled corridor to escape.

Fire doors are designed to keep fire and smoke trapped for a defined time period — enough for hotel guests to get out and make the fire easier to suppress. However, those doors won’t be able to do their job if propped open. If you see someone propping open a fire door, close it.

Modern fire alarms are effective at alerting hotel occupants to danger. In my flying career I was awakened twice in the middle of the night by such alarms, and one of those instances involved an actual fire. Both times I awoke disoriented, only vaguely able to recall that I was in a hotel. I couldn’t remember the placement of furniture and thus stumbled upon rising from the bed. In that stupor I was slow to find and don clothing prior to exiting the room. I groggily opened the room door . . . only to find the hallway enveloped in smoke.

At that point my adrenaline surged; this was no drill! The overhead sprinklers started spraying water as I looked left and right at a hotel hallway that I had only walked once a few hours before wearily crashing into bed. Equally confused guests began to exit their rooms. There was no semblance of a neat, orderly evacuation. Rather, people were screaming conflicting directions and going in opposite directions, thus impeding a smooth flow of traffic. Once we managed to exit the building, we were greeted by a freezing drizzle and since none of us had sufficient time or forethought to grab proper outerwear, hypothermia became another risk.

It was a real fire with flames and thick smoke flaring from the side of the building. The fire department deployed its massive water cannons to project columns of water upward to the third story of the structure.

It took a while to find my two colleagues (I was a flight engineer on a Boeing 727 at the time) amongst the crowd. This was a hotel next to an airport where many airline crews stayed, thus the crews were trying to assemble with workmates. Several captains who happened to have cell-phones when they exited their rooms were already telling schedulers that their crews would not be available for duty the next day.

We were not allowed to re-enter the hotel after the fire was under control. We had scant clothing, no wallets, driver’s licenses, credit cards or cash. Nor did we have our pilot certificates or medical certificates. Our suitcases with our spare clothing were back in the room, as were our uniforms and flight officer identification. This required prompt notification to the security division out of concern that these items would fall into the hands of unauthorized persons.

This was all put into perspective though by realizing this had been a real fire. Thankfully the protective features in modern building codes were sufficient to give hotel occupants quick warning of the fire and the rate of expansion of the fire was minimized so that all of us could escape the burning building. **BCA**

Also, never count currency or flaunt cash in public. You've no idea who may be watching and calculating. Try to not let your credit card out of your sight, and never use your credit card on a public computer.

Identify Theft

Internet cafes are popular among travelers since they provide a quick and easy way to grab a cup of coffee while emailing the latest details of your adventure to your family and friends. They are also a prime location for thieves to gain access to your personal information. Criminals use keylogger software on the café computers available for use by patrons. If you use such equipment, pay for it in cash, not with a credit card. And when logging into work or bank accounts, only use devices that you personally control.

Public Wi-Fi spots are prime locations for identity theft. Internet thieves have learned how to redirect your internet request to a fake website where they can extract your information. Make certain you are logging into the hotel's Wi-Fi network, not a fake hotspot. Don't stay permanently signed in to accounts; rather, log out when you've finished. Computer security experts also recommend turning off your Wi-Fi search mode to prevent your device from being diverted to a fake hotspot without your knowledge.

Anything you do on a public connection is less secure than when logged in at home or in the office. Hackers are able to use "cookies" from your email and social network sites to steal credit card and other personal information. This allows them to "sidejack" you, pretending to be you and gaining access to your valuable information.

Use mail websites that encrypt. You can tell if a website is encrypted if a small padlock icon appears to the right of the site's address in the address bar of the web browser. Also, look for "https" in the URL to know a site is secure.

Be careful with your passwords. Some websites don't adequately protect them, and if thieves break into one of those systems, they will try using that password to break into your other accounts.

Be aware that those "security questions" used to verify your information are equally vulnerable. It is easy for a thief to look up your mother's maiden name, your high school or where you were born. Use information that is not publicly known, or you can use a false answer known only to you.

Social Networks

Savvy thieves have learned to use social networking websites to gain access to your personal information. Experian ProtectMyID commissioned a study in 2011 that found one-fifth of respondents posted their travel plans on social networking sites. When data thieves get this information, all they need to do is look up a traveler's home address online and steal any mail containing information that can be used to commit ID theft. Posting travel details on social media while you're away is an invitation for trouble.

Hotel Safety

Your security and safety at a hotel begins at check-in. Safety experts recommend asking for a room from the second to seventh floors above ground level — high enough to deter easy entry from outside but low enough for fire equipment to reach. A room that isn't near a stairway or elevator reduces foot traffic or strangers prowling around the easiest-to-access rooms. If the clerk announces your room number for anyone else to hear, ask to be reassigned.

Theft is the most common crime committed in hotels. Keep the room and your items tidy so that any disorder would be conspicuous. Do not leave any valuable items out in the open. Tape items underneath the desk or side tables. Hide items in plain sight by keeping important documents concealed in a pile of restaurant menus and travel brochures. Throw valuables in truly dirty clothes. Use a "diversion safe," such as a fake can of shaving cream or hollowed-out paperback, to store valuables.

Keep your hotel door locked at all times. Meet visitors in the lobby. Keep your suitcases locked when you leave the room. Consider using a cable lock to tether your bag to something stationary. Use small zipper locks to prevent entry into your bag as well as slash-proof panels to keep thieves from tearing it open.

Inquire if the hotel has in-room safes to store valuables during your stay. If that isn't available, ask about a hotel safe or guest lock box. Hopefully the hotel safe allows you to set a new combination. Never use a safe that requires a key provided by the hotel, as there may be duplicate keys circulating among staff and former guests.

Unfortunately, unscrupulous individuals are utilizing technology to spy on unknowing hotel occupants, as

illustrated in the Erin Andrews case. The current technology that is available to such people is exceptionally difficult to detect unless one has specialized tools and training. Some devices include infrared illuminators to collect video footage at night time. Others include desk chargers, AC adapters, air purifiers and pens with HD cameras that can connect with Wi-Fi. It's enough to drive a reasonable person into paranoia. This invasion of privacy is serious and illegal. Devices that can detect camera lenses or pinpoint spy equipment that emits Wi-Fi signals are sold at specialty stores. Other protective moves include unplugging room electronics, turning some around, or putting towels over anything you suspect might have a camera.

Proper Behavior Always

Although you've known this all along, the U.S. State Department website confirms that travelers have been subject to scams and been involved in sometimes violent altercations with drunks during late-night revelry near bars and night clubs. One classic late-night scam involves attractive women enticing tourists in a reputable bar to visit another nearby nightspot where the mark is grossly overcharged.

A number of travel websites specifically advise travelers to remain sober and try not to travel alone at night. If you are out late, let someone know when you expect to return. And don't use shortcuts, narrow alleys or poorly lit streets.

Avoid loud conversations or arguments. Do not discuss travel plans or other personal matters with strangers. Be wary of strangers who approach you and offer to be your guide or sell you something at bargain prices. If you are alone, do not get on an elevator if there is a suspicious-looking person inside.

Keeping a low profile is wise, both when traveling domestically and abroad. If you want to become a target, start the "ugly American" routine — that is to be loud, arrogant, demeaning, thoughtless, ignorant, ethnocentric, improperly dressed and oblivious to local customs and manner when abroad. Such behavior is all too easy to spot, sours American regard and is embarrassing for the rest of us.

Avoid public demonstrations and other civil disturbances. If possible, stay informed on local events. If there is civil unrest, strikes by transport or telecom workers, a natural disaster,

etc., have a backup plan for getting to a safe location and with as little fuss as possible. If you are traveling with others, they should know your plan and you know theirs.

Know how to activate the country's emergency telephone system in case you get hurt, and be aware that

countries use trigger numbers other than 911 as in the U.S. And don't count on operators understanding any language other than their own.

Walking is a fine exercise during a layover, but there can be risk in stepping out. For example, simply crossing a London street can put an American in

harm's way because the Brits drive on the opposite side of the road. So, before stepping into the crosswalk, look both ways. Thankfully, the London traffic authority has painted arrows to alert the unwary to look in the proper direction.

When riding on trains, light rail or trams, keep aware of the local tracks.

Local Transport Risks

As soon as you enter a taxi, Uber or limo you are essentially surrendering control of your safety and security to someone completely unknown to you.

For business aviators within the U.S., FBOs often extend the courtesy of a van or taxi ride to the hotel. Generally, this is a trusted purveyor and you can feel assured that the driver isn't taking you on a roundabout way just to jack up

the fare. Of course, smartphones can outline the most expeditious route, but drivers in the know may want to avoid traffic jams or toll booths.

Communicating effectively with the driver is necessary to ensure you're going to the right location. That exchange is complicated if you speak different languages. This occurs abroad and domestically. In Zürich we needed a taxi to take us to the terminal for a pre-5 a.m. check-in. The taxi driver was not a Swiss native and his German was heavily accented. He spoke other languages, but English wasn't one of those. Fortunately, "zum flughafen bitte" (translation: to the airport please) worked.

If you are leaving from a hotel, ask the hotel transportation captain to arrange a taxi, and ask him for the approximate price (and tip) that you should pay. If the hotel doesn't have such a person, then call ahead for a taxi. Ask the dispatcher for the cab number to make certain you are getting into the right one.

If you are waiting at a taxi stand and flipping through your smartphone, you just made yourself a target. Smartphones are valuable, and all a thief needs is 10 sec. when a taxi is waiting at a stop light to reach through an open window and grab it.

Be wary of any "taxi" that doesn't have the company's name and phone number visible on the outside. Genuine taxis are licensed, and the taxi driver will be required to carry and display their ID badge. Legitimate taxis will also have meters. If you don't see an ID badge and meter, don't get in. Always



JETCITYIMAGE/ISTOCK

check that the taxi has an interior door handle as you open the door, and never get into a taxi with someone else in the passenger seat.

If riding alone, sit in the backseat. Some security experts recommend sitting behind the driver to keep yourself less accessible. Keep your expensive items hidden. Keep your bags close to you and keep your cellphone handy in case you need to call for help.

This of course is easier said than done because you may not know your exact location or the emergency number, and the dispatcher may not speak English.

In a foreign country unscrupulous taxi drivers will not give you the proper change or may give you worthless bills. Hence is it handy to know enough about the local currency.

Waiting in a long taxi line at McCarran/Las Vegas International Airport (KLAS) can try the patience of even the most chill person. Fortunately, there are airports with safe and efficient public transit options straight into the city center that are far less costly and often avoid the mass traffic jams that are all too common in today's congested metropolises.

If I'm arriving at London's Heathrow Airport, my personal choice is the Paddington Heathrow Express. It flows directly from Terminals 2 and 3 into the famous Paddington Station, which connects to a wide option of trains and "tube" lines. The Express cars feature massive luggage storage areas so that even international travelers (who generally carry more baggage) can find a place to stash their stuff. It is a stress-free smooth 15-min. ride into the city.

In Zürich the train runs nearly every 10 min. from the airport to the Hauptbahnhof (main train station), whereupon one can connect with a wide variety of trains and their famous local tram system, shop or grab some wonderful fast food on the way to your next connection. Just be advised that in the Swiss philosophy of efficiency, the connecting times between your arrival and departure are likely to require a brisk walk. **BCA**

Trains can come from either direction at any time and can be surprisingly quiet. Pay attention to painted or raised markings at the platform edge and stay at least 3 ft. from the train while it is entering or leaving the station. Around train tracks or in stations, heed all warning signs and signals and use caution when using headsets or cellphones.

Before traveling overseas, check the facts about the country you are visiting, such as the information provided

by the U.S. State Department's Bureau of Consular Affairs. There you will find information about current security issues, crime statistics, medical insurance information, traffic safety and more.

In business aviation we are operating multi-million-dollar aircraft and flying passengers whose net worth can be considerable. This makes them, the aircraft and crewmembers prime targets for theft or kidnapping. As flight crews, you definitely should obtain additional

training in security. There are many specialized security service providers and trainers with impressive resumes in special forces, intelligence and elite law enforcement. Many of these companies also provide threat assessment and logistical support.

It isn't possible to make oneself 100% impervious to security or safety threats, but hopefully these recommendations will keep you safe and secure during a long flying career. **BCA**

Medical Cautions Abroad

Travel to foreign destinations carries an additional threat to one's health and medical certificate. According to Dr. Lew Dick, a family physician and author of "Travel Medicine: Helping Patients Prepare for Trips Abroad," contained in the August 1998 issue of American Family Physician, one out of three people traveling abroad experience a travel-related illness. On a typical two-week trip, travelers lose an average of three days due to illness, and almost 20% will remain ill after returning home. Some of these conditions can be miserable, such as diarrhea, but will eventually pass, while other diseases can threaten your health. Taking the proper preventive steps is a necessity to guard against the litany of potential travel-related illnesses.

In the case of diarrhea, eating only freshly prepared hot foods and being extremely cautious about consuming any local water — ice cubes included — are wise measures. Taking along commercial filtering devices and water treatment kits using chlorine or iodine is worth considering. Don't forget to have routine dental and medical care updated before a trip, and be sure to bring a sufficient supply of regular medications.

It makes good sense to consult with a travel medicine specialist such as MedAire prior to embarking on a trip to a foreign location to assess which vaccinations should be updated. Such a consult should occur at least six weeks prior to the trip. In some cases, vaccinations must be administered several weeks before departure to reach an effective deterrent level.

For example, travelers who are contemplating flight assignments to areas of South America and Africa can be exposed to endemic levels of yellow fever. Malaria is indicated for travelers to Mexico and Central America. Travel medicine specialists can provide details on vaccine

country-specific risks, contraindications, side effects and accelerated schedules.

Foreign locations can be laden with disease-carrying insects carrying Lyme disease, malaria, yellow fever, encephalitis and dengue fever, just to name a few. The time of year may affect the risk level because insects have cycles often associated with rain and heat. Preventive measures include a combination of proper clothing, insect repellents, proper utilization of bug-proof screens for sleeping quarters, vaccinations and detailed personal inspections after hikes.

Aviation managers should worry not only about the direct loss of pilot availability due to exposure of their flight

crews to foreign diseases, but also that the flight crews or passengers can bring back those diseases and infect everyone with whom they come into contact. An infected crewmember can quickly infect everyone in your flight department, as well as their families. It takes

just a cursory search through the Centers for Disease Control and Prevention's website on disease-spreading mechanisms to realize that being knowledgeable and taking proper precautions are important barriers to block the spread of diseases that many Americans don't have sufficient immune systems to fight off.

Proper diagnosis and treatment from exposure to various foreign diseases can be problematic as symptoms may not appear until the infected person returns home, and a local physician may not be adequately knowledgeable in the diagnosis and treatment of an exotic disease, which in turn leads to an extended period in which the diseases can deteriorate the infected person's condition. A secondary problem is that there may be insufficient evidence-based research of possible pharmacological treatments, leaving your local physician guessing on the proper care. **BCA**



About Medical Insurance Coverage

There are differences in the types of insurance that travelers are offered. Trip cancellation or interruption coverage will reimburse you if your vacation is called off or cut short due to unexpected health or transportation issues. Medical insurance covers emergencies, accidents and, often, evacuations outside your home country. However, if you are traveling internationally, many regular health insurance plans won't cover you, so be sure to check to see if you are protected. Your health insurance might offer some international coverage, but chances are it doesn't cover the costs of illness, injury or even death when you are on foreign soil.

Depending on the coverage specifics of an evacuation policy, it might pay only to get you to the nearest hospital or it might provide transport back stateside, if need be. If you happen to go horseback riding on the west coast of Ireland and a

Connemara pony tosses you abruptly from its back, breaking your pelvis, your ability to airline home could be precluded for an extensive period of time. In fact, if you are confined in a cast, your only option for getting home is likely to be on a private flight.

If you plan to take on high-risk endeavors like skiing, horseback riding, climbing peaks or paragliding, trip medical and evacuation insurance plans are no-brainers. And if you're doing it in Switzerland, you're in luck. Invest 30 Swiss francs in a Rega "rescue card" — one of the best insurance policies you'll ever buy. (See "Rega to the Rescue," *BCA*, February 2020, page 30.)

Even if you do not have to use any of that coverage, at the very least, it will give you peace of mind that catastrophic costs will be covered. **BCA**

Help From Afar

As pilots we are trained to do an evaluation of the suitability of the destination for our aircraft, including the facility's approaches and light systems, the length and condition of the runways, any obstacles, and such. However, this assessment is only part of the preparation needed to make certain that our passengers, fellow crewmembers and ourselves come back home safe.

The resources and expertise needed to evaluate the medical, safety and security threats at a destination can be considerable, far beyond the in-house resources of even the largest flight departments. Fortunately, there are vendors such as Universal Weather and Aviation, NetJets and MedAire, among the several, with the expertise to provide this vital information.

Focusing on one example, MedAire has a team of 200+ global security experts based around the world who provide expertise on the political climate, current events, cultures and customs of any region. Its analysts' assessments help a flight department determine if its aircraft can safely operate in the area, the strength of an airport's security infrastructure, whether the aircraft can be left unattended, the availability of international standard lodging, the safety environment overall and transportation recommendations when considering the crime level and any social unrest in the region.

The recent loss of the Ukrainian airliner to Iranian anti-aircraft missiles is a tragic reminder of the inherent threat to aircraft safety when operating in hostile airspace. MedAire includes an assessment of airspace restrictions and warnings issued by governing aviation organizations.

To bring this to a personal level, imagine conducting a postflight of your aircraft after landing in Mexico. As you straighten up after examining the fuel vents under the

wing, your eye is accidentally impaled by a static dissipater on the trailing edge. Without any support network, and an inability to speak the local language, this situation would likely not end well. This event actually happened to a former colleague, and fortunately for him, the company had such a network.

The crew immediately called the home office, which at the time was contracted with the Mayo Clinic for medical consulting. The medical specialists there determined that a Mayo-trained eye surgeon was available in the region and arranged for ambulatory response as well as the necessary surgery. Even though the damage seemed so severe that the eye would be lost, the medical intervention was so timely and successful that the injured pilot resumed his flight duties just a few months later!

Suffering an illness or injury abroad is much more complicated than when at home. Does the sickness or injury need emergency medical help? Can the sickness wait a day or two until the person can get home? Is it wise to travel in such a condition? Would it be better to see a medical or dental professional? If so, getting an appointment with the best available provider in a foreign country (not to mention the hassles of insurance and language) can be an immense challenge.

Moreover, will a threatened transit strike or election or tariff threat or flu impact the planned mission? Is personal protection necessary and available?

These are among the considerations and assistance available from service providers. They also help in the management of inflight illness and injury, executive passenger medical training, hangar safety and travel risk awareness. And should things go awry while away, their response can be invaluable. **BCA**

Flight Attendant Certification?

A safety crewmember without screening, training, testing or standards

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

Ascend the airstairs of a business aircraft, then turn left and you'll have to pass myriad qualification checks before you're permitted to strap into a "window seat" and legally fly on behalf of the aircraft operator. Pilots have to pass specific flight experience, crew licensing, initial and recurrent training, and medical exam requirements issued by civil aviation organizations. Specific-model pilot type ratings are required for aircraft with maximum takeoff weights over 12,500 lb. or ones with turbojet/turbofan engines. Some governmental organizations even require type ratings for turboprops, regardless of operating weights. Aviation regulators believe that the safety of all aboard the aircraft critically depends upon qualified, certified and proficient pilots.

Not so, when it comes to cabin crewmembers. The lack of specific, industry-standard qualifications for flight attendants potentially puts passengers at risk in the event of a mishap, according to experienced cabin crewmembers.

"At a minimum, there absolutely should be [certain] regulations. How to use all the emergency equipment on board the aircraft; how to inform, prepare and evacuate passengers; knowing how to secure all galley, cabin and lavatory items for takeoff and landing; when to tell passengers it's safe to move about the cabin; and how and when to buckle-in," are some of the basics says Maureen Walker, founder of Seattle-based Walker Aviation, which specializes in flight attendant training. Walker is a 30+ year veteran cabin crewmember with experience on several types of aircraft, including purpose-build large-cabin aircraft and converted jetliners.

The lack of formal flight attendant training became painfully evident early one morning in February 2005, when a Bombardier Challenger flight crew attempted a high-speed takeoff roll and crashed off the end of Runway 6 at Teterboro Airport (KTEB) in New Jersey. At rotation speed, when the captain attempted to pitch up to takeoff attitude, the aircraft wouldn't respond to control inputs. It remained virtually frozen in a nose-level pitch attitude, even when both the pilot and copilot pulled back on their yokes with all their strength.

Five seconds after the copilot called "Rotate!" and well

above the V_1 takeoff decision speed, the captain rejected the takeoff, using maximum braking, reverse thrust and ground spoilers. But there wasn't enough pavement remaining, so the aircraft slammed through the airport perimeter fence, ran across six-lane Route 46, collided with two vehicles on the busy thoroughfare, plowed through five more vehicles in a parking lot and slammed into an industrial building.

Notably, neither the flight crew nor the cabin aide provided the passengers with a safety briefing, according to the NTSB. Four of the passengers didn't even have their seat belts fastened at the beginning of the takeoff roll. Two passengers secured their belts as the aircraft was accelerating down the runway. Two others, perched on a side-facing divan, couldn't even locate their seat belts as they were buried behind the seat cushions.

All eight passengers and some employees inside the industrial building suffered contusions, abrasions, cuts, strains and sprains but not life-threatening injuries. The aircraft caught fire, and the flames rendered the right-side over-wing emergency exit unusable. The main entry door jammed in the crash, but the crew kicked it open, enabling

injured occupants to be evacuated.

If the aircraft's impact velocity had been any greater, serious injuries or even fatalities might have been the result.

Aboard the ill-fated Challenger, there was no professionally trained, safety certified flight attendant to assist the injured passengers during the emergency evacuation. Moreover, there was no regulatory requirement for a flight attendant, the NTSB noted. On aircraft carrying fewer than 20 passengers, FAA regulations do not require cabin crew.

The charter operator had assigned a cabin aide (hostess) to the aircraft for passenger comfort and convenience. But she had no aviation experience prior to being hired by the operator four months earlier. And she had not logged any formal cabin safety training on the Challenger 600.

"I see this all the time," says Walker. "In the event of an emergency, passengers could run up to the flight deck, saying 'What's happening?!' Flight attendants keep them informed, seated in the cabin and out of the flight deck." She adds that

It's critical for all crewmembers, including flight attendants, to demonstrate normal and emergency procedure proficiency on specific aircraft.

well-trained flight attendants can save lives in the event of emergencies, especially if the cabin must be evacuated quickly after a crash.

The critical value of having a professional flight attendant aboard became clear at Colorado's Aspen-Pitkin County/Sardy Field (KASE) in October 1988, when another departing Challenger 600 careened off the east side of Runway 33 due to a nosewheel steering anomaly. It hit three parked aircraft before stopping. The crash caused a massive Jet-A fuel spill under the airplane, risking a fire. The professionally trained flight attendant calmed the passengers and assisted all of them in exiting the aircraft in minimum time. All passengers, including an infant and grandmother, were ushered well clear of the accident scene in less than 90 sec. after the mishap, assuring they were a safe distance from the highly flammable pool of Jet-A.

Industry Pushback on More Regs

By and large, business aviation is "a self-regulated industry that [mostly] tries to adhere to airline standards. Operators say they certainly don't need the FAA to get involved," says James Cannon, a long-time BCA contributor and founder of Leland, North Carolina-based Sundog Aviation LLC, a business aviation consulting firm. During his 34-year career, he's flown for WR Grace, run Home Depot's flight department, served as a board member of the NBAA and led Jet Professionals, a business aviation head-hunting firm.

Notably, he also served on the International Business Aviation Council as director for its International Standards for Business Aviation Operators (IS-BAO) program. With that experience as background, he maintains that rather than imposing new FAA regulations, IS-BAO Chapter 8, training and proficiency guidelines, should suffice in qualifying flight attendants. These specifically require (1) anyone assigned duties aboard the aircraft to understand the role of the pilot-in-command (PIC) and other crewmembers and know how to communicate, while respecting "sterile cockpit" protocols; (2) if duties include using any equipment aboard the aircraft, the person must be proficient in its normal, abnormal and emergency operation; (3) if duties include responsibility for passenger safety, the person must be formally trained in the use of all emergency equipment and medical gear, have undergone first-aid training, and recognize aircraft surface (ice) contamination and identify any hazardous materials.

IS-BAO Chapter 8 also requires operators to notify passengers if the person assigned cabin crew duties is solely onboard for passenger convenience and cabin service, and lacks formal safety-related training and responsibility for cabin safety.

Flo Newton, president of Global Aviation in Hillsboro, Oregon, is a strong proponent for formal flight attendant training. She works closely with Walker to assure clients have well-trained flight attendants aboard their aircraft. Both she and Walker are concerned that while the business aviation industry has "guidelines" for flight attendants, there are no industry-standard qualifications for hiring, no mandatory cabin crew certifications and no formal licensing provisions for cabin staff members. In short, there are no published rules or regulations.

"There aren't even crew rest rules for flight attendants," says Walker. Ideally, flight attendants not only would undergo formal emergency training, such as that offered by Aircare FACTS and FlightSafety International, they also would need to demonstrate cabin skills proficiency on each model of aircraft for which approval would be required.

Besides being trained on basic safety, egress and emergency skills, Walker says flight attendants need to be

proficient on each model of aircraft they fly, including serial number to serial number, and know the differences in cabin configuration. Unlike the standardized configuration of aircraft types used by air carriers, individual business jets and turboprops have different galley, cabin, lavatory and internal storage layouts. There are variations in galley equipment, numerous club, conference and lounge floor plans, even different dimensions and equipment in lavs.

Cabin crews need training in the operation of chairs, monuments and sofa/sleepers; where to store and retrieve loose items, bedding and galley stores; and know when it's OK to open a pressure bulkhead door to a baggage compartment. They also need to know how to check inventories of stores and supplies, how to drain potable water if the aircraft will be exposed to freezing temperatures during a prolonged layover, how to extinguish fires and handle lithium-ion battery thermal runaways, and how to provide first aid, communicate with aeromed advisors on the ground and administer medications.

Walker says because she's undergone formal first-aid medical training, she is authorized to carry a fully stocked medical kit aboard the aircraft with several prescription drugs. She's trained to coordinate with medical experts on the ground who can remotely diagnose ailments and then authorize her to administer them.

Food-handling safety is another critical skill for flight attendants. Walker says she's undergone generic initial and 24-month recurrent food-handling safety training and certification sanctioned by the State of Washington. Other states have equivalent food safety certification programs. Walker says it's essential to vet food and beverage providers, and best to visit them in person prior to ordering catering to check on food purveying, preparation and handling disciplines. You don't want your passengers to experience food-borne illness or food poisoning halfway through a transoceanic flight, when you might be several hours away from the nearest medical facility.

Embracing Best Practices

Few, if any, non-commercial business aircraft operators routinely carry 19 or more passengers, so a flight attendant isn't required. And there is no laundry list of qualifications for cabin crewmembers aboard an FAR Part 91 aircraft, as there would be for Part 91 Subpart K and Part 135 Subpart H operators.

For business aircraft operators who employ flight attendants, the NBAA's Management Guide provides generic qualifications for cabin crewmembers, covering topics such as cabin safety, emergency evacuation, passenger briefing and assistance services, aircraft security, hazardous materials recognition and food safety. The guide recommends that aviation organizations develop a flight attendant manual to be included in the flight department operations manual, and that the document contain detailed training, testing and qualification requirements. Furthermore, the manual should have sections for initial, transition, upgrade and differences training for each model of aircraft operated by the organization.

Peruse Part 91 Subpart K for fractional ownership operators and Part 135 Subpart H for on-demand air charter operators for the details. The two sections provide the foundations for creating such a manual for Part 91 flight attendants, including maximum duty times and minimum rest periods, areas of demonstrated expertise, initial and recurrent training requirements, and recordkeeping requirements. Crew resource management is emphasized, with flight attendants being trained on the authority of the PIC and how to work as part of a team with



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The lack of specific, industry-standard qualifications for flight attendants potentially puts passengers at risk in the event of a mishap,

flight crewmembers. Fatigue management, stress management and situational awareness are focus areas.

It's important for the flight attendant to be aware of when and where turbulence may be expected during the flight, how to brief the passengers for arrival at smaller general aviation airports, and how to work with other crewmembers in assisting physically impaired passengers, especially in the event of an emergency evacuation.

It's critical for all crewmembers, including flight attendants, to demonstrate normal and emergency procedure proficiency on specific aircraft. This starts with knowing the location and use of flashlights, life vests, life rafts, survival equipment, drop-down and medical aid oxygen systems, and use of cabin communications systems. Of primary importance, flight attendants need to know how to find and open emergency exits in the dark, how to wield and stow an emergency exit window that may weigh as much as 54 lb., or more, and how far it is from the bottom of the emergency exit opening to the wing or ground.

Further, they need to know how to work with other crewmembers in assisting passengers to escape through emergency exits without injury, how to exit the aircraft through a partially open door, and where to marshal passengers away from the aircraft after they exit. They should be able to administer first aid that may be needed after the aircraft has been evacuated, how best to protect the passengers from the elements and which crewmember will be the primary coordinator with emergency services personnel.

The NBAA guide addresses the special concerns of flight attendants aboard business aircraft, such as creating a confidential dossier containing dietary restrictions and pre-existing medical conditions for individual passengers, working with preferred outside vendors, creating a preflight checklist to verify that normal and emergency equipment is aboard and in proper working condition, and cleaning and restocking the aircraft, especially during layovers away from home base.

Walker says that tact and diplomacy are essential people skills for flight attendants. Reading and heeding each passenger's body language can help a flight attendant sense who needs attention, comfort, reassurance or communication. It also signals when it's appropriate to retreat and afford

passengers privacy, interrupting only when necessary for safety matters.

A recent report in *Vanity Fair* magazine criticizes private jet operations for not providing the same level of safety afforded by the airlines. "Private air travel can come with risks that commercial passengers never take on," writes author Jeff Wise. Less-stringent rules apply to Part 135 air charter operators than for Part 121 scheduled air carriers, Wise asserts. Even looser rules apply to non-commercial Part 91 operations than to Part 135 air charter firms. While pilot qualifications and training are the main thrusts of Wise's report, it invites savvy readers concerned about cabin safety.

The article may serve as an early warning signal, alerting flight department managers of the need to embrace IS-BAO standards and pursue IS-BAO certification. Such approval can provide assurance to top management, company guests who ride on the aircraft, family members and aircraft insurers that the flight department adheres to robust training, testing and certification standards for all crewmembers, including flight attendants.

While it's doubtful that regulatory authorities will adopt formal rules for Part 91 flight attendant qualification in the near future, earning IS-BAO approval, or certification by a similar, internationally recognized organization, may be the key to admission to certain airspace jurisdictions, such as Europe. The European Aviation Safety Agency affirmed in 2016 that IS-BAO is one acceptable means for non-commercial operators to demonstrate they have a fully functioning safety management system (SMS).

But even without the need to fly in Europe, or other regions where SMS is a virtual mandate for non-commercial operators, formal training and testing for flight attendants is key for passenger safety in the event of an aircraft or passenger emergency. You wouldn't allow pilots to fly your aircraft without passing stringent qualification steps, including medical fitness, demonstrated proficiency, comprehensive knowledge of the aircraft and complete preparedness for handling emergencies. Why would you require less from your flight attendants? Your safety, security and survival depend upon the capabilities of all crewmembers in an emergency, not just those on the flight deck. **BCA**



If You See Something . . .

Contract pilots see more than most

“IF YOU SEE SOMETHING, SAY SOMETHING” IS A NATIONAL CAMPAIGN by the U.S. Department of Homeland Security (DHS) to raise public awareness on suspicious activities, behaviors or situations that may suggest acts of terrorism or terrorism-related crimes. The nearly ubiquitous phrase was actually trademarked by the New York Metropolitan Transportation Authority and licensed to the DHS. But the phrase has grown beyond its roots in 9/11 terrorism.

In this new decade “something” can be nearly anything, particularly in a flight department. And threats aren’t necessarily from terrorists; rather they can be as subtle as complacency.

Contract pilots see more than most, because they are not accustomed to the aircraft and crews they are joining on short notice. They may find an aircraft with numerous inop systems, no Minimum Equipment List and a chief pilot who simply expects everyone to make do with what they have.

The 1996 crash of a Gulfstream GIV at Chicago Executive Airport (KPWK) is an example of why type currency alone is not sufficient proficiency for a contract pilot to step directly into a new plane with a new PIC. The crash involved two pilots from different companies, flying under an interchange agreement that did not address mixed crews, procedural differences or aircraft differences training.

The crew attempted a takeoff with a 24-kt. crosswind. One of the pilots said, “Reverse,” then one said, “No, no, no, go, go, go, go, go.” The airplane traversed a shallow ditch that paralleled the runway, which resulted in separation of both main landing gear, the left and right flaps, and a piece of left aileron control cable from the airplane. The airplane became airborne after it encountered a small berm at the departure end of the runway. Reportedly, the left wing fuel tank exploded. Both pilots and two passengers were killed. The NTSB attributed the accident, in part, to a lack of standardization of the two companies’ operations manuals.

But today’s contract and charter pilots face a wider variety of threats, and not ones for which their flight training prepared them. The cinematic flight from prosecution in Japan by auto executive Carlos Ghosn demonstrates the complexities of the international business aircraft world. Ghosn escaped to Lebanon, with a stop in Turkey where he transferred to another jet for the flight to Beirut. Allegedly, for the flight to Turkey he was hidden in luggage too large for X-ray scanning. The box appeared to be used for concert equipment and did not draw the attention of the pilots or security staff. The box had breathing holes, but those may not have been obvious. It is likely that Ghosn was let out of the box during these flights, but the crew may have been advised to stay in the cockpit and keep to themselves.

Once news spread of the escape, Turkey detained four pilots, the charter company manager and two ground staff. The

charter company, MNG Jet, released this statement: “One employee of the company, who is under investigation by the authorities, has admitted having falsified the records. He confirmed that he acted in his individual capacity, without the knowledge or the authorization of the management of MNG Jet.” It is difficult to predict how Turkey will handle the detained pilots and other employees. But in any international situation, few countries afford pilots the protections from prosecution that pilots in the U.S. enjoy.

Because U.S. law is designed to protect the role of the NTSB, the U.S. generally does not prosecute pilots in the wake of an accident. But in a “flight from prosecution” scenario, even the U.S. may take legal actions against pilots who knew, “or should have known,” that they were aiding and abetting a criminal action.

Contract pilots (and all pilots) face another increasing challenge with criminal actions: Marijuana possession and use is legal in a number of states, but the “just say no” laws of the Reagan era are still current federal law and carry very draconian penalties. As a reminder:

► Secure areas of the airport (the area beyond the TSA screeners) are under federal control, and marijuana is not allowed in those areas, even in a marijuana legal state.

► Regardless of whether a flight is operated under FAR Part 91, 135 or 121, marijuana is not allowed on an aircraft, either in carry-on bags, checked luggage or cargo.

Part 91.19 states that “no person may operate a civil aircraft within the United States with knowledge that narcotic drugs, marihuana, and depressant or stimulant drugs or substances as defined in federal or state statutes are carried in the aircraft.” The penalty for violation is revocation of your certificates. The rule was written decades ago and did not anticipate that some states would make recreational or medical marijuana use legal. The rule contains an exception for “authorized” carriage, but this does not apply simply because a state has legalized use and possession. The bottom line is that if a flight crew is caught “looking the other way” to allow transportation of marijuana, even from one marijuana legal state to another marijuana legal state, it could cost the crew their airman certificates.

Contract pilots enjoy better pay today than ever, and they get to set their own schedules. But they need to remain vigilant to the safety and legal threats of each new flight opportunity. Whether the issue is fugitives from prosecution, transportation of minors for nefarious purposes or transportation of “legal” drugs, the law often applies a “knew or should have known” category of culpability for the flight crews involved. Contract pilots are particularly vulnerable in these situations, because they don’t know the travelers and they have no organization supporting them. **BCA**



Beechjet 400A

Third-generation Diamond II is a gem

FOR \$2.7 MILLION, YOU CAN BUY A FULLY RECONDITIONED 1991 to 2003 Beechjet 400A (RK-0002 to RJ-0353) that climbs directly to FL 430, cruises at 420 to 440 KTAS and can carry four passengers more than 1,600 nm, says Dwayne Clemens of the aviation company that bears his name at Lloyd Stearman Field (1K1) east of Wichita, Kansas. Clemens buys low-time Beechjet 400As and reconditions them with Garmin G5000 avionics, factory-approved winglets, fresh paint and new interiors.

While there are plenty of choices in today's pre-owned light-jet market, few offer this aircraft's blend of speed, flat-floor, oval cross-section cabin and tanks-full payload. About 350 units were built and 290-plus aircraft remain in active service. Clemens operates 16 of them, mostly in quarter-share fractional ownership programs.

The Beechjet 400A has a 305-cu.-ft. cabin volume, so it's one of the roomiest light jets of its vintage. Most of these aircraft originally had BOWs close to 10,700 lb., so they could only carry 638 lb. with full tanks. But retrofitting G5000 avionics reduces weight by nearly 300 lb., while moving CG aft closer to the center of the envelope and providing synthetic vision, ADS-B, WAAS LPV approach and other advanced capabilities. G5000 also increases tanks-full payload to more than 900 lb.

The key to the Beechjet 400A's cruise speed is its supercritical airfoil and 20 deg. of sweep. It operates efficiently at 0.72 to 0.78 cruise Mach. Transonic drag divergence (drag rise) occurs significantly above its Mach 0.785 redline.

Factory-approved winglets increase cruise altitude and boost range. But Clemens stays away from upgrading the Pratt & Whitney Canada JT-15D-5s with Williams FJ44 engines because he believes the \$2.2 million price tag is cost prohibitive.

The 13-ft. long cabin interiors are reconfigured to seat eight people. Four passengers are afforded generous room in the center club section. There's a full-width, fully enclosed lavatory in the aft cabin. The aft external baggage compartment holds 33 cu. ft. of gear, accommodating luggage for four people.

Takeoff field length is 3,802 ft., assuming standard day conditions. Departing BCA's 5,000 ft. elevation, ISA+20C airport, TOFL is 6,544 ft., according to BCA's 1996 *Purchase Planning Handbook*.

Operators say Beechjet 400A's airframe is stout, but its roll control effort is high because roll spoilers are used in place of ailerons to make room for full-span wing flaps. The brakes are touchy. Many pilots say they taxi with the anti-skid off even though the procedure is not recommended in the AFM.

First hour fuel burn is about 1,350 lb., decreasing to 1,000, 900 and 700 lb. for subsequent hours. The aircraft can be flown 3 hr. 45 min., but most pilots want to be on deck after 3+30 for fatter fuel reserves. On shorter trips, operators plan on 1,250 to 1,350 lb./hr. fuel flows.

Interior noise is relatively high compared to newer light jets. Bring good active noise attenuation headsets for all occupants.

Also, air-conditioning performance is lackluster in warm weather. Aftermarket vapor cycle air-conditioning is a virtual must for operation in warm climes.

Scheduled maintenance checks are 200 hr. for "A" inspections (about \$7,000), 400 hours for "B" checks (estimated \$21,000), 1,200 hr. for "C" inspections (\$40,000) and 5,000 hours for "D" checks (\$81,000), according to Clemens. The biggest unscheduled tasks are rebuilding the horizontal tail structure that can cost upwards of \$50,000, replacing cracked PPG windshields, overhauling the landing gear at 15,000 hr. for \$80,000 and re-



pairing the impressively complex, electrical stab anti-ice system. Plan on \$370,000 for engine overhaul at the 3,600-hr. TBO. Clemens plans on \$700 per hour for fuel, \$110 to \$120 for each engine reserve and \$480 to \$490 per hour for maintenance.

Clemens offers quarter shares for \$675,000 and he charges back \$1,300 hr. (wet), \$1,300 per month for fixed costs and \$1,200 per day for pilots, if you're based in Wichita or Oklahoma City.

The base price for candidate used aircraft is \$800,000 to \$1.2 million, if you want to purchase one on your own. Virtually all scheduled maintenance is cycle- or flight hour-based, except for calendar-based battery checks. It's essential to check the overhaul/replacement/repair status of the above items to assure you're getting a bargain and not a pricey hangar queen. This is not an MSG III-friendly machine, so it's advisable to make sure that your shop's mechanics have completed factory authorized training programs.

Beechjet 400A's principal competitors are Citation V Ultra with more range, better runway performance and smaller cabin cross-section, and the Learjet 45 with a longer cabin, externally serviced lavatory, slightly higher cruise speeds, better fuel efficiency and considerably longer range.

A reconditioned Beechjet 400A offers one of the most comfortable cabins in the light jet class, reasonable operating costs and rock-solid dispatch reliability. If you're in the market for a commodious cabin and 400+ kt. block speeds, but you can afford to give up a little runway performance, Beechjet 400A is tough to beat. **BCA**

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

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

▶ **AsBAA**, Hong Kong, announced that **Jeff Chiang** is the new chief Operating officer for the association. He will be based in Hong Kong.



JEFF CHIANG

▶ **Bye Aerospace**, Englewood, Colorado, appointed **Rod Zastrow** to the Strategic Advisory Board of Bye Aerospace. Zastrow is chief operating officer and president of Spartan Air Academy Iraq.

▶ **Duncan Aviation**, Lincoln, Nebraska, announced that **Aaron Hilkemann**, president of Duncan Aviation, will retire from the position on July 1 and move to CEO and chairman of the Board of Advisors. He will be succeeded by **Jeff Lake**, the current COO for Duncan's Lincoln facility. **Dennis Kruse** has joined Duncan Aviation as avionics install sales representative, based in Provo, Utah. **Tim Fidler** has been appointed accessories business development manager. **LaLaina Doudna** has joined the company as project manager at the Chattanooga, Tennessee location.



BRAD THRESS

▶ **FlightSafety**, La Guardia Airport, New York, announced that **Brad Thress** has joined the company as president and CEO. He assumes this responsibility from **David Davenport** who has left FlightSafety. Brad joins FSI from Textron Aviation where he most recently served as senior vice president, Global Parts, Program and Flight Operations and Customer Service. In addition, he served as Cessna senior vice president of Business Jets.

▶ **Gulfstream Aerospace**, Savannah, Georgia, promoted **Sheryl Bunton** to senior vice president and she becomes a member of the company's senior leadership team. Since joining Gulfstream in 2015, Bunton has established and delivered companywide



OTTO WRIGHT

technology solutions and digital transformation strategies.

▶ **Modesto Jet Center**, Modesto, California, announced the appointment of **Otto Wright** as general manager. Wright joins the company with more than 12 years of experience in the aviation industry, mainly in leadership and business development roles. Most recently, he served as an aviation consultant and business owner. Previously, he served as business development director at Axis Jet in Sacramento, general manager for KaiserAir in Oakland, and has worked internationally with Far East Russia Aircraft Services (FERAS) and Jetex Flight Support.



MARY CONSIDINE

▶ **National Air Transportation Association** (NATA), Washington, D.C., announced that **Timothy R. Obitts** will serve as the new president and CEO.

▶ **PrivateFly**, privatfly.com/us, named **Robert Shaplen** senior vice president of sales for the West Coast. Shaplen most recently served at Gama Aviation and was previously with XOJet.

▶ **Shannon Group**, Shannon, Ireland, appointed **Mary Considine** as the new chief executive. She is a qualified accountant and has extensive experience in aviation, finance, having previously held a number of senior roles within Shannon Group.

▶ **West Star Aviation**, East Alton, Illinois, promoted **John Brummel** to Avionics Technical Sales Manager at the East Alton facility. He is a U.S. Navy veteran and has over 20 years of aviation.

▶ **Women in Aviation International**, West Alexandria, Ohio, named **Allison McKay** CEO. McKay previously served as vice president of the Helicopter Association International Foundation. **BCA**

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Falcon 20-5
Hawker 800A/XP
Hawker 850XP

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Products & Services **Previews**

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

Million Air to Open El Paso FBO

Million Air is opening a new FBO at El Paso International Airport in Texas, expected to open in early 2021. The facility will include 10,069 sq. ft. of lobby space, 23,383 sq. ft. of hangar space, a 6,000-sq.-ft. aircraft porte cochere and more than 5 acres of ramp space. The new general aviation terminal will include a cafe, refreshment bar, pilot's lounge, snooze rooms, flight planning room and conference room.

Asia Jet Partners Receives AOC from CAA Malaysia

Asia Jet Partners Malaysia, based in Kuala Lumpur, has obtained its aircraft operating certificate from the Civil Aviation Authority Malaysia. The certification makes Asia Jet Partners the country's only commercially registered private jet operator. It has also received an air services permit from the Malaysian Aviation Commission and plans to

introduce its second Bombardier Global Express 5000 in the spring. It will join the company's Global 5000. Both will be available for charter from Subang's Sultan Abdul Aziz Shah Airport.

China's Business Jet and Turbo-prop Fleets Grow

There are more than 200 B-registered business jets and about 250 turbo-props based in China, Hong Kong and Macau, according to Aviation Week Network's Fleet & MRO Data. B is China's tail prefix. Adding aircraft registered offshore, such as in Cayman, Bermuda, San Marino and the Isle of Man, the number grows to nearly 400. That includes U.S. tail numbers registered to Trustees that are based in the country.

Bombardier Will Expand London Service Center Facility

Bombardier is strengthening its European customer support network with the expansion of its London Biggin

Hill Service Center. The company has begun construction of a new, nearly 250,000-sq.-ft. maintenance and refurbishment facility which will double the size of its existing hangars. The facility is scheduled to be operational by mid-2022. It will be large enough to support an increase of Bombardier business aircraft, including as many as 14 Global 7500 business jets at the same time.

West Star Wins Apprenticeship Program Approval

West Star has been granted approval for its aircraft maintenance technician apprenticeship program by the U.S. Department of Labor as a registered program in Illinois. West Star's program currently includes 37 apprentice AMTs. The approval allows for federal grants, such as the Aviation Workforce Development Grant recently approved by Congress, and will allow West Star to expand its workforce.

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*International Procedures Training Is A Separate Event

March 1970 News

In January, **Ralph Nader**, the crusading champion of the consumer, **vented some of his anti-establishment** spleen on general aviation, as everyone felt he eventually would. . . .

Edited by **Jessica A. Salerno** jessica_salerno@informa.com

. . . . We don't think **BCA** is alone in agreeing that shoulder harnesses are a safety item we should have had long ago in general aviation aircraft. The ammunition for the Nadermen group was almost wholly supplied by the work and writings of Hugh DeHaven, A. Howard Hasbrook and Dr. John J. Swearingen.— **BCA Staff**



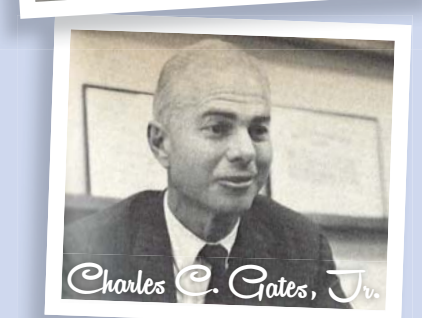
HAA-goers were invited to see the modification to the Sikorsky S-55 that replaces its radial piston powerplant with an AiResearch TPE 331.



The HAA's return to Las Vegas, after last year's affair at Hollywood, Florida, also marks a return to equanimity and peace for an association wracked with dissension.



Sloping nose section of the Aerostar 600/601 twins enhance cockpit visibility. The landing lights are incorporated in the nose.

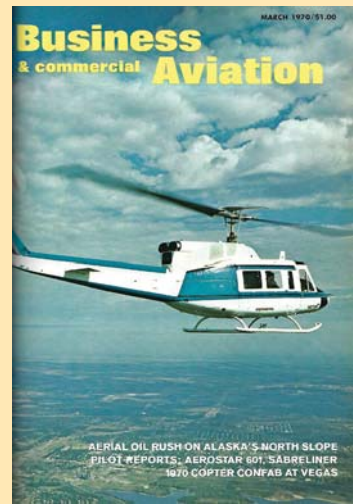


Unique supersonic bizjet is being studied by Lassiter Aircraft Corp., Culver City, California. Heading the study is Gordon Israel, who figured prominently in the transformation of the Swiss fighter into what is now the Learjet.

"There are three phases of any business: create, make and market. It was obvious that Bill Lear had accomplished the first two. What the Learjet needed to succeed was an effective marketing program, and we had the knowledge to take a product to market." — Charles Gates

Ramapo Valley Airport once deep in the country, is now in the midst of one of the fastest growing suburban areas in the U.S. Some 170 airplanes are based at the field; the largest are light twins. **BCA**

THE ARCHIVE



Bell Helicopter's twin-engine Model 212, one of four in certification flight-test program, flies in the vicinity of Fort Worth Texas. Certification of the civil 212 is anticipated in August; any prospective customers got their first look at the ship during January's Helicopter Association meeting at Las Vegas. Powerplants are two 800-hp Pratt & Whitney PT6T-3 turbines which deliver 1,250 hp through a mating gearbox, but which can produce up to 9000 hp each (30 min.) for single-engine operations. The price: \$575,000.



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