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Is Your Example Worthy of Leading?



For the most part, *Twin & Turbine* readers are professionals, possibly in more than one field, since our airplanes are often supported by other endeavors. For certain, the skills needed to fly these complex aircraft are only acquired through a professional approach to the task.

This is serious work, folks; we need solid training and discipline to pull it off.

As we rise up the aircraft capability ladder and gain additional ratings, it becomes even more important to impose professionalism on our efforts. Why? Because our airplanes are now more noticeable than the four-seat piston singles in our past. Younger, less-experienced eyes are watching how we fly the bigger planes, and because these pilots are seeking role models to emulate, what we do influences what they will become. Like or not, you've become a leader.

I still hold Flight Instructor privileges, and I've attended at the birth of several new CFIs as trainer and mentor. One of my "now that you're an instructor" lectures reminds beginning CFIs to restrain their desires to take short-cuts in flying. When you were just another pilot, I tell them, you could indulge yourself in hot-rod taxiing and intersection takeoffs, but now you're supposed to set an example. Your students and other inexperienced pilots think instructors are someone to copy; don't pursue any course of action that you don't want them to follow. With your acquired experience and judgment, it might be okay for you to try it, but don't lead them astray.

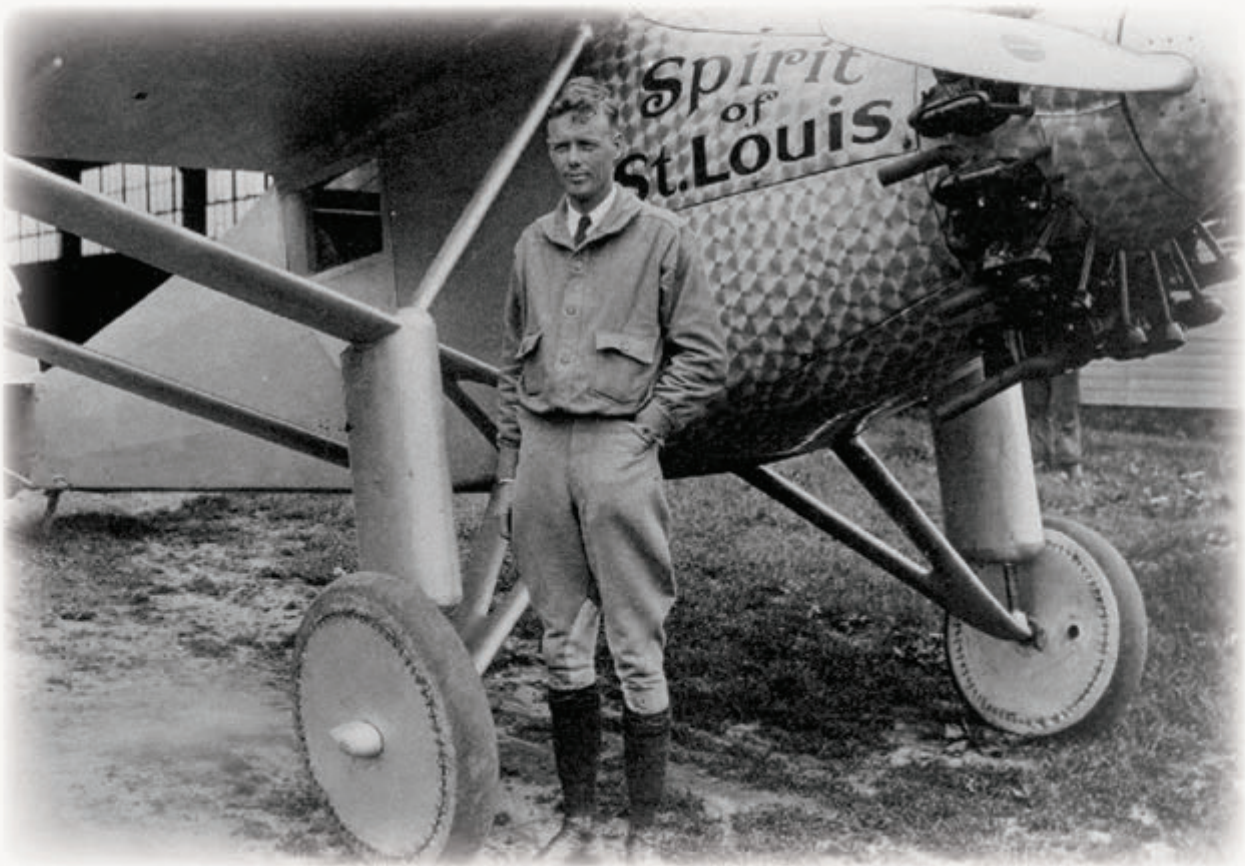
We're also being observed by the public at large; our high-performance private rides need to be seen as something to aspire to, not an arrogant statement. We can make a 5 a.m. departure across the neighboring sprawl of bedrooms, but should we? If we're the only one out flying at that hour, maybe we should take the downwind runway over open country, or depart later.

Last week, I had to lead a couple of low-time pilots on a half-continent hop, through country and airspace they hadn't seen before. I took a little extra time to communicate with ATC clearly, because I knew they were on frequency. Alone, I might have colloquialized a little more; this wasn't the time for that. And, when the weather got ugly, I diverted earlier than I would have on my own. I was setting an example, not just for this trip, but for the later ones they would make by themselves.

Because we were essentially traveling as a crew, I gave them the standard pre-takeoff briefing; "If any one of us feels uncomfortable proceeding at any point in the flight, he is to speak up. Do not hesitate to voice an opinion, early enough that corrective action can be taken." Don't let the Old Man get us in over our heads, I reminded them.

As professional pilots, the examples we project are not for us alone. Yes, it makes us feel good to be ahead of the aircraft, flight-planning for contingencies and flying a stabilized arrival profile, but our attitude of "doing it right" also carries over into the developing minds of young pilots and airport watchers. Be known as someone worthy of emulation.

LeRoy Cook.
Editor



CROSSING THE ATLANTIC WAS EASY

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When "Lucky" Lindy made his transatlantic crossing, he didn't have to deal with an ocean of congressional wrangling (maybe that's why they called him "Lucky"). The prevailing winds blew in his favor. But today, those winds have changed. Flying for business is more scrutinized than ever. Luckily, there's NBAA. We've made a home on the Hill, so that our members can make a living in the sky. Because business aviation enables economic growth. And at NBAA, we enable business aviation.

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P i p e r ' s
Seneca V

by LeRoy Cook

**The Miniature
Cabin-Class Twin**



Just over 50 years ago, a genius mind at Piper Aircraft considered the possibility of widening the fuselage of a proposed six-seat derivative of the single-engine Cherokee. Another seven inches of width, he reasoned, would make it possible to squeeze three people into the second row of seats. Charter operators would love being able to haul three couples with a 260-hp engine.

And so began the very-successful PA-32 Cherokee Six wide-body series, which subsequently begat the Piper Seneca twin and the Lance retractable single (later the Saratoga), capable airplanes in their own right. The fortuitous lateral enhancement of the stretched PA-28 fuselage made it possible for the Seneca to have a roomy twin-engine cockpit, complete with co-pilot instrumentation. And the cabin's rear-door layout easily lent itself to a club-seating arrangement, with some entertainment and refreshment accoutrements, and even a bit of aft-cabin baggage.

Today's Seneca V is, like most legacy designs, a far cry from the original PA-34 that appeared in 1972. A steady march of capability



development and tremendous advances in instrumentation and avionics have created a Seneca that far outclasses its forebears. With a full Garmin suite of integrated avionics, the current Seneca V carries a complete turbine-like cockpit.

Five Decades Of Advancements

In the beginning, the Seneca was to be a plebeian replacement for the Twin Comanche, whose final demise came in the summer of 1972, when

Piper's old Pennsylvania factory was inundated with hurricane-induced floodwaters. Rather than replace the damaged Twin Comanche tooling, it was considered wiser to let the Florida-produced Seneca carry the company's light-twin flag.

The first Seneca (which actually made it to market four years ahead of the single-engine Lance) used a pair of counter-rotating 200-hp IO-360 four-cylinder Lycomings, right out of the Cherokee Arrow. Given the airplane's 4,000-lb gross weight (increased to 4,200 pounds after the first year), the little normally-aspirated engine did not allow for much single-engine performance, a trait similar to the T-C the Seneca replaced. Two-blade props, straight-ahead seating for six (or seven, if slim), and a manually-actuated



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flap system kept the price down to an astounding \$49,900. Piper, as always, was able to produce “more airplane for the dollar” than just about anyone.

The cure for the Seneca’s lackluster engine-out performance was turbocharging and, rather than bolt on RayJay aftermarket blowers like the Turbo Twin Comanche had used, the nod was given to counter-rotating versions of Continental’s TSIO-360 engine, with six cylinders and automatic wastegate controls. However, the engine’s power output was limited to 200 hp in the PA-34T. The resulting Seneca II, introduced in 1975, could reach 13,400 feet on one engine, even with gross weight up to 4,570 pounds. Its aft cabin was also enhanced by club seating.

The Seneca II’s Achilles’ Heel was its 4,000-lb zero-fuel weight restriction, which didn’t allow for more than 700 pounds or so of cabin load, even if fuel was limited. Additionally, standard fuel capacity was only 93 gallons, although another 30 optional gallons was soon made available. A beef-up to handle more bending moment in the wing carry-through structure resulted in the 1981 Seneca III, grossing 4,750 pounds and, more importantly, offering an increase in zero-fuel weight to 4,470 pounds. The Seneca III also offered a boost in takeoff horsepower to 220. By this time, the base price had ballooned to 2 1/2 times that of the 1972 model, but the Seneca was coming into its own; a one-piece windshield and better fit and finish were now in place. During its production, the Seneca III saw changes like electric flaps in 1985 and a 28-volt electrical system in 1989.

After a 12-year run, the Seneca III was replaced by a slightly-upgraded Seneca IV in 1994, sporting circular cowling inlets and sculpted nacelles. The base price was now over eight times that of the first Seneca, a factor shared by the rest of the industry as sales became scarce

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Bob Knueve, Lead Tech, Dayton

Chris Turner

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and aircraft production rates plummeted. Nevertheless, a much-improved Seneca V appeared in 1997, with the intercooled -RB engine variant and 220 continuous horsepower available. Although numerous changes have since been wrought that would warrant a new Roman numeral designation, it is a Seneca V that remains part of the Piper lineup today.

Now equipped with a Garmin G1000 three-display electronic panel and a GFC-700 autopilot, the latest

Seneca V can be thought of a mini cabin-class business airplane, more than capable of filling the role of a light company plane, for those trips that are too short to justify a jet or turboprop. It can easily carry 1,000 pounds in the cabin with enough fuel for a two-hour VFR mission.

Systems Details

Construction-wise, the Seneca V is primarily an aluminum airplane, with composite non-structural components like cowlings and fairings. The engines are tightly

cowled, with a manually-adjusted cowl flap underneath. Polished spinners house the 76-inch swept-tip McCauley props. The three-blade props turn at only 2,600 rpm for takeoff (versus 2,800 rpm in the old Seneca III). The left engine will normally have a retractable door and louvered outlets for an air conditioner installation.

The combustion-type cabin heater is mounted in the tailcone, instead of in the nose. Baggage capacity is 200 pounds, 100 in the nose

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compartment and 100 behind the rear seats, where a swing-up door is provided for access. The 122 gallons of fuel is carried in interconnected wing tanks, requiring no pilot management, serviced by filler ports in the outboard tanks. The wingspan is less than 40 feet and height is under 10 feet.

The landing gear system is hydraulically-actuated, electrically powered by a powerpack in the nose. All three gears carry a 6.00 x 6 tire. The wide-span flaps are electric, and the tail sports a stabilator pitch-control surface, as pioneered by Piper on the 1960 Aztec. It and the rudder have anti-servo trim tabs.

Boarding the rear seats is accomplished via a low slide-in entrance, through a door on the left rear fuselage. The two front seats are reached through an over-wing door on the right side. Most of the cabin is four feet wide; there's a foldaway worktable between the CEO's right-rear seat and the facing chair.

Underway

Up front, the darkened G1000 screens await activation with power-up; redundancy is provided by primary and backup batteries. Starting differs from normal Continental fuel-injection procedure, in that the boost pump is switched on while mixture is in idle cut-off, advancing the mixture to prime the engine, then cranking with mixture full-lean until light-off. This works well, hot or cold. With both fans turning, taxiing is enhanced by the low glareshield and sloping nose. Run-up is performed at 2,300 rpm, with feathering checks done at 1,500 rpm. With trim and controls verified, cowl flaps open and boost pumps on, the airplane is ready for takeoff.

Power is gradually applied to the 38-inch redline limit, even though the wastegate controllers should restrain full-throttle manifold pressure to that number. Vmca is a low 66 knots with either engine

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SPECIFICATIONS: Piper Seneca V

Powerplants

Seats 6-7
 Fuel 122 gallons

Performance

Certified ceiling 25,000 feet
 Single-engine ceiling 16,500 feet
 Max. cruise speed 197 kts.
 Stall speed 64 kts.

Takeoff distance
 (50 ft. obstacle) 1,707 feet
 Landing distance
 (50 ft. obstacle) 2,180 feet
 Max. range
 (w/45-min reserve) 828 n.mi.
 Climb rate-2 engines 1,250 fpm
 Climb rate-1 engine 225 fpm

Weights

Ramp 4,773 lb.
 MTOW 4,750 lb.
 Zero Fuel 4,470 lb.
 Landing 4,513 lb.
 Empty, std 3,442 lb.
 Useful load, std 1,331 lb.

Dimensions

Wingspan 38.9 ft.
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 Length 28.6 ft.
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 Cabin width 4 ft.
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failed, Vxse is 78 and Vyse is 92. Rotation begins at 81 knots, flying away around 90. Gear-up, a normal cruise-climb is established at 110 knots, tweaking the power back to 35 inches and 2,500 rpm. While best-rate climb will generate 1,500 fpm, the cruise-climb gives 1,100 fpm with a lower deck angle.

As with most turbocharged piston planes, the Seneca V can scoot along at nearly 200 knots if flown up near 18,000 feet, but normal flying will be done at non-oxygen altitudes, since the cabin is unpressurized. At 10,000-12,000 feet, 175 knots is a typical max-power cruise figure, using 30 inches m.p. and 2,500 rpm. That requires about 30-gph fuel consumption, while 70% power of 25 inches and 2,300 rpm knocks around 10 knots off the speed but lowers fuel burn to 24 gph.

Handling at cruise speed requires more muscle than during climb and approach, but the Seneca V is properly responsive and quite stable, even when flown manually. Slowed down, the stall speed is a very un-twin-like 64 knots in landing configuration, so a 90-knot approach is more than adequate, and one can even use 80 knots over the threshold for short fields. A 10-degree flap setting is allowed at 140 knots, which easily slows the aircraft to the gear-operating speed of 128 knots. Full flaps can go out below 113 knots, and 15 inches m.p. holds a glideslope nicely. If passengers are not in the back, the Seneca is a bit nose-heavy in the flare, but it's easily managed with some additional trim applied. Runway lengths of 3,000 feet are adequate.

Facing only the Textron Aviation Baron G58 as competition, the Seneca V is 20 knots slower but less expensive to purchase and supply with fuel. Now well into its fifth decade of production, the Seneca V remains a dependable and flexible load hauler. With the latest instrument panel enhancements, it's ready to continue its faithful service. 





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EAA

By LeRoy Cook

In the 45 years that aviation devotees have been assembling at Oshkosh, Wisconsin, located in the heartland of North America, the summertime airshow has grown larger and larger. What was once just an annual convention of the Experimental Aircraft Association, when a few homebuilders and aircraft restorers would gather to swap stories and share techniques, is now a premier event that encompasses all of aviation. Every so often, we have to step back and wonder: Why?

What To See, How To Get There



Airventure

The simple answer is, we all come to Oshkosh because we can. Freedom to fly is a precious commodity, best exercised frequently and in concert with like-minded individuals. Camaraderie is what AirVenture Oshkosh is all about. The rest of the year, we're each engaged in personal aviation pursuits. But, for that one week, we gather to mingle. People stream through the AirVenture gates to refresh their interest in flight. That's the reason "why".

Unlike big commercial expos, primarily focused on developing deals, the AirVenture show is all about fun. Everyone is welcome, so long as they enjoy some aspect of aviation. Freedom to express your devotion to the cause can be found in antique and classic restorations, aerobatic flying, ex-military warbirds, building of aircraft from plans or commercial kits, and even business aviation.

A business aircraft presence is certainly part of the EAA AirVenture Oshkosh scene. The National Business Aviation Association exhibits on the flightline, and manufacturers like Textron, Embraer, Pilatus, Piper and Daher will show their latest jet and turboprop offerings. In the public parking, King Airs and MU-2's can be seen next to Cessna and Beech singles. Last year, my airplane was tied down within 200 feet of a Learjet 36 and a Gulfstream V taxied in as I was departing.

Now, the curmudgeons among us complain that "Oshkosh isn't like it

used to be!", as if it could magically be downsized to the walkable, earthy, low-budget operation of the 1970s. That can't happen, because the world discovered the place, and people started coming in bigger and bigger droves. During general aviation's heyday, the show hit its stride, and even after new-pilot starts and production numbers dropped, Oshkosh continued to grow, because this was the one place we could still come in hard times, despite not having flown as many hours or bought as many new airplanes.

Oshkosh attendees may sacrifice other excursions, but not the annual Rite of Summer. The importance it holds in the hearts of enthusiasts is reflected in the numbers; upwards of

a half-million people attend during the week, 10,000 airplanes fly into the three airports in the area, 4,000 camping sites spring up in a temporary city adjacent to the show and every available lodging option in the city of Oshkosh is pressed into use. Last year, 2,649 showplanes attended, there were nearly 800 exhibitors in the display halls and spaces, and 2,081 international visitors registered their arrival; only a quarter of those were from neighboring Canada. In good times and not-so-good, everyone comes to AirVenture.

The 2015 Prospects

What's there to see this year? Lots! EAA AirVenture Oshkosh will have something to appeal to everyone.





country music star and pilot Dierks Bentley, on Monday, July 20, and a Salute to Veterans show by TV and movie celebrity Gary Sinise and his Lt. Dan Band, scheduled for Friday, July 24.

Some of the daily themes will be a Burt Rutan Legacy day on Tuesday, July 21, marking the 40th Anniversary of his VariEze design, and special honors for the crew of Apollo 13 on Wednesday, July 22, some 45 years after the near-tragic Lunar voyage. Thursday is Gateway to Innovation Day, Friday is Salute To Veterans Day and Saturday will feature World War II tributes.

AirVenture's crowd-pleasing afternoon airshows always showcase the best of the aerial demonstration world. New this year will be Jeff Boerboon in his highly-modified 1929 Waco Taperwing "Sasquatch", which has a GE CJ-610 turbojet mounted under the fuselage to supplement its R-985 radial engine, generating 2,500 pounds of thrust to permit vertical climb maneuvers. The only Fairey Gannet early-1950s turboprop submarine hunter airplane will perform, and on Wednesday, July 22, a special night airshow will be featured, in addition to the afternoon show. While EAA AirVenture Oshkosh is generally free of class-distinction, the Aviator's Club chalet will return to the flightline this year, for those wanting to enjoy its comfort and cloistered viewing.

Making It Happen

That such an extravaganza can be pulled off is an amazing act of coordination and cooperation, involving over 4,000 EAA volunteers. The Wittman Field airport (KOSH) is a regional treasure, featuring multiple runways, an ILS approach, an expanse of parking and (normally) not a lot of traffic. However, for the week in late July, KOSH becomes the Busiest Airport On Earth, seeing more daily aircraft movements than anywhere else, even though night operations are not permitted. Flown-

The 2015 historical themes will center on the 70th Anniversary of the end of the Second World War, along with the 75th Anniversary of the Battle Of Britain. Had the notable Few and their stalwart leader, Winston Churchill, not turned the Nazi tide, this publication might very well have wound up being printed in Deutsch instead of English. Accordingly, one of the last flying Avro Lancaster bombers will be at AirVenture, and at least one Boeing B-29 Superfortress will be on hand. Other notable warbirds scheduled will be the only flying Consolidated PB4Y-2 Privateer patrol bomber and a rare Goodyear-built FG-1D Corsair.

More modern aircraft on display will include a North American F-100F Super Sabre from the Vietnam War era, and the first display appearance of a USAF B-52H Stratofortress, still nowhere near retirement after a half-century in service. An F-35 Lightning II will make a debut, and an F-22 Raptor will be making Heritage Flights in formation with older fighter aircraft.

Airbus Group is bringing its A350 XWB (Extra Wide Body) 300-seat long-range twin-engine airliner to the first three days of AirVenture, for public tours and arrival and departure demonstrations. In addition, the record-seeking Perlan II pressurized glider, sponsored by Airbus, will be on display. The Perlan Project expects to fly to 90,000 feet in mountain wave lift.

Some other attractions at this year's Oshkosh will be attempts to set a record for a mass skydive event on July 22 and 24, involving 108 parachutists, organized by the Skydiving Hall of Fame in Fredericksburg, Virginia. The famed short takeoff and landing contest planes from Valdez, Alaska are back by popular demand, to exhibit their unbelievable 50-foot landing rollouts. The sponsored evening entertainment includes a concert by

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in aircraft are parked on every bit of grass (as well as the seaplane marina) and a parallel taxiway is designated runway 18L/36R during the show, replacing runway 22/4 that's closed for heavy warbird parking.

It would be impossible to handle such a traffic volume using normal VFR controlled airport procedures. Oshkosh is a non-radar Class D airport, but radar separation wouldn't work anyway; limited IFR traffic is handled by Chicago Center, coordinated by the local controllers. The supplemental FAA ATC contingent at AirVenture is competitively recruited from the best controllers in a 17-state region, and it uses creative "Oshkosh procedures" to get the huge and varied volume of aircraft in and out.

The physical layout at Oshkosh is an airport immediately adjacent to a small city, with housing and industrial businesses on two perimeters, farmland on the other edges. A huge lake lies just east of the field, for an easy pilotage reference. However, during EAA

AirVenture, traffic is channeled through specific entry routes, both to synchronize aircraft in an even flow and to minimize radio communication. All pilots flying in must obtain and follow the NOTAM issued for the show, downloadable at www.eaa.org/en/airventure. The size of the NOTAM stems from the specificity of its pages; different procedures are printed for each runway in use, for arrival and departure, and for IFR, VFR and warbird arrivals. There's even a provision for no-radio aircraft.

When inbound, listen to the NOTAM's arrival ATIS frequency (not the charted one for the airport) and do what it says. If the airport is not closed to arrivals, the procedure begins at the small town of Ripon, 15 miles southwest, where you must descend to a specific altitude and slow to a standard speed, watching for other aircraft to follow along the abandoned railroad track leading to Oshkosh. Stay precisely in trail, a half-mile or so behind, and listen up on the arrival frequency for instructions from the "gatekeeper" at Fisk, a spot halfway to OSH. You'll be addressed by color and type and told to respond by rocking your wings; do not talk unless requested.

You'll be given a runway assignment at Fisk; be ready to flip to the appropriate arrival page in the NOTAM. Switch to tower frequency, listen for instructions and acknowledge with a wing-rock, and stay close behind your preceding traffic, which will be clearing the runway

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into the grass along the sides. Be prepared to aim for a requested color-coded touchdown spot, the controller's way of adjusting spacing. Do not contact ground control; just follow the marshalling signals from the volunteer flagmen. Per the NOTAM, they take their cues from a lettered sign you've placed in your windshield.

If your aircraft is not suited for parking on the sod, for which you're expected to provide your own tiedowns (emergency rentals are limited), you must make prior arrangements for a hardstand spot. Basler Flight Services does a creditable job under the overflow conditions, but there's only so much room.

Departure must also be conducted in accordance with NOTAM procedures. If IFR, observe your slot reservation time. More appropriately, wait for VFR conditions and leave the transponder off until 30 miles away, maintaining the runway's NOTAM procedure until well clear of the Class D. When ready to taxi, place your VFR/IFR sign in the window and just move out to join the queue; you'll hear an ATC query on tower frequency near the runway, to confirm you're listening. Wave an acknowledgement and be ready to be launched without loitering.

Should you feel not quite ready for the total Oshkosh fly-in experience, you can land at Appleton's Outagamie County airport, 16 miles north, or Fond du Lac airport, 13 miles south at the foot of Lake Winnebago. Both will have tower control, grass parking and bus service to the show. If arriving by airline, Appleton is served by commuter flights and Milwaukee and Chicago are the closest points with major airline connections. Unless you've planned months ahead, lodging and rental cars will only be found at considerable distance from the show.

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Running the Gap

by Thomas P. Turner

The Beechcraft Duke was in visual conditions at Flight Level 270 (FL270). The pilot reported he observed a 10-mile wide opening between a large thunderstorm cell and a smaller cumulonimbus (CB) build-up that was developing just to the southwest of the large cell. As the airplane approached the gap, the pilot noticed that the CB was developing faster than he had anticipated. The airplane's onboard weather radar was depicting only light precipitation, while the large thunderstorm cell northwest of the airplane was depicting extreme precipitation. As the airplane entered the northeast side of the CB, it encountered light to moderate turbulence followed by an extreme downdraft. The pilot initially lost control of the airplane, then recovered at an altitude of about 14,500 feet, and the airplane sustained substantial damage. A reconstruction of NEXRAD weather data displayed to the ATC controller revealed that the airplane had entered an area of extreme (VIP 6) echoes.

We all should know the extreme hazard of flying through thunderstorms. In recent years, we've learned about the hazard of misinterpreting weather data uplinks, especially NEXRAD radar images that can be as much as 20 minutes old by the time they are visible in the cockpit – when 20 minutes is a significant percentage of an air mass thunderstorm cell's entire lifespan. The National Transportation Safety Board even issued Safety Alert #017 reminding pilots that

cockpit NEXRAD weather uplinks are not accurate enough to plot a course between or in the vicinity of thunderstorms... that a display of the "latency period" is the time since the NEXRAD image was transmitted, not the time that the individual radar images were recorded, which will always be older.

There are times, however, when airplanes crash and it at least appears from the investigative process that the pilot was maneuvering around thunderstorms but did not actually penetrate a radar return that correlates to a storm cloud. What might cause that? There are actually several possibilities.

Hail. One explanation might be the hail threat. Hailstones have been reportedly encountered as far as 20 miles downwind of major cumulonimbus clouds. Generally, storms of this magnitude have well-developed anvil tops; one of the "classic weather text" warnings about thunderstorms is to avoid "severe" thunderstorm clouds by at least 20 miles, and to avoid flying beneath anvil clouds at any distance from the cloud boundary. "Regard as severe any thunderstorm," the FAA tells us in Advisory Circular 00-06A, Aviation Weather, "with tops 35,000 feet or higher whether the top is visually sighted or determined by radar." In my experience, that's the vast majority of all thunderstorm cells. From a hazard-to-flight standpoint, we should avoid almost all storm clouds by at least 20 miles.

New cell development. Individual storm cells can develop quite rapidly, in three stages:

- The Developing or Updraft stage, marked by vertical updrafts of up to 3,000 feet per minute, creating intense wind shear turbulence for the airplane that encounters this rising air.
- The Mature stage, with updrafts and downdrafts measuring in the thousands of feet per minute. By meteorological definition, the Mature stage begins when precipitation begins to fall from the cloud.
- The Dissipating or Downdraft stage, when most air movement in the cell is downward...at thousands of feet per minute.

Critical to a pilot's interpretation of NEXRAD or airborne radar is that, by definition, dangerous Developing stage turbulence occurs before rain begins and therefore before the cell may appear on radar.

Clear Air Turbulence. Clear Air Turbulence, or CAT, is a generic term for any significant turbulence that occurs outside the boundaries of a cloud. CAT is most frequently associated with high-altitude flight in the vicinity of the jet stream. But, it can also describe the rolling and swirling flow of air along a front in an area of cumulonimbus cloud development. Clouds can be thought of as forming as whitecaps on waves of air. That doesn't mean that the waves between the whitecaps can't be rough as well.

The guidance to avoid storm cells by at least 20 miles means that storm clouds must be at least 40 miles from one another, with no overhanging anvil, for you to split the difference and fly between them. That's a big gap in a line of storms – much larger than the 10-mile-wide gap the Duke pilot was trying to use. The classic texts actually advise us to avoid trying to fly in areas with more than 6/10th coverage of thunderstorm cells...even with active airborne weather radar.

Turbulence in the gap

What about crashes that follow an attempted deviation around storms? How might we explain an airplane that seems to be flying along just fine, then fails to respond to Air Traffic Control transmissions and suddenly plunges downward into the ground? The late centenarian pilot Captain Johnny Miller wrote prolifically about his storied career as an aviator “from Jennys to jets,” as he put it. John once wrote about an experience he had while crewing an Eastern Air Lines DC-8 in an area of strong thunderstorms. He noted that the airplane unexpectedly hit severe turbulence so intense that, even strapped in with two shoulder harnesses, he was flung upward and sideways, and he hit his head on the upper sidewall hard enough that he was momentarily dazed. John speculated that in a light airplane it would be possible for a pilot to hit the cabin sidewall or headliner with enough force to knock him/her unconscious and be unable to control the airplane... or perhaps even break the pilot's neck. This, John suggests, might explain airplanes that lose control and crash for no apparent reason, when they have strayed too close to a thunderstorm but may not have actually penetrated the storm cloud. A pilot knocked unconscious by turbulence would explain many cases when an airplane went down when flying in the vicinity of thunderstorms.

Playing TAPS


Just as we intellectually understand we should avoid flying within 20 miles of a thunderstorm, we also can repeat – often simply by rote – that we should slow the airplane to its Turbulent Air Penetration Speed (TAPS) to avoid overstressing the airframe in turbulence. The TAPS is usually considered to be the same as the Design Maneuvering Speed, or VA. Maneuvering Speed is an indicated air speed at or below which the wing will attain critical angle of attack and stall before it exceeds the airplane's load limit. Momentarily stalling “unloads” the wing and prevents catastrophic damage in turbulence or aggressive maneuvering.

VA, however, is defined solely at the airplane's maximum gross weight. In reality, what we might call the “VA Effect” happens at a lower-than-maximum-weight speed when the airplane is at lower weights. Some manufacturers publish a VB speed, or range of speeds, for use at less-than-maximum weights. Most manufacturers that publish VB say that the speed decreases about 1% - 2% for every 100 pounds of weight below the airplane's maximum gross weight. If your airplane does not have a published VB this at least gives you some guidance.

Two things are not often taught about TAPS, however: First, VB is not your target airspeed when flying in turbulence. It is the maximum speed you should fly, a sort of

unofficial new VNE or “barber-pole” speed. Your target airspeed in turbulence must be a good bit lower, so those 10- or 20-knot increases in gusts result in a speed that is still below VB. Second, you must slow to TAPS before you enter turbulence. You don't get “one free bump” before you slow down, because the airplane will exceed its structural limit in that first bump if you're not already below VB. You need to anticipate when you might encounter heavy turbulence and slow the airplane down before the first bump.

Running the gap

Running the gap between storm cells is a calculated risk. First, the gap should be at least 40 miles wide, with you splitting the difference. Second, although airborne radar is better than NEXRAD uplinks, and NEXRAD is better than nothing at all, if you're cutting it close (i.e., 20 miles from cells) it's best to avoid clouds visually, in case a new, updraft-stage cell is in your path. And third, it's a good idea to slow down before you fly between strong thunderstorm cells, because you don't get a free bump before you decelerate to turbulent air penetration speed. 

Thomas P. Turner is an ATP CFII/MEI, holds a Masters Degree in Aviation Safety, and was the 2010 National FAA Safety Team Representative of the Year. Subscribe to Tom's free FLYING LESSONS Weekly e-newsletter at www.mastery-flight-training.com.

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Zen and Aircraft Maintenance

First published in 1974, and now dutifully placed in the philosophy section of bookstores and libraries, Robert M. Pirsig's novel, *Zen and The Art of Motorcycle Maintenance* became a modern classic. Likened by *The New York Times* to Thoreau and Melville, the odyssey is a philosophical adventure about love and fear, growth, discovery, and life's most critical questions.... like motorcycle maintenance.

The story revolves around a summer motorcycle trip across the U.S. by a father and son. Among its many contemplative and philosophical discussions, the story explores how the main character deeply understands and enjoys performing maintenance on his motorcycle, including manufacturing components from everyday materials such as a soda can, if required. This is in contrast to a traveling companion who hates not only the physical act of maintenance and repair of his own motorcycle, but also the painful and confusing mental gymnastics required in order to understand the workings of machinery. The dichotomy provides fodder for many argumentative debates about life's choices.

Overly Simplistic

A recent pop-quiz in another aviation magazine included the following questions: If the battery dies, will the motor quit; what color is 100LL; what does a fuel quick-drain do; how many magnetos does the average aircraft engine have; and how many spark plugs does a four-cylinder engine have? The

questions seemed overly simplistic. Then I contemplated the reason for the basic level of knowledge sought by the questions. We are all different in our abilities, interests, level of mechanical aptitude and experience, like the two characters in the book. That all pilots enjoy, or at least understand, machinery is not a valid assumption. There are pilots that ignore the subject unless it's needed to pass a test, comply with a regulation or save their bacon.

When young, I was a GA worker bee – mowing grass around the FBO, plowing snow from ramps, washing airplanes and accumulating maintenance apprentice experience toward an A&P certificate. I learned amazing things while out on the airfield. The detail of things, for example: the shape and size of the taxiway, runway lights and the design and spacing of VASI's. The details of a taxiway stripe – how the paint has thickness and the edges are rough; nothing at all as they appear when you taxi or fly past, oblivious to their details. As a maintenance apprentice, I made the same observations about machinery. This revelation of “detail” gave me an appreciation for the mechanical redundancy, reliability, complexity and artistry of airplanes.

Elegance

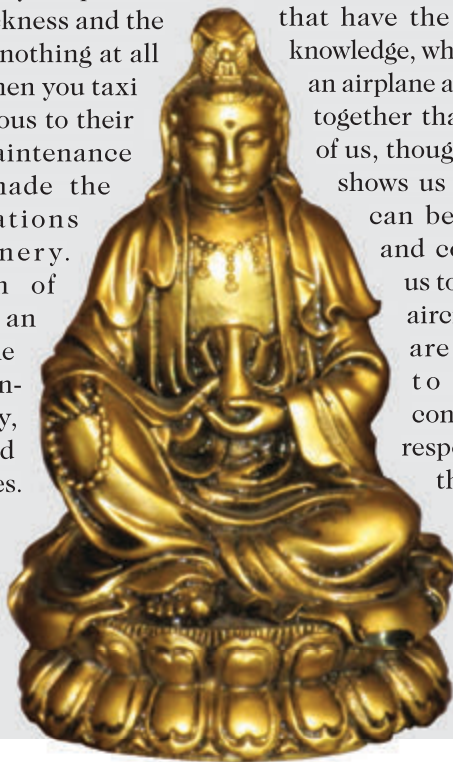
It's this artistry where “Zen” enters our story. The details of a

simple nut, as in nut and bolt, serve as an example of the contemplation of detail. There is no steel in nature; all nature has a potential for steel. First, you must create the type of metal you need, based on shear and tensile strength, heat-treating and elasticity; then drill a hole in the selected material, then use a lathe to make the threads – finally recognizing the shape of the nut that has been created. The function and relevance of the hardware becomes overshadowed by the very elegance of the part itself. This manufacturing process is repeated hundreds, or thousands, of times in the creation of a machine. It gives you a deeper appreciation of the adage: “Even the most complex flying machine is just a collection of man-made parts, flying in close formation.”

Dizzying Nightmare

In the aviation field, we have the same dichotomy as explored in the motorcycle adventure, as it relates to aircraft maintenance: some of us like to get hands-on, others hate it. Most that are averse to performing maintenance are lacking in time, desire or knowledge. As in the motorcycle adventure, however, maintenance is a dizzying nightmare to some. Conversely, there are those that have the time, desire and knowledge, who would rather take an airplane apart and put it back together than to fly it. For all of us, though, getting involved shows us why maintenance can be time-consuming and costly, and it helps us to better understand aircraft systems. If you are still disinclined to participate, consider this: you are responsible for not only the maintenance of your plane, but proper logbook entries as well. To wit, the FAR's:

91.403(a)
The owner or



operator is primarily responsible for maintaining the aircraft in an airworthy condition.

This means that it's our responsibility to fix things that break, to know what inspections are required and when, and to comply with mandatory service bulletins and AD's (airworthiness directives) as well – AD's are those letters we get in the mail from the FAA. We all hire an A&P or IA to do these things, but it's our neck, both physically and legally, that's on the line for the correct and timely accomplishment of the work – and its documentation.

91.405(b) Each owner of an aircraft shall insure that maintenance personnel make appropriate entries in the aircraft maintenance records indicating that the aircraft has been approved for return to service.

This one means that, even though most of us have no clue what the log entries are required to legally say, we are responsible for making sure they are correct and that they include the words "approved for return to service". We are bound by this FAR to be informed and involved.

And finally, Paragraph 6 of the Airworthiness Certificate aboard all U.S. certificated aerospace vehicles says:

TERMS AND CONDITIONS

"Unless sooner surrendered, suspended, or revoked..... this airworthiness certificate is effective as long as the maintenance and alterations are performed in accordance with Parts 21, 43, and 91 of the FAR's as appropriate...."

Unless we make sure that all maintenance has been performed in accordance with the FAR's and logged properly (neither endeavor of which we have much knowledge), the Feds can revoke our airworthiness certificate. So, once again, we hire someone to comply, and trust them to know the rules and document their work properly.



Use the FAR's, Luke

You probably shouldn't jack your G550 and change the tires and re-pack the wheel bearings yourself, or have your droid do it either, but your shop may allow you to supervise. It would be a great opportunity to see the "details" of the nuts and bolts of the landing gear assembly, and it may encourage you to reflect a bit before you slam on the brakes during the next landing. To get deeper still into its components, and become one with your machine, use the FAR's to guide your journey:

"The holder of a pilot certificate issued under Part 61 may perform preventive maintenance on any aircraft owned or operated by that pilot, as long as the aircraft is not used under Part 121, 127, 129, or 135.

If you do the preventive maintenance authorized, you must make an entry in the logbook documenting the work and the entry must include: A description of the work performed, the date of completion, the signature, certificate number, and kind of certificate held by the person performing the work."

There are just over a dozen maintenance items that we, as the owner/operator pilot, are allowed to accomplish. The list includes things like changing the oil and filters, changing air filters, cleaning and gapping spark plugs, changing tires, cleaning and greasing wheel bearings and servicing or replacing the aircraft battery. In addition to the maintenance procedures authorized, there are over 90 "checks" on the

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engine, cabin interior, landing gear, wings, empennage and propeller that we are allowed to accomplish. Basically, these checks are all things that you might perform during an extremely-thorough preflight, run-up and test flight.

I invite you to substitute airplane for motorcycle in this quote from *Zen and The Art of Motorcycle Maintenance*: “Precision instruments are designed to achieve an idea, dimensional precision, whose perfection is impossible. There is no perfectly shaped part in a motorcycle and never will be, but when you come as close as these mechanical instruments take you, remarkable things happen, and you go flying across the countryside under a power that would be called magic if it were not so completely rational in every way.”

Way Outside The Box

The EAA conducts its annual gathering of inventors, builders,

technicians and aviation enthusiasts this month in Oshkosh. It’s an inspirational gathering in which people are encouraged to think outside the box in the design, manufacture and maintenance of aircraft and components – often, way outside the box. With the advent of 3-D printing, the reality that materials and parts like the nut, that have no shape or function except in our minds until we manufacture them, has been placed into the toolbox of dreamers. Any person can now transform a thought into a physical, functional component



– even a completely operational device. We have only to recognize nature’s potential elements in order to create materials with the chosen properties and then “print” a component or mechanism with the desired capabilities. Perhaps with this type of technology, a Zen-like appreciation of materials, and in the hands of a hard working visionary like VanGrunsven, Pobereznay or Rutan, another quantitative leap of discovery awaits. With a newly kindled interest in aircraft maintenance, the visionary could be you. •E•

Kevin Dingman has been flying for 40 years. He’s an ATP typed in the B737 and DC9 with 20,000 hours. A retired Air Force Major, he flew the F-16 then performed as a USAF Civil Air Patrol Liaison Officer. He flies volunteer missions for the Christian organization Wings of Mercy, is employed by a major airline, and owns and operates a Beechcraft Duke. Contact Kevin at Ding10d@gmail.com.

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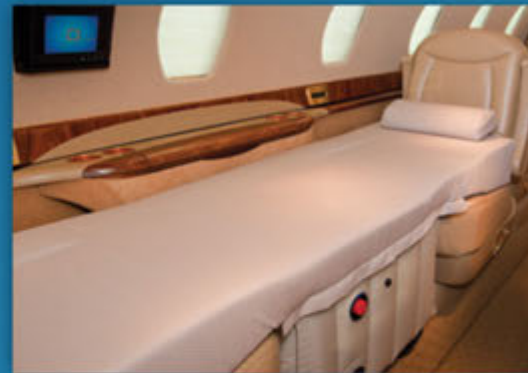
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Most Remembered

The flight I most remember on a wet day one November,
Was an out-and-back I'm fortunate to tell.
We were coming back from Robbins with a drop-in planned
for Dobbins
When the weather over Georgia went to hell.
The forecast called for clearing, though an upper trough
was nearing
With cumulo-nymphs building in the west.
The weatherman insisted if we took off now we'd miss it
But, in retrospect, he was an optimist.
The sun was shining yet as we lumbered to our jet,
Stowed our gear and fired that mother up.
We had no apprehension as we're cleared into position,
Then Stanley lit the burners – giddyup!
The sky was blue and white as we rocketed to height,
Though the white was growing tall and turning gray.
With Stanley under hood, I did the best I could
To dodge the taller build-ups in our way.
When he called up Dobbins Tower she reported
that a shower
Now obscured her view of Runway Oner-One.
Turning final it was raining. What the hell, it's only training,
So I asked her for the viz. She said, "There isn't none."
Inside the outer marker, our world was growing darker
As we banged from side to side and up and down.
At the minimums selected, our glideslope full deflected,
I yelled at Stan, "For God's sake, go around!"
As Stanley clobbered the power, I called good-bye to Tower
And told her we'd be back some other day.
I figured it was best we be headed to the west
With Columbus some three hundred miles away.
The turbulence was fierce, and the crackling hurt my ears

When a blinding flash of lightning split the air.
We were climbing like a comet when I heard my
student vomit
And my only thought was getting out of there!
I called for further clearance but, except for interference,
The radio was silent as a stone:
Just the static, my own breathing – and the sound of
Stanley's heaving –
Filled my head. I turned down interphone.
With poor ol' Stanley sick, I shook the forward stick
And kept climbing with a sense of urgency.
The fuel was looking tight and I knew we needed height,
So I dialed the code to squawk Emergency.
Passing twenty-one I still couldn't find the sun,
But I looked around and found alarming things:
Both EGTs were rising and crystal horns of icing
Were sprouting like stalagmites on my wings!
When you hear that little voice that says you got a choice,
Mister – shake the stick, control your destiny.
Grab the devil by the throat, be a hero or a goat,
But there ain't no sunshine where you gotta be!
It was down into the well of that dark electric hell
As I aimed our Thirty-Eight into the muck.
I felt an engine cough so I pulled some power off
And hit both starter buttons just for luck.
Did you ever stop and wonder where the lightning and
the thunder
Have their genesis? They've got to start somewhere.
Well, I can tell you straight, it was my own T-38
That they started from. I know, 'cause I was there!
Passing over Birmingham, we were sorely in a jam;
To say the least, our fuel state wasn't good.

Flight

by Lt. Col.
Gary "Waldo" Peppers,
USAF (ret.)

The ride was really bumpy, and Stan in back got jumpy
Every time a lightning bolt lit up his hood.

But the ice was dissipating and the turbulence abating
In the warmer air at lower altitude.

Just a hundred miles remaining and at least it's only raining.

We'll break out soon, that brightened up the mood.

It was then I felt a shudder, first a tremble in the rudder,

Then a buzzing like a chain-saw in my seat.

I scanned the engine gauges as I fumbled for the pages

Of my checklist, when I saw the overheat.

The number one was cooking – its EGT was looking

Like Chernobyl as it passed the thousand mark.

I thumbed the throttle gate and did not hesitate



To jam that lever all the way to park!

The temperature came down as the RPM unwound,

And I compensated for the adverse drag.

With a snap, crackle, pop the engine shuddered to a stop

And lay there like a lump of molten slag.

When the left-hand engine froze I felt lucky, I suppose,

That the gen on the right picked up the load.

But our fuel was disappearing. "Stan," I said, "I'm fearing

We just might have to have this mother towed."

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I thought about my life and what they'd tell my wife,
 And I wondered if this seat would really work.
 But you play the cards you're dealt, so I cinched my
 safety belt
 And slapped myself for being such a jerk.
 My eye caught something wrong – how long's that
 light been on?
 Prob'ly ever since I shut that engine down.
 We had thirty miles to fly with the right gauge showing dry
 And the left gauge barely read a hundred pounds.
 Then arcing onto final with the throttle back in idle
 We broke out at just about two thousand feet.
 I flipped the gear doors open, pulled the handle and
 was hopin'
 To see three green – and they never looked so sweet!
 On final, down and dirty, we dodged an MU-30*
 (Who called us awful names, he later said).
 I ran the flaps full down as the main gear touched
 the ground,

Aero-braked and stopped it straight ahead.
 As the trainer came to rest, I called for ground egress
 And shut the one remaining motor down.
 "Stanley," I reflected, "I guess we weren't expected."
 We safed our seats and scrambled to the ground.
 I stood there in the silence, but for sounds of distant sirens,
 While Stanley kissed the ground for cheating Fate.
 Did the seven eighty-one and my paperwork was done,
 And I smiled: Yippee, another one point eight!

*T-1A Jayhawk

I wrote this ballad for the occasion of my Air Force retirement in 1999, as a sort of recap of my career. All of the events and most of the dialogue actually did happen—just not all in one flight. The point of my poem is that, no matter how trying a particular flight may be, no matter how scared we might feel, or how frustrated we might become or how relieved we might be at its successful conclusion, it is in the logging of a flight that we take great pleasure. Every flight you can walk away from is a good one. And if they can still use the airplane again, so much the better. It's all good time. •&

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NBAA Maintains Spotlight on ADS-B Privacy Concerns



As the FAA continues its transition to its NextGen air traffic management system, NBAA continues to raise concerns that Automatic Dependent Surveillance – Broadcast (ADS-B) flight tracking technology – a cornerstone of NextGen – does not include needed protections for operators’ privacy, security and business competitiveness.



of a company’s flight operations by competitors trying to deduce their next business moves, or by individuals with more ominous intentions.

This isn’t the first time that NBAA has fought to protect the security, privacy and business competitiveness of aircraft operators by allowing them to opt out of being subjected to real-time broadcast of flight information. Four


I recently raised these concerns while attending a NextGen Advisory Committee meeting to discuss policy issues pertaining to the modernization of the nation’s air traffic control (ATC) system.

years ago, when the Department of Transportation wanted to impose restrictions on the ability of business aircraft operators to participate in the Block Aircraft Registration Request (BARR) program, NBAA pursued efforts to enable operators to retain those safeguards. With the industry’s direct support, we prevailed.

As readers of *Twin & Turbine* already know, ADS-B Out transmits an unencrypted, real-time signal that includes the aircraft’s Mode S transponder code, its call sign, aircraft type, position and airspeed, as determined by the aircraft’s own GPS-based avionics. In addition to providing a clearer and more accurate picture of flight operations to ATC, flight crews may also utilize this information to enhance their own situational awareness.

As the BARR experience demonstrated, the need to protect the privacy and security of one’s real-time movements is well understood not only by the aviation industry, but also by organizations from across the political spectrum – from the U.S. Chamber of Commerce to the American Civil Liberties Union. Respected media outlets also recognized the importance of these misgivings, as did members of both parties in Congress, who eventually passed legislation requiring the FAA to provide an opt-out from real-time broadcast of flight data.

To be clear, NBAA’s concern about ADS-B in this specific area does not mean that NBAA opposes ADS-B; in fact, NBAA participates in all the major government-industry advisory groups involved in ADS-B development, because we know this new technology will offer significant efficiency gains that will benefit business aircraft operators.

NBAA believes that people should not have to surrender their security or privacy just because they board a general aviation airplane. As we continue working with policymakers to bring attention to this matter, we may need to call upon others in business aviation to weigh in. If that time comes, I know we will be able to count on your support, as well. 

However, we are greatly concerned that anyone with the right equipment can capture that real-time data and potentially use it for nefarious purposes. That could include tracking

Bolen Raises Industry's Concerns over ATC Privatization before Senate Committee

NBAA President and CEO Ed Bolen represented the interests of general aviation (GA) in an appearance before a May 19 hearing by the U.S. Senate Commerce, Science & Transportation Committee focused on the debate over FAA reauthorization, and moving towards a privatized air traffic control (ATC) network.

Like most federal agencies, the FAA's funding and priorities must be approved (or "reauthorized") by Congress every few years. The agency's most recent reauthorization is set to expire in September, and the Commerce Committee holds jurisdiction over the formation of the FAA reauthorization package that will ultimately be considered by the full Senate.

"FAA reauthorization is among the most important issues currently before the aviation community," Bolen noted. "Business aviation is a critical part of the aviation sector, helping generate over a million jobs and more than \$200 billion in economic activity each year. As the Senate debates reauthorization, this hearing provides an opportunity to remind lawmakers about the many ways business aviation supports citizens, companies and communities, and to ensure that the concerns of NBAA Members are well understood."


In testimony presented before the committee, Bolen specifically noted misgivings over discussions about transitioning to an aviation system in which Congressional oversight would be removed from aviation policy-making.

Bolen told lawmakers such debate is cause for great concern to the GA community, as it opens the door to agendas promoted by the interests of parties that might place bottom-line business priorities over ensuring that the aviation system serves the public interest – an assurance provided by long-standing

Congressional oversight of decisions related to taxes, airport-and-airspace access and other policy matters.

"The question on the table - perhaps the fundamental question in this reauthorization debate - is who is going to ensure that our public airspace is operated for the public's benefit?" Bolen asked lawmakers in his testimony before the Committee. "The airspace above our heads belongs to the American public. It doesn't belong to any private company, or group of companies. It doesn't belong to any segment of the aviation industry, or even the aviation industry itself."

Bolen's appearance before the Senate Commerce Committee followed testimony he has provided to House lawmakers concerning FAA reauthorization. In recent months, Bolen has also participated in a number of Washington policy forums on the issue, including those hosted by the U.S. Chamber of Commerce, the Airline Pilots Association and other organizations.

The committee's hearing was the fifth in a series of panels recently held on reauthorization for the agency. 



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Bloomberg News Publishes NBAA's Response to Misleading Business Aviation Safety Story

NBAA was quick to respond to a May 14 article by the Bloomberg news organization that distorted business aviation's safety record. In a forceful letter, NBAA President and CEO Ed Bolen took a stand for accuracy in safety coverage of the industry.

"For starters, Bloomberg readers were never told that business aviation shares a safety record comparable to that of commercial airlines, and that one of the most significant factors underlying this outstanding record is the industry's stringent pilot-training practices," Bolen noted. "Business aviation flight departments commonly require more experience than the 1,500-hour minimum required for new-pilot hires by the airlines, as well as the highest pilot training and medical certifications available."

Bolen's response also pointed out that business aviation operators utilize rigorous training, along with "leading-edge onboard technologies" that further enhance safety and maintain pilot situational awareness.

"Business aircraft flown by many operators are typically as sophisticated – and often, even more so – than aircraft flown by the airlines, featuring cockpit technology that let pilots see through clouds and fog, and autopilots smart enough to initiate a descent if an aircraft cabin depressurizes," he added.

Bolen also noted the stark contrast between "largely homogenous" airline operations, taking place along the same routes and to the same airports, with the diverse operating environment common to business aviation.


"Each business aviation flight may take the pilot(s) to a new airport, presenting new potential risks to be analyzed and mitigated," he added. "These destinations may not offer

the same robust reporting provided at the major airline hubs for factors such as runway conditions and outages, weather updates, available services, and other aspects unique to the mostly small airports used by business aircraft."

Furthermore, although NBAA provided two staff for interviews with the story's author – and connected the reporter with the respected business aviation safety authority, Robert E. Breiling and Associates – Bolen noted the writer excluded all comments from the NBAA representatives, and the data provided by Breiling.

"[I]n attempting to quantify the business aviation safety record, the writer appears to have chosen a data set that arguably does not provide the clearest, most comprehensive possible picture on the matter," Bolen stated. "Other news organizations that have covered business aviation safety have routinely found Breiling to be a credible authority on the matter, but despite the availability of Breiling's data for this story, the writer ultimately chose to set aside the information."

"NBAA and its Member Companies understand all too well that one aviation accident is too many, and that the industry must continually learn from the lessons accidents provide, and work to find ways to avoid similar future tragedies," Bolen concluded. "That said, the story's lop-sided view of business aviation left out important information about what goes into making business aviation one of the safest forms of transportation, which routinely, reliably delivers many thousands of businesspeople to their destinations each year."

Bloomberg's editors ultimately published the letter in its entirety on the organization's newswire. 

NBAA Concerned About Proposed Expansion of Alaskan Military Operation Areas

NBAA recently identified three areas of concern related to the proposed expansion and modification of the vast Joint Pacific Alaska Range Complex (JPARC) that could potentially affect business aviation operations in Alaska.


The proposal would add nearly 7,000 square miles to the Fox 3 military operation area and attach to its eastern perimeter the approximately 3,200-square-mile Paxon Military Operations Area (MOA), which would encompass the airspace from 500 feet above ground level up to Flight Level 180.

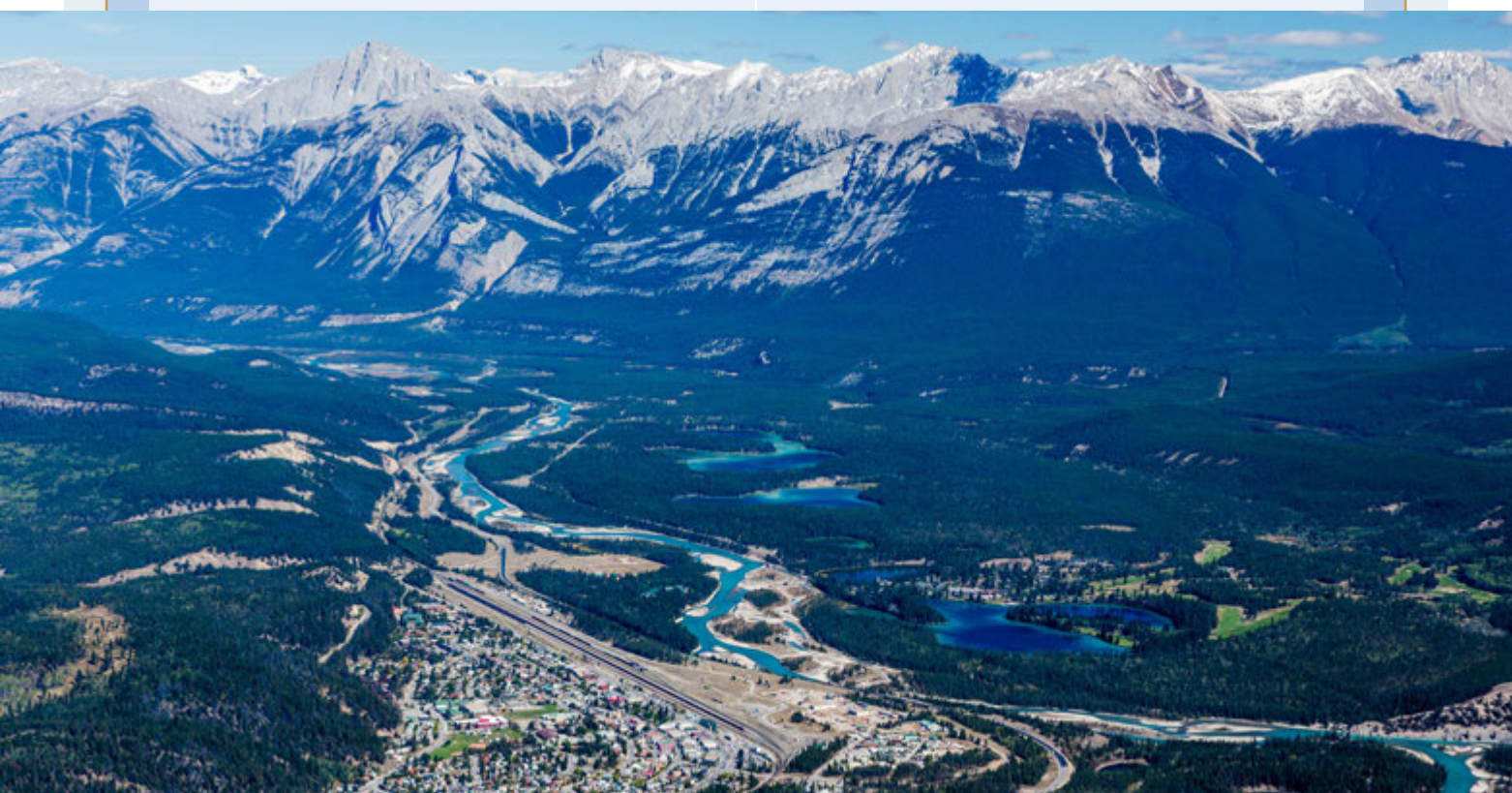
The proposal also calls for the lowering of Fox 3 from 5,000 feet to 500 feet, and anticipates that the MOAs would be active 240 days a year for an average of 12 hours a day. Avoidance would be impractical due to the size of these MOAs when active, noted Bob Lamond, NBAA's director of air traffic services and infrastructure.

Concerned that lowering the MOA floor to 500 feet would reduce safety by compressing VFR

traffic, NBAA urged the FAA to consider this in its final decision, and requested that the Special Use Airspace Information Service (SUAIS) be expanded to include all of the proposed MOAs and that SUAIS coverage be a condition for activating the MOAs' lower altitudes.

Operated by the military, the SUAIS provides real-time status information for 65,000 square miles of JPARC's interior airspace, but does not cover the 42,000-square-nautical miles of training airspace over Gulf of Alaska. Covering the proposed MOA expansion would require additional communication equipment.

When active, the Paxon MOA directly affects two Victor airways, a T-Route, as well as all flights following direct routes through the MOA, said Lamond. Given the anticipated activity of 240 12-hour days, NBAA has requested that non-participating IFR traffic be given priority for transit through the MOAs, as the Air Force has done recently at the Powder River Training Complex, a 28,000-square-mile block of airspace over the Dakotas, Montana and Wyoming. 



NBAA's Role as Advocate Extends Far beyond Capitol Hill

Every day that Congress is in session, NBAA representatives are working to ensure that lawmakers on Capitol Hill understand the importance of business aviation to their constituents and communities back home. While that represents a large portion of the Association's advocacy efforts, it's only one aspect of NBAA's engagement on behalf of the industry.

"From meetings with international officials and aviation stakeholders to conversations with mayors and other local representatives across the country, NBAA works tirelessly to promote policies, regulations and initiatives that support the positive contributions of business aviation," said NBAA President and CEO Ed Bolen.

As one example, NBAA promotes the interests of business aviation within the executive branch – including engagement with officials at the FAA, NTSB, Department of Homeland Security, TSA, IRS, and the U.S. Treasury – on a diverse range of regulatory matters affecting business aviation.

These efforts recently led to clarification from the FAA on whether cockpit voice recorders are necessary on certain Part 135 operations normally operated by a single pilot. The agency also acknowledged the need for a science-based approach to measuring the effects of aircraft noise on communities around airports used by business aviation.


NBAA also consults with international officials on topics of importance to the industry, including its participation earlier this year through the International Business Aviation Council (IBAC) at the International Civil Aviation Organization's Second High-Level Safety Conference, and in regular meetings with European and Asian aviation safety regulators.

Closer to home, NBAA's regional representatives meet with state and local lawmakers,

including at recent events organized in support of general aviation and business aviation in Michigan, North Dakota and Texas.

NBAA also works with state legislatures to promote fair taxation policies for business aviation users. These efforts have resulted in exemptions for general aviation (GA) aircraft to New York's sales and use tax; "fly away" sales and maintenance exemptions in Arkansas; and seeking legislation in Texas to deal with interpretations from the state Comptroller that would impose significant new burdens for aircraft operators to qualify for the 'sale for resale' exemption through aircraft leasing.

"This work also extends to the national level; for example, NBAA recently met with the Office of the Tax Legislative Counsel at the U.S. Treasury Department and had a positive and productive discussion about federal excise tax matters," added Scott O'Brien, NBAA Senior Manager, Finance & Tax Policy. "Our Members also engage their elected representatives on these and other issues, with some even flying their business aircraft to D.C. for these meetings."

Staff members from NBAA also participate in numerous rulemaking committees and joint industry/government working groups, while NBAA Air Traffic Services (ATS) personnel are stationed at the FAA's Air Traffic Control System Command Center to represent the interests of business aviation when decisions are made about how air traffic will be handled. 



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AEA Convention shatters attendance record

Nearly 1,900 attendees and a sold out exhibit hall marked the Aircraft Electronics Association's convention in Dallas.

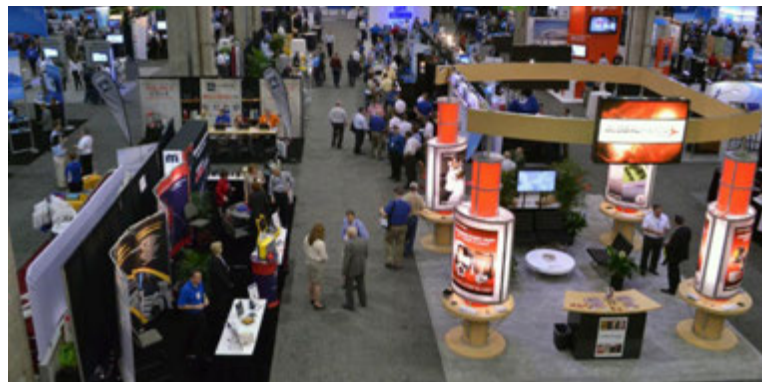
The 58th annual AEA International Convention & Trade Show, which took place April 8-11 in Dallas, Texas, attracted 1,897 attendees with more than 350 avionics repair shops and more than 20 countries represented. The attendance figure breaks the event's previous high mark of 1,873 attendees at the 2005 convention, which also took place in Dallas.

This year's attendance figure marks a 21-percent increase over the 2014 event in Nashville, Tennessee, which drew 1,568 attendees. In addition, more than 135 companies displayed their products and services in the AEA Exhibit Hall, which sold out for the first time since 2005.

"The topic of ADS-B naturally dominated this year's show, with the looming mandate just 56 months away," said AEA President Paula Derks. "There were 33 companies that participated in the New Product

Introductions session, which garnered a lot of interest from the industry. Avionics shop owners and technicians from more than 20 countries were able to take advantage of over 90 hours of professional development and technical training classes. An upbeat atmosphere was easily apparent, and hopefully, it's another positive sign that the industry is continuing to recover from the recent economic recession."

The 59th AEA International Convention & Trade Show takes place April 27-30, 2016, in Orlando, Florida. 



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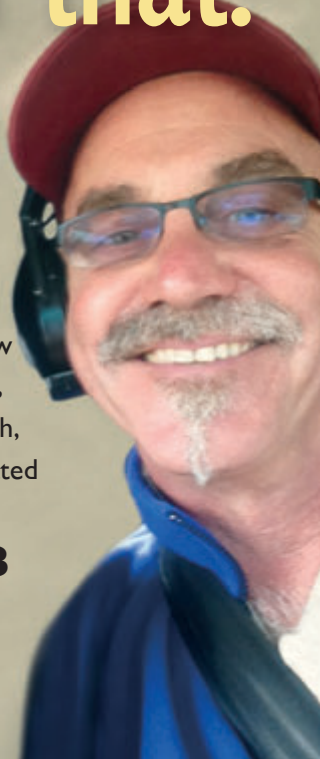
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The Pilatus PC-24 Makes Its Maiden Flight

On May 11, 2015, the first Pilatus PC-24 Super Versatile Jet took off on its maiden flight at 10:00 local time from Buochs airport in Switzerland. Nearly 1,800 Pilatus staff involved in the PC-24 project were there to applaud Prototype P01, call sign HB-VXA, as it taxied for takeoff. The 55-minute flight went exactly as planned with no problems whatsoever.

The twin-engine business jet took off from Runway 7 in just under 2,000 feet and climbed to 10,000 feet in around three minutes. The maiden flight followed a route across central Switzerland – from Altdorf to Brünig via Engelberg.

Test pilot Paul Mulcahy flew the PC-24 as pilot in command. Mulcahy has test-flown countless aircraft types and has a wealth of experience on twin-engine business jets. “Everything looks great so far! Beautiful handling – the PC-24 flies just as expected – a real Pilatus aircraft!” reported the second experienced test pilot, Reto Aeschlimann, from the cockpit.

Throughout the flight, the PC-24 was accompanied and monitored by a PC-21. As is normal on maiden flights, the PC-24 landing gear was not retracted on this occasion. Twelve flight test engineers watched the flight from the ground.

The first Swiss business jet

“It’s an emotional moment for sure, and another major milestone in the Pilatus and Swiss aviation history”, says Oscar J. Schwenk, Chairman of the Board of Directors. “Seeing our new business jet take off on its maiden flight is something we’ve worked very hard for, and dreamt about for a long time. Today, at last, that ‘Swiss Dream’ became a reality!”

A total of three PC-24 prototypes will be used to complete a rigorous test program of some 2,300 hours over the next two years. Certification and initial deliveries are planned for 2017. Pilatus sold 84 PC-24’s in the space of just 36 hours at the 2014 European Business Aviation Conference & Exhibition (EBACE).

The PC-24 is the world’s first business jet to be equipped with a standard cargo door, with takeoff and landing performance allowing the use of very short and even unpaved runways. The jet also boasts a spacious cabin with an interior that can be customized to accommodate individual customer needs.

Further information is available from: www.pilatus-aircraft.com

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CenTex Aerospace Achieves Numerous Milestones With Its Saddle Tank Conversion STC

The FAA has approved CenTex's revised PMA for Saddle Tank kits, adding the King Air 200 and 300 series aircraft to the original PMA for the King Air 90 aircraft.

The first installation of the CenTex Saddle Tanks Plus has been completed at Elliott Aviation in Moline, IL. The conversion was performed on a King Air 350 for an operator located in Kansas City, MO. The Saddle Tanks Plus will allow the operator to conduct non-stop flights to the west coast with NBAA reserves using Boeing wind data. This eliminates a fuel stop which provides a time savings of 45 minutes on the flight. In addition to the reduction in flight time, they are able to experience the added benefit of more comfort and less disruption for the passengers.

Also, the increased cargo capacity in the Saddle Tanks Plus provides the added convenience to carry



several standard carry-on bags, or engine & propeller covers and plugs. The professionalism and quality installation by Elliott Aviation resulted in a superior, on time conversion. Exceptional customer satisfaction was established due to the cooperative effort between Elliott and CenTex Aerospace.

Supplementary production of the Saddle Tanks has begun at a manufacturing facility in Wichita, KS. This will allow CenTex to meet the growing demand for the Saddle Tanks. The facility, which also manufactures fuel tanks for OEMs such as Boeing and LearJet, will complete the first set of CenTex Saddle Tanks for a King Air 350 customer in a few weeks.

According to Greg Barnes, President of CenTex, "It has been





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an extremely busy time, and CenTex is truly blessed with talented and dedicated employees that allow us to provide an innovative product at an exceptional value. The response to our Saddle Tanks has been overwhelming, and we are continuing in our efforts to add even more modifications and enhancements to the King Air lineage based on the needs expressed by our customers. I do believe that CenTex is 'Making Aviation Better', a company mission statement that has been reinforced by the positive comments we consistently receive from our customers."

Contact CenTex Aerospace by phone (254-752-4290), email (info@centex.aero), or visiting the corporate office in Waco, TX (KACT). 

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Imagine returning home from combat facing devastating injuries and long-term hospitalization-- in a facility hundreds of miles away from your family.

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The VAC provides free air transportation to wounded veterans and their families for medical and other compassionate purposes, through a national network of volunteer aircraft owners and pilots.

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The Worldwide General Aviation owner/operators and chief pilots of these air

100%
TOTAL MARKET COVERAGE

JETS

CHIEF PILOTS & OWNERS

Aircraft Count

4 AIRBUS ACJ319
32 ASTRA 1125
31 ASTRA 1125SP
63 ASTRA 1125SPX
51 BEECHJET 400
275 BEECHJET 400A
58 BOEING BBJ
391 CHALLENGER 300
65 CHALLENGER 600
58 CHALLENGER 601-1A
133 CHALLENGER 601-3A
56 CHALLENGER 601-3R
279 CHALLENGER 604
5 CHALLENGER 800
169 CITATION 500
319 CITATION 525
284 CITATION BRAVO
151 CITATION CJ1
69 CITATION CJ1+
202 CITATION CJ2
160 CITATION CJ2+
390 CITATION CJ3
180 CITATION ENCORE
306 CITATION EXCEL
5 CITATION I
288 CITATION I/SP
478 CITATION II
50 CITATION II/SP
173 CITATION III
329 CITATION MUSTANG
138 CITATION S/II
257 CITATION SOVEREIGN
284 CITATION ULTRA
287 CITATION V
20 CITATION VI
104 CITATION VII
257 CITATION X
199 CITATION XLS

1 DIAMOND I
53 DIAMOND IA
3 DORNIER ENVOY 3
282 ECLIPSE EA500
47 EMBRAER LEGACY 600
8 EMBRAER LEGACY 650
158 EMBRAER PHENOM 100
82 EMBRAER PHENOM 300
123 FALCON 10
28 FALCON 100
25 FALCON 200
176 FALCON 2000
21 FALCON 2000EX
81 FALCON 20C
17 FALCON 20C-5
26 FALCON 20D
3 FALCON 20D-5
7 FALCON 20E
8 FALCON 20E-5
59 FALCON 20F
82 FALCON 20F-5
229 FALCON 50
8 FALCON 50-40
113 FALCON 50EX
135 FALCON 900
21 FALCON 900C
116 FALCON 900EX
98 GLOBAL 5000
112 GLOBAL EXPRESS
25 GULFSTREAM G-100
161 GULFSTREAM G-200
8 GULFSTREAM G-300
27 GULFSTREAM G-400
222 GULFSTREAM G-450
7 GULFSTREAM G-500
330 GULFSTREAM G-550
42 GULFSTREAM G-I
110 GULFSTREAM G-II
31 GULFSTREAM G-IIIB
186 GULFSTREAM G-III
188 GULFSTREAM G-IV
317 GULFSTREAM G-IVSP
182 GULFSTREAM G-V

40 HAWKER 1000A
9 HAWKER 125-1A
2 HAWKER 125-1AS
1 HAWKER 125-3A/RA
2 HAWKER 125-400A
29 HAWKER 125-400AS
1 HAWKER 125-400B
4 HAWKER 125-600A
11 HAWKER 125-600AS
113 HAWKER 125-700A
50 HAWKER 4000
187 HAWKER 400XP
21 HAWKER 750
223 HAWKER 800A
2 HAWKER 800B
335 HAWKER 800XP
14 HAWKER 800XPI
67 HAWKER 850XP
131 HAWKER 900XP
4 JET COMMANDER 1121
6 JET COMMANDER 1121B
12 JETSTAR 731
11 JETSTAR II
51 JETSTREAM 31
40 JETSTREAM 32
15 JETSTREAM 41
15 LEARJET 23
26 LEARJET 24
5 LEARJET 24A
19 LEARJET 24B
53 LEARJET 24D
14 LEARJET 24E
9 LEARJET 24F
33 LEARJET 25
57 LEARJET 25B
7 LEARJET 25C
94 LEARJET 25D
6 LEARJET 28
28 LEARJET 31
172 LEARJET 31A
43 LEARJET 35
426 LEARJET 35A
21 LEARJET 36

34 LEARJET 36A
24 LEARJET 40
219 LEARJET 45
193 LEARJET 45XR
115 LEARJET 55
5 LEARJET 55B
12 LEARJET 55C
293 LEARJET 60
130 PREMIER I
16 SABRELINER 40
13 SABRELINER 40A
7 SABRELINER 40EL
3 SABRELINER 40R
24 SABRELINER 60
1 SABRELINER 60A
2 SABRELINER 60AELXM
12 SABRELINER 60ELXM
3 SABRELINER 60EX
1 SABRELINER 60SCEX
85 SABRELINER 65
1 SABRELINER 75
17 SABRELINER 80
3 SABRELINER 80SC
101 WESTWIND 1
4 WESTWIND 1123
45 WESTWIND 1124
76 WESTWIND 2

TURBO PROPS

CHIEF PILOTS & OWNERS

Aircraft Count

275 CARAVAN 208
1087 CARAVAN 208B
3 CARAVAN II
34 CHEYENNE 400
221 CHEYENNE I
14 CHEYENNE IA
303 CHEYENNE II
59 CHEYENNE III
21 CHEYENNE IIIA
59 CHEYENNE II XL
22 CHEYENNE IV
303 CONQUEST I

Twin & Business Aviation Markets

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354 CONQUEST II
49 KING AIR 100
502 KING AIR 200
12 KING AIR 200C
12 KING AIR 200T
203 KING AIR 300
3 KING AIR 300LW
588 KING AIR 350
34 KING AIR 350C
17 KING AIR 90
7 KING AIR A/B90
120 KING AIR A100
203 KING AIR A200
58 KING AIR A90
221 KING AIR A90-1
135 KING AIR B100
902 KING AIR B200
78 KING AIR B200C
63 KING AIR B200GT
2 KING AIR B200SE
3 KING AIR B200T
66 KING AIR B90
295 KING AIR C90
32 KING AIR C90-1
160 KING AIR C90A
316 KING AIR C90B
7 KING AIR C90SE
278 KING AIR E90
160 KING AIR F90
17 KING AIR F90-1
1 MERLIN 300
1 MERLIN IIA
29 MERLIN IIB
12 MERLIN III
20 MERLIN IIIA
49 MERLIN IIIB
14 MERLIN IIIC
5 MERLIN IV

13 MERLIN IV-A
13 MERLIN IV-C
105 MITSUBISHI MARQUISE
1 MITSUBISHI MU-2D
29 MITSUBISHI MU-2F
1 MITSUBISHI MU-2G
22 MITSUBISHI MU-2J
32 MITSUBISHI MU-2K
15 MITSUBISHI MU-2L
23 MITSUBISHI MU-2M
30 MITSUBISHI MU-2N
38 MITSUBISHI MU-2P
55 MITSUBISHI SOLITAIRE
673 PILATUS P-12
341 PILATUS PC-12 NG
549 PILATUS PC-12/45
154 PILATUS PC-12/47
18 PIPER 700P AEROSTAR
492 PIPER MERIDIAN
10 ROCKWELL 680T TURBO
6 ROCKWELL 680V TURBO II
7 ROCKWELL 680W TURBO II
9 ROCKWELL 681 HAWK
89 SOCATA TBM-700A
91 SOCATA TBM-700B
4 SOCATA TBM-700C1
115 SOCATA TBM-700C2
318 SOCATA TBM-850
22 SOCATA TBM-900
6 STARSHIP 2000A
51 TURBO COMMANDER 1000
27 TURBO COMMANDER 690
129 TURBO COMMANDER 690A
113 TURBO COMMANDER 690B
58 TURBO COMMANDER 840
16 TURBO COMMANDER 900
23 TURBO COMMANDER 980

TWIN PISTON

OWNERS

Aircraft Count

9 ADAM A500
1550 BARON 58
479 BARON 58P
137 BARON 58TC
5 BARON A56TC
142 BARON G58
43 BEECH BARON 56 TC
2 BEECH BARON 58 PA
217 BEECH DUKE B60
193 CESSNA 340
556 CESSNA 340A
120 CESSNA 402B
BUSINESS LINER
64 CESSNA 402C
38 CESSNA 404 TITAN
288 CESSNA 414
374 CESSNA 414A
CHANCELLOR
72 CESSNA 421
61 CESSNA 421A
454 CESSNA 421B
757 CESSNA 421C
66 CESSNA T303
124 PIPER 601P AEROSTAR
29 PIPER 602P AEROSTAR
465 PIPER CHIEFTAIN
28 PIPER MOJAVE
870 PIPER NAVAJO
24 ROCKWELL 500 SHRIKE
33 ROCKWELL 500A SHRIKE
69 ROCKWELL 500B SHRIKE
46 ROCKWELL 500S SHRIKE
8 ROCKWELL 500U SHRIKE

28 ROCKWELL 520
COMMANDER
15 ROCKWELL 560
COMMANDER
21 ROCKWELL 680
COMMANDER
17 ROCKWELL 560E
COMMANDER
11 ROCKWELL 560F
COMMANDER
36 ROCKWELL 680 SUPER
17 ROCKWELL 680E
19 ROCKWELL 680F
COMMANDER
22 ROCKWELL 680FL GRAND
COMMANDER
14 ROCKWELL 680FLP
GRAND LINER

HIGH PERFORMANCE MOVE-UP SINGLES

OWNERS

Aircraft Count

250 BEECH BONANZA
493 CESSNA 182
71 CESSNA 206
448 CESSNA P210N
26 CESSNA P210R
58 CESSNA T182
1 CESSNA T206
2714 CIRRUS SR22
240 PIPER MALIBU
387 PIPER MALIBU MIRAGE

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TWIN & TURBINE

by David Miller

Getting High

Flight Level 450 is definitely rarified air. And, other than three glasses of Cabernet, it's about as high as most of us get. But I found myself there recently, with Lt. Col. (Ret.) Jon Huggins, Executive Director of Citation Jet Pilots Association, and my good friend, Stuart Fred. We were on a trip to Cedar Rapids, Iowa to visit the "skunk works" of Rockwell Collins and their Pro Line Fusion avionics system.

But even better than FL 450 is what we were flying, Stuart's brand new (25 hours total time) Citation CJ4. "Don't touch anything," Stuart barked as we taxied out from his gorgeous hangar on Houston's Ellington field (KEFD). "Put your shoes in this bag so you won't get footprints on my new carpet."

I must admit I would have felt the same had it been my new airplane. I asked him where the peanut butter crackers were. You know, the ones that break into a hundred pieces and fall all over the carpet at your first bite.

He was not amused.

We were cozy, warm, and quite content at FL450, with a TAS of 420 knots in ISA+2 temperatures. But, two hours enroute, during what was supposed to be a routine weather flight, the ATIS for Cedar Rapids (KCID) changed our day.

"Cedar Rapids information Charlie, wind one three zero at four knots, visibility one quarter, mist, overcast 200."

I dutifully reported the facts to Captain Fred. "Gee, I've never flown an approach to minimums in this airplane. It should be interesting." We did a thorough approach briefing and checked on with approach control. "Runway 9 RVR 1,200, rollout 800," said the polite female controller with a mid-western accent. "Say intentions." The approach chart said we needed an RVR of 2,400 feet, and although we could legally begin the approach, no one was even trying it. We decided to hold.

"Cleared direct to Cedar Rapids to hold west on the 270 degree radial, right turns, expect further clearance at 1530 Zulu," she said.

One of the great things about the CJ4 is the huge 5,800-pound fuel capacity, so we weren't rushed to leave the area. But, after a couple of turns in the pattern, it was obvious the weather was



With 5,000-plus hours in his logbook, David Miller has been flying for business and pleasure for more than 40 years. Having owned and flown a variety of aircraft types, from turboprops to midsize jets, Miller, along with his wife Patty, now own and fly a Citation CJ1+. You can contact David at davidmiller1@sbcglobal.net.

not cooperating and Iowa City (KIOW), only 26 miles away, had 10 miles visibility and 1,400 overcast. Off we went to the alternate.

By the time we buttoned up the airplane, Stuart had (1) set up for an ILS, (2) held at a fix, (3) diverted to his alternate, and (4) shot an LPV approach to a landing. All in a new airplane, now with only 27 total hours on the Hobbs meter. And he did it like a seasoned pro.

We learned even more about the future of flying during our visit with the folks at Rockwell Collins. Their new Pro Line Fusion system is now certified and flying on a King Air 250 and 350. Fusion marries the best of their FMS 3000 capabilities with incredible graphics on three huge displays, to provide the pilot with up to ten windows of information and the ability to actually change and manipulate data by touching the PFD's and MFD. It's pretty awesome. I dreamed about seeing it in a CJ 1+ like mine. That dream will eventually be a reality. More about that in the coming months.

On the flight back home, I felt it necessary to bring my own Travel John for relief purposes. Believe me, no one wants to be the first person to use Stuart's potty.

Fly safe.

Photo courtesy of Beechcraft



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