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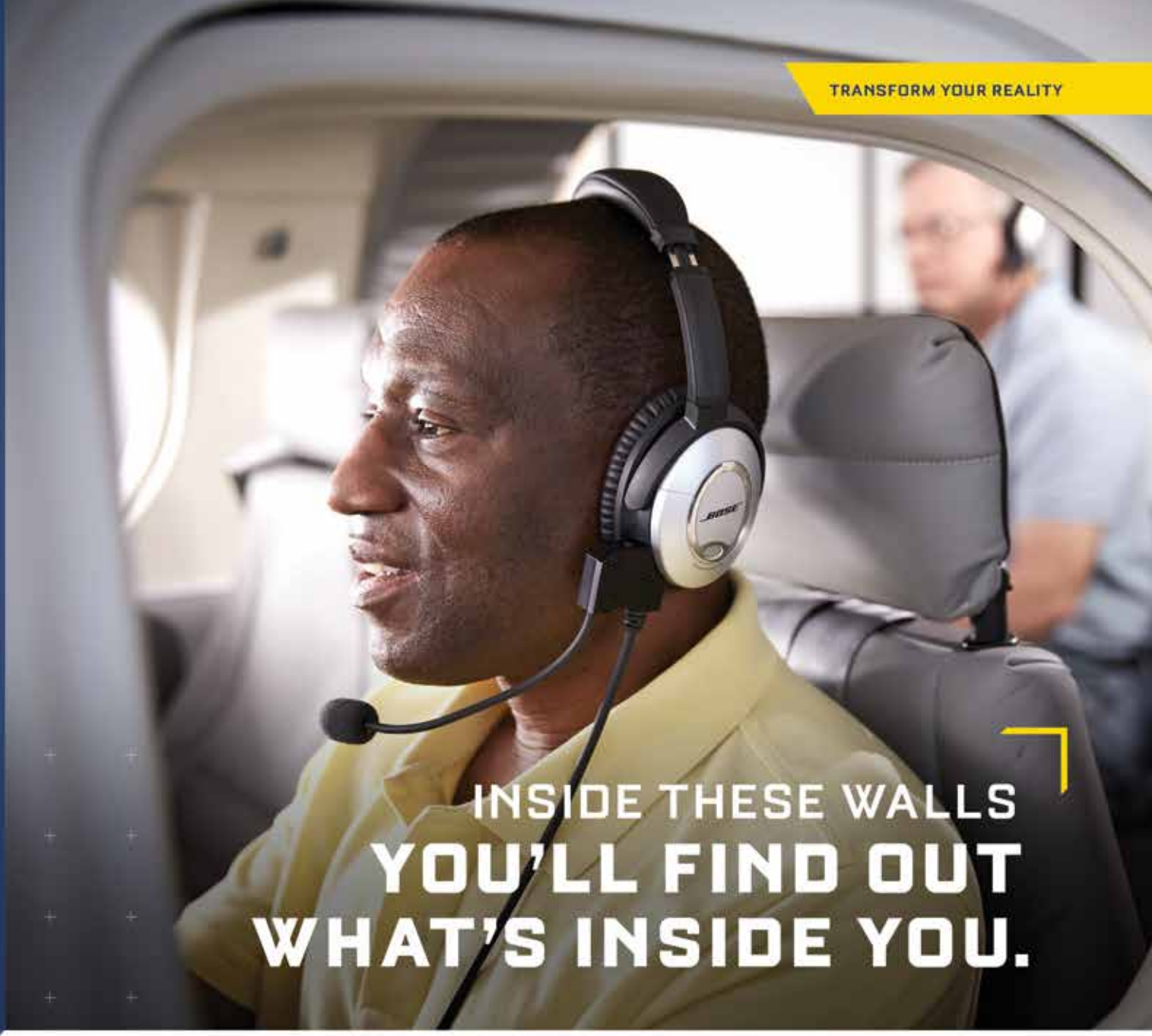

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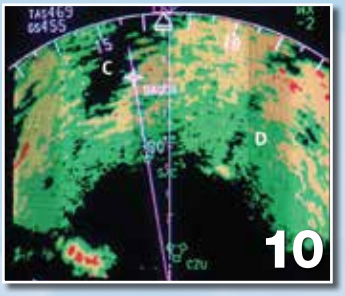

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The Numbers Game

How good are you at playing the numbers game, when flying? Like most pilots, you probably have some number-crunching aids to apply in common situations. You know, like so-many pounds of fuel for the first hour and so-many for each hour after, during cruise flight. Or, tripling the thousands to be lost to get the distance required to make a crossing restriction. For a reciprocal heading or runway direction, add two hundred and take away twenty, or vice versa. We all have these little aids in our toolbox.

Making the numbers come out right is both useful and satisfying, but we have to be careful to stay on top of our game, or we'll transpose and transgress. One of the worst offenders is mixing up altitudes and headings, like being cleared to fly "two-one-zero until reaching Flight Level one-eight-zero", and then flipping the clearance to fly 180 to FL210. I even transposed a frequency and transponder code the other day.

When it comes to loading calculations, I like to round up to get things even; empty weight plus max fuel gives us 1,000 pounds for the cabin, plus a little cushion. That sort of thing. The problem is, I fly more than one airplane, and I can forget which one is heavier and which one is lighter. Numbers only work if you have the right numbers.

Nevertheless, I like to work the numbers, both to understand what the outcome of a given situation will be, and to verify what the computer is telling me. It's important to keep your brain in the loop, rather than blindly accept a readout that can't be logical. Back in the day of the E-6B whiz-wheel, it was common for students to reverse the miles and time rings and tell me it would take two hours to fly a 90-mile trip. "Now, does that make sense?" I would respond, driving home, hopefully, the need to always verify results with common sense.

We've all probably had the experience of being handed off with an arrival vector that was obviously wrong, because we were going to a different airport than the one the controller had in mind. All the FMS and ATC computers in the world won't keep us on the right track if the wrong data is entered at the beginning. GIGO ("garbage in, garbage out") was the old programming admonition, and it's still true. Computers are great at keeping track of numbers, and humans aren't. But humans can analyze, based on experience and desired outcome, something computers lack.

That's not to say we want to abandon the convenience of immediate arrival fuel-remaining readouts or automatic V-speed calculations. But with great capability comes greater responsibility; we can now get the wrong answer much faster, if we don't watch the inputs. That's why I'll never give up the TLAR (That Looks About Right) method, which beats the WAG (Wildly-Applied Guess).

* * * * *

When I joined *Twin & Turbine* Magazine as Editor five years ago, it was with the understanding that I would stand down if a more worthy replacement could someday be found. That day has arrived; after this issue, I'll no longer be your editor. The good news is, we are fortunate to have former editor Dianne White coming back, effective with the January issue. Dianne knows the territory, from her past experience in this chair, and will be exactly what the magazine needs.

I leave with an accumulation of fond memories and a lot of friendships I hope to keep. Be careful out there.

LeRoy Cook

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Flying the Gra

More horsepower is the answer to a lot of aviation shortcomings. The venerable Cessna Caravan, after 30-plus years in production, has grown into a dependable workhorse, seen all over the world in utilitarian roles. But there's always a desire for a little more…payload, climb, takeoff capability…the usual list.

As with any good airplane, there are always going to be aftermarket add-ons to satisfy such desires. And such has been the case for the Caravan. Meanwhile, Textron Aviation's Cessna division could see the need for a further power upgrade for its stretched Caravan 208B, which had already gone from 600 shp to 675 shp with the PT6A-114 engines. This time, they added nearly 200 more horses, dropping in a PT6A-140 that churns up 867 shp. The result is the Grand Caravan EX.

Now, if you think you know Caravans, the sturdy servants of package hauling, bush flying, tourist trips, skydiving drop zones and seaplane operators, be aware that the old 208 has gone through several generational changes over the years. First, of course, was the lengthened fuselage of the windowless Federal Express cargo van, then the boost to 675 shp, initially in the longer Grand Caravan, then in both models. The Wipline amphibious floats transformed the Caravan into a fine waterplane, and the Garmin G1000 instrument panel brought the stodgy steam-gauge front office into the modern age. And Yingling Aviation's Oasis executive interior has created a posh environment for owners who don't intend to go roughing it.

At this point, you can have your Caravan just about any way you want it. The short-cabin Caravan 675 remains in the product line, if 340 cubic feet of cabin cargo space isn't required, but the longer Grand Caravan is popular for its ability to handle a combination of passengers and cargo.

Prior to NBAA BACE 2016, we were given an invitation to come to the Wichita, Kansas factory to sample the Grand Caravan EX, with its latest appointments. After waiting out some late-summer thundershowers, which

nd Caravan EX

Putting The Extra In The Cessna Caravan

by **LeRoy Cook**

gave us a chance to reacquaint ourselves with the 208B in the shelter of its hangar, the skies broke open with the beautiful Midwestern blue we had been promised.

As Jon Grief, demonstration pilot and training specialist, showed us around the big turboprop, we were reminded of both its size and its simplicity. For all its bulk, it's still a strut-braced high-wing fixed-gear single, like its smaller siblings in the Cessna line. When Cessna laid down the lines for the Caravan, it already knew a lot about making utility airplanes. Fixed gear is more rugged than retractable wheels, and keeping the wing out of the way of loading and obstructions is important. Cessna just scaled up the 206, for the most part.

To differentiate the 208B from the original Caravan, look for a bulge above the cockpit door, forward of the wingroot; the smaller 208 has the wing leading edge in that location. And there are seven side windows instead of five, thanks to four feet of extra fuselage length. A big plane needs a big powerplant, of course, and turbine power is the answer for needs of more than 350 horsepower or so. The Pratt & Whitney Canada PT6A was the choice from very beginning; the 867-shp engine in the Grand Caravan EX takes up no more room than the earlier engines, and it allows the gross weight to grow to 8,807 pounds, a slight increase over the old 208B to preserve useful load.

There are a few changes under the cowling with the new –140 engine; the fuel filter bypass indicator is now checked on the right side of the engine, rather than the left. The old messy EPA can, mandated to catch the small spurt of unburned Jet-A at shutdown, is gone,

SPECIFICATIONS
Cessna Grand Caravan EX

2016 base price	$2,527,900
Powerplant	Pratt & Whitney Canada PT6A-140, 867 shp
Seats	10-14
Fuel	339.1 gal.
Performance	
Certified ceiling	25,000 ft.
Max. cruise speed	195 kts
Stall speed	61 kts
Takeoff distance (50 ft. obstacle)	2,160 ft.
Landing distance (50 ft. obstacle)	1,871 ft.
Max. range (w/reserve)	1,125 n.mi.
Climb rate-sea level	1,330 fpm
Weights	
Ramp	8,842 lb
MTOW	8,807 lb
Landing	8,500 lb
Empty, std.	4,558 lb
Empty, as tested	5,394 lb
Useful load, std.	4,284 lb
Useful load, as tested	3,348 lb
Dimensions	
Wingspan	52.83 ft.
Height	8.17 ft.
Length	41.58 ft.
Cabin length	21.33 ft.
Cabin width	5.17 ft.
Cabin height	4.25 ft.

Information: *www.txtav.com*

replaced by a recycle system that simply burns the leftover fuel at the next start-up. And because our demo bird had the optional 300-amp generator (in addition to a standby alternator) there was extra ductwork to cool the big dynamo.

There's a lot of thought in the Caravan's design, oriented toward keeping it running out in the field. The lead-acid battery is easily serviced, or removed, by swiveling it away from the firewall on its mounting. The hinged cowling halves prop up to keep them off your noggin, and the cockpit doors have restraint rods to hold them from banging forward in the wind while you're working under the hood up front. The ignition exciter box is vital for starting, so an extra unit can be carried on a mount provided beside the primary box; all you have to do is switch three Cannon plugs to get home.

The massive three-blade Hartzell propeller has a diameter of 106 inches, with plenty of ground clearance; a four-blade McCauley Blackmac prop is an option. The well-braced nosegear is mounted right behind the propeller disc to protect the prop when negotiating dips in rough ground. The demonstrator's maingear, which flexes on long maintenance-free springs, was fitted with the optional 29 x 11-10 high-floatation tires in place of the standard 8.50 x 10 tires. For all its off-road capability, the subject airplane was equipped with a vapor-cycle air-conditioning system, very welcome in the tropics. Heating is provided by warm compressor bleed air, modulated by a heat exchanger.

Fuel is carried in integral tanks in the wings, all 335 usable gallons of it. It's usually burned simultaneously,

but individual valves allow one side to be shut off for parking or balancing. For the floatplane kit, inboard fuel fillers are provided to facilitate more convenient dockside refueling, reducing fuel capacity to 240 gallons.

For a single, the airplane casts a large shadow. The 280 square feet of wing area spans a tad over 52 feet; even the horizontal tail is 20 ½ feet wide. The rudder tip is just over 15 feet above the ground. Without its typical cargo pod under the belly, the Grand Caravan EX has a greyhound look on the ramp. Most operators will want the pod's four bins of extra space. The demonstrator aircraft had the TKS anti-icing system installed, with a 20-gallon tank of fluid installed in the second pod compartment; the tank is anchored to the fuselage structure, not the pod floor, and two pumps are installed to make sure the fluid is available when needed. About 3.4 hours of dispersal is provided in "normal" mode, with a full tank.

The massive wing has pitot/static masts on both sides, with two landing/taxi lights per side, and an optional weather radar pod goes on the right leading edge. To keep the stall speed in landing configuration from exceeding the 61-knots of Part 23 certification, extra-wide Fowler-type flaps are installed, with vortex generators molded into a rubber strip on the outboard section, aft of the roll-control spoilers, and an added Gurney strip keeps airflow attached at the trailing edge. The wing's upper surface has a row of vortex generators behind the leading edge. The ailerons alone are not sufficient for control at low speed, even with servo tabs, so a spoiler actuates with up aileron travel. Trim is provided on the right aileron, the rudder is trimmable and both elevators have trim tabs. To enhance pitch control, vortex generators are on the horizontal stabilizer. An external rudder lock handle, transplanted from the twin

Cessnas, lifts up to secure the rudder when parked; if not released, up elevator travel disconnects the lock.

Given the chest-high cabin floor, the obvious question is "how do you get in?" The Caravan opens up like a utility knife kit; passengers climb aboard via a two-piece three-step airstair on the aft right side of the fuselage, cargo is loaded through a huge 50-inch opening on the left side, the lower door hinged to fold flat for uninhibited access, and two crew doors up front allow pilots to enter even with the cabin stuffed full. Agility is a prerequisite; boarding ladders fold down to facilitate the ascent. Rain gutters are installed above all the doors.

Once Jon and I were ensconced, I raised my gangplank (er, ladder) to secure the door. The cockpit, like everything else about the airplane, is big; the three G1000 displays hardly make a dent in the panel space and there's enough room to slip aft between the seats. Looking behind, the double-club seating arrangement in our aircraft was only one of the possible interior arrangements (only the two crew seats are standard equipment). U.S. Part 23 regulations only permit nine passenger seats, but up to fourteen total seats are often ordered by export customers, utilizing an aft bench.

The spacious cockpit has a waterfall of circuit breakers on the left sidewall and panel, with starting and electrical switches nearby. The overhead is used only for fuel valves, loadmeters and rheostats, oxygen controls and a control lever for the standby flap motor, in case the primary motor goes out. The center pedestal has trim wheels, the flap switch, throttle, prop and condition levers, and a manual fuel control lever for emergency operation—everything except a landing gear handle.

Reliable mechanical standby instruments are arrayed above the power quadrant. Panel vents are fed by air inlets on the forward fuselage, while the cabin's overhead system is supplied by vents at the top of the wing struts. The big single exhaust diverts soot and gases away from the cabin.

The Garmin G1000 flight deck, with the GFC-700 autopilot, remains Textron's choice for the Caravan, given the back-country utility mission, where bulletproof reliability is paramount. Dual AHRS (attitude and heading reference system) and air data computers are installed, and we had terrain, traffic and Safe Taxi available, along with dual audio panels to avoid reaching across.

Firing up is typical PT6A procedure, except the generator comes on line automatically when the starter is turned off. Fuel boost on, we lifted the start toggle and observed 12% Ng before going to low idle with the condition lever. After accelerating to 52% Ng the starter was moved to off and avionics came on. Moving out of the ramp requires attention to the plane's size, even if it's a high-wing single. The big engine powered us along in taxi with little urging, and some restraint from Beta, or even reverse, was helpful. There's a lot of throw in the hefty rudder pedals; the Caravan can swing around in under 33 feet, if persuaded.

Pretakeoff checks included a test of the overspeed governor at 1,750 prop rpm and unlocking and deploying the manual inertial separator handle at 400 ft/lb torque to make sure it works. That's about it; the G1000 already had our flight plan to Wellington, Kansas, south of ICT. Flaps are normally set to "approach" for takeoff; earlier Caravans had detents for 10, 20 and 30-degree positions, but the EX was simplified to "app" and "full", the 20 and 30-degree points. Naturally, you can select any mid-position you desire.

Redline power is 2,347 ft/lbs., so moving the power-lever to about 2,200 was sufficient. Takeoff weight was just under 8,000 lbs. There's no need to delay liftoff, initiated at 74 knots. Flaps came up at 95 knots and Vy is 108 knots. The EX climbed out at 1,500 fpm; for quietness, climb procedure normally reduces prop rpm to 1,800 rpm, from the 2,000 rpm takeoff setting.

There was no reason to climb high for the short run to Wellington; we leveled at 4,500 feet. Reducing prop rpm to 1,600 brought the torque up to 2,145 ft./lbs., with a profligate fuel flow of 420 pph; most Caravan flights are carried out at 10,000 feet or so, where fuel consumption is reduced to about 360 pph. The IAS settled on 157 knots, for a TAS of 170; without

the belly pod, the EX will pick up another 10 knots.

Prior to landing, we conducted some handling checks, finding the big Caravan somewhat ponderous at cruise, which makes it a stable platform. Slowed down to pattern speeds, it lightens up considerably; however, the big pitch trim wheel must be spun when flaps are extended, which soon becomes an automatic reflex after moving the flap lever. A clean-configuration stall warning came on at 75 knots, breaking gently at 70; with full flaps, the warning came on at 65 knots and a little more enthusiastic break occurred at an amazing 55 knots.

The TCAS system warned us of inbound traffic, unseen but well announced. About 400 ft/lbs. slowed us to pattern speed and we came down the slot to the runway at 85 knots, finding the surface a little earlier than we thought, with the wheels far below the cockpit. Turnoff came in about 1,200 feet, with generous reverse thrust. Jon then suggested a short-field circuit, in which case we climbed out at a steep 86-knot Vx, easily achieving pattern altitude by runway end. This time, we approached at 80 knots, plunking the EX right on the numbers.

After sufficient enjoyment, we headed back to Wichita's Eisenhower airport, where a "short approach" was requested, a good opportunity to see how the Grand Caravan EX fits in with fast traffic. Carrying 150 knots so we could extend approach flaps when desired, we steamed around onto final with 125 knots, the full flaps limit, and bled off speed to make the first exit. No problem.

The powerful Grand Caravan EX is exactly what a lot of long-body Caravan operators have been looking for. It preserves the short-field capability of the other 208's, but can deal more successfully with high-and-hot conditions. And its friendly manners haven't changed. T&T

Whatever Happened

Today's pilots often place algorithims ahead of the raw data

More and more pilots today are relying almost blindly on an array of information fed to them by a computer. What is presented to them, after being massaged by an algorithm, they accept; information from raw nature is not analyzed as it used to be years ago. The FAA warned us about that shortcoming 25 years ago inAC 60-22. Look it up.

The short of it is, you cannot dispatch a long-haul flight with only TAFs, NOTAMs, Weather Depiction and wind aloft charts, and some satellite pictures. Didn't you ask for the area forecasts, SIGMETs, turbulence, icing, high ice water content, and lightning charts? What do you know about the geography of the area over which you'll be flying? Some time ago, I asked a colleague from a well-known international airline about his weather radar. Basically, I wanted to know his make and model, and he couldn't answer that simple question, nor could his other crewmembers. "As long as I see some colors on the screen, I'll avoid them", he said. No mention of using airborne weather radar as a crosscheck on navigation or its value in maintaining situational awareness and separating terrain features from thunderstorms.

You may say I'm an old fashioned pilot that never got used to "new technologies". You would be wrong. I like new gadgetry, but I always check it against other sources. Let me explain; this example comes from my last flight, non-stop from Miami to BuenosAires.

Of course, during the preflight briefing I used all the information I had at hand, including the charts already described.

South To Buenos Aires

The flight was quiet until south of Jamaica. Then, far in the distance some lightning was seen; first, some with a red tone, then turning whitish. We were at FL330 over OTAMO, the exit point from Jamaica. Note in this photo the scatter of little echoes off to the left. That's sea clutter and it indicates to me the surface wind is from the south. Since I'm above FL300 over the Caribbean, why do I care? It's just for the 6-million-to-1 chance that I might have to ditch. It has happened you know. It's not something I worry about, but just something called playing the "What If?" game. Should that once in 6-million-to-1 chance occur, by knowing what the surface wind is doing I am prepared to react calmly, rather than in a panic of not knowing what to do.

Between KOVAB and MORGI, right of course, there is a string of echoes. There are no islands in that area so it must be a string of storm cells. Abeam of BAQ, to the left, there is another green something at around 200 nm. This one is particularly hard to say whether it's storm or terrain...except that in flying over the area many times before I know that land is a bit farther away. It must be weather.

Note that in this photo I have TILT at -2° (upper right corner). I have three reasons: (a) as altitude increases, storms over the sea lose reflectivity faster than over land, so if you want to see them in their true reflectivity, TILT has to be set a bit lower, and (b) since my antenna has a 3.5° beam, I know from long experience that everything coming into the 30 NM ring should be avoided to prevent an encounter with a CAT Bubble, and, lastly, (c) with that TILT selection in flight above FL290 the ground is painted from about 80 nm and, therefore, because of the looking-down angle, any echo inside 80 nm must be a tall thunderstorm or a very tall mountain.

See the dent on the left? That's Santa Marta Bay, which makes it clear to me the echoes just to its left are thunderstorms. There are no mountains in that area.

We flew a bit farther south, 40 nm, until we started our deviation between KOVAB and MORGI after the storms on the west side of Santa Marta Bay started to fade away.

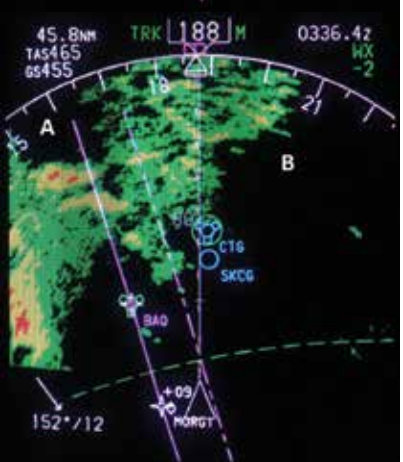
to Airmanship?

by **Captain Guillermo Rubino**

Nevertheless, we decided to steer well clear of them; we didn't want to get trapped by a terrible "CAT Bubble".

Abeam BAQ I circled in white (in photo 6) a small green echo. Any idea of what it is? That's the Route 90 causeway that ties Barranquilla with Cienaga and points farther east.

After flying 37 nm closer, another green appeared at the far end of the screen, right on our track at 240 nm, and the ones in the BAQ area seemed to be stronger and extending to the right (both marked in red). To the left, abeam BAQ, there are other greens (white arrow). Those are a mixture of ground and clouds. That's the Sierra de Santa Marta area.

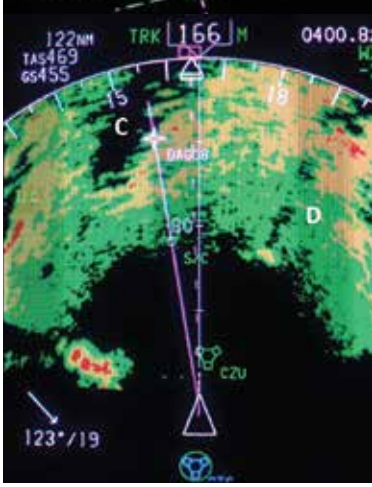


Farther south, the picture became clearer. Shall we go left or right of course? Can we safely fly the gap between BAQ and echoes to its left? Although a left deviation through that gap may have been shorter, swinging right around CTG offered a clearer path so we went right. But, for ATC reasons, we had to wait until passing MORGI to begin the deviation.

As we progressed south, we saw that nice shadow, marked with a white "A", cast by the storms to the left at about 120 nm. But the question now is, why we do not have ground clutter in the area marked with a "B"? To answer that you have to know some geography. There is only water there. What we see is somewhat hilly terrain ahead, then shoreline and finally water to the right.

With TILT still at -2°, it is perfectly clear that we had to avoid the green area to the left of our course. Just remember, green means the chance I may encounter light turbulence is 100%, moderate between 5 and 20%, and severe almost NIL. But those chances are dependent on the highest color in the echo. Meaning, if there is any red, stay away from the ENTIRE echo, yellows and greens as well as the red! (So said thunderstorm scientist Jean T. Lee; do you remember him from the "Rough Rider" project?).

Note the green echo beginning at 25 nm over on the left and by the wind arrow down in the lower left corner. Careful scientific research has shown that lightning is most likely lurking in that green stratus cloud downwind of the storm. Stay away from it if at all possible.



After passing CTG (Cartagena) we decided it was time to get back on course and a direct to LET (Leticia) was requested. This is an interesting picture in which I marked two shadows; "C" and "D". Can you tell which one is produced by a storm and which one not? Once again, geography knowledge gave me a helping hand. "D" is pretty simple; the shadow extends straight out from my radar as a radial. That's a radar shadow behind a weak little echo. But the shadow at "C" shape is different. It's slanted across the display at odds to the expected radial, therefore it's not a radar shadow, it's a terrain feature. In this case, it's the Magdalena River Valley. Again, I recognize it from my knowledge of geography.

By the way, note that the beam is scanning the ground from 80 nm outward. That's the "Parked" position for TILT. It's where TILT should always be if you aren't doing something else with it. Why? As mentioned earlier, with the ground being scanned from 80 nm outward, any echo that intrudes inside that 80 nm range has to be very tall, because of the downward-looking angle. Therefore, it's a tall thunderstorm.

So, how about the reds you see on the left? Can you identify any of those features that will allow you to catalog it as a dangerous line of storms?

It is very important to note that we were flying over an area covered by oceans, swamps and lakes. There is plenty of water to feed many, many storms. From then on, our flight to BuenosAires was just a piece of cake; clear sky, no fogs.

Details Matter

I'm telling you how I dealt with these storms because I have seen too many pilots flying without paying proper attention to those details - details that will make a big difference when it comes to dribbling around Cbs. It's called "Airmanship" or more exactly "SuperiorAirmanship". I wasn't born with it; I accumulated it by paying attention to what I see out the windshield and comparing that to my radar. That doesn't take as long as you might suppose. It's just practicing good airmanship.

Here is a nice definition, taken from Skybrary (*http://www.skybrary.aero/ index.php/Airmanship)*: "Airmanship is the consistent use of good judgment and well-developed skills to accomplish flight objectives. This consistency is founded on a cornerstone of uncompromising flight discipline and is developed through systematic skill acquisition and proficiency. A high state of situational awareness completes the airmanship picture and is obtained through knowledge of one's self, aircraft, environment, team and risk."

Maybe you have one of those new fancy radars, fully automatic, and you think you don't have to worry about anything except how to switch it on and avoid the red. Let me tell you, that's a mistake, and woe to you and your passengers.

Finally, here's a photo of the BuenosAires sky at dawn at the end of another safe, relaxing flight, thanks mostly to knowledge of geography and use of radar to verify, verify, verify. T&T

Tis the T-eason.

It's time to have the dreaded LOW-T conversation. If you're heading into your fifties or sixties and feeling a general lack of energy or desire to have sex, Better Life age management will work closely with you to develop a custom health plan to get you feeling great again. It's never too early or too late to get started, so if you believe you may be feeling the effects of low-T there's no better time to start your success story than right now.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The 61.55 Currency Ride

With A "Long Armed" PNF

By **Kevin Ware**

We are eastbound out of BVS, just north of Seattle, headed for Spokane (GEG) on our way to FL 450 in a Lear 40, with the airplane very light and climbing at over 4,000 feet per minute through 17,000. Just for the experience, I have been hand flying since takeoff, and I am trying to be on top of my game, since we are using this flight as an update for my soon-to-expire "61.55" currency. Fifteen seconds later, we shoot through FL 180 doing nearly 60 mph in the vertical and, consistent with the recommended cockpit resource management (CRM) procedure, I ask TL, the pilot not flying (PNF) sitting to my right, for that checklist.

Unlike airline or Part 121 operations, where, by necessity, all pilot actions are very standardized, in Part 91 flying there's a lot of individuality in how flight crews work together. On this flight, I am fortunate to have TL as the PNF, but he's also conducting my 61.55 checkride. TL is regarded within our pilot group as someone who knows a Lear 40 absolutely cold, and when acting as PNF he just takes care of whatever needs to be done with every switch, dial or lever in the cockpit, regardless of its location, as soon as the situation dictates. For this reason, he is sometimes referred to as "Long Arm Lewis".

All this being the case, as soon as I request the FL 180 checklist, there materializes into my line of vision a long arm covered by a brown shirt sleeve, reaching way across the panel to manipulate the required knobs on the left side. All I have to do is sit there with my left hand loosely on the control wheel, taking an occasional jab at the trim switch to keep our airspeed at 275 knots. Some pilots resent all the extra help, but not me. My take on CRM is that I should happily use all resources available, particularly when on a FAR 61.55 check ride in an airplane I have not flown for a while.

FAR 61.55 is the applicable regulation dealing with currency in jet aircraft for those planning to fly as SIC (second in command), and it can be used even by pilots already type rated in the aircraft. It is almost an FAR oddity, in that it only requires you to do four relatively simple things annually in order to be current:

1. Review and be familiar with operational information specific to the aircraft.
2. Complete three takeoff and landings to a full stop as sole manipulator of the controls.
3. Demonstrate engine-out procedures while executing the duties of PIC.
4. Demonstrate that you have had crew resource management (CRM) training.

The really nice part is that, if you are still legal, all of this can be done while the airplane is on a trip somewhere, which vastly reduces the cost. The needed logbook endorsement can also be signed by a "qualified management official" within the company, as opposed to a designated pilot examiner (DPE). On this trip, TL is the "qualified official", and although characteristically "long armed" and helpful, he is taking pains to see that we follow the requirements of FAR 61.55 to the letter.

In spite of being cleared to FL450, I decide, given our proximity to GEG, that we might as well level off at FL320. We inform the Seattle Center controller of this, and he responds by clearing us directly to Spokane. TL is punching the FMS buttons even while the controller is still speaking, hits "direct", looks at me briefly until I nod, then pushes the NAV button on the autopilot panel, which starts the airplane on a 20-degree turn direct toward the airport. Since we are still at FL 320, I begin thinking about heading down, but find the PNF

is already ahead of me, with the ATIS frequency dialed in, and the VNAV display already up on the FMS. GEG is clear, but has changed its runway to 3 from 21, the one I had initially programmed. More prompt button pushing by my long-armed PNF, and we are quickly set up for the ILS to 3. However, a few minutes later, I can see the airport from 20 miles out and decide to save some time by just hand-flying the approach visually, so we cancel IFR and I turn off the autopilot in order to set up for a wide left-base entry.

It's always interesting to make vertical path decisions purely on the basis of how things look out the window from some distance away. As it turns out, I miss it slightly; when we roll out on a six-mile final, all four of the VASI lights are white. I pull the power all the way back, call for full flaps, and as soon as their drag drops the IAS below 150, ask for the gear. Fairly quickly, one of the white VASI lights turns red, and when another starts to turn pink I push in power to maintain Vref, trim out any control pressure, briefly take my hands off the wheel, and say to TL…"that looks about right, what do you think?" He replies, "yeah, looks fine to me, but you might want to stay five knots above Vref; we have lots of runway and it will give you a little more time in the flare." Good idea.

Using the helpful landing hint, I touch down gently and we make exit G3 about halfway down the runway, which happens to be almost in front of the FBO. The tower clears us to Signature Flight, even while still on tower frequency. I call for the after-landing check list, which TL, with a bit more of "long arm" reaching, has already about half completed. The ramp guys have us park right in front of the FBO door and lend us a van to get dinner at the nearby Longhorn Steakhouse, where we get seated right away. The trip and check ride are going very well indeed.

It is well after dark by the time we get back from dinner. The Lear 40, all white and floodlit, with its engines looking like they are half the diameter of the fuselage, shines brightly just outside the FBO door, surrounded by orange traffic cones. We drink coffee and yawn until our VIP pax finally arrives at 10:30 and, while I get the clearance back to Seattle, TL briefs our pax and closes the door. As we taxi out, the controller voluntarily offers runway 21, even though runway 3 is being advertised as the active on the ATIS. That gives us a nearly straight shot at our destination of Boeing Field (BFI), and with a Lear's low altitude burn rate, probably saves well over what we paid for dinner in fuel… good thinking on the controller's part.

Ten minutes after takeoff, we are at FL 320 and shortly thereafter can see the entire Puget Sound basin from Olympia to the Canadian border, all lit up like a flat Christmas tree. Somewhere within that mass of light bulbs there is a beacon and two parallel lines of lights belonging to the runways on Boeing Field. The controller informs us to expect a visual approach to runway 31L, which, even after a fair amount of visual groping in the sea of lights below us, we just can't make out. So I just turn inbound when the needle centers on the ILS that "long arm" has conveniently already set up.

We land and drop off our passenger at Clay Lacy, then immediately take off again. Five minutes later we are at 4,000 feet heading directly for BVS, which is just about 20 minutes away. I have the airplane on autopilot, with heading and altitude mode activated and pulling about 65% power, with the airspeed just below 250 knots. Everything is going just fine until I notice the airspeed slightly fading. This puzzles me until I see TL has used a "long arm" to sneakily reduce the left engine to idle.

An engine failure at reduced power is not commonly practiced and can sometimes be initially confusing, because you do not get all the other cues, such as engine noise changes, or sudden deceleration and rotation about the vertical axis. In addition, when an engine operating at low power goes to idle, there are no warning lights and the autopilot in a Lear 40 does a remarkably good job of quietly sacrificing airspeed in order to maintain heading and altitude. Fortunately, I clue in to what is happening before anything bad happens, click off the autopilot, push in power and rudder on the right side, announce a left engine failure and ask for the checklist, which TL again handily takes care of, using his "long arm" method.

By the time we have finished with the engine-failure exercise we are near our destination. The conditions are CAVU and I elect another visual approach, but this time I cheat slightly because I know the location of OPIXE, the IAF (initial approach fix), by ground reference, and so I just head the airplane to that location while descending to the crossing altitude of 3,000 feet. When we get there and turn from base to final, the VASI lights show two white and two red, like magic. The last landing of the required three is completely uneventful, although I do have to fuss more than I would like, getting the reverse-thrust levers stowed.

Ten minutes later, we are standing at the counter in the office doing the paperwork when "Long Arm Lewis" reaches way over from the other side to sign off my FAR 61.55 logbook entry…done for another year.

There is a lot to be said for a PNF with "long arms". T&T

Kevin Ware is an ATP who also holds CFI, MEII and helicopter ratings, and is typed in several business jets. He has been flying for a living on and off since he was 20, and currently works as a contract pilot for several corporations in the Seattle area. When not working as a pilot, he is employed part-time as an emergency and urgent care physician for a large clinic in the Seattle area.

NBAA-BACE 2016 Wrap-Up

By **LeRoy Cook**

Signs of the general aviation recession were hidden by optimism at the 2016 National Business Aviation Association's convention, held in Orlando, Florida in early November. The NBAA show has been internationalized with the added "BACE" (business aviation convention & exposition) appellation, making it officially the NBAA BACE. As the worth of business flying spreads around the globe, sparked by North America's example of bizav, the European EBACE, Latin American LABACE and other such shows have continued NBAA's targeted convention and trade show model. As the U.S.'s 6th largest trade show, the annual NBAA meeting alternates between the venues of Orlando and Las Vegas.

Orlando's weather couldn't have been better this year, after Hurricane Matthew blew past just a month or so earlier. A total of 129 aircraft were on static display for the show; nine were towed the ten miles from Orlando International airport in the dead of night so they could be exhibited in the Orange County Convention Center, along with six helicopters, and the rest were crowded onto the Atlantic Aviation ramp at Orlando Executive airport. Over 1,100 exhibitor spaces were packed into the OCCC's main hall.

"At the convention center and the airport alike, exhibitors and attendees have told us that this year's NBAA-BACE was a resounding success," said NBAA President and CEO Ed Bolen, following the show. "The activity level was high and the enthusiasm was strong. Equally important, the show provided a reminder of the industry's size and significance in the U.S. and around the world."

Notable Speakers

As always, NBAA offered educational and safety-oriented seminars throughout the show, along with general sessions featuring notable speakers and presentations. Day One's opening session had remarks from Congressman Sam Graves, leader of the General Aviation Caucus, followed by U.S. Customs and Border Protection Commissioner R. Gil Kerlikowske, relating how cooperative efforts of business aviation and CBP had eased many travel requirements. Among other CBP accomplishments, there are now 15 pre-clear locations, such as Shannon, Ireland, that allow aircraft to clear customs before entering the U.S., and a procedural change so that CBP no longer requires APUs to be shut down while an aircraft is being processed for entry.

Sharing the opening session was author and historian David McCullough, whose latest book "The Wright Brothers" portrays an intimate look at the life and times of the fathers of controlled powered flight. McCullough related how the Wrights efforts were supported by strong family ties and perseverance in the face of failure. He quoted the Wrights as saying "No bird ever soared in a calm." McCullough was also feted on the second day at NBAA by receiving the Combs Gates Award from the National Aviation Hall of Fame, an unexpected honor but well deserved.

The Second Day's General Session was more political in tone, in keeping with the looming history-making election. Representative Bill Flores of Texas and Senator Bill Nelson of Florida told how bi-partisan work in the Senate helped thwart plans for ATC privatization, user fees and other mischief. Senator Nelson, who flew on the Space Shuttle, was presented with NBAA's Meritorious Service to Aviation Award. However, the most heavily-attended presentation was one featuring remarks from political power couple Mary Matalin and James Carville, whose across-the-fence repartee always brings insight into the workings of the political process. By the time you read this, of course, their predictions of a Presidential election full of surprises will be history.

News At The Show

There are always notable announcements forthcoming at NBAA. The major surprise on Mondy was the presentation of an FAA type certificate to Cirrus Aircraft for its SF50 Vision personal jet, the first single-engine jet to achieve such status. While not exactly a business aircraft, the 6,000-lb. all-composite Vision seats six or seven and cruises at 300 knots up to FL280, pushed along by a Williams FJ33-5A fanjet. Deliveries are to begin in December. Commonality with the piston-engine Cirrus airplanes includes a ballistic emergency parachute, sidestick controls and Garmin's G3000-based Perspective touch-screen avionics suite. It has reportedly attracted

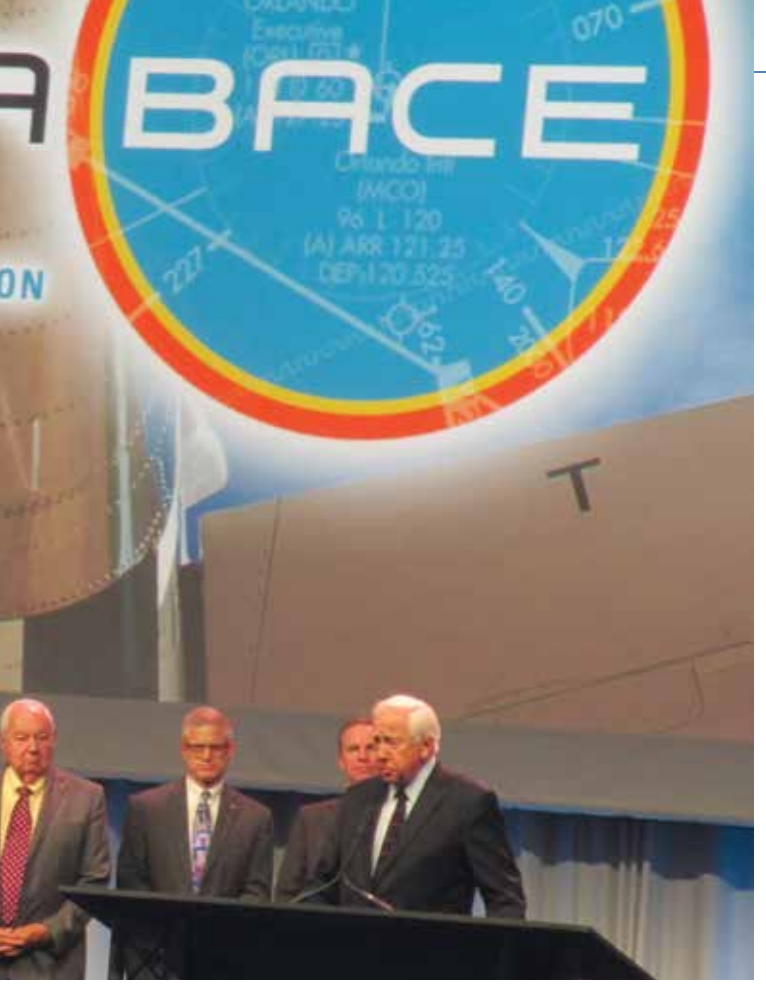
600 orders and production will be steadily ramped up to reach a rate of one aircraft per week by the end of 2017, in order to meet demand. The Vision is priced at $1,960,000.

At the other end of the scale, Embraer brought its $26-million redesigned Legacy 650E to the show, featuring Honeywell Primus Elite avionics, and Textron Aviation displayed its prototype of the Citation Longitude mid-size jet, fresh from its first flight, with an announcement of performance increases over initial projections. A full cabin mockup of the Citation Hemisphere also attracted much attention. The Honeywell Primus Epic cockpit has been selected for the Hemisphere, and it will be powered by the Safran (formerly SNECMA) Silvercrest engine.

On Day Two, Pilatus flew its Number Two PC-24 "Super Versatile" jet to the show for a short visit; it was already based in the U.S. for environmental and avionics testing. Some 1,000 hours have been flown on the PC-24 program, in 600 flights.

In other news, Duncan Aviation is testing a Winglet Technologies transitional winglet retrofit for the Citation Sovereign and FlightSafety International announced the availability of Master Level Advanced Training for King Air, Citation, Pilatus PC-12, Falcon and Gulfstream pilots.

Sales announcements at the show included a Textron Aviation transaction involving the sale of three Citation X's to long-time customer Schweitzer Engineering Laboratories, and Piaggio's sale of five Avanti Evolution airplanes to West Coast Aviation Services. Daher announced the recent delivery of its 800th TBM turboprop, and the company is expecting to deliver over 50 TBMs in 2016.



The vitality of business aviation was apparent at Orlando, despite the challenges of a flagging global economy and political uncertainty. No other transportation system can serve the needs of corporate travels with flexible response and broad access. Make plans now to attend the 2017 NBAA BACE, to be held in Las Vegas October 10 to 12, 2017. T&T

by **Kevin R. Dingman**

Let It Snow

Above average snowfall is forecast

> *"A day without sunshine is like, you know, night."*
>
> *– Steve Martin*

For all life on earth, nothing is as fundamental as the length of daylight. The tilt of the Earth's axis affects the duration of daylight and plays a major role in our weather. It's tilted at an angle of 23.44° to the plane of its orbit and because of this, at certain times during the orbit, it's dark longer and we get cold weather. It's a time of the year that produces fast moving fronts, icing conditions, strong and gusty winds with drifting snow and it's like, you know, winter.

It took me a lifetime, but I have a nice airplane, a private hangar with an office, pre-heat equipment out the wazoo and reliable snow plowing. For this pilot, who keeps an artificially-lighted Christmas tree up all year long and cold weather gear at the ready, it's a great season. My dad raised me to be an outdoorsman, to love the seasons. I have clothes for rain, cold, snow and wind – some might even get me through a torrent of frogs and locusts. Cold never bothered me as much as does heat and humidity. Just as southerners think we're crazy to put up with cold and snow shoveling, the heat, humidity and bugs endured in the south are perplexing to a northerner. That's why God made air conditioning – y'all say. And that's fine if you like living in a cubicle indoors, but not me. Part of why we fly is freedom and the view. Let not a little thing like planetary tilt interrupt our flying schedule.

Tilted

In the northern hemisphere, winter solstice always occurs around December 21st or 22nd. In the Southern hemisphere, it's around June 20th or 21st. This year, it's on **December 21st at 5:44** A.M. EDT (10:44 UTC) and marks the official start of winter in the Northern Hemisphere and summer in the Southern Hemisphere. Winter solstice is the day with the fewest hours of sunlight during the whole year. Our shortest day this winter will last just nine hours and 15 minutes. The word solstice comes from the Latin words for "sun" and "to stand still." In the Northern Hemisphere, the points on the horizon where the sun rises and sets advances southward each day and the high point across the sky, which occurs at local noon, also moves southward each day. At the winter solstice, the sun's path has reached its southernmost position. The next day, the path will advance northward. However, a few days before and after the winter solstice, the change is so slight that the sun's path seems to stay the same, or stand still – to "solstice." The sun is directly overhead at high-noon on winter solstice along only one planetary marker: the latitude called the Tropic of Capricorn – it's a bit south of the equator. Now that we're astronomically up to speed about why it's so cold and dark cold outside, onward to its relevance on our operations.

The Forecast

Temperatures in the North cause nostrils to momentarily stick closed and thin layers of snow will create a squeaky noise when you walk. Flying can be a bit more work for pilots: snow removal and preheating are added to the preflight list, taxi speeds are slower and low visibilities can be widespread. On the other hand, it's the kind of weather the airplane loves: cold, dry air for the motor to breathe and tightly-packed molecules for the wings to finesse into lift. Compared to the hot, humid days of summer, it's ideal. Traveling in our airplanes exposes us to wide-ranging temperatures and weather. This year, the National Weather Service is forecasting above-average temperatures and below-average precipitation for the southern part of the U.S. People in northern states should expect below-average temperatures and above-average precipitation. Forecasters expect the remaining U.S. to experience an average winter. The biggest wintertime changes for us occur during planning and preflight: preheating motors, adding a fuel system icing inhibitor (FSII) like Prist to our jet fuel when needed, using deice fluids, calculating holdover times and selecting alternates. When inflight, we'll be using fuel heat and the anti-ice equipment. On arrival, flying low-visibility approaches and computing landing distances will be the norm and we'll be diverting a couple of times. You've heard it all before, but stay with me; here comes the mandatory wintertime preflight stuff:

The Laundry List

Engine Oil – Check your aircraft manual for proper weight oil to be used in low temperature ranges. Warm it up before you start the motors. Use an oil cooler baffle if, and when, allowed.

Oil Breather – Assure that the breather system is free of ice. When crankcase water vapor cools, it condenses in the breather line and can freeze and clog. A number of engine failures have resulted from a frozen crankcase breather line. A clog can cause pressure to build up, sometimes blowing the oil filler cap off or rupturing a case seal, which causes the loss of the oil.

Hose Clamps, Hoses, Hydraulic Fittings and Seals- inspect all hose lines, flexible tubing, and seals for deterioration and security.

Cabin Heater – Each year, accident investigations reveal carbon monoxide as a probable cause in accidents that have occurred during cold weather. It's critical that a thorough inspection of the heater system be made to eliminate the possibility of carbon monoxide entering the cockpit or cabin. A pressure decay test on combustion heaters is mandatory for most and a great idea for the rest.

Control Cables – Because of contraction and expansion caused by temperature changes, control cables should be properly adjusted to compensate for the temperature changes.

Oil Pressure Controlled Propellers – Propeller control difficulties can be encountered due to congealed oil. Use caution when intentionally feathering propellers for training to assure that the propeller is unfeathered before the oil in the system becomes congealed.

Batteries – Wet cell batteries require special consideration during cold weather. Test, clean and charge the battery. A healthy battery should need charging only after several weeks of disuse. If the battery is two or more years old, it will probably need to be replaced.

Wheel wells – During thawing conditions, mud and slush can be thrown into wheel wells during taxi and takeoff. If frozen during flight, this mud and slush can create landing gear problems. The practice of recycling the gear after takeoff should be used as an emergency procedure only. The safest method is to avoid these conditions with retractable gear aircraft or to leave the gear extended an additional 5-10 seconds on takeoff when feasible. Make sure your anti-skid system is armed for takeoff and landing.

Inspect deicing equipment – Check deicing boots for cracks, cuts and holes. Cycle the boot system once each week to prevent stiffening of the rubber, which can shorten boot life. Use only cleaning and performance-enhancing products approved by the manufacturer of your system.

Preheat – Use a heated hangar when available both at home and on the road. A couple of hours above 50° F should be good. If not, oil pan heaters, kerosene-fueled torpedo heaters and individual electric-type cylinder heaters are good. Don't leave the aircraft unattended, and keep a fire extinguisher handy. Don't place heat ducting so it will blow directly on parts of the aircraft such as upholstery, canvas engine covers, flexible fuel lines or oil and hydraulic lines.

Been There, Done That

An employer over-primed an engine and caught it on fire, and I've done the same myself. I've had a wheel brake freeze, windshield heat failure, CADC probe heat failure, fuel heat failure, wing heat failure and one blade of prop heat failed. I've seen deicing personnel accidentally skip half of my airplane and have had fluid holdover times expire. Minimum takeoff fuel has been reached waiting in long lines. Make like a Boy Scout and be prepared. A wintertime addition of ten or twenty minute's fuel above your summertime number is prudent. List an alternate (or two) if the weather is marginal or if the arrival airport has only one approach or one runway – snow plowing will close runways on a regular, and unpredictable, basis. Be ready for holding and a missed approach. Ask for braking action reports (use the Mμ chart from Owl Snot, *T&T* April, 2016) and calculate landing distance on every approach. Allow extra time to get yourself and the airplane ready. Ramps will be slippery – walk and taxi slowly. Airfield surface markings and signs are buried, covered or obscured, making incursions more likely. Aborting a takeoff on a slippery runway due to an incursion will exercise your judgment and adrenal glands.

This time of the year, dawn comes later, and dusk earlier. Light may be fundamental to life, but for us so is currency and proficiency. Just because it's cold and dark, don't solstice, son – get out of the tilted chair in your cubicle and go flying. Both you and the airplane need to stay aeronautically limber despite our astronomical condition. A condition that is a bit more work. That 23.44° tilt will, after all, make it, you know, like winter. T&T

Kevin Dingman has been flying for over 40 years. He's an ATP typed in the B737 and DC9 with 22,000 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 Dinger10d@gmail.com

Twin Proficiency:

Missed Approach: The First

300 feet to go…hand on the throttles (you're going to have to pull them back if you see the runway, or push them forward if you don't). 200 to go… localizer centered, glideslope centered. 100 to go… still nothing but gray outside. Missed approach point: no runway environment in sight, miss the approach….

You've now entered what is arguably the highest workload phase an instrument pilot can face—the missed approach. There's a lot you have to do to transition from a descent to a safe, consistent climb. How can you minimize the workload and manage a safe missed approach?

The first 400 feet

The standard missed approach is designed around a 200 ft/nm climb gradient. The minimum rate of climb you'll need to maintain this gradient depends on your ground speed.

Ground Speed (kts)	90	100	120	140
Vertical Speed (fpm)	300	417	500	583

Minimum climb rates required to achieve 200 ft/nm climb

For pilots of most twins these climb rates are easily achievable. But if your airplane is heavy, density altitude is high, or engine power is reduced, you may have to decide before beginning an approach if you'll have the climb capability to miss the approach. In fact, the minimums for many approaches, especially in mountainous terrain, are driven not by obstacle clearance for the approach inbound, but the need for terrain or obstacle clearance on the missed approach.

At the minimum 200 ft/nm climb gradient you'll be two miles from where you initiated climb before you're at 400 feet. There's a lot going on in the first 400 feet climbing out from a gray hole so close to the unseen ground.

Fighting denial

Pilots are, by nature, can-do people, and this manifests itself in an expectation that we will be successful in flight operations. We tend to expect we'll be able to land out of every approach, and may not think much about the possibility of missing the approach until we find ourselves at minimums with no runway environment in sight. "Missed approach denial" will cause indecisiveness and delay exactly when you don't have time to dawdle.

We need to redefine "success" in completing a trip as safe arrival at a destination that meets minimum standards of weather, fuel and personal safety margins. Most times, that destination will be the one originally planned, but on any given flight "success" may mean landing somewhere else. A mindset that successfully flying an approach means flying the procedure to FAA and personal standards (including the missed approach if needed), and not landing on the runway at the end of the approach, will go far to fight missed approach denial.

Set-up for success

Missed approaches are risky when workload exceeds the pilot's immediate capability, so by reducing pilot workload we have a much greater margin of safety.

Think about what you need to do at the missed approach point if the runway environment is not in sight. At the very least, you need to:

Missed Approach Checklist

When beginning a missed approach:

1. Missed approach…COMMIT. Once you decide to miss, don't try to "salvage" the approach or circle to land if you subsequently break out. If you start the miss, fly the miss.
2. Autopilot…DISENGAGE. Use the flight director "go around" feature if equipped.
3. Power…ADVANCE. Smoothly advance power to the recommended missed approach setting
4. Pitch…ESTABLISH. Establish the recommended pitch attitude or, if no recommendation exists, the same initial climb attitude you use on takeoff.
5. Wings…LEVEL. Fly runway heading to at least 400 AGL before making any required turns.
6. Flaps…AS REQUIRED. Begin flap retraction as required or recommended in the flight manual or POH.
7. Positive rate of climb…CONFIRM.
8. Landing gear…RETRACT as applicable.
9. Cowl flaps…OPEN as recommended, if equipped.
10. GPS…SUSPEND or OBS MODE as applicable.
11. Navigate…AS REQURIED once established in a climb
12. Report…REPORT MISSED APPROACH when able.

by **Thomas P. Turner**

400 Feet

- Begin a climb, initially straight ahead
- Configure the airplane for climb
- Prepare to navigate the published or assigned procedure
- Report the missed approach (and, if you're a stickler for regulations, the reason you were required to miss)

Let's look at each of these requirements, and consider what can be done to reduce workload.

Advance power: If possible, set the propeller controls for climb power before reaching the missed approach point. That way, if you need to climb out you have effectively made your engines a single-lever power design: move the props to climb before final let-down.

What about mixture control? Many pilots fly at lean-of-peak (LOP) at least some of the time. Common LOP practice is to set mixture for cruise and leave it there through landing. A mishap trend is emerging, however, where LOP pilots are having power failures at the beginning of a go-around or missed approach. If the mixture is very lean, advancing the throttles (adding air) causes it to go leaner still, reducing power output on a fairly steep curve. If the mixture is not advanced sufficiently the airplane will continue to descend, and the engines may quit altogether when you need them most…in IMC only a couple of hundred feet above the ground. Sure, some instructors teach advancing the mixture first, then throttle, when missing an approach. The principle of workload reduction suggests, however, that you advance the mixture controls before beginning your approach, so there's one less thing

to do if success mandates flying the missed approach.

Climb straight ahead: Many missed approach procedures are quite complicated, but they all begin the same way: climb straight ahead before turning. Keep the wings level as you advance power. If the airplane is properly trimmed, pitch attitude will trend toward that needed for climb. "Proper" trim would be one that results in an indicated airspeed close to optimum for climb. There are any number of reasons to fly this airspeed or that for an instrument approach. The best rationale (in my opinion) favors flying at the speed at which you'll climb on the missed approach. That way, when you advance power and reconfigure the airplane for climb, it'll already be trimmed for the missed approach airspeed. It'll tend to do exactly what you want it to in this high-workload operation.

Configure for climb: Once power is up and attitude is right, begin reconfiguring the airplane for climb. Some airplanes require retracting flaps right away, especially at higher density altitudes. Others will climb just fine with partial flaps out. Some, like the Beech Barons I often fly, have a decided pitch-down tendency with flap retraction which suggests the pilot not be in any hurry to bring flaps up in the first 400 feet of a missed approach. Experience or a little instruction in the airplane you fly will teach what's best for you.

After you're on attitude and speed for climb and you have a positive rate of climb, retract landing gear and retract any remaining flaps as needed. Don't forget to open cowl flaps if your engines require a lot of cooling air at high power/high angle of attack, but this can wait until you're at least 400 feet into your climb.

Prepare to navigate: After you're climbing in trim with the wings level, navigate the missed approach. You reduce workload and increase success by having most of the

Autopilots and the missed approach

It's common practice to fly autopilot-coupled approaches in low IFR conditions. There's a very strong argument that this increases safety significantly by keeping the airplane within very tight instrument tolerances all the way to the missed approach point, and enabling the pilot to maintain the "big picture" while monitoring the autopilot-flown approach.

But everything changes if the runway environment's not in sight at the MAP. Following horizontal and vertical guidance, the autopilot doesn't know what to do next. You'll have to hand-fly the first portion of the missed approach. True, many installations have a "go around" button, but in virtually all cases "hitting the button" disengages the autopilot and puts the flight director command bars in a straight-ahead climb position—but you have to manually make the airplane follow.

Further, autopilots have the ability to hold a little control force against trim. This is why it's common for an airplane to pitch up or down when you click off the autopilot—the system was "pushing" or "pulling" against the trim. When you reach the MAP on a coupled approach, then, not only will you have to take over manually and hand-fly at least the transition into climb, but you may have to do it with a slightly out-of-trim airplane. Anticipate the possibility the nose will want to go up or down from its desired pitch when you click off the autopilot to begin the missed.

missed approach navigation prepared before you ever start the approach. When you review the approach chart make a note of the initial direction and altitude called out in the missed approach procedure. I like to write these on a "sticky note" and put it somewhere where it's in my primary scan. That way, I won't have to try to find it in the fine print later on; writing it down also helps me memorize the information for when I might need it.

With many GPS navigation systems, there's one more task to perform; hit the OBS button to exit SUSPEND mode so you're able to navigate toward the holding fix when you have reached the altitude where turns begin.

Report the missed: Lastly, you'll need to tell controllers you missed the approach so they know you're flying the procedure. This can (and must) wait until you have everything else under control. As a simulator instructor most of the missed approach "accidents" I saw were prefaced by the student's call of "missed approach" to ATC. Think about what happens when you make the call:

N12345: "N12345, missed approach."

ATC: "Roger, 345, climb runway heading to 2000, then right turn direct Bingo, contact departure on 120.575."

N12345: "Runway heading to 2000, right to Bingo, departure 120.575." You now retune to departure frequency.

N12345: "Departure, N12345 at 1200 climbing to 2000."

ATC: "Who's calling departure?"

N12345: "N12345, 1300 climbing to 2000, missed approach at Wichita."

ATC: "N12345, negative radar contact, are you squawking….."

You get the point. A lot of talking starts when you call missed approach, distraction you don't need in the initial moments of a miss. You were already cleared for a missed approach direction and altitude as part of your approach clearance. So, fly what you were told to fly until you have everything under control and are ready to accept any changes ATC may require.

What we've all been taught about flying applies to a missed approach as well: aviate, navigate, then communicate.

The first 400 feet

The first moments of a missed approach are among the highest workload you're likely to encounter. You've got a lot to do to turn a descent into a climb, while you're very close to the ground you cannot see. Successfully flying the transition into missed approach climb is greatly enhanced by the proper mindset and preparation, so when you reach the missed approach point and nothing but nothing is outside the windscreen, there is a minimum number of things you need to do to get the airplane pointed safely skyward. T&T

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.

EN ROUTE

With CenTex Conversion, King Air 200-series Flies Farther, Faster and Safer

CenTex Aerospace, Inc. announces it has received FAA approval of a new addition to the popular Halo series of gross weight increase conversions. The new Halo 275 conversion for King Air 200 and 250 series airplanes increases the maximum takeoff weight to 14,000 pounds and the maximum landing weight to 13,500 pounds. Price of the Halo 275 conversion kit is $115,000.00, which includes all of the required components and parts, STC, Maintenance Manual Supplement, and AFM Supplement. To be eligible for the Halo 275 conversion, the airplane must be equipped with High Flotation landing gear.

Like its predecessor the Halo 250 conversion, the Halo 275 approves an increase in the maximum Mach number from 0.52 to 0.58 Mach for all 200 series King Airs. Also, it adds five safety systems that increase operational safety and comply with Commuter category requirements: engine fire extinguishing, aural over-speed warning, elevator trim out-of-range warning, improved stall warning in icing conditions, and emergency lighting in the cabin.

Additionally, CenTex Aerospace announces a 500-pound increase in the maximum zero fuel weight for airplanes equipped with Halo 250 and Halo 275 conversions.

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King Air B200's manufactured in 1993 and after, and King Air B200GT's, as well as King Air 250's, are eligible. Contact CenTex Aerospace for details if your airplane is already equipped with the Halo 250 conversion. High Flotation landing gear is not required for this increase in the maximum zero fuel weight. For more information, contact CenTex Aerospace or one of their authorized dealers, which are listed online at *www.centex.aero.* T&T

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EN ROUTE

Cessna celebrates segment leadership with 5,000th Citation light jet delivery

On October 3, 2016, Cessna Aircraft Company, a subsidiary of Textron Aviation Inc., announced the recently delivery of the 5,000th Citation light business jet, a Citation M2, to Helitrip Charter LLP, which is leasing the aircraft to Catreus Ltd., an established charter operator based in the U.K. This milestone demonstrates Textron Aviation's leadership in the light jet segment.

"We are thrilled Catreus will be operating another M2, as the M2's excellent combination of range and efficiency will be a great addition to their fleet to help meet their growing customer base", said Kriya Shortt, senior vice president, Sales and Marketing. "Cessna's innovative spirit transformed the light jet segment, and we continue to demonstrate our leadership in this segment by bringing products to market that our customers want and need. The 5,000th Citation light jet delivery reiterates that our company remains the indisputable leader with decades of proven performance, reliability and versatility."

Catreus currently manages and operates a mixed fleet of aircraft, which includes the Cessna Citation Mustang, Citation M2, Citation Bravo, Citation Excel, Citation XLS and Citation XLS+ business jets. Catreus' combined aircraft fleet now operates approximately 3,000 charter hours a year.

"We are delighted to add another Citation M2 to our fleet. After bringing the first M2 into the U.K. last year, we have seen an increase in demand for the aircraft. Adding a second M2 to the fleet will now allow us to meet the demand," said Cy Williams, CEO, Catreus Ltd. "We have recently been approved as the first operator to operate the M2 out of London City, which means our entire fleet is now London City approved. We look forward to our continued relationship with Textron Aviation."

Cessna entered the light jet segment in 1972 when the company delivered its first Citation. Since then, the Citation light jets have continued to lead the light jet segment, to include the Citation I, Citation II, Citation Bravo, Citation S/II, Citation V, Citation Ultra, Citation Encore, Citation Encore+ and the CJ family. Cessna's current light jets – the Mustang, M2,CJ3+ and CJ4 – are all single-pilot certified and ideal for corporate, charter or private use.

For further information, visit *www.txtavn.com* T&T

Cessna Flies Its Citation Longitude

Cessna Aircraft Company, a subsidiary of Textron Aviation Inc., announced the successful first flight of its Citation Longitude super-midsize jet on October 8, 2016. The flight comes less than a year after the company unveiled new details for the revolutionary aircraft – the company's latest example of continued investment in its family of larger business jets.

"Today's successful first flight of the Citation Longitude was performed exactly as we anticipated," said Scott Ernest, president and CEO, Textron Aviation. "Our product development process is second to none and allowed us to move smoothly from unveiling the Longitude last November to the first flight of the prototype in just 11 months. This milestone not only showcases our continued commitment to investing in new products to meet market demand, but also our focus on investing in our development and production processes to bring the aircraft to market quickly without compromise."

The Longitude took off from the company's east campus Beech Field Airport, piloted by experimental test pilots Ed Wenninger and Stuart Rogerson. During the two hour and two minute flight, the team tested the aircraft's flaps, landing gear, pressurization systems, stability and control.

"I was extremely pleased with the performance of the Longitude during the first flight," said Rogerson, senior flight test pilot. "The level of maturity in flight characteristics is already very high. I was particularly impressed with how intuitive the flight systems are, validating the extensive integration work done by our development teams. We accomplished everything we wanted to do during this maiden flight, setting the pace for the flight test program."

The prototype aircraft will continue to expand the performance envelope, focusing on testing flight controls and aerodynamics, while the first production model, set to fly in the coming weeks, will be primarily used for systems testing.

"With industry-leading design and production expertise, our world-class team is able to execute quickly and precisely, enabling the company to bring new concepts to market faster so both pilots and passengers enjoy an unrivaled level of capability and comfort," said Michael Thacker, senior vice president, Engineering, Textron Aviation.

The Citation Longitude is designed specifically for maximum

passenger comfort and offers the lowest cabin altitude in its class at 5,950 feet. With seating for up to 12 passengers, the Longitude features a stand-up, flat-floor cabin with a standard double-club configuration and a class-leading walk-in baggage compartment, fully accessible in flight. It features the next evolution of the Garmin G5000 flight deck and is powered by FADEC-equipped Honeywell HTF7700L turbofan engines with fully-integrated autothrottles. The Longitude offers a full fuel payload of 1,500 pounds, a maximum cruise speed of 476 knots and a high-speed range of 3,400 nautical miles. T&T

EN ROUTE

Signature Technicair® Offers New Ads-B Compliance Option For Turboprops And Light Jets

Signature TECHNICAir®, in collaboration with FreeFlight Systems, is proud to announce ADS-BFREE, a new option for simple and cost-effective ADS-B compliance.

Initially available to non-RVSM turboprops and light jets without TCAS II, the upgrade replaces existing transponders with a light-weight, compact worldwide-compliant dual ADS-B approved transponder system, designed to simplify installation and provide a whole new level of value in meeting the ADS-B compliance mandate. Included features are:

DO-260B mandate standard compliant ADS-B Out, 1090MHz, Mode S, extended squitter (ES) transponders with Flight ID.

Integrated control head that provides an air-data source, operational control, pilot controlled Flight ID and ADS-B integrity monitoring and alerts.

UAT (978MHz) ADS-B In receiver to provide flight deck awareness on compatible displays and PEDs of FIS-B weather information and TIS-B traffic data.

Stand-alone WAAS/GPS for ADS-B Out position reporting

"Very few operators have pursued ADS-B solutions and there is a massive wave of installations that will be needed to meet the mandate deadline. Signature TECHNICAir has heard the voice of our customers and many are still waiting for a more practical, more cost effective and less risky solution than those presently available", said Bill Thompson, Avionics Sales & Development, Signature TECHNICAir. "We are very excited to answer the call by offering a solution our customers can afford to adopt today. In doing so, they support the NextGen movement and the importance of the precision, efficiency and safety for which it stands."

Signature TECHNICAir provides comprehensive MRO services at its 16 U.S. locations. It offers a full portfolio of both fully integrated and stand-alone ADS-B solutions as well as Sandel® Avilon®, the first flight deck designed for Performance Based Navigation. For more information, call +1 855 595 4192 or visit *www.technicair.com*. T&T

EN ROUTE

Garmin® announces G5000™ program for the Cessna Citation Excel and Citation XLS aircraft

On October 25, 2016, Garmin International Inc. announced a G5000 modernization program for the popular Citation Excel and Citation XLS. The Supplemental Type Certificate (STC) is targeted for approval in late 2018 and will be available from select Garmin dealers, as well as Textron Aviation Service Centers.

"For over five years and across multiple airframes, the G5000 has received enthusiastic praise from aircraft operators as it offers an unprecedented level of situational awareness, yields a significantly lower cost of operation and delivers an exceptional in-flight experience," said Carl Wolf, Garmin vice president of aviation sales and marketing. "With this, we're excited to grow our integrated flight deck upgrade programs to include the ever-popular Citation Excel and XLS, providing these customers with an attractive path to achieve global airspace modernization initiatives with a state-of-the-art avionics suite."

The G5000 integrated flight deck modernization program for the Citation Excel and Citation XLS will feature three high-resolution 14-inch flight displays alongside dual touchscreen controllers. The G5000 offers optimal situational awareness, which features landscape-oriented flight displays with multi-pane capability, allowing pilots to simultaneously view maps, charts, checklists, TAWS, TCAS, flight plan information, weather and more. Geographical map overlay within the HSI is also available on the PFD. Charts can be viewed across all three displays and are geo-referenced, including Garmin FliteCharts™ terminal approach procedures or optional Garmin ChartView powered by Jeppesen, as well as Garmin SafeTaxi® airport diagrams. The G5000 flight deck for the Citation Excel/XLS is estimated to provide a weight savings of 200 pounds or more compared to the current system, allowing additional baggage, passenger and/or fuel load flexibility.

The G5000 installation on the Citation Excel/XLS will include a fully digital Automatic Flight Control System (AFCS), offering optimized performance throughout the aircraft's flight envelope. The G5000 system supports a wide range of capabilities including coupled wide area augmentation system (WAAS/SBAS) approaches, vertical navigation, and flight level change (FLC) modes. New to the Citation Excel, and available as a standard feature on the Citation Excel/XLS, emergency descent mode is automatically enabled by the autopilot in the event of a loss in aircraft pressurization. Safety-enhancing autopilot underspeed protection (USP) is an optional feature and allows the autopilot to assist with airspeed management. Fully coupled go-arounds are also enabled by this technology, greatly reducing pilot workload and bringing sophisticated flight monitoring and performance capability to these aircraft.

With the G5000 upgrade, the Excel/XLS will receive a fully-integrated Automatic Dependent Surveillance-Broadcast (ADS-B) Out solution. Other features include PBN/RNP 0.3 with LPV/APV approach capability, and optional synthetic vision technology (SVT™), which works seamlessly with Terrain Awareness and Warning System (TAWS) alert coloring and voice alerts by displaying obstacles and terrain threats. This upgrade will also support Reduced Vertical Separation Minimum (RVSM) operations.

For more information, go to *www.garmin.com*/aviation. T&T

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by **David Miller**

First Time Flyer

With 6,000-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, Patty and David currently fly a Citation M2. You can contact David at davidmiller1@sbcglobal.net.

It doesn't matter how many hours you have in your logbook. Or how many type ratings you have. The fact is, the first time you fly an airplane as the sole PIC (Pilot In Cockpit) it is a new experience. Being all alone "up front" on that first flight can be challenging, frustrating, and sometimes downright scary. But it can also provide the biggest legal "high" anywhere.

For me, that experience has included a Cherokee 140, a 172, a Cherokee 6 and Arrow, Model 35 and 36 Bonanzas, a B55 and B58 Baron, a Duke, B100 and C90 King Airs, and the Citations Mustang, CJ1+ and, most recently, M2.

We prepare for each of those events by studying manuals, training in a simulator and airplane, mentoring, and even sitting in the cockpit for hours at the hangar. But there is nothing else quite like doing it the first time by yourself.

My M2 experience began with a copy of Garmin's G3000 PC Trainer. This was followed by a couple of days in ICT at Flight Safety and two hours in their full motion simulator. Then two days with a mentor experienced in the airplane. Call me anal, but I want to be comfortable for most situations when the passengers arrive.

And they did arrive in early July for a flight to Gunnison, CO (KGUC). I was hoping for CAVU conditions in the mountains but it was not the best weather for a first time flyer.

KGUC 10SM OVC060

KTEX 3SM BR SCT035 OVC048

KMTJ 8SM BKN075

Forecasts called for good visibilities with rain showers developing into thunderstorms within two hours of our arrival. Flying the M2 is the easy part. But running the G3000 like a maestro conducting a symphony requires some practice. And flying into Gunnison on the 4th of July often requires holding.

Had I practiced enough?

We departed Dallas in clear skies and dropped into Amarillo (KAMA) for fuel, since I had not yet received my RVSM approval. What a bureaucratic waste to fly at FL280 burning so much extra kerosene. On the next leg, nearing Gunnison, the G3000 offered the ultimate in weather briefings. One of its great features is its ability to look at scores of METARS along your route. We were descending in the clouds at FL240 with all anti-icing on.

"November 921 X-ray Tango, I just had three aircraft divert from Telluride to Montrose," came the news from Denver Center. "It looks like you can go direct to COGRI for the DME arc to runway six and possibly get into Gunnison." We were in light rain and turbulence, and it was getting interesting.

Now, all that training was being put to good use. I programmed the boxes and V-Nav, set minimums, and watched the G3000 do its magic. Denver had to put a little pressure on me. "X-ray Tango, there are two aircraft behind you for the approach." This is subtle pressure to cancel your IFR flight plan so the other guys don't have to hold. Especially in the mountains, I always wait until I am certain of landing, just in case I have to miss and find myself climbing in IMC without a clearance. We broke out just inside the FAF and I squeaked on a landing just like I do at least once a year.

All that preparation made the entire flight one of the most comfortable ever.

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