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MARCH 2016 $3.95 US
VOLUME 20 NUMBER 3


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TWIN & TURBINE

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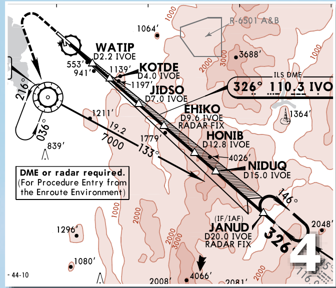

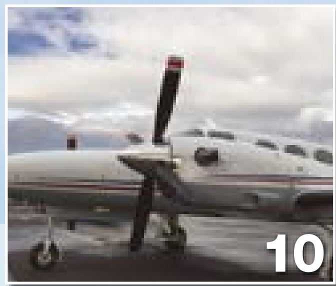

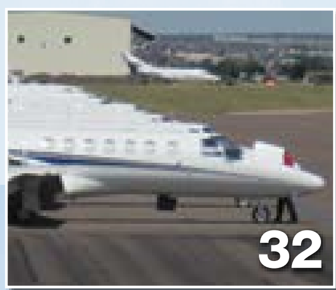

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editor's briefing

When You Absolutely, Positively, Don't Have to be There

When I flew Part 135 charters, the unwritten rule was "Always schedule the trip; it'll usually work out. If not, we'll use a backup plan or cancel." Customers were told to make alternate travel plans if they had a critical need to be there, in case we couldn't fly. And everyone understood that safety was the number-one priority; convenience, comfort and schedule came next.

With the reliability and performance of turbine-powered aircraft, we can handle a lot of daunting weather, but we have to be willing to give up in the face of doubtful success. Risk management can be supported by all kinds of safety checklists, acronyms and numerical assessments, but in the final analysis it's up to the pilot-in-command to say "enough, I'm not going" or "we're not going any further, let's land now."

I like the Standard Operating Procedure approach a company CEO declared to me in conversation the other day. He said, "This is not an airline. It's just a flight for the business. We don't have to go, and if the weather or other factors are uncertain, we'll just cancel the trip." And his flight department flies brand-new equipment certified to the Flight Levels. His feeling was based on the fact the company's personnel and aircraft are too valuable to be gambled with. As he put it, nothing justifies pushing hard to fly a trip when it's only a company mission.

A reminder notice on the bulletin-board in our military operations office stated, "There is no reason to fly through thunderstorms in peacetime." EMS medevac operators go to great lengths to avoid adding stress to what are often viewed as critical life-or-death flights. Similar guidance is seen in lots of operations manuals and SOPs. But, in the end, the PIC has to rule. And support for his or her decision must come from up and down the line. Company owners, supervisors, fellow pilots and ground personnel–all need to respect the authority of the PIC.

But, what if you're all of these, as the single-pilot/owner? Quite simply, raise your operating standards to reflect the many roles you have to play. When you're the scheduler, dispatcher, maintenance supervisor, flight attendant, Captain and copilot, there will be times when you just don't feel right about taking on the responsibility of a trip. And that's all right.

You need to respect the limitations of operating a high-performance aircraft with a crew of one, in a system geared to crewed cockpits. Face it; some trips have to be flown with extra help. And if you're beginning to be uncomfortable with a situation, remember the CEO's philosophy; "it's only a company (or personal) mission." Keep your perspective, and enjoy your flying.

LeRoy Cook

HOW LOW did you go?

by **Adam Alpert**

The Bell 212 crew had waited in vain for seven hours, hoping the weather would improve at the departure airport, Alerk Island, NWT, and the destination, an oil rig in the Beaufort Sea. The helicopter was finally dispatched in night IFR conditions to fulfill the leasing company's requirement to have a machine and crew located at the drill site.

Once in range of the rig, the crew commenced an improvised IFR approach, in ice fog, descending to 500 ft MSL, an altitude believed to assure sufficient separation from the platform and sea below. The weather at the time was: wind east at 10 knots, visibility 1 ½ in fog, 400 ft overcast, temperature -19C.

As the platform passed beneath them, the crew saw the glow from the rig and proceeded briefly outbound, then turned back in the direction of the lights, using a tear-drop maneuver while descending to a target altitude of 150 ft for the inbound leg. Slightly after reaching that altitude, and without warning, the helicopter struck the sea ice. It disintegrated upon impact; a post-impact fire completely consumed the aircraft. One of the two crew members suffered serious injuries.

There are a number of troubling aspects to the way this flight was conducted, including improper in-flight decision making, improper IFR procedures, a poorly planned (improvised) approach, and failure to go missed once visual reference was lost. But the Canadian Safety Board listed two primary causes in its report that speaks to the inherent dangers present when subtle errors creep into the aircraft's altimetry. In the case of this Bell 212, the pilot's altimeter, in compliance with regulations, read 50 feet low when set with the proper barometric pressure. Still, it was the crew's failure to accomplish the proper temperature correction that likely doomed the flight.

To understand how this could happen, it is useful to review the recently-updated FAA-issued temperature correction chart. While temperature correction hasn't been mandatory in the United States for designated airports until recently, it has been understood for a long time that very low (below ISA) temperatures can have a dramatic effect on pressure altimeter accuracy. Knowing the temperature measured by the rig operators was -19C, at 150 feet the crew should have added 30 feet to their

KBTV/BTV | JEPPESEN | BURLINGTON, VT
BURLINGTON INTL | 10 APR 15 (10-1W) | COLD TEMPERATURE TABLE

COLD TEMPERATURE RESTRICTED AIRPORT

The cold temperature altitude correction note with its associated temperature depicted on affected approach charts indicates a cold temperature correction is required on the approach when reported temperature is at or below the published temperature (refer to the following COLD TEMPERATURE CORRECTION TABLE).

Advise ATC with altitude correction. Advising ATC of corrections to be made in the final approach segment is not required. Refer to FAA's Notice to Airmen Publication (NTAP) Graphic Notices General for a complete list of published airports, temperature(s), segments, and procedure information (www.faa.gov/air_traffic/publications/notices).

COLD TEMPERATURE CORRECTION TABLE

HEIGHT ABOVE AIRPORT (FEET)

REPORTED TEMP	200	300	400	500	600	700	800	900	1000	1500	2000	3000	4000	5000
+10°C (+50°F)	10	10	10	10	20	20	20	20	20	30	40	60	80	90
0°C (+32°F)	20	20	30	30	40	40	50	50	60	90	120	170	230	280
-10°C (+14°F)	20	30	40	50	60	70	80	90	100	150	200	290	390	490
-20°C (-4°F)	30	50	60	70	90	100	120	130	140	210	280	420	570	710
-30°C (-22°F)	40	60	80	100	120	140	150	170	190	280	380	570	760	950
-40°C (-40°F)	50	80	100	120	150	170	190	220	240	360	480	720	970	1210
-50°C (-58°F)	60	90	120	150	180	210	240	270	300	450	590	890	1190	1500

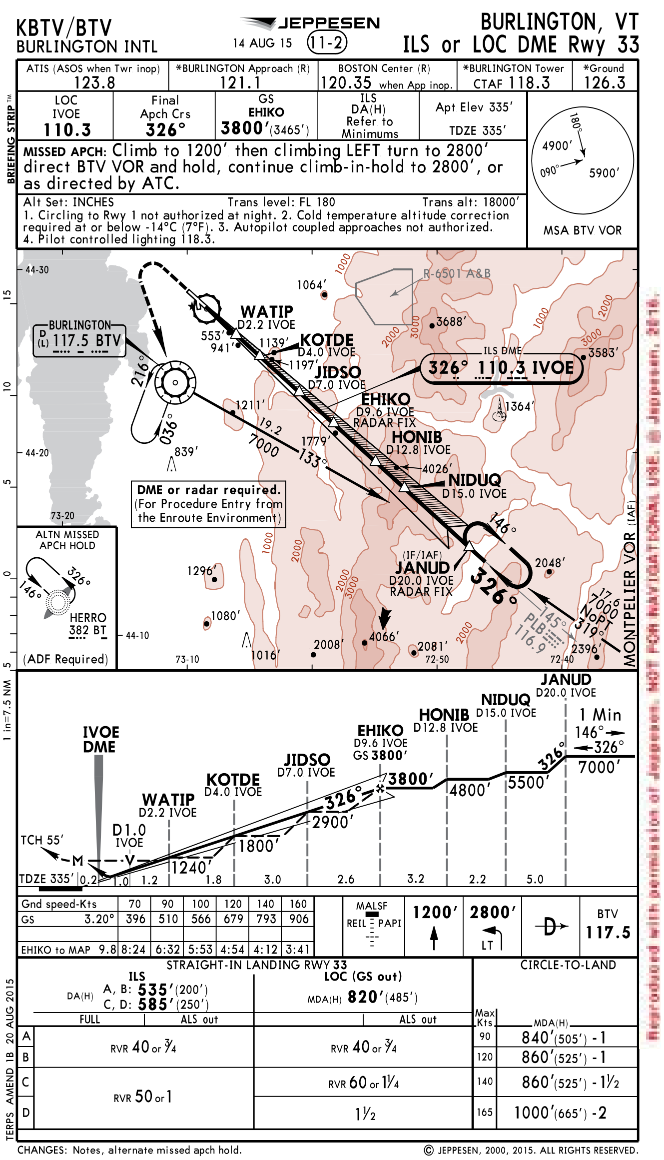
target altitude. Not doing so put the aircraft only 80 feet above the ice when the altimeter read 150 feet. With very little visual reference, and while searching in the morass for the oil platform, it's easy to see how whatever buffer remained was consumed.

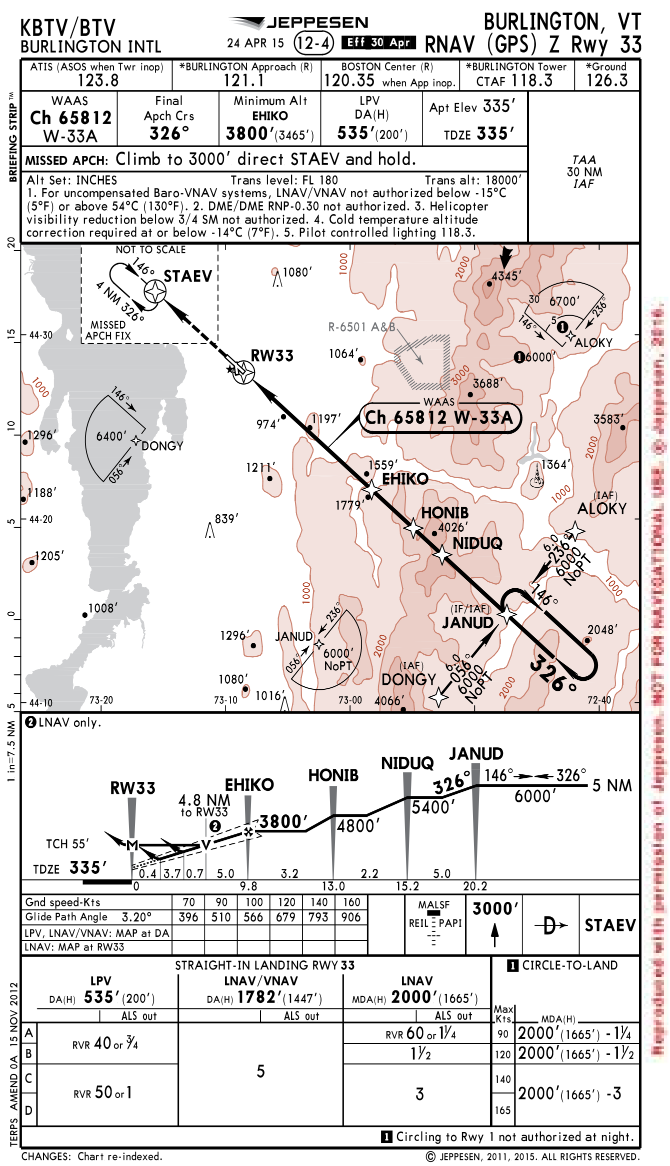
There are now 284 airports in the United States where temperature correction is required to complete one or more instrument approaches. Each airport is listed showing the segment that is affected, Intermediate (after the IAF/Intermediate fix and prior to and including the FAF), Final (after FAF to MDA or DH), and/or Missed (all published altitudes), and the aerodrome temperature governing when temperature correction must be accomplished. For some airports, temperature correction is required for multiple segments to complete the approach safely and legally. When there are multiple segments identified, each one may have its own low-temperature trigger point.

So how does the pilot know whether a particular airport is impacted and to which segment(s) the calculation should be applied? The FAA's list of affected airports and applicable segments is published in the General NOTAMs section, along with aerodrome temperature that must be reached before temperature corrections apply.

In the case of the Jeppesen charts, the Cold Temperature Correction Table is included as part of the plate packet, with the note section of each individual approach plate showing the maximum temperature not requiring correction. The government publications show the same information in the AIM 7-2-3, ICAO Cold Temperature Error Correction Table and as a snowflake symbol on the plate, respectively.

Once it's determined that temperature correction is required and the applicable segments are identified, the pilot must calculate the proper adjustment. Our CJ3's Rockwell Collins Proline 21 suite has a special setting that allows the computer to automatically calculate the temperature correction for each affected waypoint, using the





aerodrome temperature for input. For airplanes not so equipped, the pilot must make the calculation manually. In either case, it's the pilot's responsibility to inform ATC that the approach will be flown using temperature-corrected altitudes. And while it is illegal (and unsafe) to fly an approach requiring temperature correction without making the necessary corrections, ATC is under no obligation to inform the pilot as to the transgression. Ascertaining applicability and making the proper correction is 100% a pilot responsibility.

Actually doing the calculation is relatively simple, but there are some pitfalls to be avoided. First, the correction table is based on a zero elevation relative to the Above Airport Ground Level (AAGL) height of the waypoint where the calculation is being made. So, for example, in cases where the prototypical Burlington, Vermont's ILS/LOC Rwy 33 approach requires temperature correction, the airport elevation (335') must be subtracted from the MSL waypoint altitude before referencing the correction table. Assuming a -30C day, typical in Vermont mid-winter, and knowing from the NOTAM that only the intermediate segment is affected:

AAGL	Table AAGL	Correction (ft)	Altitude to fly	
Before Niduq	5500'-335'=5165'	5000'	950'	6450' (6500')*
Before Honib	4800'-335'=4465'	5000'	950'	5750' (5800')*
Before Ehiko (FAF)	3800'-335'=3465'	4000'	760'	4560' (4600')*

* rounded up from the table calculation for purposes of better altitude targeting in the cockpit and clearer communication to ATC.

It's important that the pilot not make an altimeter-setting change to accomplish temperature correction. Also, although the correction value is always calculated by interpolation or rounding up (not down) from the closest table AAGL altitude, as in this example, extrapolation for AAGL altitudes greater than 5000' is not required. For AAGL altitudes over 5000', the 5000' column is used.

The Burlington case also shows that altitude corrections tend to increase in magnitude the higher the waypoint is above the aerodrome altitude. At the airport, there is, by definition, no temperature-related error, because barometric pressure and temperature sampled from the same place largely correlate with the correct altitude (as the temperature goes down, the pressure increases). But, at altitude, the temperatures are often lower than at the airport below. If they are low enough below ISA, the airport's barometric pressure that is used to set the airplane's altimeter and the pressure at altitude measured by the airplane's altimeter don't correlate well with the actual MSL altitude. If the temperatures are low enough, the error can be very large. Proof by example, the government's formula assumes a –2C degree/1000' normal air lapse rate. In cases where the actual lapse rate is more, the error can be even worse than the temperature correction table predicts. We see this in Vermont occasionally, following the passing of a strong cold front.

The admittedly conservative Burlington example should give pause because, without correction, an airplane flying at the published minimum altitude of 4800' MSL between Niduq and Honib could actually be as low as 3850'MSL on this particular day; 176 feet below


STOP Safer
STOP Shorter
SAVE Money
BREAKTHROUGH GPS / DIGITAL ANTI-SKID
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the top of Camel's Hump Mountain if tracking just slightly left of the highest point (4026' MSL). Also, consider that the approach plate specifically forbids autopilot-coupled approaches, making precise adherence to vertical and lateral guidance just a little more challenging. Even on a somewhat warmer day, the buffer could be perilously thin. Scary!

RNAV approaches are much like ILS and LOC approaches, but it is important to understand when baro altimetry-related temperature correction applies. LPV approaches follow the same rules appropriate to ILS approaches because the glide slope is 100% determined by GPS WAAS satellite information. In contrast, LNAV approaches inherently dependent on barometric altimetry are subject to temperature correction, much like LOC or VOR approaches whenever the airport's Final segment is called out within the NOTAM document and aerodrome temperatures apply. Temperature correction for baro-dependent approaches should not be confused with low temperature restrictions that apply to LNAV/VNAV approaches at certain airports. For example, in the case of Burlington's RNAV Z (GPS) approach to 33, the baro-derived LNAV/VNAV approach is forbidden for airplanes not equipped with automatic temperature compensation (to adjust the glide slope) when the airport temperature falls below -15C.

It is curious that there haven't been more accidents related to low temperature altimeter error. Part of the reason may be that low temperature days in the USA tend to be clear days; mostly visual approaches. There is also a lot of buffer built into the design of instrument approaches to mitigate for other sources of mistakes, including less-than-precise navigation and instrument error. ATC also deserves some credit in the sense that, except for a very few sectors in mountainous areas where special procedures apply, the MVAs used by controllers already enjoy a buffer beyond any effect caused by the worst-case low temperature day. It is for this reason that the pilot is not required to perform low temperature corrections when receiving vectors from ATC.

This is a cautionary tale. While a temperature-related altimetry error by itself likely won't result in an accident, the Bell 212 crash reminds us that it can certainly contribute. And special care must be taken in mountainous areas where approach fixes may be high above the airport , knowing that these errors can be very big indeed. And now that it's a FAA requirement to perform temperature correction at designated airports when conditions demand, it's the pilot's legal obligation-responsibility to do so. Remember, temperatures low, look out below. T&T

Back to

by Kevin Ware

It is a gray, windy winter afternoon and I find myself weaving back and forth across the runway's white centerline like a drunken sailor,rapidly accelerating through 90 knots on the takeoff roll in a Cessna Conquest I. It has been awhile since I have flown turboprops and Tim, the check pilot sitting next to me, says "It really pulls to the left, doesn't it?…I think it's torque from the Blackhawk mod." No mention that it could be the pilot, which was very kind of him. After mostly flying either business jets or my own Cessna 340 for the past couple of years, I am back in a turboprop and the asymmetry in power being delivered to the widely-spaced propellers by the modified airplane's PT6s has caught me by surprise.

Over the next couple of flights, I gradually tame the weaving. Then I spend some time thinking about the differences between piston twins, jets and turboprops.

Under normal circumstances in most piston twins, even if the engines do not power up evenly, there is not enough thrust available to significantly alter the direction the airplane is going on takeoff. And jets, with their closely-spaced engines, pretty much track where you have them pointed. Turboprops have enough power, however, that even slight differences in the rate the engines power up can (unless well anticipated) cause all kinds of directional problems. This can make keeping the nosewheel exactly on the white line during the takeoff roll, a basic expectation for professional pilots, difficult to manage sometimes.

But the differences go well beyond that, and they are evident throughout the flight. With most piston twins, you just push the throttles slowly to the stops and hope there is enough power output to top the green lines on manifold pressure and RPM gauges. With the FADEC systems on newer jets, both engines come on line at a nearly-identical rate and nicely limit their output to whatever the computer mandates. But with turboprops you really must watch the small two-inch torque gauges very closely to prevent them from going over redline. And the need to glance back and forth between the runway and gauges, while making small adjustments to the power levers, just makes tracking the white line all the more difficult.

Even once you're airborne, trouble around the vertical axis is not over. Unless you have the torque gauges matched exactly, the thrust asymmetry gives the passengers in the aft seats all kinds of odd sensations when you fiddle around with the throttles, rudder trim and yaw damper, trying to balance things out. And, of course, just about the time you get it perfect, the controller gives you an altitude change, and the dance starts all over. Piston twins just don't make that much power and the engines on business jets are usually aft and closely-spaced enough to minimize yaw problems.

Climb Management

When all these initial issues are resolved and you are finally climbing to cruise altitude, you can be sitting there relaxed and sipping coffee, but getting puzzled as to why the turboprop's airspeed is tapering off with the autopilot set for a given rate of climb. Then the light dawns, and the memory returns. These are not turbocharged pistons that automatically maintain manifold pressure all the way up, nor are they jets that have computers to worry about that sort of thing for you. The PT6s require continued throttle advancement in order to maintain power during a climb, and you must personally take care of it by gradually pushing the levers up to keep torque constant during the climb, or the whole thing just slows down. So, you switch the coffee cup to your left hand, and make the needed power adjustments with your right.

Then, passing through about 18,000 feet, you may find that, with the torque set for climb, the inter-turbine temperatures (ITT) can start to hit the redline. Ah, yes, you remember. There is the business of the PT6s being torque-limited when below about 18,000 feet, but temperature-limited when above that altitude. So, you now move your focus from the torque meters to the ITT gauges, located in the middle of the vertical engine instrument cluster. However, with the Blackhawk mod in the Conquest the temperatures stay well under redline all the way up to the high 20s, even while pulling maximum torque.

Now in cruise, you need to decide what RPM the props should be at, and, unlike jets where you don't worry about it at all, or in pistons where your choice is limited by power output, you have quite a range to select from. Your options are between 1,600 and 1,900 RPM, and the setting you choose can make a big difference in the level of vibration and noise for those sitting in the back. Further, due

Turboprops

to the varied harmonics in any given airframe, a lower RPM is not always better. Sometimes, quite oddly, 1,700 can seem less noisy than 1,600 for those sitting aft of the cockpit. So, it is wise to ask the passengers what setting they like best, before you start dinking around too much with the propeller RPM controls. Besides, too much unannounced variation will just confirm the negative opinion of your piloting skills that was formed during the takeoff roll.

As High As You Can Go

You are now at FL280 and going along nicely with the passengers reading magazines, but then the cloud tops gradually start coming up to your flight level, causing a bouncy ride. In the jet, you would be higher to start with, and can nearly always climb above the tops, even if it requires going to FL 450. But, unlike jets, many of the turboprops are not RVSM equipped, and few have the power output to perform well at those levels. So there you stay, bouncing along in and out of the sunlight. A piston passenger would expect this sort of thing, but in a "jet prop" they might wonder if you are doing this just to get them upset.

Finally, it is time to start down, and this is one area where turboprops really shine. Unlike pistons, you need not worry at all about shock cooling, so just bring the power back and point the nose down. And, unlike jets, those big four-blade propellers out there make wonderful speed brakes, so spoilers, with their buffeting noise, are not required. Down you go, with everything going along just fine, until the over-speed horn sounds off, reminding you that the power increases all by itself as you descend unless you continuously pull the throttles back…the reverse of what was required during the climb.

Now, when it comes to entering the pattern…do you leave the propellers set at 1,700 RPM, or push them up to 1,900 as the checklist suggests?Push them up and the passengers will wonder what all the noise is about; in addition, the extra drag will cause a sudden and firm touchdown when you pull the power back during the flare. But, if you leave them set at a quiet 1,700 RPM you will need to remember to push them back up before applying reverse thrust or attempting a go-around. All things to consider that are not an issue in jets.

Slowing Down

Having successfully managed a reasonable landing, you taxi in and find the airplane is going way too fast at idle power. Of course, you could ride the brakes, but that is an expensive idea, and you just might wear them out and they won't be there when really needed. Your other options are pulling the propeller on one engine (usually the right) back into feather. This slows things down to a comfortable pace, but creates a disharmony some people find objectionable. It also looks odd, one propeller turning like crazy and the other just barely moving. This can cause the passengers to wonder if you landed just before theengine quit. The other option is to pull both power levers back into Beta range, or even slightly reversed. You can completely stop the airplane by doing this, and even back up a bit if not too worried about FOD. It does, however, cause that loud propeller buzz you often hear from big commuter turboprops at large airports. Big airplane buzz must be good, so that is what you choose.

Once parked, shutting down the PT6's is reasonably simple. There is no long wait for the cylinder head temperatures to cool down, and with the propellers barely turning there is no concern about prop blast or jet exhaust blowing something over behind you while you work through the shutdown checklist. So, you just wait for the ITTs to drop below 610 degrees (which they almost always are), then pull the red fuel-control levers aft, which promptly shuts the engines down with a satisfying whine.

When you exit the airplane there is that smell of burnt kerosene wafting aft toward you, something pilots find particularly intoxicating. And so, nostrils flaring, you wander away thinking…great machines, those turboprops. 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.

Why Do Pilots Run Out Of Gas?

by **LeRoy Cook**

Fuel is one of those absolutes in aviation, like altitude and airspeed, that positively must be maintained and managed until the aircraft is parked. It would seem simple enough to keep sufficient fuel in the tanks to enable a planned landing. But, several times a year, some pilot somewhere tries to fly with his tanks contaminated by air, with a less-than-successful outcome. It's embarrassing to run out of gas in a car, but it's more than embarrassing in an airplane, when you can't just coast over to the side and flag down a passerby. Rather than preach to the choir about checking for fuel quantity before departure and keeping plenty of reserves, let's examine why people run dry and see how it can be prevented.

Three methods persist in bringing us to earth, when it comes to running out of fuel. The first, fuel exhaustion, is simply using up every drop of gas on board; there are no options, the airplane is now a glider and it must be steered to a landing of some sort. The second error, fuel starvation, means the pilot mismanaged the fuel supply, running empty on one tank and allowing himself to be forced down while there's still fuel available somewhere onboard. Lastly, a fuel system failure is more rare, but it can happen, such as when a pump fails, a valve won't function or a leak develops, rendering all or some of the fuel unavailable.

Ignorance

Amazingly, some pilots just don't have a clue as to how their engines are supplied with the necessary fuel. Understanding one's fuel system is crucial to longevity in this business, meaning that you need to know how many tanks there are, how they feed, and what it takes to get the fuel to the engines–lines, vents, pumps, valves and drains. Easy fuel management is a great asset for an airplane, but it's important for pilots to know that not every airplane is as friendly as others they've flown. Moreover, the system behind the perceived simplicity is often quite complicated.

Most modern transport-category aircraft utilize automated, simplified fuel management procedures. This does not mean the fuel supply and delivery system is simple, just that it normally does not require pilot interaction. You must still understand its inner workings and how to recognize faults. You were given an overview of your plane's plumbing during initial or differences training; review the layout periodically to maintain your knowledge.

As an example of how important it is to understand the plumbing, Cessna's older tip-tanked piston-powered twins had a convoluted fuel system that grew more complex over the years of production. Fuel is contained in as many as six tanks, which must be used in an exact order, with pumps on the engines, in the tanks and in the lines, some of which are activated on their own and some by pilot-actuated switches. The valving and gauging takes some study, and I guarantee you that running a tank dry once in a while is a given. Not studying a diagram of an old twin Cessna's fuel system before flying it is a big mistake.

Another case of ignorance that leads to running out of fuel is guessing at the consumption rate. I never cease to be amazed at the pilots who actually base their decisions on simple rules of thumb, instead of the numbers derived by test pilots and placed in the airplane's operations manual. Even those latter figures, however, need to be verified in your own operation. Yes, a fuel computer works off a super-accurate transducer in the line, but even it can be fooled by incorrect inputs from the crew, or erratic refueling, perhaps caused by a sloping ramp or an unfamiliar fueler.

Missionitis

The intense desire to get home even if the fuel is running low, or to finish the flight without making an inconvenient stop, or neglecting to refuel because you don't have the correct credit card with you, has put more than one airplane down a few miles short of its intended arrival.

We can all succumb to pressure to complete a mission. Once upon a time, I nearly had to glide in with a turbocharged executive twin in the dark, because I was returning after midnight and it would have been difficult to find fuel at that hour, and because my passengers were anxious to get to bed. Whatever the reasons, once committed, I wound up staring at the seductive airport beacon light, inching closer as the gauges settled more solidly on the empty mark, mixtures leaned to the edge of roughness. The approach was straight-in, since the wind was in our face (as it always is when you're pushing fuel) and we parked at the pumps, feeling quite full of ourselves for completing the trip. The next morning I signed a fuel receipt that showed five gallons were left in each side of the system, hardly enough for a good go-around. That's what comes of letting a desire to complete the mission override your judgment.

Sometimes you start a mission with a barely-adequate fuel load and then everything changes, leaving you with an unexpected marginal fuel state. In the foregoing scenario, an unplanned drop-off stop earlier in the evening had eaten up some of our fuel reserves with an extra climb back to altitude. Increasing headwinds or passengers who can't make up their mind are simply actions that have to be dealt with; it's your responsibility to pick the best fuel stop and eliminate the pressure to press on. If you're coming back later than expected, take on extra fuel; refueling options become more limited in the wee hours. Remember, you're the one acting as pilot in command and the pressure of the mission can't be allowed to make you abdicate your responsibility.

Over-optimism

Wishing and trusting doesn't add fuel to the tanks. A fatalistic acceptance of a situation has often led to a pilot proceeding until dry-tanks, ignoring all the signs because of his assumption that all will turn out right. I once had to take fuel out to one of my airplanes that was sitting in a wheat field, its tanks dry because the pilot kept on going with the gauges on empty, hoping the airplane would make it home.

I suppose one reaches a point at which there's no sense in worrying, because there's nothing more you can do. However, such acceptance should be a last-ditch condition. As long as you have flight controls and flying speed, you have the power to improve your situation, even if it's just steering to stay over landable terrain. You must, however, plan to never reach such an untenable point.

When you plan the flight, base your expectations on worst-case scenarios. Add extra time to a headwind calculation and don't count on every bit of tailwind that's forecast. Move to the more-pessimistic line on the cruise chart if you're between altitudes or power settings. Don't pin your hopes on fueling at only one airport along your route. That may be the one that's closed for construction, blocked for traffic or out of fuel. Every planned stop needs an alternate and that alternate needs an alternate.

Fuel Management

In August, 2001, an Airbus A330 exhausted its fuel supply over the Atlantic, because an unknown leak was dumping Jet-A overboard at many gallons per minute. Miraculously, an airport 65 n.mi. away in the Azores was reached with altitude to spare and all 306 persons aboard survived the dead-stick landing. Had the crew known the source of the excessive consumption, steps could have been taken to isolate the leak.

Most fuel incidents happen because no one manages the fuel, not because the gauges fail or a filler cap comes off or headwinds pick up. Start by checking the tanks during preflight. If you want full tanks, make sure you have full tanks, and that doesn't mean fuel is simply visible in the filler neck. Most flat wing tanks can hold several gallons more if topped off slowly and you had better believe that placarded amount painted beside the fuel filler port was based on squeezing in every drop.

Computational errors have brought about some famous fuel-exhaustion incidents, the most notable being the "Gimli Glider", a Canadian Boeing 767-233 that was mistakenly short-fueled by employing the wrong metric-conversion factor. Fuel gauging and fueling systems can be calibrated in gallons, liters, kilos and pounds, but the aircraft's engines know only time. Make absolutely certain you are working with the correct units when computing your fuel load, both to avoid an erroneous over-weight takeoff and the other extreme of a serious shortage of fuel in the cruise and arrival segments. Bush-country pilots, tasked with bringing out anything that can be stuffed aboard, frequently quip "fuel doesn't weigh anything", preferring to have extra endurance when crossing the jungle. However, excessive tankering limits performance and it costs fuel to lift the added weight to altitude.

Pilots run out of fuel because they ignore the obvious and refuse to make piloting decisions. Taking an upbeat, optimistic view of life may you a joy to be around, but it won't extend the time left in your tanks. Learn your airplane's fuel system, then use that knowledge to make good fuel decisions. T&T

WOUNDED WARRIORS

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From the Flight Deck

Rules

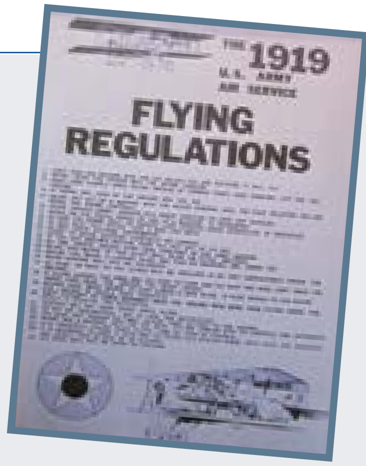
by **Kevin R. Dingman**

Rules are made for people who aren't willing to make up their own.

— General Chuck Yeager

Having slipped through the audits, reviews, simulations, tests and safety nets, a gremlin laid in wait…. for years. Waiting for the paths of a cavalier pilot and an obscure catalyst to intersect. One that would allow demonstration of its dominance over physics, geometry, thermodynamics, aerodynamics and luck. When the impossible happens, the bean counters will not be aboard. As the ground or icy waters approach, when the face of the boogeyman fills your windshield, the designers, engineers, attorneys and sales team are in their cozy cubicles. Having done their honest best with the available data, they will be shocked that a shifty little variable festered into such an issue.

It's not in the manual because it's never happened, and it can't happen. A statement claiming an absolute should raise an eyebrow – and the hairs on the back of your neck. Predicted results. Maximum demonstrated values. Forecast pressure-vessel cycles. Wing attach bolt lifespans. Hypotheses, educated guesses, historically-based predictions, metallurgical test results and safety factors. Weather minimums, currency requirements and flight physicals. Rules are based on a compilation of calculated risks, probabilities, past occurrences and expectations. Test pilots and astronauts know that unforeseen variables are constantly introduced into our lives. And that some of them will be well outside of the tolerances and safety factors from which we based the rules. And that those rules are, therefore, only as good as the results they produce. As the pirate/ philosopher


1919
U.S. ARMY AIR SERVICE
FLYING REGULATIONS

Captain Barbossa espoused: "The code is more what you'd call guidelines than actual rules." If the rules will produce an unsafe result, we are authorized to modify them, deviate from them or ignore them all together.

Flawless

The thing about breaking rules, however, is that if you decide to deviate, it had better be a flawless performance; one that brings a tear to the eye of women, children, dogs, cats, bean counters and the Feds. "In an in-flight emergency requiring immediate action, the pilot in command may deviate from any rule of this part to the extent required to meet that emergency." That's from the FAR's of course, but you could justifiably add most other non-aviation related rules to the list that we may find necessary to break. And the "immediate action" part is a bit misleading. Immediate decision would be more accurate. When we lose an engine at 25k and need to land gear-up… on a private beach… twenty minutes later… that's not so much an immediate action as an immediate decision. And perhaps the words 'in-flight' should be removed from that FAR altogether. Are they saying that we can't violate FARs during a fire on the ground, while not in-flight? It takes knowledge, experience, courage and confidence to break rules. Remember, not all the rules were written by non-pilots that may have never resolved a life-threatening, in-flight event. In fact, most of the rules came from folks like you and me that have seen things happen, been through bad things, have survived and then, afterward, while at zero airspeed in the comfort of their homes, have come up with ways to prevent the bad things from ever happening again (there's an absolute) or ways to execute a better plan when they do, in fact, happen again (and there's the more-likely reality).

Save the Day

As the PIC, breaking rules to save the day is the last thing we want to do. Even following the rules to save the day is near the bottom of our fun-list. That's because we know that saving the day is never a sure thing. We could easily mess it up, screw the pooch – become the squirming hatch-blower. Wandering outside the box by breaking rules is a gutsy move. We'd much prefer a smooth, uneventful and pleasurable flight. One in which we can enjoy the act of flying the airplane, the pleasure of our companions, and the view. Please Lord: no ice, no thunderstorms and no issues with the machine or passengers that require me to break the rules. Let it all go according to plan. But, we know that things happen. So we spend every flight paying close attention to the instruments, the sounds of the airplane, the weather and the millions of "what-ifs" as each potential landing zone passes out of range or our destination weather deteriorates.

We keep track of everything: our location, the time, fuel, weather and the condition of our passengers, crew and cargo. Thinking logically, calmly and intuitively. Creating the best outcome under the conditions presented. Understanding what the machine needs and both the how and the why of procedures and rules. That's what we do in order to stay safe. Is it sometimes difficult? Yes. Does it distract from daydreaming and looking out the window? You bet. Does it make our passengers think we are anal? Probably. The variables when flying an airplane are almost infinite, so we give it our full attention and we make decisions. We try to limit the variables to those that have acceptable risk and for which we are proficient in the permutations that could arise. If we work at it, always learning and thinking ahead, the task is manageable.

Outside the Envelope

If you operate your machine often enough, through design changes, modifications and fixes, and through changes to the airspace environment, you can get a feel for what really matters– to the airplane (anthropomorphically speaking) and to your performance. A safe and illuminating way to get a feel for the airplane, and push both your and the airplane's performance envelope, is in the sim. *T&T* readers have access to very realistic and high-quality simulators. After completing the standard syllabus, feel free to do extreme things that you'd never do in your airplane. Try some aerobatics in which you stall or exceed g-limits. Explore the coffin corner, attempt a dead-stick landing in the weather, a total electrical failure and a gear-up landing. Have the sim operator put an inch or two of ice on the plane. Land on a runway with poor or nil braking and take off on a runway shorter than your accelerate-stop distance. Hand fly an ILS all the way to the runway with 500 RVR. These exercises will give you a feel for what it looks like if you violate the rules. How about some violent control reversals or uncoordinated flight control use, or a continued takeoff after an engine failure below decision speed? Simulate the landing gear failing to retract and practice fuel computations with the gear down. Any of these situations can be caused by human error, instrument calibration, the failure of a component or just plain bad luck. Seeing these in the simulator will help you think outside the box–and the envelope.

The more easily we recognize an irregular event, or when we fly outside of normal parameters, the fewer surprises we will face. And the more likely that the flight will remain within the laws of physics and rules of the Feds. Consistency and proficiency will help to insure this outcome. Was this the airport of intended landing or did we divert? Did we arrive in the terminal area with the amount of fuel intended? Did the descend-via RNAV arrival get us frazzled and make us feel behind? Were we rushed in loading the approach and setting it up? Are we behind because we accepted a turn to final at eight miles when we should have intercepted at twelve? How precisely did we fly the final approach course? Are we scrambling to get the gear and flaps out as we wait for the speed limitations and then chasing the LOC, GS or VNAV? At the airlines we emphasize flying a stable approach–even to the point of having several mandatory "stable" callouts. We must be configured, within airspeed tolerance vs reference airspeed, and maintaining lateral and vertical approach parameters. If not, we are required to abandon the approach. And finally, how consistent are our landings? We judge them, as do our passengers, by touchdown point vs target, smoothness and the deceleration during roll-out. Next is recognizing precisely how the airplane will react at different weights as we reduce power in ground effect, how we manage the crosswind, execute the flare, and finesse the touchdown.

Consistency

Most anyone can learn to fly and land a basic airplane. Mastering the tasks of operating a complex machine in the weather, however, requires training, practice, planning and discipline. We can't eliminate mechanical failures, control the weather or manage the actions of others, only our own proficiency and choices. Consistency helps to limit the variables of a flight, and it makes it easier to recognize deviations from our proficiency zone and to remain within the rules. From arrival at the hangar to parking at the FBO, keeping operations consistent will help us recognize when things are not right. Even then, stuff will happen. If you need to save-the-day, stretch the envelope or break some rules, everyone will be glad you're a bit anal about the process. Especially when the boogeyman fills your windshield. T&T

Kevin Dingman has been flying for over 40 years. He's an ATP typed in the B737 and DC9 with 21,000 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:

What's This V_{SSE}?

by **Thomas P. Turner**

V_{SSE}: The safe, intentional one-engine inoperative speed. Originally known as "Safe Single-Engine Speed." Now formally defined in 14 CFR Part 23, Airworthiness Standards, and required to be established and published in the Approved Flight Manual/ Pilot's Operating Handbook. V_{SSE} is the minimum speed to intentionally render the critical engine inoperative.

FAA Airplane Flying Handbook

Multi-engine airplanes have several significant advantages over single-airplane types. The advantage that is most, well, *advantageous*, is a matter of debate. Payload capability, center of gravity range, speed, and system redundancies are commonly cited as justifications for accepting the additional cost and complexity of owning and flying a piston twin, when compared to a high-performance piston single. The sole most common reason pilots choose a twin over a single, however, is the additional safety that comes with the second engine.

The irony is that if an engine fails in a single-engine airplane the aircraft tends to nose down and remain wings-level, remaining under control unless the pilot resists its natural tendencies. While when one engine in a conventional twin-engine airplane quits, the airplane will immediately, and sometimes dramatically, depart from controlled flight in all three axes (roll, pitch and yaw) unless the pilot *actively prevents* it from doing so. To actually benefit from the safety advantage of a multi-engine airplane, then, the pilot must actively and frequently practice engine-out scenarios under realistic conditions, while at the same time doing so in a safe and controlled environment.

The case can be made that preparing for an engine failure at a critical moment, such as immediately after takeoff, simply cannot be done safely in an actual airplane. Instead, it requires some sort of simulator-based training so the pilot can experience the "surprise factor," and so both pilot and instructor can survive the inevitable mistakes that are part of the learning process.

For now, let's look at one important factor in the simulation of engine failures in a piston twin in actual flight instruction. We've covered the other vital aspects of this training before ("Blue Line, White Arc, Red Radial", *T&T*, October, 2012). There is another element of safe in-airplane engine failure presentation and practice, however, that many twin-engine pilots might not know (or remember), but which is critical to safety and, to the extent possible, vital for accurately presenting engine-out performance in training: V_{SSE}. V_{SSE} is defined at the beginning of this article. Operationally, V_{SSE} is the slowest indicated airspeed at which an instructor should initiate the simulation of a failed engine in multiengine flight.

As an example, as I complete this article I'm about to go instruct a pilot in his Beechcraft Baron 58. Section X, the Safety Information portion of the Baron 58's Pilot's Operating Handbook (POH) expands upon the FAA's definition to say:

V_{SSE} is specified by the airplane manufacturer and is the minimum speed at which to perform intentional engine cuts. Use of V_{SSE} is intended to reduce the accident potential from loss of control after engine cuts at or near minimum control speed (V_{MCA}). V_{MCA} demonstrations are necessary in training but should only be made at a safe altitude above the terrain and with power reduction on one engine made at or above V_{SSE}.

The indicated speed for V_{SSE} is published in the Emergency Procedures section of Baron POHs. The POH speeds do not vary much from one model to the next, as listed on this table:

Model	V_{SSE} (KIAS)	V_{SSE} (MPH)
95-55, A55, B55	84	97
C55, D55, E55 through TE-942 (except TE-938)	85	98
E55 TE-938, TE-943 and after	84	97
58 TH-1 through TH-1471	86	99
58/G58 TH-1472 and after	88	n/a
58TC TK-1 through TK-84	86	99
58TC TK-85 and after/58P	87	n/a

It's very important to realize that V_{SSE} is ***only five to six knots above single-engine loss of control speed (V_{MCA})*** in these airplanes! V_{SSE} is far below single-engine best rate of climb speed (V_{YSE}), which is your target airspeed immediately upon detecting an engine failure during takeoff or at the beginning of a balked landing/go-around. V_{SSE} is about the liftoff speed for a

Baron, which is usually five knots above the published calibrated V_{MCA}.

Check your airplane's POH and find your published V_{SSE}. Compare that value to those for V_{MCA} and V_{YSE} to see how big (or small) the margin is between V_{SSE} and the more commonly known single-engine speeds for the airplane you fly.

As a pilot, the importance of knowing V_{SSE} is to recognize the crash history that resulted in a requirement to define V_{SSE} in the first place, and to ensure that your multiengine instructor is experienced and familiar enough with the airplane you're flying that he or she knows and adheres to the V_{SSE} warning. In or out of training, consciously review, before every takeoff, that any engine anomaly, simulated or real, at a speed below V_{YSE} requires an *immediate* pitch downward to increase airflow over the controls to make sure you can counteract the roll, yaw and pitch of asymmetric thrust, and thereby actually attain the safety benefits you sought when you chose to own and fly a twin-engine airplane. 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

Hartzell's Investment In Five-Blade Swept Props Cuts Wide Swath Through Business Aviation

Hartzell Propeller has strengthened its global leadership in turboprop propellers through a multiyear, multimillion-dollar investment in advanced aerodynamics and manufacturing techniques, featuring structural composite technology.

The result has been the rollout of several new five-blade structural composite propellers and an aggressive campaign to identify fleets of turboprops for five-blade propeller upgrades that enhance performance across the board.

All Hartzell structural composite blades are certified for unlimited life. This means that they can be overhauled at their normal TBO and continually returned to service, with no limit to the total number of flight hours accumulated.

Focus on Current Production Turboprop Fleets

During the past two years, Hartzell has partnered with several of the industry's most iconic OEM's to introduce specially designed 5-blade carbon fiber swept props for new turboprop aircraft and as upgrades to the existing fleets. These structural composite offerings include:

1. DAHER TBM
2. Pilatus PC-12
3. Piper Meridian and M500

Significant Business Aircraft Investments

"In the recent tough environment for business aircraft, Hartzell has made significant investments in industry-leading advanced structural composite manufacturing techniques and sophisticated aerodynamics resulting in clear and definitive performance boosts," said Hartzell Propeller President Joe Brown. "This confidence in the future of business aviation and our close relationships with aircraft manufacturers strengthens Hartzell's global brand leadership."

Hartzell props feature modern aerospace conforming materials that include carbon fiber and epoxy resins, produced on state-of-the art automated manufacturing equipment.

Key Materials, Advanced Aerodynamics

The material choices enable aerodynamic design innovations that feature thin, maximum efficiency airfoils giving Hartzell's new turboprop propellers significantly increased performance and stunning ramp appeal. Hartzell's five-blade composite propellers outperform other propellers because of the improved aerodynamics enabled by high-strength material.

Hartzell's five-blade propellers provide lower in-flight vibration and produce greater thrust for better take-off and climb performance. Through optimized aerodynamic design, the low-end performance is coupled with improved cruise performance. The larger surface area and blockage effect of five-blade propellers provide quicker descents, resulting in smoother touchdowns with less float.

For example, in the single-engine TBM 700/850, Hartzell's modern five-blade swept-prop generated as much as ten percent faster takeoff acceleration, two knots higher cruise speeds, and 100 fpm better climb rate, along with measurably less noise in the cabin and at the airport. After less than two years on the market, Hartzell's new TBM propellers are already flying on more than 20% of the total TBM fleet.

For additional information, visit *www.hartzellprop.com.* T&T

Jazz Weight and Balance

Jazz Software Releases Jazz W+B to the Apple App Store

As of November 5, 2015, Jazz Software announced the availability of Jazz Weight and Balance for iPad and iPhone. By offering pilots a better way to compute their aircraft weight and balance, the app reduces preflighting time and increases safety, by accurately checking loading in relation to the weight and balance envelope and that there is enough fuel onboard for the planned flight.

Jazz Software partnered with the Vermont Flight Academy and Vermont Technical College's Aviation Degree Program to make the app as simple and intuitive as possible.

"The Jazz Weight and Balance app has become Vermont Flight Academy's most important preflight tool. The easy-to-use interface has made a somewhat daunting and time consuming task fast and simple. My Job as Chief Flight Instructor is to make sure we train conservative and safe pilots. Jazz Weight and Balance has made my job easier and I can now easily verify that none of our planes are flying in an unsafe condition." - Ben Higgins, Chief Flight Instructor, Vermont Flight Academy

"As a private pilot, I really wanted an elegant and simple app for calculating weight and balance, and could not find one," said Lou Krieg, President of Jazz Software. "We spent countless hours working with pilots and students to ensure the Jazz Weight and Balance app meets their needs for both accuracy and ease of use."

Once opened, the app presents the user with a technical, yet simple, user interface. The lower half of the iPad app is the weight and balance chart with color-coded normal, utility, and aerobatic envelopes. The top right quadrant is the area where the user inputs all of the weight and balance information. The data can be entered using either a standard number pad keyboard or the scrolling dial input that Apple pioneered on the original iPods.

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Features:

- Saving Flights: Saving flights allows for a quicker preflighting process by saving your weight and balance data from a previous flight to the same airport.
- Exporting Flights: Flights can be printed to a Wi-Fi connected printer or emailed as a PDF.
- Multiple Device Syncing: With multiple devices, it is critical to stay in sync. All data that is on one of your iOS devices will sync wirelessly to all of your iOS devices.
- Templates: Built in templates get you on your way to your first weight and balance in only a fraction of the time.
- Alerts: Alerts increase safety by notifying you if you are at risk from a variety of hazards like running out of fuel or being over max gross weight.
- Aircraft Fleets: Students and renters can download aircraft they use from their local flight school and be ready to use the app immediately. Free registration by the flight school is necessary for the fleet to appear on the app.
- Multiple Fuel Stations: Airplanes that have a complex fuel system can take advantage of a flexible fuel burn profile for an accurate weight and balance calculation.
- Multiple Units: Multiple fuel burn units gives you the ability to calculate the weight and balance based on volume, time, or weight.

For more information about aircraft fleets and details on other features, visit *jazzsoftware.com/products/wnb/*

Priced at $9.99, Jazz W+B is available on the App Store;in the US, visit itunes.apple.com/app/apple-store/id886263643?pt=13355&ct=First%20PR&mt=8t. T&T

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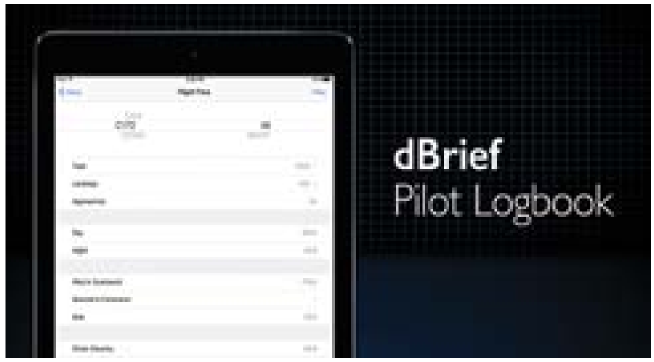

dBrief– A Logbook App For General Aviation

Streamlined app offers free alternative to overkill logbook software

As you may be aware, the electronic logbook scene is an abyss. There are tons of options, but the professional ones are outrageously expensive, and the most-popular free ones are cumbersome and hard to use on mobile–and they all fail in one crucial area: the simplicity of logging a flight.

Enter dBrief: an app for pilots who want to painlessly keep track of their flights. dBrief enables users to log flights in seconds flat, affording pilots the freedom to log a flight before leaving the cockpit. Flights synchronize across devices, so it's possible log a flight on your iPad and see it appear on your iPhone.

For the niche of pilots who are looking to

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track duty time, rest requirements, and other more detailed metrics, a commercial logbook may be more suitable. However, dBrief is a boon to flight instructors, Part 135 pilots, and others who fly multiple flights per day. Users can view flight maps, swipe through detailed overviews, and see future currency requirements (e.g. “You will need two approaches to get current”).

Complete with 3D Touch for the iPhone 6s, dBrief encapsulates the essence of iOS to deliver the best native experience. The service is completely free, and strives to give the common pilot a superior instrument.

The app can be downloaded for free at: *itunes.apple.com/us/app/dbrief/id653891142?ls=1&mt=8*

You may visit *www.dbrief.me* for more information. T&T

EN ROUTE

AVIDYNE ANNOUNCES NEW LOWER-PRICE IFD440FMS/GPS/NAV/COM OPTION

New entry-level IFD440 provides a la carte pricing for added functionality.

Avidyne Corporation announced on February 1, 2016 that it is offering a new lower-priced IFD440FMS/GPS/NAV/COM, starting at $12,399, including mounting tray and installation kit.

The new entry-level IFD440 pricing option allows customers to add wireless (WiFi & Bluetooth®) for $1,300 and Forward Looking Terrain Alerting (FLTA/RTC) for an additional $1,300, should they choose. These capabilities are enabled as add-ons through separate activations. Previously, all IFD440s included wireless and FLTA/RTC at $14,995 + $650 for tray and install kit.

"Our new IFD440 pricing allows customers to get access to a new Avidyne FMS/GPS/NAV/COM at an even lower cost," said Dan Schwinn, Avidyne's President & CEO. "Enabling the built-in wireless capabilities– including Bluetooth and WiFi–and FLTA/RTC through a la carte activations gives customers a lower-cost, entry-level solution with more flexibility when outfitting their aircraft."

"While many customers will opt for having all functionality enabled, this new IFD440 pricing makes it much easier for customers to do apples-to-apples price comparisons with competitive systems that do not have these performance-enhancing extra features," said Tom Harper, Avidyne's Director of Marketing. "It will also allow customers who are buying multiple IFD440 units or an IFD540 and IFD440 to reduce their overall costs by only having the added functionality in one unit if they choose."

The IFD540 will continue to be offered with WiFi/Bluetooth & FLTA/RTC included as standard functions for $16,999, and with 16-watt transmit as an option. The mounting tray and installation kit are included in the retail price, which represents a price savings of $650 MSRP.

Additional information: *www.avidyne.com.* T&T

Upgrading

When your company is expanding and you need a plane with more range to keep up with its needs, maintaining family ties is a logical option. Now that Textron Aviation supports both the former Beech Aircraft and Cessna Citation lines, an upgrade from a Premier 1 jet to a Citation CJ4 makes a lot of sense.

Bob Norton, president of BioZyme, Inc. in St. Joseph, Missouri, has long understood the value of his company's aircraft, which he characterizes as a valuable tool for the business. Norton got into flying in mid-life, rather than as an aviation dreamer during childhood. He was in the food processing business and had to travel a lot, and he grew weary of spending an untoward portion of his time sitting around airline terminals and driving to the final destination.

In short order, Norton bought a Piper Archer and obtained his private license. The ability to hop in the little Piper and fly to a convenient general aviation airport opened up a great travel option for him. One of his good friends was president of BioZyme, Inc. and, in conversation with his friend, the subject of retirement came up. Norton eventually found himself at the helm of a major livestock nutrition company, one that had a Beech Bonanza available as a company plane and a CFI full-time pilot on staff.

Norton earned his instrument rating in that Bonanza, and when it grew into a Baron his multi-engine rating followed in due course. Before long, a King Air B100 replaced the Baron, to get him up and out of the weather, and a King Air 200 was the B100's replacement. The Premier 1 jet logically replaced the Super King Air, and it served well until last year, when a larger, longer-range aircraft was needed.

"We started out working with dealers and staff over a 300-mile radius, then that expanded to 600 miles and then 1,200 miles, so our choice of an airplane has had to accommodate those changing needs," Norton said. Single-pilot certification was a plus, for repositioning convenience. BioZyme occasionally ferries the aircraft with a single pilot, but current company policy is to always have two pilots on the flight deck with passengers in the back.

Improving Nutrition

BioZyme Incorporated is a privately-held company with a long history in nutrition research. Its livestock feed supplements help animals break down the forage and feed in their stomachs more efficiently, getting more nutrition from those inputs and reducing feeding expense. Its custom-tailored products are sold largely through

to a CJ4

by **LeRoy Cook**

dealer and distributors, with the largest number concentrated in the livestock belt through the middle half of the U.S. However, 25 percent of BioZyme's sales are now made overseas, where the global economy is especially supportive of efficient livestock solutions and technology.

Situated almost directly in the center of the U.S., BioZyme is ideally located for a medium-range business aircraft. The Beech King Airs and Premier 1 gave it payload and range capability for most trips, but often more seats were needed and a fuel stop was required for the longest trips. The Premier had served well, but it was time to upgrade. Last year, taking company scientists to a convention in Orlando, Florida required stops in both directions, but the new CJ4 will easily make the trip non-stop. In the week after our visit to BioZyme, a trip was scheduled to Modesto, California, a mission that also benefited from the CJ4's longer legs.

"Our airport (KSTJ) has everything we need (even precision approach radar, thanks to the Air National Guard Wing on the field), but there is no MRO service, so we have to take the jet to Wichita or have AOG mobile service come to us. Warranty is important to me; I want the airplane covered if maintenance is needed." After looking at other light-midsize jets, Norton settled on the Citation CJ4. With up to 9 seats and over 2,000 nm of range, it still offered single-pilot ferry capability and will easily serve the company's present and future needs.

Norton and chief pilot Zane Goforth went to FlightSafety International's Wichita Learning Center to earn their type ratings. The CJ4 uses a Rockwell Collins ProLine 21 flight deck, as did the Premier, and its Williams FJ-44 FADEC engines were familiar, so the transition wasn't totally foreign. Goforth came out of an airline background (CRJ and 747-400 crew cockpits); his transition to a single-pilot rating meant he had to learn to rely on the autopilot and handle emergencies with an empty right seat.

A Typical Company Trip

On the day I visited BioZyme, the daily mission was to be an out-and-back to Abilene, Texas, a 450-mile hop to return an executive of a subsidiary company who had been picked up earlier in the week. BioZyme's average passenger load is about three, but the single-club plus two interior is comfortable for six and two extra passengers can go on the side-facing seat by the door and a belted lavatory seat. I occupied the copilot slot on the way down and luxuriated in the cabin with the passengers on the way back.

SPECIFICATIONS Cessna Citation CJ4

Powerplants	Williams FJ44-4A, 3,621 pounds/thrust, 5,000-hour TBO
Seats	2+8
Fuel	870 gallons
Performance	
Certified ceiling	45,000 feet
Single-engine ceiling	28,200 feet
Max. cruise speed	451 kts@31,000 ft.
Takeoff distance	3,190 feet
Landing distance	2,740 feet
Max. range (w/reserve)	2,192 n.mi.
Climb rate-2 engines	3,854 fpm
Climb rate-1 engine	1,270 fpm
Weights	
Ramp	17,230 lb.
MTOW	17,110 lb.
Zero Fuel	12,500 lb.
Landing	15,660 lb.
Basic Operating	10,260 lb.
Useful load	6,970 lb.
Dimensions	
Wingspan	50.83 ft.
Height	15.42 ft.
Length	53.33 ft.
Cabin length	17.33 ft.
Cabin width	58 in.
Cabin height	57 in.
Baggage	1,040 lb.

Average equipped price: $8,995,000
Information:www.cessna.txtav.com

Home-base FBO Express Flight at St. Joseph expertly hangars and ramps BioZyme's aircraft and Norton insists on having it in a hangar when overnight away from home, if one is available. The CJ4's custom-designed paint job would soon be further enhanced by a company logo. The airplane had been in service for only two weeks and would be turning over 30 hours total time on this trip; I was careful to wipe my feet on the FBO mat.

Goforth's preflight preparation involved supervising the single-point fueling for the trip; 4,400 pounds of Jet-A brought the takeoff weight to approximately 15,500 pounds, well under the 17,110-pound maximum. The static-wick tennis balls were stowed, the refreshment center was restocked with coffee, ice and water, and the aft baggage bin was left ajar to receive luggage. As the steps were raised and the eight-pin door was secured, we turned the right engine and watched the automated start sequence. The engines idle at a low 24% N1, and taxiing is easily managed with rudder-pedal nosegear steering. While slightly longer than a CJ3, the CJ4 has a narrower maingear span and maneuvers easily.

The lately-designed CJ4 cockpit is more pilot-friendly than earlier Citations, with most system checks automated and fewer switches and breakers to check. There are no thrust reversers, but with four-panel spoilers and powerful anti-skid brakes, the runway numbers are impressively short. Goforth found the V_1-cut climbout to be impressive during his training; the single 3,600-pound thrust turbofan could manage nearly 1,500 fpm. For our departure, the ProLine computer said V_1 was 95 kts, Vr was 98 and V_2 was 111. As the FADEC throttles were moved to the takeoff detent, the airplane launched like a scalded cat and was off the ground in under 2,000 feet.

Scooting upward at 240 knots in climb-power detent, the FJ-44's turned 94% N1 and delivered 3,500 fpm on a near-ISA day. We transitioned to .64 Mach as the climb progressed, and we were still doing 2,000 fpm as we passed FL400. We leveled gently at FL430 about 21 minutes after brake release, even

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- Home is somewhere in Eastern US;
- A pleasant and easy going personality.

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By Email (no attachments, except photo(s), please) to Sptravcomp@gmail.com

Unless overwhelmed, will try to respond, at least briefly, to all applicants.

though we were held down by several ATC restrictions on the way up.

For conservative planning, Goforth figures on 1,500 pounds of fuel for the first hour and 1,300 pph thereafter. That said, we settled into cruise at FL410 using only 1050 pph, at 96% N1. Limiting Mach is .77, which the CJ4 was eager to exceed. We were truing at 420 knots over Oklahoma City, cleared direct KABI. All too soon, it was time to start the descent; Goforth set up a descent target of 10,000 feet when 30 miles out. He says the CJ4 is easily capable of slowing down while going down, seldom requiring the speed brakes.

With 12.5% more wing area than the CJ3, the CJ4 requires adherence to speed control on approach, but fits into 4,000-foot runways without difficulty. We had 7,200 feet available, so adding 5 knots above the Vref of 103 kts over the fence still had us down and turned off at the 5,500-foot point. Abilene Aero gave us 700 pounds of quick Jet-A and we were soon buttoned up for the return hop. A 50-knot tailwind at FL450 took us back to base in good time, and we arrived at KSTJ just two hours after landing in KABI.

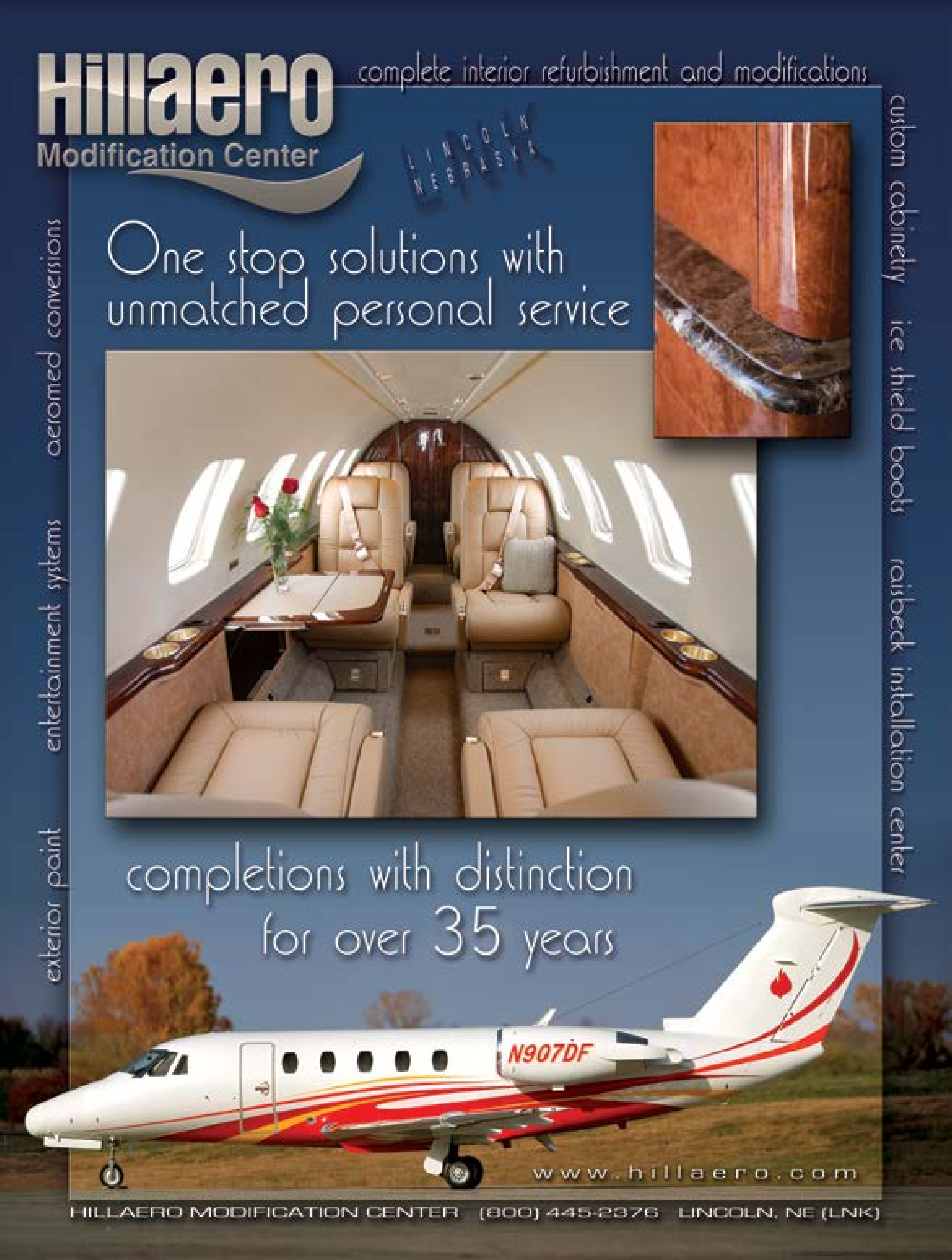
A Vital Business Tool

As Norton puts it, "there's no way we can travel like we need to without the airplane. We pick up customers and bring them to our plant, we discuss the business in privacy during the flight, and we take distributors and headquarters employees to meetings, minimizing nights on the road and long hours away from their family."

During the previous week, right after putting the new CJ4 into service, Norton and Goforth took the airplane to visit a customer in Shawnee, Oklahoma, a nice town with a 6,000-foot runway that's not convenient to reach by airline. While there, Norton got a phone call from an incoming Korean distributor who had missed his connecting airline flight in Dallas and was stranded at DFW after 26 hours on the road. No problem; the CJ4 met him at the Signature FBO and he was in St. Joseph an hour-and-a-quarter later.

A trip earlier in the week illustrated the ability of BioZyme's airplane to get them where they need to go. The first stop from St. Joseph was North Platte, Nebraska, then to Billings and Dillon in Montana, and to Boise, Idaho after that. Try putting that together in one day by airline.

The flexibility of general aviation is its strength, bringing people closer to where they need to go, on their schedule. The CJ4 was an excellent choice for BioZyme, as the company continues to expand its business. CJ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The 2015 CJP

by **LeRoy Cook**

A tremendous turnout supported the 2015 gathering of the Citation Jet Pilots Association, held September 9-13 at the historic Broadmoor resort and spa in Colorado Springs, Colorado. Approximately 100 Citations crowded the huge ramp at Colorado Jet Center and the accompanying crowd brought by that fleet filled the plenary and seminar sessions in the International Center hall at the Broadmoor.

Pikes Peak's famous bald visage overlooks the Broadmoor Resort, only 10 miles away, but there was too much to do at the convention to leave time for mountain climbing.

The exposition hall held a sell-out vendor crowd of CJP supporters. The ever-popular silent auction of donated items and services raised funds and the companion programs kept interest high for the non-pilot attendees.

On Thursday evening, after the first full day of the convention, Platinum-Plus sponsor Textron Aviation hosted a gala dinner party at the Cheyenne Mountain Lodge in the hills above Colorado Springs, where the crisp mountain air whetted appetites and relaxed visiting took place on the patio, viewing the city and plains below that were twinkling in the twilight.

Delivering the Keynote Address on Friday was special guest Dr. Anousheh Ansari, Iranian-born engineer who has been very supportive of space flight since her youth in pre-revolution Iran. Most famously, Dr. Ansari underwent a year of training with the Russian space program to prepare for an 11-day visit to the International Space Station in September, 2006, which she described in detail for the group. Previously, in 2004, the Ansari family had donated substantially to the $10 million X-Prize competition, awarded to the first privately-developed spacecraft capable of carrying passengers to make repeated sub-orbital flights to a height of 100 kilometers, defined as the beginning of outer space. The X-prize was won in October, 2004 by Paul Allen's team, flying the Scaled Composites Spaceship One vehicle, which further inspired Richard Branson's Virgin Galactic space tourism venture.

Another major figure appearing before the CJP convention's assemblage was NTSB chairman Christopher Hart, who is himself a Citation-rated pilot. During his Saturday presentation, Chairman Hart stressed professionalism, analyzing several historic aviation incidents that exhibited both professional and non-professional pilot ability. He decried the current U.S. aviation

Convention

system of allowing applicants to make unlimited attempts to pass certification checkrides, which he feels has allowed sub-standard pilots into the industry, unlike the tests for railroad engineers, who are only allowed two chances to pass signal exams when seeking their certification.

The CJP's highly-educational seminars, spaced throughout the convention, were well attended, including product updates by avionics and engine suppliers, as well as the popular Citation Market update by Cyrus Sigari. Citation jet flying tips were presented by Neil Singer, who also held the popular Companions Ground School session.

All in all, the 2015 gathering was a great CJP Convention, the culmination of many months of work by Executive Director Jon Huggins, president David Miller and Executive Administrator Cheryl Hardy. The 2016 convention will be held October 19-23 at The Roosevelt Hotel in New Orleans; start planning immediately for CJP's meeting in the Crescent City!

For additional information, visit *www.citationjetpilots.com* CJ

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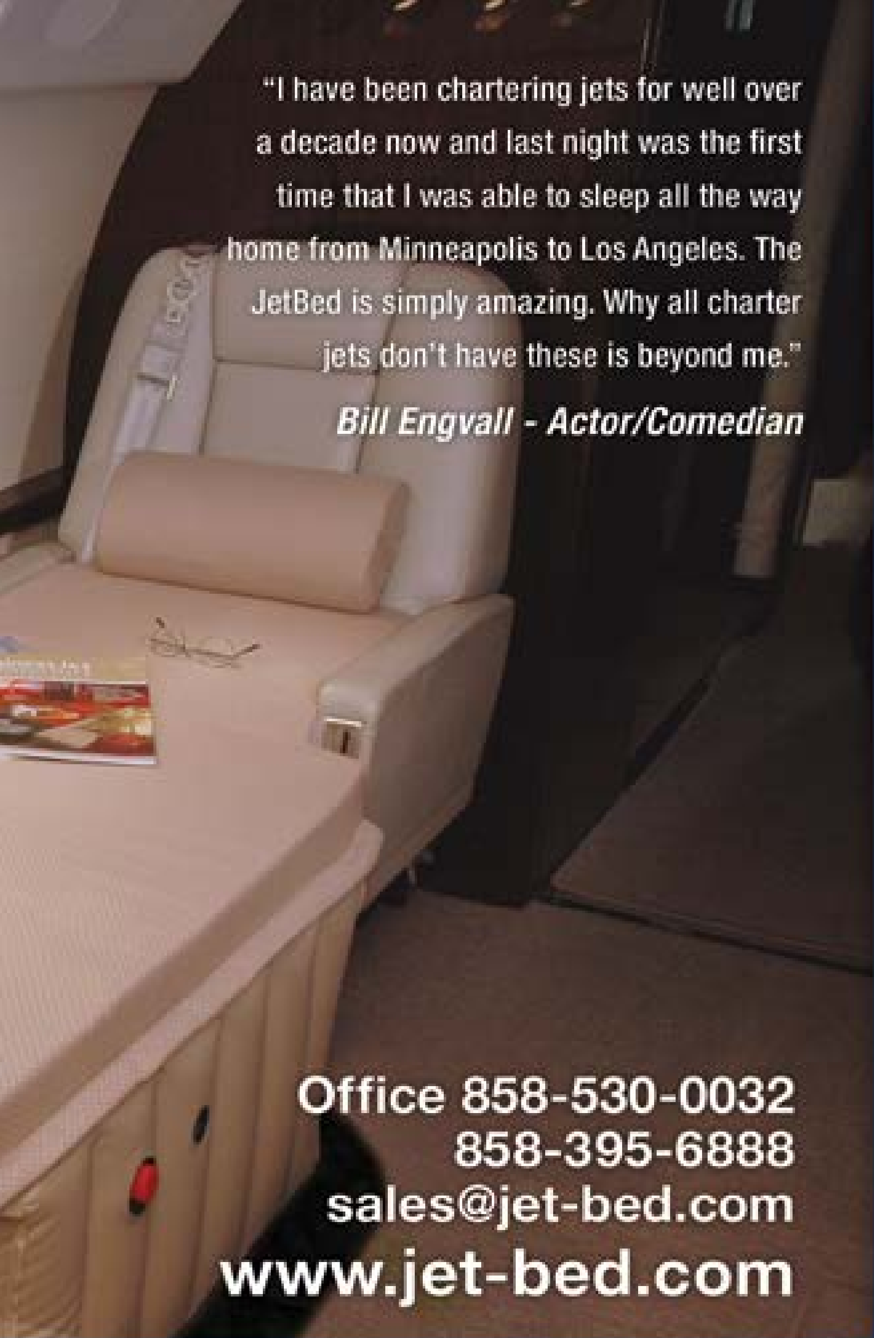

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Maintaining FLYING SKILLS

by **LeRoy Cook**

Much has been made of a recent general deterioration in manual flying skills, leading to a "dumbing down" of piloting abilities in order to fill cockpit seats. But, when faced with an in-flight crisis, it still takes a professional crew to avoid disaster, even if the aircraft only requires one pilot.

There is a danger that we're training new pilots to be excellent system analysts and procedure adherents, to the exclusion of being able to creatively belly-flop an Airbus into a river when bird ingestion leaves the aircraft without power. Everyone agrees that automation is a useful resource, a load-shedding tool that allows pilots to concentrate on critical decision-making. What it should not be is a means of prolonging decisions, or a substitute for maintenance of basic skills. The discipline needed to avoid stagnation of ability has to begin with active participation in the pilot's seat – not by thumbing a procedures manual or programming an FMS. Whenever possible, we need to click off the autopilot, or navigate with basic equipment, just to remember how it can be done.

I can still recall training myself for the ATP checkride, fighting to maintain the close tolerances demanded by the test standards for a precision approach. Allowing the crossed needles to stray outside the CDI's central doughnut meant a go-around, on one engine, and perhaps a very expensive retest. At times, it didn't seem possible that one could keep those needles centered while under pressure to accurately fly the procedure. Gradually, I learned to increase my scan rate, make early, timely corrections, and get ahead of the airplane instead of chasing it. In the end, I was subconsciously willing the airplane to hold a tight course, making it an extension of my mind.

Self discipline, then, is the way to improve piloting skills. Visualizing where we want the airplane to be, and using thrust, pitch, yaw and roll to achieve that end, does not come naturally. It takes practice, initially in a procedures trainer or simulator, but eventually in the airplane. There's no substitute for the feedback of loading and motion found in actual flight. The best of simulators is still a simulation, useful in its own right but not the real thing.

The discipline behind successful piloting starts with understanding the best technique to achieve the desired outcome, and believing that it can be done, even if it doesn't work out on the first attempt. This methodical, disciplined approach leads to taxiing on the centerline, subconsciously, without even concentrating on steering. That desire to guide the aircraft precisely translates into a takeoff and landing roll that also adheres to the stripe.

Takeoff Discipline

In a takeoff profile, there is a target speed to be achieved in the initial climbout, usually a different one for all-engines or engine-out configurations. The airplane cannot be "driven" to this state; it has to be guided there by a disciplined pattern of raising the nose into the correct attitude, at a controlled rate, so as to make the wheels leave the ground at an airspeed slightly above minimum-unstick, accelerating toward the climbout speed with minimal pitch change. This flow of events does not happen without disciplined practice.

Behind such precise piloting is a desire to be better. To accept mediocrity is to invite atrophy of skill. If you repeatedly settle for "good enough" you will broaden the definition of that term to fit nearly all cases, and you'll no longer improve. I am a fan of manual trim control; even though I want the convenience of an electric trim rocker switch under my thumb, I also like to roll tiny increments of pitch trim into the wheel next to my knee. I can feel the minuscule change in my seat cushion, responding to my finger strokes, in a way no stepper motor can duplicate.

Autopilots can be excellent instructors, if one observes their gentle anticipation of level-off or course capture. When it's our turn to fly, we need to emulate the autopilot's early, incremental application of control, so as to roll out directly aligned with the desired track. Rather than let the automation do it for us, we should attempt to fly manually in a similar manner, accepting nothing less than perfection. Practice subtle hand-flying every time the opportunity is offered.

By the same token, do not fly with the fixation of an autopilot, concentrating solely on the minutia. Our chief asset, as cognitive human beings, is to analyze the "big picture" and determine where and how to make inputs so the airplane winds up in a defined spot, properly configured and in the correct energy state. That takes a lot of decision-making and control movement, but if you can't do it, you're not a pilot.

Persist To The Goal

Cockpit discipline is much like the persistence of a distance runner. A runner has to analyze the route ahead, save up energy for a grade, pace himself to avoid "running out of gas" too early, and overcome fatigue and pain by settling into a stride that he can maintain. Running is as much a mental activity as a physical one. It takes practice, gradually improving performance to reach a higher personal-best over time.

Bringing a high-performance airplane into a stabilized approach path is the epitome of piloting ability, particularly when not following a published arrival procedure. In such a case, one has to plan ahead, to reach key positions with the aircraft slowing just enough to be on target for the next leg. Once acquiring the airport visually, it's all about keeping the energy state of the airplane in balance with the deceleration required to reach a stabilized final approach.

The Final Outcome

The landing, of course, is the payoff, the subjective evaluation where many sideline judges score a pilot's ability. But the contact of tires against pavement is only the outcome of all the prior planning and skill acquisition. I like to imagine an open window at the runway threshold, through which I must pass on the way to touchdown. At this window, I must be on speed, not too high or too low, with the aircraft configured for the landing. I cannot miss the window's open space, and I must not allow the airplane to carry too much or too little energy beyond that window. Then, and only then, can I concentrate on the act of rolling rubber onto concrete.

When I introduce a new candidate to the task of learning to fly, I liken the process to mastering a musical instrument. One does not become a musician by learning to manipulate keys, valves and strings. Rather, one has to become part of the instrument, making it an extension of his or her will. Discipline is required to keep working at the job of growing in skill, and to maintain that skill, once acquired. Taking time off, particularly in the initial stages, invites deterioration of the meager skills so painfully learned. Discipline is key, staying the course to higher levels of ability.

Thinking ahead is the way to keep on a disciplined path. A runner has a goal, somewhere out ahead, and along the way he or she may set shorter goals; "if I can keep going until that next milepost, I will take stock there, and if all is going well I will continue this pace." In that way, runners eventually find themselves at the finish line, just as pilots work to perfectly pass waypoints with the airplane at the proper time, height and energy state, and thereby arrive at the destination.

Never consider the task of hand-flying to be a waste of time. It should be seen as an opportunity to test oneself, against the ultimate judge, the airplane itself. Discipline yourself to fly a perfect liftoff and departure, to level at top-of-climb without disturbing the passengers, to plan the navigation in an efficient manner to maximize fuel remaining, and to fly a descent profile that leaves nothing undone. As helpful as the automation is, it's only a tool, and you should discipline yourself to be capable of manually taking the aircraft anywhere the autopilot can go. CJ

A Flying Squadron…For Cita

Jon **Huggins, Executive Director, Citation Jet Pilots, Inc.**

When I was flying T-38s and U-2s for the US Air Force, my squadron mates and I didn't "own" the jets …but sometimes it sure felt like we owned them! We flew them all over the U.S. and all over the world, experiencing some of the most unique adventures I could imagine. With those high-performance jets, there was so much to know and be good at… and keeping that proficiency simultaneously in TWO different jets made it that much more challenging.

You may be surprised to know that we have an "Owner Pilot Association (OPA)" or "type club" in the military, where the pilots come to be great aviators: it's called "the flying squadron". For most of my career, I was in the 1st Reconnaissance Squadron, the oldest flying squadron in the United States military; I was an instructor pilot in the 1st RS for 14 years. Day-in and day-out, I worked hard to improve my skills in those aircraft, but I was also tasked with getting our new pilots the necessary instruction and knowledge they needed to become successful reconnaissance pilots. The squadron was the place where pilots came to become better at their craft. It was also a great social outlet, where kindred spirits with a passion for aviation would get together, after work or while deployed overseas, and continue "hangar flying" well into the evening.

The U-2 and T-38 are high-performance jets, each in its own right. Had I gone through initial training, and then spent the next few years trying to improve my flying skills with no outside help, I would have failed miserably… and I'd be lucky to be alive. But, having the support of the squadron… from the newest new guy to the oldest, crusty, weathered senior instructor… keeps everyone challenged. Yes, our squadron "Owner Pilot Association" was instrumental in my success as a military pilot.

An OPA For Citation Pilots

Certainly, if you've owned or operated your own private aircraft, you've at least considered joining your aircraft's Owner Pilot Association. The common experiences of the collective group are passed on to the members, along with the learning of hard lessons from those who experienced them first-hand. But when it comes to turbine aircraft, the complexities innate in them, and the requirements for a more-polished pilot skill set, makes the turbine-class OPA more than just a good idea: it will provide you the support structure that you must have to if you are going to continually improve your abilities and master your duties as Pilot in Command of these high-performance wonders. Not to mention, it will also save you significant time and money. Bottom line: if you're an owner, operator, or otherwise directly involved with turbine aircraft, you need to be a member of your respective turbine OPA.

There are OPAs for each of the turbine-powered owner-flown aircraft currently on the market, and each of them strives to advocate for its members and provide them the tools they need to operate more efficiently. For owners of a Citation jet-variant, there is the Citation Jet Pilots Owner Pilot Association (CJP), an independent, not-for-profit OPA (*www.CitationJetPilots.com*). Through the support of CJP Members and CJP's corporate partners, CJP is able to deliver a variety of member benefits that provide a compelling value proposition for joining.

CJP is the de facto "flying squadron" for Citation owners and pilots… and, like any military squadron, it is made up of members that are brand-new to Citation ownership and/or flying, all the way up to members that are on their 7th or 8th Citation. Although the vast majority of our members are single-pilot rated, many fly with another pilot, whether they are in an M2 or a Citation X.

CJP was started seven years ago when eleven people got together in Las Vegas to discuss ownership of the then-new Citation Mustang. Since then, CJP has grown into a diverse, international organization of over 900 members, of which 425+ are Citation Owners. Our owners are located world-wide, with the bulk of them residing in North America.

The Benefits Of CJP Membership

One of the biggest member benefits of CJP is its mass: the association is able to advocate for its owners and members with a significant voice. And as powerful as that voice is, it gains strength as our membership ranks grow. Our ability to leverage our size and unity is also beneficial to our corporate partners that sponsor CJP. They realize that, as CJP Partners, they are able to communicate directly and easily to all of our members, rather than spending their marketing dollars attempting to contact each person individually. In addition to Textron Aviation, our top-level Platinum Partners include jetAVIVA, ProFlight, Wagner Family of Wine, FlightSafety International, and Garmin. They, and all of our partners, have made significant investments that allow CJP to continue its mission of providing the support and education to allow our members to operate their jets efficiently, economically, and safely.

tion Pilots

Each fall, CJP holds its Annual Convention. It is 3 ½ solid days of content focused on owners and pilots of Citation aircraft. We certainly have wonderful evening events… but the real action is from 8am-5pm, when experts from all fields of aviation share their knowledge on the Citation fleet, physiology, training, cockpit resource management, weather radar, and a myriad other topics. Our 2016 Convention is to be held October 19-23 in New Orleans.

CJP also hosts three Regional Events each year. These are smaller, more intimate gatherings of about 20 owners and 50-60 people in total, in a very unique setting, with a custom itinerary that provides a unique experience and opportunity to build relationships amongst our members.

So what other "tangible benefits" does CJP provide? For Citation owners, they receive a $500 certificate good at any Citation Service Center or through a Mobile Service Unit (MSU). Just that one benefit alone means that you are *losing* money each year if you are not a CJP Member. Our simulator training providers offer discounts ranging from $500-$750, and we frequently have auction items that can save you thousands on your annual training.

CJP's burgeoning *FuelAdvantage* program is open to anyone with a turbine-powered aircraft, and provides significant savings to turbine owners, while driving more business volume to participating FBO's.

Arguably, CJP's most valuable resources are the Member Forum and the Russ Meyer Citation Library (RMCL). The forum is a living, online community where members can share knowledge, experiences, ask for help, and find out "gee, I never knew that" information. When a simple forum post saves you thousands of dollars in troubleshooting, I would say that is "valuable".

The RMCL is a virtual library that is chock-full of technical documents, training aids, performance, and safety related material… all related to Citation operations. In conjunction with Embry-Riddle Aeronautical University, the RMCL grows each and every day as new, relevant material is added to the library. It is the one-stop-shop for Citation information.

In the turbine world where avionics upgrades are well into the six-figure range, major inspections are five-figure, and just about anything else is a four-figure item, CJP's annual fee of $300 makes joining an easy decision. That's about 55 gallons of Jet A at KTEB, the last time I looked. If you are not a CJP Member, *that omission is costing you money.*

Looking back on my military flying career, I simply cannot imagine having been a U-2 pilot… on my own… without the help and observations of other knowledgeable pilots and the expertise of those that maintained, serviced, and provided the logistics support for keeping the U-2 "on the edge of space." Similarly, as a low-time Citation pilot, I would never imagine trying to go it alone without the support, professionalism, and network that is provided by CJP. Join us today!

Go to www.CitationJetPilots.com for more information on CJP. CJ

Jon "Huggy" Huggins (Lt Col (ret), USAF) is the Executive Director of the Citation Jet Pilots, Inc. He is FAA-rated in the Citation 525 and BE-300, as well as the F-5, L-29, T-33, and T-38, and has over 8,000 hours of turbine time, including over 4,100 flights in the U-2, T-38, and King Air 350.

By **Kevin R. Dingman**

Reactions Aging and reaction time

"The time elapsing between the beginning of a stimulus and the beginning of an organism's reaction to it." That's the definition of reaction time – if you don't mind being called an organism, that is. Even if you do mind, it's still the definition. Our high school driver's education teacher used "age, experience and wisdom" as his retort to the class contention that our youth and quick reaction time made us better drivers than older, slower-thinking drivers. We had yet to learn that the quickest reaction time is the one in which you avoid the need to react quickly in the first place. And that it's not good to infer that the teacher is old. It can be difficult to get such things through a teenager's head, though, and some remain saddled with the cumbersome burden of a similar, slow-to-learn arrogance.

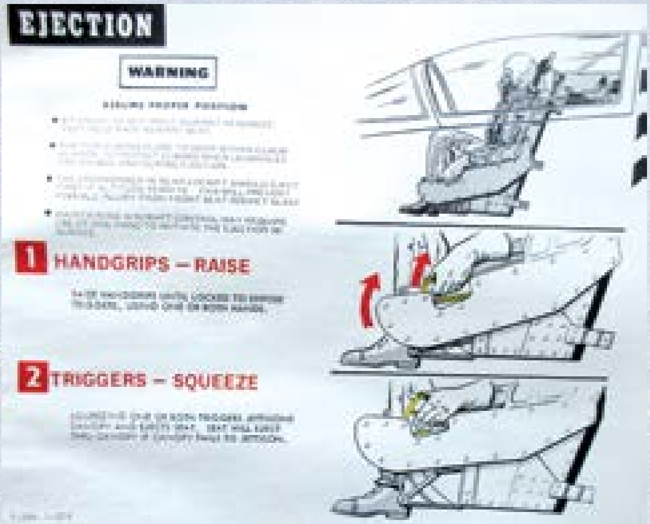
Screaming Passengers

The top 12 percentile–that's what I scored today using an internet reaction-time test–and I'm within a nine-iron of age 60. Another test categorized my reaction time as equivalent to that of age 40; not quite as fast as an arrogant high school kid. They were very simple physical tests, however, using the "click-now" function and were more similar to an arcade game than a useful measuring tool. Also, more of a hand-eye coordination assessment than a test of the ability to react, they didn't require any decision making other than the recognition of a visual cue. There was no requirement for subject matter knowledge, analytical thinking or risk assessment. There were no time constraints like an approaching mountain, accumulating ice, low fuel or the end of a runway. There were no screaming passengers, no smoke filling the cabin, no sounds of accelerating air or a decelerating engine. You could not clip any trees, sink in the ocean, land short, or bend any metal, even if your decision was wrong or reaction inadequate. In other words, there was no pressure. No pressure except for that imposed by my arrogance while trying to get into the top ten percentile. Perhaps the most relevant factor as a pilot, however, was that the tests didn't provide for "gotta-get-there-itis" or the option to not react at all.

If it ain't broke…

Without a ballistic recovery system or an ejection seat, we must control the aircraft until it stops moving. The decisions we make determine that stopping point; where our flight path intersects the tangent of the horizon. We prefer that area to be a nice, long, paved runway. The need for us to react instantly in order to achieve this geometric solution is normally relegated to taking off, landing and perhaps avoiding a mid-air collision. Other than these examples, however, the need for a nanosecond analysis, decision and immediate reaction is uncommon; there is normally time to think. Not drawn-out, committee-meeting type thinking, but enough time for analysis. As in business and politics, however, our deliberation and analysis sometimes results in the correct decision to not take any action at all…for the moment. Some of our actions can be irrevocable, and a hurried decision, even when using well-developed intuition, can be incomplete, inadequate and occasionally disastrous. We have learned to slow down, analyze by cross-checking multiple sources, gather the data, evaluate the options, and then react, appropriately and deliberately. Only at the end of the process do we execute any physical portion of the reaction, which is the moving of a control – or five. An unnecessarily quick reaction could generate an unpleasant surprise and additional difficulties. The first few seconds, or even a full minute, when reacting to an event are therefore used for recognition, analysis, decision making, and then action, if any.

Flying single-pilot in the weather can elevate heart rates faster than a letter from the IRS or an engine failure at V_1. Unlike a warm sunny day, or in days past when we could analyze and react more quickly, inflight events can become distressing. It may take more time and effort in the planning and execution of the flight



to ensure a safe, smooth and stress-free operation. We are getting older and probably slower in thought and movement, maybe complacent and sometimes forgetful. Father Time is unstoppable and, for all of us, aging can move along more quickly than a fast moving cold front – and faster than we recognize. It's common for the perpetually-young person in our minds to overestimate ability or to modify reality through hopeful optimism. We push ourselves, often without realizing, as if we were young and swift. We assume that we will think and react quickly when needed. The time to discover that we are not the teenager we once were is not during an inflight event. How do we recognize if we are experiencing diminishing abilities as time overtakes skill, cunning and luck – I mean, experience? There are clues and you may have seen them.

Remembering More Slowly

It could be the struggle to read back parts of a clearance, missing radio calls, forgetting or skipping some of a checklist, difficulty in remembering a speed, pressure or other operating tolerance or limitation. It could be anxiety in the execution of a climb-via or descend-via procedure, loading the wrong approach, trouble flying the approach, or a less-than-optimal landing. And not simply a hard landing, necessarily; one that touches down too far down the runway, not on centerline or at a too-fast or too-slow airspeed.

Nowadays, a common indicator of diminishing proficiency is remembering more slowly. Whether it's an obscure GPS function, such as flying a parallel GPS track, or something used less often, like the missed approach mode, rapidly changing technology is a fine litmus test of our ability to learn, remember and to keep up with the airplane. Even a modern transponder with traffic and weather can trip us up as we swipe through the pages of data and information. Struggling with avionics or other systems is indicative of low proficiency or a change in our ability to think and react. Some say we remember more slowly not because our brains are older, and therefore slower, but because they are full of data and other "crap", from years of experiences. And it simply takes more time to find the data in our full hard drives. Perhaps similar to creating a hot-path or an icon for the most frequently needed data, training and accessing the data more frequently can be a defense against this phenomenon.

In order to stay ahead of the airplane and avoid the need for quick reactions, we use checklists, an efficient and practiced instrument crosscheck, and we try to remember past experiences or the experiences of others. We stay within operating limitations, properly manipulate the flight and engine controls, and avoid letting the airplane touch anything other than rubber to runway. Initial and recurrent training helps to point out and correct our weak spots.

The MU-2 folks are very happy with the results that SFAR 108 (Special Federal Aviation Regulation) has produced in their pilot community. Perhaps we could follow their lead and accomplish the same type of training regimen. Most of us that fly turbines and larger vehicles already do so. And not necessarily to comply with or avoid further government-imposed regulation, or to satisfy the insurance underwriters and BOD, but in order to keep up and stay alive. Perhaps we can increase the frequency of our recurrent training to every six or nine months instead of once each year. If nothing else, we should grab a buddy as a safety pilot every couple of months and fly some approaches – including the missed. Throw in an unplanned diversion as well. Have your safety pilots select an airport without telling you in advance. And let them decide after which approach you should divert. It will force us into a short-notice reaction as we assess runways, the weather, approaches and make the fuel computations.

Diapers

A pilot's reaction time is based on his or her experience, knowledge, ability to access memory and forecast outcomes, and, unfortunately, age (not to infer that you're old–the student driver remembers that part). Distractions, fatigue, complacency and lack of understanding are detriments to decision making and reaction time. What may have been a manageable flight in the past may now peg our fun-meter or fill our task-management diapers. If this type of apprehension occurs when we go flying, it's the old organism in us telling the young organism that the demands of the task may be too high. We can avoid the areas of discomfort by re-route, re-schedule or cancellation. Or we can take a chance and continue with the hairs standing up on the back of our neck. Remember the old adage: "better to be on the ground wishing you were in the air, than in the air wishing you were on the ground." Let's use our age, experience and wisdom to avoid the need to react quickly in the first place– no one wants a full diaper. CJ by LeRoy Cook

Under New Guidance, ATP's Motto Is "Knowledge Fuels Safety"

For more than four decades, since the firm's inception in 1973, Aircraft Technical Publishers has been providing vital technical information and, more importantly, management of that information, to flight departments and MRO companies throughout the world. Under the guidance of its new CEO, Charles Picasso, ATP continues to expand and improve its service.

"I'm looking forward to working with our partners and clients, who can expect to receive the same level of service excellence from ATP, as well as look forward to exciting new developments on the horizon," said Picasso. "It's an honor to take the helm of an organization with such an esteemed history in the industry and lead ATP into a new era of growth."

What exactly does ATP do? According to company sources, Aircraft Technical Publishers is the general aviation industry's only single-source provider of information management and services for manufacturers, operators/owners, and maintenance providers.

As any aircraft owner can tell you, it's a real hassle to keep track of all the required inspections, replacements and deadlines for the various certificated equipment in and on the airplane. As aircraft have grown more complex, so has the paperwork supporting them. Continuing airworthiness requires adhering to a schedule of inspections and life-limit compliance, not just for the airframe and engines, but all components, both those that came with the airplane and those that have been added.

A steady stream of airworthiness directives and service bulletins continually add to this burden. ATP's 23,000 users, in 96 countries, receive updates and monitoring of the client's fleet, even if it consists of a single airplane, and ATP provides current data to the FBO maintenance shops that often service a variety of aircraft. FAA regulations require repair stations to have the proper manuals or other information to work on each type of aircraft or component. To facilitate this, ATP maintains the world's most comprehensive library of up-to-date maintenance, operating, and regulatory content. Without ATP to keep them up to date, operators and MRO providers have a huge problem acquiring and maintaining the required data.

Because it has enduring relationships with more than 200 leading manufacturers, ATP plays a pivotal role in facilitating collaboration and information exchanges among manufacturers, owners/operators, maintenance providers, regulators, and aviation schools. ATP works closely with some 54 OEMs, bridging the gap between manufacturer and client to ensure compliance is being met. ATP subscriptions are provided on an annual basis, priced depending on the need; the cost of ATP's services can vary widely, from a few hundred dollars to ten of thousands, but, in talking with Mr. Picasso, we were surprised at the affordability of ATP support for small operators. CJ

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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
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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 IIXL
22	CHEYENNE IV
303	CONQUEST I

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12	KING AIR 200T
203	KING AIR 300
3	KING AIR 300LW
588	KING AIR 350
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7	KING AIR A/B90
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7	ROCKWELL 680W TURBO II
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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 560A 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

37,744 TOTAL AIRCRAFT

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ON FINAL

by **David Miller**

Mortality

How often do you think about life and death? Personally, I really think I am going to outlive just about everybody. I don't like visiting retirement homes, even though my mom lives in one. But, once in a while I reflect on just how tenuous my place is here on this planet. I had that opportunity in January.

Don and Dawn died in their CJ.

We weren't close friends, but Patty and I spent time with them at various Citation Jet Pilot's events. They were friendly and outgoing. Seemingly always smiling. The kind of folks you like to be around.

They departed mid-morning from Salt Lake City (KSLC), after an event. According to partial audio recordings, Don reported an autopilot failure in IMC conditions with light rain and asked departure control for a vector to better weather. Soon thereafter, a "mayday" call. The aircraft debris was spread over a mile of snow-covered terrain.

I was stunned as I listened to the audio of Don struggling for control of the airplane. Was it instrument failure? Was he presented with confusing altitude or pitch information? What were the last seconds like? Over and over, I wondered what I would have done in the same situation.

We are cautioned not to speculate. As pilots, we are supposed to be professional. To wait a full year for the official NTSB report. But we are human. We reach out to others and offer opinions. And in this case, knowing the victims made it personal. Patty was strangely quiet as I tried to explain to her what had happened.

As I speculated.

Let's face it. No matter how often we train, flying can be dangerous. And although more people probably die driving to the airport than flying from it, a plane crash always seems to get national attention.

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, Miller, along with his wife Patty, now own and fly a Citation CJ1+. You can contact David at davidmiller1@sbcglobal.net.

My mind flashed back to 1974 when my father's partner died in his Bonanza and how that event changed my business and personal life. I thought about how Don and Dawn's families would be changed forever.

I have always wondered why a total stranger will get in an airplane with me, ride facing backwards in moderate turbulence at 41,000 feet, sit quietly as I descend through icing conditions and shoot an approach to minimums, and then criticize my driving on the way home from the airport.

Then it struck me that I needed to go flying. And for no good reason at all, I drove to the airport, carefully preflighted my airplane, and flew in the clear, morning skies to Shreveport.

Where am I going with all of this?

I have no idea. I just need to talk about it.

Fly Safe.