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TWIN & TURBINE

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Avoiding Ambivalence

"Why bother to check the weather?" said my veteran traveling companion. "We're going to go anyway." His idea had merit, at least from his point of view. We had been at the boring resort-based meeting far too long; any change of location would be welcome. So, very likely, we were going to go "anyway", just for a change of scenery.

However, I insisted on at least a cursory look at the current and forecast conditions, and we found the weather doable, if not perfect. What I wanted to know was, quite simply, what were the options if we ran into unflyable weather. Yes, we wanted to go somewhere – anywhere – to get away, but forewarned is forearmed (to paraphrase from the Latin, "praemontius, praemuntius"). It looked as if diverting north, should our filed route become untenable, would give us a safe harbor if needed.

Now, I get a lot of jabs about my habit of in-flight note-taking; by flight's end, my ever-present clipboard is filled with times-over-points, the previous frequencies, ASOS weather and fuel-burn notations. I'm not obsessive about it; I'm just a little more detail-oriented than my friends who just punch up the route and rely on ATC to sort it all out. I've had too many in-panel failures, flying strange equipment over unfamiliar country; I like to have my suspenders holding my pants up, in case my belt fails.

The "doesn't matter, why bother?" attitude of ambivalence can get pilots into a world of hurt. Whether it's taking off with a tailwind component to avoid a long, involved taxi-back, or not checking the weight-and-balance effect of throwing all the gear in the tailcone, or figuring the weather will clear up in time for your arrival, the shoulder-shrugging approach to piloting eventually will catch up with you.

Like the old bumper sticker that jokingly says "Who Cares About Apathy?", ambivalence is just a way of shedding workload. Employing this labor-saving device kicks the can down the road until it finally has to be picked up and carried to the waste bin. By then, you may have stubbed your toe a few times and the can might be unusable from all the dents it's accumulated.

Last month, one of our airplanes was stranded halfway home, because the pilot chose to launch in the path of approaching thunderstorms, preferring to disregard signs like a low pressure area and a radar depiction of the storms, in an ambivalent trust that "it'll work out all right." And perhaps it did, when he wisely parked the aircraft at an intermediate point, but the disrupted mission wasn't completed and it had to be flown later, doubling the cost.

Management studies generally recommend that the best course is to deal immediately with things that can be resolved on the spot, then to prioritize the must-do deferrals in order of importance, taking care of the easiest first if there's no priority difference. We have a lot of important stuff to do in the cockpit, some of it life-threatening. It pays to avoid ambivalence.

LeRoy Cook.
Editor

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In the Belly of

By **Gary "Waldo" Peppers**

From a three-foot hover, I nosed the Bell 47 over the edge at the main base of West Cameron 180, an offshore oil field near Cameron, Louisiana. Descending toward the water toward our blistering sixty-knots cruise speed, I made my wake-up call to the company radio operator in Intracoastal City: "Tango Four Seven is up and around, West Cameron One Eighty, local." After a few seconds the operator came back with, "Good morning, Tango Four Seven, how's the weather?"

"Clear and calm," I reported. And warm, I thought, for early January.

"How's the viz?" the operator persisted.

I gazed at the sun on the horizon. "About 93 million miles," I smirked, "Why?"

"You're the only one flying today, so far. Everyone else is shut down in fog. Keep a good eye out." He didn't need to caution me about weather. Though I had a helicopter instrument rating, courtesy of Uncle Sam's Army, my trusty old Bell's panel was bare – not even a turn-and-slip. This was strictly a day-VFR operation.

I let my riders off at a "toad stool" pumping platform about two miles from base. As I idled, they went below to retrieve data cards that recorded the natural gas flowing ashore overnight. With the cards, I'd return to the main platform for my next two operators. With all six teams delivered to their work platforms and all cards retrieved, I could look forward to a short break and breakfast.

the BLOB

I could only make out the outline of the platform from 500 yards away, and it was fast fading into the fog.

Even when you know you're about to die, force your brain to focus.

The company VHF net was indeed quiet. Nobody was reporting up. I heard none of the light-hearted banter that was usual just after first light. It was an eerie silence.

"Tango Four Seven, you better git on back now," said a voice over the FM net from the base platform. "We got fog comin' in."

I acknowledged and wound up the rotor to encourage the pumpers to get a move on. Less than a minute later, the junior member of the team appeared with the cards, pointing to the west and gesticulating wildly.

I didn't wait for Moise to clear the deck but lifted off immediately, swinging the tail rotor away from him as I dove into translational lift. Seeing A Platform, I was awed at the spectacle. The white cliffs of Dover were marching across the oil field from the southwest, like the Blob that ate Santa Monica. B Platform, 300 yards west, was already obscured, as were all the toad stools to the west and south. But A Platform was still clear, bathed in bright sunlight, just two minutes away.

Pushing the nose over and pulling maximum manifold pressure produced 75 knots with the big neoprene floats. From a mile away, I figured I was going to make it. The platform was still silhouetted against the fog, but the Blob was gnawing at its western corner.

From a half-mile, the helideck was beginning to look fuzzy. I could only make out the outline of the platform from 500 yards away, and it was fast fading into the fog.

I shifted my approach to the auxiliary platform, on the southeast end of the base platform. It looked like a completely independent structure, jutting out from the face of a limestone cliff. The base platform had been wholly swallowed by the Blob, and as I continued flogging toward my safe haven, just 200 yards away, it began to gobble up the aux platform.

I was way too fast. In my haste, I'd been pushing redline, and now it was time to transition for landing. A hundred yards from safety, I pulled the cyclic stick way back and bottomed the collective to slow down fast. Between my feet on the anti-torque pedals, I watched the helipad rapidly fade to white as I closed another fifty yards toward the deck.

Man, I said to myself, this is not going well at all. The hair stood up on the back of my neck but real panic had not yet set in. My forward momentum carried me into the fog bank as I continued to decelerate – 50 knots, 40, 30. For another stubborn moment I clung to Plan A, believing I could slow to a hover and find the platform lurking just ahead in the fog.

Glancing down to get one final visual reference before I surrendered to the Blob, I was alarmed to find that I could barely discern the water just fifty feet below. That did it. Finally, I realized my only option was to go around while I still had flying speed and at least a fleeting outside reference: Plan B.

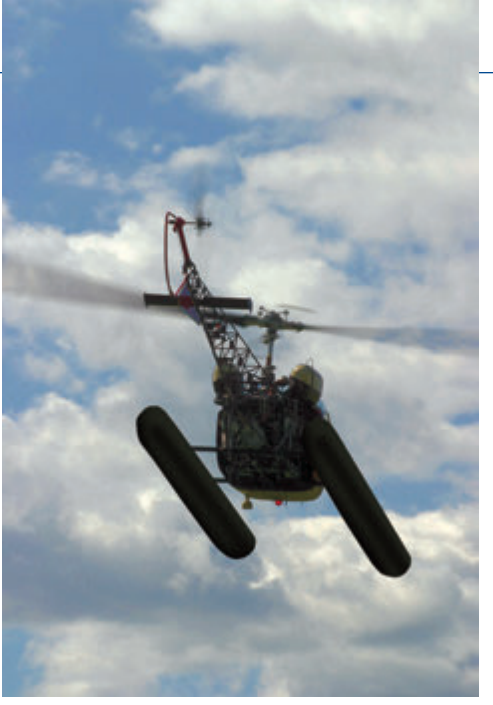
A go-around in a piston helicopter is a complex operation, even in perfect conditions. I knew I didn't have time to smoothly transition to climbout attitude, so I just ignored the engine/rotor gauges and airspeed indicator, focusing on the barely-discernible water below. I simultaneously pushed the cyclic forward to lower the nose, pulled the collective lever up to my armpit, wrapped the throttle grip open, and fed in nearly-full left pedal. In the second or two it took to establish

a ten-degree nose down attitude, I didn't care whether I oversped the rotor or overboosted the engine.

With an approximate climb attitude established, I reduced collective slightly and adjusted pedals to keep the tail straight behind. When I looked inside the cockpit, airspeed was 30 knots and increasing, a good sign. Manifold pressure was in the yellow but engine and rotor rpm were in the green. Since any change in pitch, power or antitorque would affect all the others, I determined not to change a thing. I checked my attitude relative to the water. Nothing but white. The Blob had me.

Caught By The Blob

The limits of Plan B were obvious. How do I transition to instrument flight without any instruments? How do I stay right side up without even a turn-and-slip indicator? And how do I make a one-eighty to get out of this mess alive?

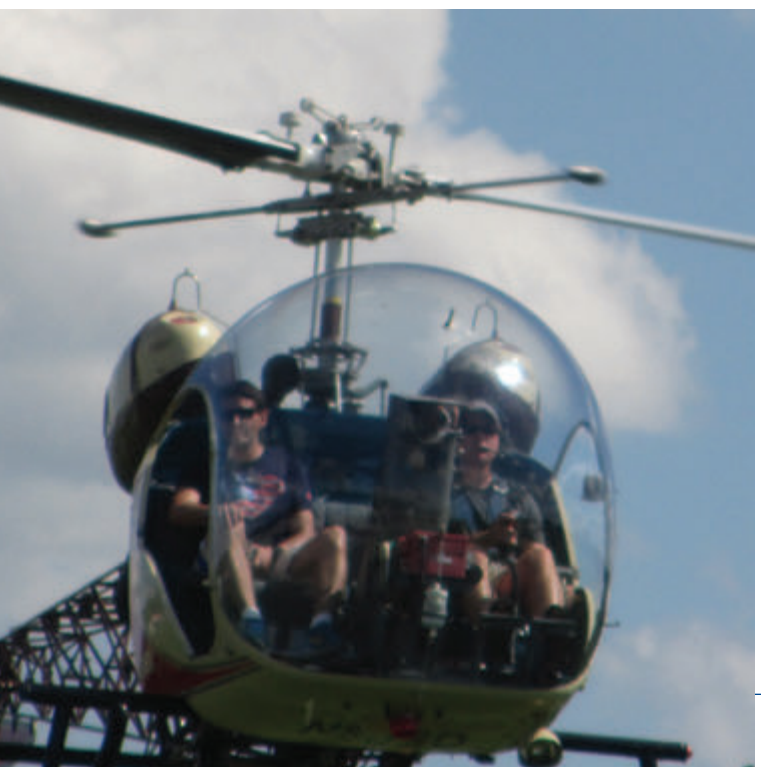


Panic grabbed me by the throat! Suddenly, I was aware of nausea, ringing in my ears and tightening in my chest. Please, God, don't let me die scared and stupid! I forced myself to think. My altimeter showed 70 feet and increasing slowly while the VVI indicated a slight climb. Hoping to clear the platform ahead, I resolved to freeze the controls right where they were.

My instruments showed I'd established a 50-knot, 900-fpm climb. At that rate, I'd climb out of the fog in a minute or so, I thought. My whiskey compass had finally settled down on a southwesterly heading, near as I could tell. Now, if I could just hold those parameters. . . .

The first indication I was losing it was the noise. I heard an increase in air rushing past, even before it showed on the indicator. When I looked, I saw 65 knots, increasing, and rate of climb was decreasing through 500 feet per minute. Thinking I might have inadvertently decreased pitch attitude, I increased cyclic backpressure. After a second, I saw no change in the trend. I felt like I was straight and level, but I knew I was in a bank. The question was, which way? The compass

showed a slow turn toward the south. My best guess was that I was in a left bank. I decided to put in about an inch of right stick and wait to see how the trends developed. If they increased toward a downward spiral, I would reverse inputs immediately and double it until the trends reversed. I could feel the blood pounding in my neck. I had to force myself to breathe.



I moved the cyclic and waited a couple of potatoes; no change. Airspeed was up to about 70 knots and the VVI showed 400 fpm downward but was steady. Why was that? Think! If I were in a right turn, I reasoned, both rates should have increased a lot very quickly. Must be that I had only put in enough right stick to stop the increase in left bank but not enough to roll out. I gave the stick another inch or so to the right. My ears rang. I fought down the bile in my throat.

Slowly but perceptibly, the airspeed noise began to diminish. The ASI needle began to unwind and the VVI needle started to rise. I kept right stick in until the VVI reached 500 fpm upward, then centered the cyclic and hoped I'd allowed enough for the lag in the VVI. Altitude showed 400 feet and climbing.

The VVI maxed out at about 800 fpm and then immediately began to fall off. Airspeed decreased to 50 knots and then began to increase again. *Right bank, right bank!* I screamed at myself. I displaced the stick half-way to the left and fought the temptation to pull back, as the VVI plummeted through 1,000 fpm downward. Airspeed noise was increasing and the altimeter unwound rapidly. I muttered another prayer while I waited for the VVI needle to stop falling. Or to impact the water, whichever came first. Dead man waiting to die, I thought.

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At about 1,200 fpm, the VVI needle finally reversed and began to climb. This time I centered the cyclic while the VVI was still in the bottom half of the indicator and tried not to change any other controls. The altimeter was still decreasing but its rate was slowing. The VVI needle continued to rise, although it slowed as it passed level flight. The altimeter bottomed out at about 150 feet and held steady. A quick glance at the drunkenly-pitching compass told me nothing; for all I knew, I was flying deeper and deeper into the belly of the Blob. I held my breath and concentrated on the gauges that could provide useful information to keep me alive for another thirty seconds.

I was still waiting for the instruments to settle down when I popped out the side of the fog. BAM! Just like that. One second I was fighting for my life, deep in the bowels of the Blob, the next I was bathed in the morning sun with all my life's opportunities before me. Thank you, God. I breathed deeply and laughed out loud.

I landed on the closest platform and called for the workboat. Just as I finished strapping down the old Bell the Blob arrived. By the time the MV Dora arrived to take me back to base, even my feet had begun to look fuzzy in the thick fog.

My entire excursion into instrument conditions had lasted perhaps two minutes, though it seems a lifetime when I examine it. I was thankful the fog grounded me until the following day. It gave me time to analyze my actions and reflect on what the experience had taught me.

Assessing Risk

The lessons, of course, are obvious. But it's oversimplification merely to remind others of the hazards of VFR-into-IMC flight. That is the consequence of flawed decision-making, not the cause.

My decision to continue in the face of obviously-deteriorating conditions is inexplicable. I simply made up my mind that I could do it, then focused on accomplishing what I'd decided. When a successful outcome became less assured, I threw out all the stops in an attempt to complete the approach. Even as I was entering the fog, I was still determined to complete it, rather than to consider an alternative course.

In my subsequent 24 years as an Air Force fighter pilot, I benefited greatly from a concept we called CRA, for Combat Risk Assessment. Simply stated, CRA requires the decision-maker to weigh the likely cost of a course of action against the likely benefit. Factors to consider include the probability of success, the value of the best-case success, the cost of the worst-case failure, which conditions affecting the outcome are known and controllable, and alternative courses of action. I approach all decisions (OK, *most* decisions) from a CRA framework.

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God looks after dumb animals and fools. If you've ever been afraid for your life, you'll know what I'm talking about. Not when death is only a possibility. I'm talking about when you're virtually *certain* you are going to die, you have a few seconds to contemplate your mortality, *and* you still retain some control over your ultimate fate: Never give up. Even when you know you're about to die, force your brain to focus. *Think!* Don't be the guy who rides an Airbus 38,000 feet down to the Atlantic in a full stall. Make yourself use all information available, however incomplete it may be, to stay alive.

Better yet, before you introduce yourself to a near-death experience, conduct your own CRA whenever there's some degree of risk. What do you gain if you succeed, what's the likelihood of success or failure, and what's the cost of failure? And remember this: No decision to eject is irrevocable until you pull the handles. T&T

Why do Pilots Over

We spend a considerable amount of time during initial training on the subject of weight and balance computations, making sure the trainee knows how to use the charts, plotters and software applicable to the aircraft. Getting the numbers to come out in an acceptable range assures that the aircraft will perform and handle as expected. Regretfully, we often see pilots, once rated, ignore the W&B calculations. If it fits, it'll fly, seems to be their motto.

Indeed, it may be difficult to tell the boss he or she can't bring along one more passenger, or that those steamer-trunk luggage cases have to be left behind. If it's a hot day in the mountains, the aircraft may be weight/runway-length restricted; will the aircraft owner understand why luggage or people have to be off-loaded? All too often, job security pushes pilots into accepting the risk. And, after the aircraft's limitations are ignored one time, such procedures will soon become a habit, or expected conduct.

Taking weight-and-balance seriously means more than just doing the math, or having the computer do it. It requires an understanding of the risks and reasons behind proper loading. Pilots overload, or miss-load, because they don't assign value to the task of load calculation.

How Heavy Is Too Heavy?

I had one pilot tell me that as long as he wasn't more than 300 pounds over the handbook's ramp weight, it was okay. The salesman had said so when he bought the airplane. In my mentoring role, I discussed the matter at some length, making the point that no evil magic was going to transpire even if he was 301 pounds over gross weight. The wings weren't going to break off nor would the engines refuse to accelerate us to liftoff speed. But neither would it be okay to ignore the manufacturer's limitations, just because he wanted to fill all the seats that came with the airplane.

To heighten our discussion, I picked up his expensive pilot operating handbook and carried it over to the trash can, where I summarily deposited it. I told him he might as well throw it away, because it was meaningless. All the performance numbers in that book were based on operating the aircraft while loaded within its weight-and-balance limits. If he chose to overload it, he was, in effect, becoming a test pilot. No one at the factory could tell him how it going to work, because their testing stopped after assuring that all was well at maximum takeoff weight.

And so, if you don't want to be a test pilot, you had better stay inside the normal loading envelope. Not because the airplane won't fly, or because you can't handle it if nothing unusual comes up, but because you have no tested data to guide you, no normal cushion of safety to make up for nature's foibles or your ineptitude.

A rather svelte pilot I know was flying a twin Cessna with two porcine individuals ensconced in the rear-most seats. They had flown in this configuration many times, but on one particular trip they encountered thunderstorm-related turbulence and the aircraft pitched up and down so violently it wound up with overstress damage to the tail and aft fuselage. Why? Because the aircraft was loaded with the C.G. well aft of the allowable range, which eliminated the airplane's normal stability and control response. It became so sensitive it was easy to overcontrol.

Balance Is Vital

Too often, we focus on respecting the airplane's maximum ramp weight or zero-fuel weight, neglecting the danger of flying with the loaded C.G. outside the stated limits, whether expressed in inches aft of datum or in percentage of mean aerodynamic chord. As seen above, loading too far aft removes the positive stability expected of certificated aircraft and could prove deadly in a stall condition. Loading outside the forward C.G. limit, on the other hand, can make it difficult to rotate the nose up for takeoff or landing and cause stiff handling in pitch. Landing nosewheel first, because you've run out of elevator authority, is not a recommended way to conclude a flight.

The tragic loss of a Boeing 747 freighter during takeoff at Bagram, Afghanistan in April, 2013 was caused by heavy cargo of military vehicles shifting as the airplane climbed through 1,200 feet AGL. Given the suddenly-extreme aft C.G. movement, the crew was unable to prevent the stall and the huge widebody went into the ground as a ball of fire.

Therefore, to preserve handling and positive stability, always assure that the center of gravity remains inside the normal loading limits, even if your aircraft weight is under

load their Airplanes?

by **LeRoy Cook**

the maximum allowed. What's positive stability? It's exhibited by an airplane's tendency to resume a trimmed speed, after being disturbed, either by control action or turbulence. If the airplane is pitched up and airspeed falls off by 10 knots, it should pitch down on its own, hands-free, accelerating beyond the trimmed speed until it pitches up from the dive, slowing to a lesser speed than before. After a few lessening oscillations, it will come back to the original speed, all on its own. If loaded to the aft-c.g. limit, the airplane may show neutral stability, meaning it's reluctant to return to a trimmed speed without pilot intervention, and if loaded beyond the aft limit, it can become dangerously unstable, diverging rather than recovering.

Zero Fuel Weight

Many aircraft have been "grown" after their initial certification to allow extra seats or cargo space. In some cases, adding too much weight in the fuselage will exceed a designed wing-bending moment because of the concentration of weight inboard. The answer is to establish a maximum zero-fuel weight; since fuel normally goes into the wings, keeping the span-wise loading distributed more evenly assures airframe integrity. Naturally, it's the minimum-fuel condition that sets the zero-fuel weight limitation, not a takeoff loading.

A maximum landing weight, on the other hand, usually results from design limits for the landing gear. An overweight landing, if necessary, has to be done with as little vertical descent at touchdown as possible. Bear in mind that reference speeds and stopping distances are usually predicated on max-landing weight, unless a special page in the operating manual is devoted to overweight landing. In small G/A aircraft, you may very well be the test pilot if you land heavier than the maximum landing weight.

Thus, knowledge of your aircraft's loading is important for survival, not just attaining the rating. The reason most pilots can depart without visibly doing their sums is because they know, or should know, that today's load falls into an acceptable range. They have confirmed this from prior calculations with similar body counts and luggage, although it pays to check the bags for one with anvils in it.

Wise pilots spend downtime working some sample calculations of passenger, fuel and baggage scenarios. In doing so, it's possible to find the areas where you will run into trouble, and you won't have to figure the weight and balance each time if you are familiar with today's example.

In simple summation, don't fly heavy and don't fly out of balance. This is not advice to pass the course for a rating; it's guidance to stay alive. T&T

Twin Proficiency:

Making a Confident "Go" Decision

by **Thomas P. Turner**

All of us strive for maximum utility from our airplanes. We all bucked the conventional wisdom to become pilots ("little airplanes aren't safe," virtually everyone told us), because we have places to be, people to meet and things to do. Airplanes carve a large section out of our business or family disposable income, so co-workers, accountants and family members pressure us to eke maximum use from our airplanes (or sell them). The cost of multiengine airplanes means many of us strive to justify them as a business tool to increase productivity and perhaps even profit – which, in the right applications, they most certainly can. And, pilots are goal-oriented, can-do people – once we decide to make a flight, it's in our nature to do everything we can to complete it as planned. Faced with all these pressures, how can you make a confident, and safe, "go" decision?

Instead of clear-cut "no-go" situations that get lost in the gray murk of real-life air travel, let's look at what we can do to stack the deck in favor of a "go" decision…as long as we can do so *consistently* and *with safety*.

Not if, when

The weather is, by far, the most common reason flights are delayed, rescheduled or canceled, and the most significant adverse factor associated with cross-country general aviation flights.

It's not a matter of *if* you will have to delay or cancel a flight because of weather, it's a matter of *when* and *how often* weather will alter your plans. As I often put it, there is no such thing as an all-weather airplane. Get used to it. Make sure your passengers, family, business acquaintances and customers know it too – if you travel by airplane, you *will* be canceling or rescheduling some meetings and trips with little notice. If, in specific cases, that doesn't meet your personal or business needs, find an alternative way to travel.

Likewise, the most common reason airlines delay or cancel trips is adverse weather. If it stops the air carriers, it will stop you even sooner. The more you fly, the more you'll find yourself changing plans. How can you avoid the mental trap of *having* to make a flight when bad weather threatens? How can you safely "go" when hazardous weather is in the forecast?

I recall a client I taught in a pressurized Beechcraft Baron at the factory training program about 25 years ago. He purchased a fully-refundable airline ticket prior to every business trip he took in the Baron. I remember three observations he made about his Standard Operating Procedure:

First, as long as he was willing to leave no more than about 12 hours earlier, or depart to come home no more than 12 hours later, than would be optimal for just-in-time arrival on each end of the trip, he almost never had to use the airline ticket. So, he cashed in the refund almost all the time.

Second, even in that era of $2.25/gallon avgas, it would have usually been cheaper for him to take the airlines than to fly his Baron. So, he did not have a financial pressure to take his Baron instead of flying commercially; actually, the reverse was true.

Third, he found that the simple fact he had a prepaid airline ticket in his pocket for both the outbound and homeward-bound legs significantly reduced his stress level in the days leading up to an important business trip, and it eliminated the constant worry about the weather many pilots feel when they're away from home on a trip and need to get back. An available airline ticket back home means you have an available "out" in both directions; you're no more pressured to fly home than you are to make the outbound trip. Of course, you'll have to come back after the airplane later, but you

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can do that when your schedule is more flexible, or if your business or pleasure soon takes you back to the same location.

My client was relaxed and able to focus on business before and during a business trip. Because he was under less stress, he was able to get more done before trips. When the time came to begin flight planning, and during the entire time he was in the airplane, he was able to forget about business and fulfill his primary duty (at that time) of being captain of his personal airliner (see "Promote Yourself to Captain," *Twin and Turbine* March 2015).

Appropriate "go"

Ways to have an *appropriate* "go" mentality in adverse weather conditions are:

Be flexible with your schedule. Plan to take off early enough that, even if you get all the way to the run-up area or the takeoff roll before encountering an indication requiring a no-go decision, you can still put the airplane away and get where you need to be in time for the meeting or family reunion. This goes for both the outbound trip (which, on business trips, is often more time-critical than the return) and the flight back home (which is usually the more time-critical leg for personal and family trips).

Flexibility with your schedule means you can get off ahead of incoming weather or make it to the destination before the bad stuff rolls in. You have time to use the tried-and-true method of flying as far as you safely can go toward a line of weather, landing at some intermediate point with enough time to hangar the airplane in advance of the storm, then continue your trip after the adverse weather blows by. In the worst case, fly as close as possible to your intended destination and rent a car to drive from there – I've done that several times, saving *most* of the time of driving the entire way, and avoiding the inconvenience of an airline schedule.

Buy a back-up. Airplane owners spend thousands upon thousands of dollars on upgrades to give their panels and equipment redundancy. Why not invest several hundred dollars on the redundancy of a back-up refundable airline ticket to dramatically reduce the pressure on you to make a "go" decision? As we said earlier, chances are pretty good you'll cash in the ticket as soon as you're home from the trip.

Make it easy enough on yourself to say no-go for the return trip as it is to cancel the outbound flight. Give yourself return-trip flexibility so you don't feel as if you *have* to take risks to make it back home or to the office.

Act like an airline captain when it's time for flight planning and operations to begin. Plan your activities prior to launch so you don't have to attend to business details when at the airplane. Turn your cell phone off while reviewing the weather, preflighting the airplane, and certainly when actually in or around the aircraft. Whatever it is, it can wait until you power up your phone after completing your captain's duties at the end of your trip.

Now that most of the pressure is off and we have you focusing solely on your pilot-in-command responsibilities, in future issues we'll look at the five aviation weather hazards – thunderstorms, turbulence, ice, reduced visibility and surface winds – and some of the ways you can make good weather decisions when facing these threats. 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.

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Part Two

By **John Loughmiller**

What I've learned in nearly 50 years of examinations

Previously, we discussed what a pilot could do to avoid problems during the vision portion of FAA medical examination. Now, we'll look at the Coronary and Cardiovascular portions of the exams. There are some things you can do that will help avoid problems during this portion of your flight physical.

The first thing to understand is, the FAA is not doing clinical medicine. Its concern is sudden incapacitation in the cockpit. For instance, FAA data indicates that concern is justified when at-rest blood pressure exceeds 155 over 95 and remains high during successive readings.

The average medical doctor becomes apoplectic, however, when they learn that the FAA will certify a pilot with a blood-pressure level that high, because they want to see at-rest BP readings below 120/70. They consider a person pre-hypertensive slightly above 120/80 and clinically hypertensive at a considerably lower BP level than 155/95.

Another example – this time going the other direction: Premature Ventricular Contractions (PVCs) and Premature Atrial Contractions (PACs) can cause your heart to feel as if it's doing flip-flops and can be quite disconcerting. But doctors know they occur in both healthy and unhealthy people, sometimes at a rate of hundreds a day. Cardiologists know that since PVCs and PACs occur in both healthy and unhealthy people; so, in and of themselves, they are not predictive of heart attacks unless accompanied by other factors.

In the absence of these additional factors, most doctors will not order expensive tests solely on the basis of a few PVCs occurring as single events. (*Runs of PVCs - two or more in succession - may or may not result in further testing by your regular doctor. It depends on what other factors are present and if your MD is super cautious.)*

Still, regardless of current clinical practices, the FAA will require a pilot seeking a 1st class medical certificate to undergo a complete cardiac workup - including a stress test and probably a nuclear test as well - if more than one PVC appears on the annual electrocardiogram. If you pop a couple of PVCs on your 1st class flight physical ECG, you will be doing a stress test in the near future, according to current guidelines published in the AME handbook. Again – clinical medicine and sudden incapacitation medicine are not the same thing and the FAA's main concern is investigating whether or not you're likely to conk out while flying.

OK. On to a few suggestions about how you can avoid raised AME eyebrows.

Blood Pressure Tripwires

It's very common for pilots to develop White Coat Hypertension when in the presence of an AME. For me, it used to mean an elevation of about 10 points on both measurements.

I had the White Coat Hypertension problem until I found an AME that left the BP measurement for last and made a show of signing the medical certificate after completing the entire exam except for the BP requirement. That simple technique did wonders to lower my BP. (I knew he could always tear the certificate up but the fact he had signed it disarmed my concern for some reason.)

That AME is retired now and I'm back to taking steps to lower it in other ways. If you're concerned about blowing past the 155/95 limit, you might consider doing what I do now.

Drink plenty of water, cut out salt starting 48 hours before the exam and eat some bananas, because unbalanced electrolyte levels – in this case potassium – can enhance BP issues. Eight tall glasses of water each day also helps flush the toxins out of your body and, strange as it sounds, will result in less water retention, which is a very good thing.

Make sure the arm from which the BP measurement is taken is at heart level and don't slouch in the chair. Also, don't hold the arm up yourself; ask the person taking your BP to support your arm if they don't do it on their own.

No Caffeine a full 24 hours before your exam – zero intake, nada, zip, none.

If there is something going on in your life that is producing stress, consider rescheduling your exam. Even something as mundane as an argument with your significant other just before an exam can make your BP rise temporarily. AMEs are instructed to not rely on just one BP measurement if an airman exceeds the limit but if you break the 155/95 barrier, that in itself will typically cause a shot of adrenalin due to fear of not passing your exam, which can cause even more BP troubles. To reiterate: Reschedule your physical if you are stressed out.

If you do these things and still have BP over 155/95, you may need to be on a beta-blocker (or certain other drugs) to get things under control. If your personal physician puts you on any of the common BP reducing drugs, the AME can issue a certificate nowadays upon written assurance by your doctor that your BP is under control along with information describing what drugs he or she has prescribed. (Your BP measure-ment in the AME's office still has to be below the 155/95 limit, which it will be if your BP is truly controlled.)

Ectopic Beats, PVCs, PACs and Caffeine Intake

Ectopic Beats is a generic name for variation from normal sinus rhythm – the constant and evenly spaced pulse - and are often caused by PACs or PVCs.

Depending on when they occur, they feel like an extra beat or a skipped beat when taking a pulse. If PVCs occur when the heart's tricuspid valve is closed, you'll feel a flutter in your chest when they occur; otherwise, you won't feel anything and likely won't even know they're happening.

Since AMEs are instructed to ignore "occasional" ectopic beats, resist the tendency to obsess about them if you're only going for a 2nd or 3rd class medical which do not require an ECG.

If you *are* required to have an ECG, there's little you can do to prevent the ECG from ratting you out on your PVCs, but there's a lot all pilots can do to eliminate PACs. PAC generation is particularly sensitive to caffeine intake, so lay off the coffee, soft drinks and energy drinks for a few days before your AME visit. Ditto for any food that contains caffeine.

The problem for those seeking a 1st class certificate is you won't be able to tell what – PAC, PVC, or something else - is causing the ectopic beat without an ECG. All you know is your pulse appears to be irregular. If you feel extra or skipped beats happening in your pulse, your best option is to have an ECG done by your personal physician to see what's happening prior to seeing your AME. (Your doctor will check you out for other coronary factors too, which is a very good thing.)

If the beats are PACs, lay off the caffeine and most likely they will go away. If they are PVCs and you are seeking a 1st class medical, prepare yourself for the AME's inevitable demand for a stress test and perhaps more if the ECG catches more than one PVC.

Your Personal Physician and the FAA

Because of the disconnect between clinical medicine and sudden incapacitation medicine, pilots have to take a different approach with their personal doctors than regular folks do, because our doctors frequently must provide opinion letters to the FAA if our flight physical turns up something unusual. For that reason, we have to make sure our physicians understand how different the FAA is with respect to medical objectives and stress that it's critical that the doctor be extremely careful how he or she documents medical facts to the FAA. Tell them it's just like an IRS audit: address the FAA's specific concerns truthfully but volunteer nothing else.

The root of the problem is, doctors as a group want to be helpful to a colleague, so they will often speculate about what may be happening in their correspondence. They cannot do this with the FAA. Tell your physician that he or she is not dealing with a colleague. Rather, they are dealing with the equivalent of a lawyer, who happens to be a physician.

I've had success showing my doctors the actual FAA AME guidelines. (The AME handbook is available online at the *faa.gov* website.) Once they get over the FAA's attitude on clinical medicine versus sudden incapacitation medicine, most doctors will be very helpful when providing opinion letters – at least by the time you reach the second or third iteration.

A Final Couple of Comments

This article - and the previous one dealing with the vision portion of the FAA exam - is not intended to be medical advice; I'm a pilot and an electrical engineer by training, not a physician. But I do have 50 years of experience jumping through the FAA's medical certification hoops and have learned a few things about their certification philosophy, which I've tried to pass on to you.

The suggestions I've made are not intended to hide anything and in fact will *not* hide any true problem. What they will do is help you minimize false positives during the FAA exam – and false positives can cost you time and money plus create consternation you don't need. T&T

John Loughmiller is a freelance writer, commercial pilot and CFIIMEI-A. He retired from the business world a few years back and is now living the dream as a contract pilot flying various piston and turboprop twins for other businessmen.

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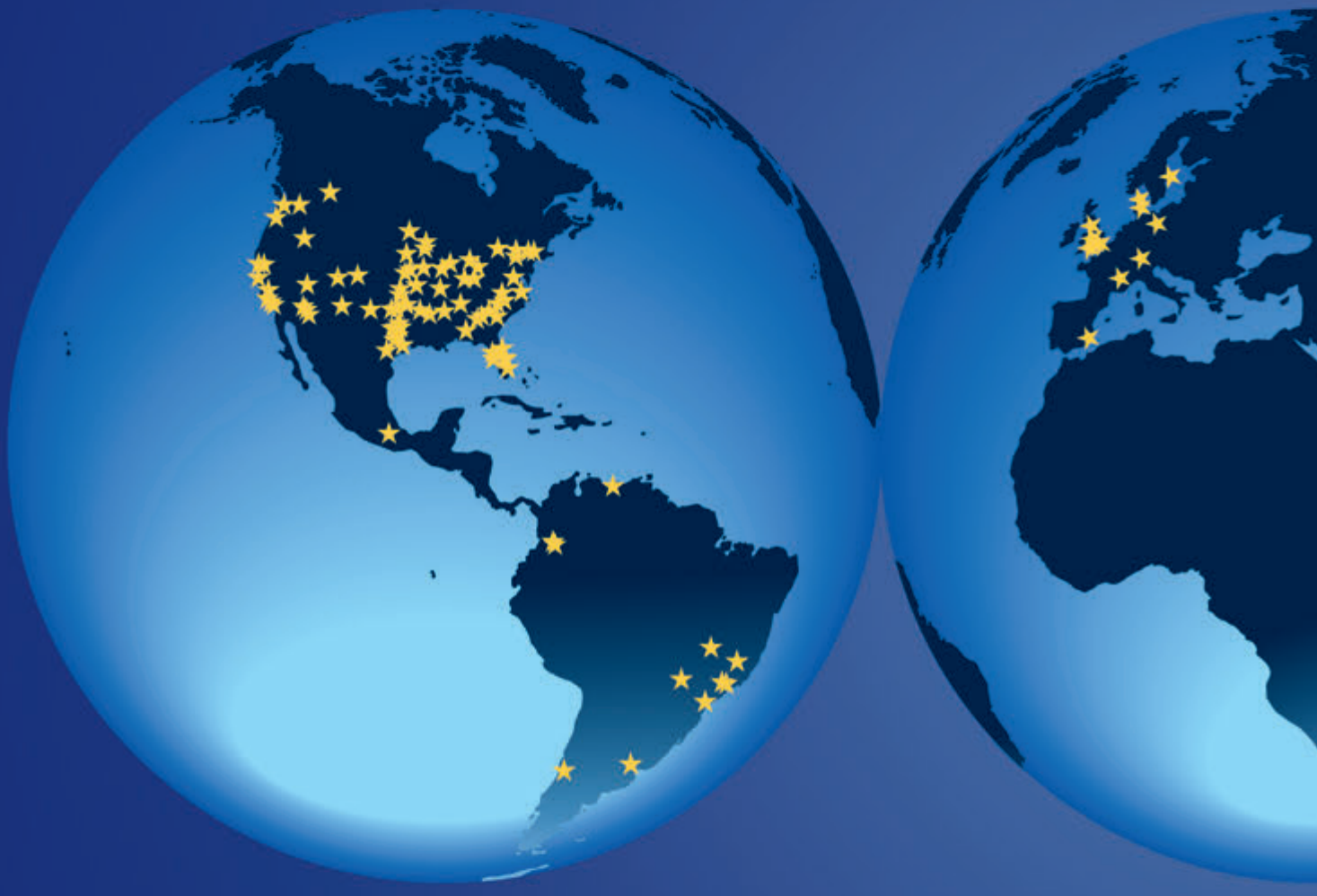

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Cholla Airplanes
(Cylindropuntia Aeróplanos)

by **Kevin R. Dingman**

They appear soft and fluffy, like a dandelion in full bloom, its white orb of seeds anxious to launch with any breath of wind. It's a treacherous and deceptive quality; how something so alluring as the fuzzy and harmless-looking cholla (choy-ah) cactus, can bequeath so much grief. The Jumping Cholla (Cylindropuntia fulgida), therefore, provides a fine metaphor for things to which we are enticed, that get under our skin and, like the sirens of Ancient Greek mythology, have glamour and a mystical allure – and perhaps an anthropomorphic agenda, not apparent to the casual neophyte. Yes, we are pirouetting around the trials and tribulations of aircraft ownership. Like the rocky shores of the siren's island, the underlying attributes of ownership are, sometimes, not so pleasurable.

The cholla plant has pads that separate from the main stem. A common false theory is that static electricity in the arid desert is so intense that the fluffy spines are electro-magnetically attracted to objects. Unlike other varieties of cacti with solid spines, cholla's have hollow spines which makes them extremely light, and it's this fact that allows them to easily attach to clothing, skin, shoes or whatever they touch with their needle-like sharpness. So easily, in fact, they seem to "jump" at you – hence the name "jumping" cholla. Since the plant is covered with spines, it's difficult to grab and remove the pad from your skin. If there is moisture, such as in your skin, the tips curve once in contact, locking the spines just below the surface.

Into The Crash

In Ancient Greek mythology, sirens were dangerous yet beautiful creatures who lured passing sailors with their enchanting music and voices, only to shipwreck on the nearby rocky coast of their island. It seems our modern brains remain susceptible to the siren virus. Once you have an encounter with aviation, like the cholla, you are hooked. It can become an obsession, or at least a life-long pursuit of happiness. The hollow spines of the Cylindropuntia Aeróplanos jump at you and they are pretty much impossible to remove. And, once stuck with spines of the flying bug (that will be the only mixed metaphor, I promise), most of us seem inclined to remain involved with aviation and airplanes until our strength or money is exhausted – occasionally driven to the rocky shores of bankruptcy or divorce. It's in our pilot-genes, after all, to fix things – to maintain aircraft control until the very end, as said by aviation legend Bob Hoover: "Fly the airplane as far into the crash as possible." It can be a slippery slope as time and assets are drained in the process of retaining ownership of a flying machine.

Paper Cuts

The repairs and improvements we choose for our planes may provide a safety enhancement, an increase in efficiency or simply a desired aesthetic effect. All of us have a list of must-have and like-to-have work: the Duke could use a prop overhaul, new boots and a fresh interior. Other owners may need more urgent work – leaking fuel bladders, hot section inspections, overhauls or a new cylinder or three. But even a simple set of new tires, brakes pads and strut adjustments can cost thousands of hard-to-find dollars. When you add the cost of recurrent training, insurance, registration, GPS updates, loan payments and hangar rent, it can seem like death by a thousand paper cuts (oops, one more mixed metaphor). And some of the paper cuts, whether self-inflicted or imposed by regulators and insurance companies, often add tincture of iodine to the wound.

Too young to know what tincture of iodine is? Before the days of topical medications for the epidermis that cause no pain during application (mom would say that if it didn't sting, it wasn't working), there was tincture of iodine; picture rubbing alcohol applied to an open rash or sunburn. Sometimes, the expensive paper cuts of aircraft ownership are not our fault or that of the machine. Sometimes they are put upon us by regulators eyeing the big picture (iodine), engineers solving errors and inadequacies (more iodine), and failures of components or materials

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(still more iodine). But, sometimes, we ourselves choose technological and aesthetic "improvements" that are simply too good to pass up (Bactine or Neosporin).

A few years ago, all Duke engines (TIO-541-E1C4's) were having a problem with camshaft/lifter scaling. The theorized reasons for this condition ranged from bad steel to bad oil to inadequate lubrication. One of the first solutions was an additive to the engine oil (it's in Aeroshell 100 plus – LW16702), next was a camshaft that was alleged to be better lubricated. Another was a bigger oil filter and still another was more frequent oil changes. Finally, the problem seems to have been solved by an engineer who designed lifters in which the ends are made of carbide. So far, this seems to have worked great. There are always other issues though – like the cracked engine case I had a couple years ago (lots of iodine).

It's been demonstrated many times that knowledge and experience will increase the likelihood of successfully dealing with an in-flight emergency, thusly lessening the danger, grief and expense of the event. The same is true of aircraft maintenance technicians and engineers – knowledge and experience can lessen down-time, bloody knuckles, frustration and your bill. I concede that money can fix most issues related to our airplanes, and having some extra lying-around money is a good thing.

I was talking to a King Air pilot at Oshkosh about ADS-B. It wasn't his plane but he was in charge of its operation, including the upcoming mandate. His avionics shop was having quite the time trying to come up with an ADS-B solution for the plane. I wondered how this could be: plenty of expensive and magical avionics already installed and, apparently, an owner with liquidity (i.e., some lying-around money) for completing the conversion. Here's the rub: none of the options available would interface with his existing suite of magic avionics. It would mean replacing many, many thousands of dollars' worth of stuff in order to install ADS-B. Apparently, money can't solve everything – unless it's a briefcase full of it.

Metaphorically Speaking

Try to not let the fluffy dandelion seeds of aircraft ownership get you down – they will just contaminate your yard even more next spring. Besides, you never know, they may be a jumping cholla in disguise. Why are there so many metaphors in this column anyway? Why am I asking you? And what's the point of all this metaphoric talk about cholla, sirens, paper cuts, iodine, airplane addiction, flying the plane as far into the crash as possible, and staying in the game until the very end? I receive mail from readers who struggle to fly their airplane as often as they would like. Some tell me thanks because they are relegated to living the flying dream vicariously through our stories and those in other magazines. So, it's not to make light of the struggles we go through in order to keep our planes – but perhaps to make a humorous point that you are far from alone in your anxiety over the occasional, even constant, analysis of the cost/benefit relationship of aviation and aircraft ownership. Your frustration when the lying-around money isn't lying around is shared by many.

Consider this commonly spoken axiom on the subject of ownership: don't try to justify owning an airplane. It's the Nike anti-thesis, Just Don't Do It. If your BOD, CFO, CPA or spouse insists on a logical analysis to justify the time and expense of your plane, do your best to describe the efficiencies and joys of ownership. If your argument is thin or your resolve weak, you may be pinned, your rear full of cholla. If needed, you can borrow my justification at no charge or cholla: Life is short. And for now, I can afford the plane; and since I really like to fly – I am going to fly. Someone has to take good care of all the airplanes of the world. It's my duty to help with at least one. You can quote me on that. T&T

Kevin Dingman has been flying for 40 years. He's an ATP typed in the B737 and DC9 with 20,000 hours. A retired Air Force Major, he flew the F-16 then performed as a USAF Civil Air Patrol Liaison Officer. He flies volunteer missions for the Christian organization Wings of Mercy, is employed by a major airline, and owns and operates a Beechcraft Duke. Contact Kevin at Dinger10d@gmail.com.

EN ROUTE

Blackhawk Modifications, Pratt & Whitney Canada Commemorate 1,000th PT6A Engine Delivery at EAA AirVenture Oshkosh

On July 22, 2015, senior executives from Blackhawk Modifications, Inc., and Pratt & Whitney Canada commemorated their 16-year collaboration and 1,000th engine at EAA AirVenture Oshkosh.

A King Air C90 with the milestone engine installed is being offered for sale and was one of the aircraft on display in the Blackhawk exhibit at AirVenture Oshkosh.

For further information, visit *www.blackhawk.aero*

Pictured, from left, are: P&WC executives Maria Della Posta, Senior Vice President; Denis Parisien, Vice President, General Aviation Programs; John Saabas, P&WC President, and Nick Kanellias, General Manager, Sales & Marketing, congratulate Blackhawk President and CEO Jim Allmon on 16 years of success.

About Blackhawk Modifications, Inc.

Based in Waco, Texas, Blackhawk Modifications provides new engine installations and STC paperwork for all models of King Air 90 and 200, Cessna Conquest, Piper Cheyenne I, II, IIXL, and Cessna Caravan models 208A and 208B. Blackhawk's contributions to the upgrade industry continue to be new PT6A engines, components, associated hardware, and STC paperwork. Blackhawk engine upgrades, featuring PT6A engines, have been installed on more than 500 aircraft worldwide.

Contact Edwin Black, SVP Sales & Marketing 254-755-6711 or *edwin.black@blackhawk.aero*, *www.blackhawk.aero* T&T

P&WC leaders noted that "Blackhawk has earned a rock-solid reputation for providing value-added conversion solutions to its customers. Because our PT6A engine has played such an important role in Blackhawk's remarkable success, we are particularly pleased that the 1,000th engine will be used to support an evolving business venture of selling converted aircraft."

SPECIAL CITATION JET OWNERS SECTION!

First

Plane, a Jet

by **LeRoy Cook**

How did it come to be that Tom Garritano's first foray into aircraft ownership was a Cessna Citation Mustang jet? As he puts it, "The Cirrus I was renting was no longer available, so I said, 'Looks like we're going to have to buy an airplane.' When Tom Craft called me from Cessna sales, that got the ball rolling." The rest, as they say, is history.

Garritano had become a fairly recent convert to aviation. He and his long-time partner, Jan Carpenter, were on an "aviation cruise" themed shipboard vacation, with John and Martha King and other notables aboard, and the seed was thereby planted. Jumping right in, he began taking flight training in 2008 and became a rated pilot in March of 2009. He's racked up at least 200 hours per year ever since. Most of his pre-jet time was spent in glass-cockpit Cessna Skylanes or Cirrus SR22's; he acquired his instrument rating in 2011 and then flew a Piper Seminole at ATP, Inc. to gain his multiengine ticket. "I was never going to do things in a hurry; I wanted to take extra time to do it right," he said.

Garritano has applied this philosophy to the jet transition as well. He estimated it would be a two-year process to gain single-pilot certification, which proved be about right, even though he had accomplished all the legally necessary steps much earlier. His methodical approach toward "being comfortable" with the airplane was well-regarded by his insurance carrier and mentoring pilots. Fortunately, he began the transition with over 1,000 hours of total time, and 900 hours of it was behind G1000 panels; that alone made the Mustang's cockpit much less intimidating.

"I tried very hard to avoid buying my own airplane," Garritano said. Splitting his time between bases in the Chicago and Orlando areas, he had good, well-equipped rental airplane arrangements and flew heavily from both locations. But, circumstances and year-end incentives brought matters to a head between Christmas and New Year's Day in 2012. "We literally HAD to close on the airplane three days after Christmas, because the weekend and holiday deadlines were going to shut everything down," as Garritano relates.

Getting Rated

In his typical fashion, he approached the Mustang transition carefully and deliberately. The initial training was accomplished at FlightSafety International's Orlando learning center, but when it came time to fly the actual airplane he was fortunate to find a highly-qualified neighbor, Russ Faller, a retired 747 airline pilot. As is normal, he first obtained the crew-only type rating, flew under Faller's mentoring for a while, then qualified for his single-

pilot type rating. Jan and he have found "no shortage of destinations" to visit with the airplane, and she has obtained her private pilot certification, to make sure she can assist and take over in an emergency. Her own determination to be a pilot started with a "companion course" at the 2013 Citation Jet Pilot's Convention, where it was obvious that she could not only be a standby crew member, but a pilot in her own right. So, they bought a 2011 G1000 Skylane in early 2014 and Jan had her private ticket just over a year later.

When we met in mid-2015, Garritano had 772 hours on the C510. "When I bought the airplane, I received a three-year ProAdvantage service coverage package that was targeted for 125 hours a year. We blew through that in the first year!" Usage notwithstanding, his "High Sierra" edition interior was spotless and the airplane had matured into a squawk-free state after the usual new-plane teething period.

Garritano uses *flightplan.com* for most of his routing and planning, typically seeing 320-330 knot speeds in the mid altitudes. For maximum range, of course, FL390 to FL410 are desirable, but that requires a suitable stage length to get light enough for the climb. "I've had the advantage of having a team behind me," he said, giving credit to his mentor pilots, his service and support staff at Textron, his insurance agent, Greg Hiser at Air Capital Insurance in Wichita, and Kirby Ortega, a retired chief pilot and demo pilot at Cessna, who mentors extensively in Mustangs. He also had high praise for John Azma at Azma FLT, Inc. in Orlando, who does airplane-only training for clients worldwide.

The Citation Mustang

When it comes to designing and supporting an entry-level jet, no one is more qualified than Textron's Citation group. The Citation 510 came about roughly 10 years ago, in response to the pre-recession hoopla over the coming deluge of light jets being developed by a host of companies. Some were to be single-engine personal aircraft, others were to be Baron-size twins; a lot were never to be at all, given the economic downturn. Cessna elected to go a notch above the minimum-possible owner-flown jet, returning very close to its roots with a small, but capable, Citation that would offer short-field performance and vice-free handling.

Pratt and Whitney Canada's tiny PW615F turbofan was chosen for the Mustang's engines, putting out 1,460 pounds of thrust per side and offering FADEC (full authority digital engine control) management, so the pilot would have minimal involvement with its operation. The little Pratt can deliver fuel burns in the 30-gph range when cruising in the upper flight levels, contributing to a 1,200 *n.mi.* max range. The Mustang may generate some snide "Slowtation" remarks, but 340 knots is pretty impressive to pilots used to half that speed in piston twins.

The Mustang's hangar footprint isn't excessive, with a 43-foot wingspan and just over 40 feet of length. The T-tail is 13.5 feet tall and the gear span is a relatively modest 12 feet. Carefully-designed ventral fins add extra stability at high angles of attack. Systems-wise, everything about the Mustang is designed for simplicity and low workload. The landing gear and anti-skid brakes are powered by an electro-hydraulic powerpack, while the wing flaps and speed brakes are electric. Deicing is via conventional pneumatic boots on wings and tail, with an electrically-heated windshield. The airconditioner is an electrically-driven vapor-cycle system. The 385 gallons of Jet-A are filled over the wing, just as in lesser aircraft.

The wing, on the other hand, is a sophisticated design, more or less scaled down from the Citation Sovereign's planform, with a lightly-swept (11 degrees) leading edge.

Specifications
Cessna Citation Mustang

Powerplants

Pratt & Whitney Canada
PW615F-A turbofans, 1,460 lbs/thrust

Seats	6
Fuel	385 gallons

Performance

Certified ceiling	41,000 ft.

Single-engine ceiling

Max. cruise speed	340 kts
Stall speed	72 kts
Takeoff distance, s.l. std. day	3,110 ft.
Landing distance, s.l. std day	2,380 ft.
Max. range (w/reserve)	1,200 n.mi.
Climb rate-2 engines	3,010 fpm
Climb rate-1 engine	

Weights

Ramp	8,730 lb.
MTOW	8,645 lb.
Zero Fuel	6,750 lb.
Landing	8,000 lb.
Empty	5,600 lb.
Useful load	3,130 lb.

Dimensions

Wingspan	40.6 ft.
Height	13.4 ft.
Length	43.2 ft.
Cabin length	9.75 ft.
Cabin width	4.6 ft.
Cabin height	4.5 ft.
Baggage	718 lb.

Information: www.cessna.txtav.com

It's tailored to be very stall-friendly, so there's no stick-shaker or pusher. Some vortex generators molded into the deicer boots do their part to keep the stall mild.

Baggage can go in the upper nose compartment, with doors on both sides, or in a smaller bin in the tailcone, all totaling 63 cubic feet and holding 718 pounds. The entrance door is typical Citation, opening forward to expose folddown steps that are lowered for climbing aboard. One is greeted by a non-belted when-you-gotta toilet seat before turning right to the four-place club-seating cabin or left to reach the cockpit. The 9.75 foot-long cabin is 4.6 feet wide and 4.5 feet high, very comfortable once seated, with oval windows at eye-level rather than the usual low-mounted rectangular panes of other Citations.

Maneuvering into the cockpit is easier than in most jets, because the control wheels are panel-mounted, instead of sprouting from the floor, and the center pedestal is short and truncated, making it easy to grab the windshield assist bar and swing into a seat. The simple shoulder harnesses are similar to a light twin's and the seats adjust manually, vertically and fore-and-aft. There are no old-fashioned storm windows, but a traditional manual trim wheel is still on the pedestal.

The Garmin G1000 avionics suite consists of dual 10.4-inch PFD screens, flanking a 15-inch MFD, with standby instruments centrally arranged above it. The GFC700 autopilot controls and annunciators are in the glareshield, for eyes-on-the-road manipulation.

Up And Away

Starting is virtually automatic; the pilot only moves a power lever forward after N1 spools up and the rest is handled by FADEC. Once an engine is running, the air conditioning comes on and avionics are available. The second engine starts cooler, with generator assist. A good shove is needed to initiate taxi, given the low idle thrust, and only minimal braking is needed to hold down speed. The pedal pressures are light and steering is responsive.

Most of the pretakeoff checks are done at the ramp or on the taxi roll, so there's little to do when reaching the hold line. The G1000's FMS keypad is aft of the throttle quadrant, where entries can generate field elevations to schedule the pressurization. Of course, the friendly knobs of the Garmin panel are still available if desired. V-speeds are in full display; at a takeoff weight of 7,630 pounds (900 pounds under gross), 1,800 pounds of which was fuel, the V1/Vr was 90 knots and V2 was 97 – not typical jet figures.

The "takeoff" flap setting is normally used, and strobes go on when pulling out onto the runway. Acceleration is strong, considering the small engines, and liftoff with 10-degrees pitch attitude came at about 2,200 feet down the runway. Initial climb was well over 2,000 fpm, transitioning to about 1,500 fpm when speed was increased to 140-150 knots and the power levers were slid back from "takeoff" to "climb" detents. Once trimmed, that's it; the Mustang is a solid, transport-feel airplane, with fairly heavy control forces and the stability of a brick.

Going high for fuel burn reduction is normal, even on modest trips. Speeds of 320 knots will be seen when cruising in the 20's, with 340 in the mid 30s. Limiting Mach is .63. Coming down is as simple as sliding the levers back and perhaps triggering the speed brakes. The landing gear can be used for deceleration as well, since it can be lowered at up to 250 knots, well within normal IAS, with retraction limited to 185 knots. Approach flaps can go out below 185 knots, full flaps at 150 knots.

Stalls, I'm told, are non-events, with numbers in landing configuration down in the lower 70-knots range. Push power up and apply a bit of angle-of-attack reduction and the Mustang flies away harmlessly. Vref is typically less than 100 knots, and the friendly wing provides lots of lift, which means, once the landing is assured, you'll probably trim off a few knots for the threshold. Rollout is 3,000 feet or less, depending on the braking used. The Mustang was fitted with the brake system off the CJ3, so there's ample stopping power.

As a first jet, or a first-purchase airplane, the Citation Mustang couldn't be a better choice. It handles flawlessly, runs on relatively little fuel and delivers a comfortable, solid ride. Tom and Jan are a fortunate pair. CJ

by **Kevin Ware**

Gremlins of Night Flight

Night flight has a tendency to bring out all the gremlins that most pilots are certain live in the wiring and other mysteriously-inaccessible spaces of their aircraft. In addition, the gremlins themselves, quite strangely, seem to become more active when the pilots are rushed. And, on this night, we were really in a hurry.

It is 9:12 PM and we are over Annette Island (ANN) in Southeast Alaska, descending out of FL200. The night is moonless and as black as the inside of a bag of charcoal. Out the Lear's curved windshield, snow is blowing horizontally at 300 knots into the recognition lights, looking like long streamers of white ribbon that materialize out of nowhere and end at the wing tip. With the headset off my left ear, I am explaining to the passenger sitting behind that we have the little jet going as fast as it can but still may not get there in time. The gremlins must be listening, because all of a sudden the over-speed warning horn goes off in its loud and alarming fashion, startling the passenger.

JC and I are on the first of a two-leg night flight from Bellingham (KBLI), Washington to Juneau, Alaska (PAJN). In spite of our being ready to depart much earlier, one of our passengers showed up an hour late. As a result, although we both know better, RC and I are just plain hurrying the airplane. Ketchikan (PAKT), our first stop, is located on an island across the Tongas Narrows from the town, with no services available on the airport side other than the airline terminal and FBO. The last ferry from the airport to town leaves at 9:30 PM. If our passengers miss it, they will be sleeping on the FBO floor until the ferry starts running again in the morning.

The gremlins were not yet awake when we took off on BLI's runway 16, turned right, and shortly thereafter were cleared direct to ANN at FL380. Reaching altitude, we peacefully cruise along at maximum-continuous power with ISA +10, doing mach .77 on top of a cloud layer, with a bright blue haze on the horizon from the continuously-setting sun. The Universal FMS shows that if we make a straight-in to runway 29, we will be on the ground by 9:15. But, by now, the gremlins of night flight are becoming alert, and it is not to be.

First, the weather at PAKT, which had been 3,500 broken and 10 miles, with calm winds, drops to 1,500 broken and 6 miles, with light rain and winds from the east. This means our hoped-for quick VFR arrival from directly over ANN will instead be the ILS to runway 11. At 250 knots, we rush from ANN over to COGOX (the ILS 11 IAF), turn left to the outbound heading of 295, fly straight for 30 seconds, then, with the FMS driving the autopilot, watch as the system starts the procedure turn with a left to 250. We expect it to fly on that heading for a minute, make a right 180, then intercept the ILS and quickly finish the approach. But, the gremlins are now fully active. Instead of stopping the turn at 250, the older and cantankerous FC200 autopilot pauses briefly, then continues drifting left with about a 5-degree bank. This causes one of those "why is it doing that?" conversations pilots flying as a crew sometimes have. After a brief period of speculation, we get to the inevitable "I don't like this" stage of our discussion, at which point we click off NAV and switch to HEADING mode.

By now, we are 10 degrees past 250, which means we will need to make more than a 180-degree right turn to get back on the inbound procedure. But, just as we are start that turn, RC, sitting in the left seat, says he can see the lights of Ketchikan out of his side window. Given the way the clock is rushing toward 9:30, that is very good news indeed. We call the PAKT FSS and cancel IFR, roll the airplane back to the left, and switch to a visual approach. We are a bit high, so the power gets pulled all the way off, the spoilers go up, and the gear comes down. As the second light on the VASI starts turning pink, we are doing our calculated approach speed of 131 knots, lower full flaps, and start adding power. Crossing over Vallenar Point to the west of PAKT, we have the glide-slope centered and are nicely stabilized. We touch down at the 500-foot mark, hurry off the runway and roll downhill to the FBO.

It is 9:26 as we arrive at the FBO's ramp and shut an engine down while still rolling, with the nearest passenger

opening the door the second we stop. There follows a bag-throwing frenzy as our passengers grab their stuff and, with one minute to spare, catch the ferry. Gremlins notwithstanding, we made it just in time and (perhaps unduly) are feeling a bit proud of ourselves for such a fine demonstration of flexible airmanship. The guys in back, of course, are oblivious to all this, and those going on to Juneau just want to get moving.

As we start the airplane for the short flight to PAJN, we remind ourselves there is no longer any need to rush. We then call for our clearance, and the FSS lady tells us the bad news; there is an Alaska 737 on the ramp, ahead of us in the queue, estimating departure in 10 minutes. In this part of Alaska, the departing flight not only has to take off, but also has to make contact with Anchorage center and clear the area before the next flight is released. Result being, if the 737 goes first, it could easily delay our departure by 20 or 30 minutes. Luckily, the 737 driver comes on the frequency with the fact they have yet to close the cabin door, hinting he may need well more than 10 minutes. The guys in back would not look kindly on a half-hour, fuel-burning departure hold, so we take the hint and tell the FSS station we will be ready to go in 5 minutes.

The gremlins must have been listening because, as we taxi back up the ramp, we notice the Aileron-Spoiler Augmentation System ('aug/ail' system) check light works intermittently when first tested. The 'aug/ail' system does not have any effect on our takeoff performance, but it does effect the landing distance. If the system is truly not working, it means a partial-flap landing, an increase in the approach speed of 15 knots, and a 50% increase in landing distance. With the courteous Alaska pilot cranking up behind us, we re-test it again and it works OK. Gremlins pacified, we again depart into the night.

It takes about 25 minutes to fly from PAKT to PAJN in a Lear, and the tower has long closed by the time we arrive there and set up for the LDA X approach, in marginal VFR conditions. The gremlins have, of course, disabled the ATIS, and the last we heard about airport conditions was that there were NOTAMS out for multiple closed taxiways. Remembering the 'aug/ail' light issue, and just to be safe, we quickly crunch the numbers for a partial-flap approach. We add the required 15 knots to our approach speed and 50% to our landing distance. The runway at PAJN has 8,857 feet of available, so, even with our higher approach speed, we will still have a good 2,500 feet to spare.

When we pass over Coghlan Island (CGL), about three miles from the runway, another Alaska 737 comes on the flight watch frequency, stating he is taxiing out to runway 8 at Juneau, but will hold short of taxiway C. Thoughtful of him, as neither of our airplanes have a working reverse gear, and Charlie is the only useable taxiway off and on the runway. As we pass over the approach end doing 144 knots, the runway lights are a rainy, myopic blur. We touch down, get the brakes and reverse thrust on, and start a 180 on the runway at the 7,000 foot mark. The thoughtful 737 guy on the ground behind us asks if we would mind him entering the runway and back-taxiing to the departure end, before we have exited. Great idea! That will get him off taxiway Alpha, which we will need to use after exiting on Charlie. The gremlins remain silent as we move around each other in the night like well-choreographed ballet dancers on a dark stage.

It is nearly midnight as we taxi into the FBO ramp. Just before shutting down we give the 'aug/ail' system one final test…it works perfectly. The gremlins must have fallen asleep in their hidden cracks and crevices, tired out from all that messing around with our hurried night flight. CJ

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.

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Surely, That's Wind

by **LeRoy Cook**

Fly long enough, and you'll encounter the phenomenon of wind shear. Sometimes known as air pockets, sinkers, bumps, CAT (clear air turbulence) or simply updrafts and downdrafts, the common ingredient is a change in wind speed or direction over a relatively short horizontal or vertical distance. While aircraft tend to fly at a constant speed relative to the air supporting them, when the air itself changes energy properties by altering the speed of its flow, there is an initial effect on the aircraft occupying that air parcel.

Encountering changing wind speed requires a corresponding change in the aircraft's speed, in order to restore the airspeed previously held. Given no change in thrust, the airspeed will slow down with a reduction in the relative wind speed, or speed up as relative wind increases. These speed changes cause altitude excursions if not managed by thrust adjustment, and any directional changes in the wind causes sudden turbulence in an otherwise smooth flight.

Wind shear, therefore, can cause injuries to unsecured cabin occupants, loss of aircraft control, and disorientation in low visibility. With plenty of altitude at our disposal, the inconvenience of jolts and vertical displacement can be only a nuisance, as long as everyone's belted in. Some advanced airborne radars can provide warning of wind speed changes ahead, but they are not infallible.

High altitude wind shear largely originates with crossing the edges of a jet stream, which are unseen rivers of flowing air in the upper atmosphere. The associated turbulence may be in the form of buffeting as one enters or leaves the jet, vertically or horizontally, while the ride is relatively smooth in the core of the jet, where the wind speed is constant. Less well understood are low-level jets blowing at 40 to 50 knots above a temperature inversion, typically seen during a clear, cool evening at 1,000 to 3,000 feet AGL. While surface winds are calm in the cold air below, warmer air atop the inversion level can be moving rapidly, ready to disrupt the energy state of the climbing aircraft. Turbulence will be felt as the aircraft or descends through the inversion boundary, but the ride will be smooth above or below it.

Wind shear met during cruise may require a request (or demand) for a block of altitudes.

Wind shear encounters may also be experienced in the standing waves downwind of a mountain ridge, produced by terrain-level winds blowing perpendicular to the ridgeline. Multiple waves can exist, disrupting the air at altitudes well above and below the peaks. Aircraft control can be compromised and even structural damage can occur, particularly if the pilot attempts to hold altitude with strong control inputs. Expect mountain waves to develop when speed exceeds 15 knots, even when the precipitous ridges are only 500 feet or so in height.

Wind shear met in the upper flight levels during cruise may require a request (or demand) for a block of altitudes until the disturbance subsides. Automatic flight controls may disconnect, requiring basic manual attitude flying and thrust changes to mitigate the altitude excursion. Similar to riding out the up and down drafts in a thunderstorm, it's best to hold the nose and wings level and allow the airplane to ride out the turbulent air.

With limited clearance from terrain, particularly when the airplane is in a low energy state during takeoff and landing, wind shear becomes a much greater hazard. Obviously, hitting the ground is to be avoided at all costs. If the descending airplane encounters a reduction in headwind, sink rate will increase because the aircraft suffers a loss of airspeed. At a constant thrust setting, the only way to regain lost energy is to convert altitude into speed, precisely what the aircraft will attempt to do. Conversely, encountering a stronger headwind component causes the airplane to rise above the previously-stable glidepath, tempting the pilot to reduce thrust and lower pitch attitude, perhaps creating an excessive sink rate.

Wind shear on approach is a poisonous brew requiring prompt, strenuous correction. If sink rate increases near the ground, the pilot should immediately go to TOGA (takeoff/go-around) power and increase pitch attitude until the stick-shaker activates, easing off only after achieving a positive rate of climb and an altitude that will clear all looming obstacles. This is no place for hesitation.

Shear!

Should the approach become unstabilized, either from airspeed excursions or piloting inputs against the wind shear, it's better to go around and make another attempt, rather than cross the threshold with 20-knots extra airspeed or, worse yet, 20 knots loss of speed and a heavy rate of sink toward the approach lights. Again, prompt piloting action is required. Any second attempt should be flown with regard to the wind shear action seen with changing altitude on the first approach.

One technique that can be used to maintain a safe energy state in turbulent conditions is to fly to maintain a constant groundspeed readout. Varying thrust aggressively to keep groundspeed steady keeps the aircraft moving down the glideslope in a relatively stabilized condition, even as it encounters wind shear during descent.

Taking off with thunderstorms in the vicinity of the airport is asking for a wind shear encounter, reached either horizontally, as one approaches outflowing surface winds from the storm, or vertically, as wind speed changes during climbout. The aircraft is typically heavy, already using max power, and in an energy state leaving little reserve to sacrifice. Flying into an increasing headwind is beneficial, as climb gradient will steepen, while losing speed during the climb will make it more difficult to meet minimum gradient profile.

Wind shear on approach is a poisonous brew requiring prompt, strenuous correction.

Be alert for wind shear advisories during weather briefings, shown as "WS" notes in terminal forecast remarks and pilot reports. The "WS" label is followed by an altitude and the wind's speed and direction, which can be compared to the reported surface wind to see the apparent change to be expected during departures and approaches.

Supplying pilot reports of speed loss during climbout or descent is most helpful, more so than just asking "is everyone making it in?" A preceding aircraft may have escaped the full brunt of the windshear, while your approach can be in peril. Leaving a report of "20 knots airspeed loss at 2,000 feet" warns the next crew of what to expect on their approach, and to be ready.

The worst-case scenarios are those with convective weather in the area, particular with mature storms in their dissipating stage producing strong outflow winds. These situations are variable, minute by minute, as individual storms move relative to the runway in use. It helps to stay in visual conditions, both to see the rain shafts and observe blowing wind indicators and tossing trees, and to maintain attitude control when fighting turbulence. Wind shear alert is available at some airports, with perimeter wind detectors able to show varying winds at opposite sides of the field. If the tower controller broadcasts a wind shear alert from this information, take it as a sign that things are getting dicey.

Wind shear, whether encountered up high in jet stream country or near the ground during terminal area operations, requires caution. This is serious flying, not systems monitoring, so be prepared to assume full PIC duties. CJ

Demons

By **Kevin R. Dingman**

Air conditioning, humidity control, autopilots and auto-brakes. Airborne internet, coffee makers, drink chillers and butt warmers – they make our airplane feel just like home. These niceties permit our attention to be focused on the safe, efficient and enjoyable operation of the vehicle. But, they also make it easy to overlook the significance of operating a machine at Mach numbers in the flight levels – and how harsh the environment is a scant window-thickness away.

In order to keep our brain in a confident, comfortable and conscious state, aircraft environmental systems are made reliable and redundant. The same is true of systems that alert us to, or prevent us from exceeding, velocities that could result in structural or control issues. Concurrent with our goal of keeping the shiny side up and landing on a paved surface as often as possible, we must ensure that supersonic shock waves and our cabin environment are where they belong. This includes control of Mach, cabin pressure, temperature, smoke and fumes and the decibel level of your favorite music.

Inhospitable

I used to drive from Phoenix to the North rim of the Grand Canyon to go hunting. The final leg before ascending the Kaibab plateau is a section of desert with an environment similar to that of Death Valley – it's dangerously toasty; sometimes in the 120-125 Fahrenheit range. When exiting my air-conditioned, Def Leppard-saturated truck to get fuel, the contrast in temperature was shocking. On another trip to retrieve new motors for the Duke, I journeyed through the Idaho and Montana winter, where sections of the route were minus 20 Fahrenheit – another shock when exiting the vehicle. Through the window at 37,000, these contrasts serve to remind me how harsh the environment is just an inch away. Outside your jet, the air is -50C and blowing at 500 mph. If you lose pressurization or heating, that environment is the one in which you must survive. It will be a life-or-death situation and it will be shocking.

No Pressure

A loss of pressurization can occur slowly or quickly. A slow leak could take minutes, or hours, to become apparent, potentially shrouding the threat. Once at a pressure altitude of 25,000 feet, TUC (Time of Useful Consciousness) is 3-5 minutes. At 35,000, it's ½ to 2 minutes, at 40,000, it's 15-20 seconds and above 50,000, about 9-12 seconds. A rapid or explosive decompression, usually associated with structural failure of the pressure vessel, requires immediate action. The onset of hypoxia in an explosive scenario can happen in seconds, due to the drop in pressure of the oxygen already in your blood and the lack of oxygen under pressure to replace it. During a rapid or explosive decompression, the times above are approximately half of those listed at each altitude. In a six to ten-seat jet, it's quite intense and in a fighter-sized jet it can be downright violent. At the altitudes we fly, once the cabin pressure reaches ambient, we may have two minutes, or as little as 10 seconds, to take action.

The altitude chamber is touted as the ultimate source of high altitude training. In an article published in 1992, however, citing Air Force, Navy and NASA studies, the drawbacks of the chamber, especially for those over 40 and more than 14 pounds overweight, were discussed. Those drawbacks include: expanding gas syndrome (extreme bloating), hyperventilation, cerebral hypoxia (hypoxia of the brain), decompression sickness (the bends) and pneumothorax (over-pressurization of the lungs, causing lung failure).

These dangers are encountered in the pursuit of high-altitude training objectives: correct use of the oxygen mask, pressure breathing techniques, communicating while wearing a mask, Valsalva techniques, recognizing personal symptoms of hypoxia and experiencing rapid decompression. The training objectives are valuable but the risks are not insignificant. An alternative to the chamber is PROTE: Portable-Reduced-Oxygen-Training-Enclosure. As the name implies, the system reduces the amount of oxygen within the enclosure without decreasing the pressure as in a barometric chamber. This allows the learning benefits of a reduced oxygen environment without the dangers of large pressure changes.

Debilitating Pain

The negative effects of the altitude chamber are, however, an unambiguous reminder that even if you recognize a pressurization problem or your symptoms of hypoxia, there are medical conditions that can be an immediate, permanent, and occasionally fatal result of a decompression – whether it's a gradual or rapid

onset and whether it occurs in the airplane or in an altitude chamber. The most common after-effect is DCS (decompression sickness) or the bends – a condition in which gasses in solution come out of solution due to a pressure drop (like opening a bottle of champagne). This release from solution results in circulation loss in the joints, lungs, spinal cord, cerebrum, and cerebellum, accompanied by significant, often-debilitating pain, making it difficult or impossible to fly an airplane.

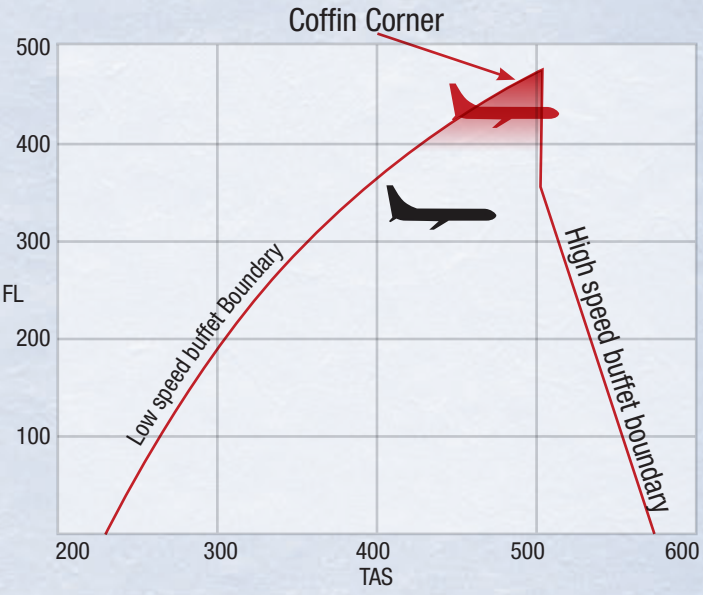
Radiation!

Cancer, genetic defects and fetal damage are possible conditions resulting from radiation. We are irradiated every day on the surface of the planet from terrestrial radiation, cosmic radiation and galactic radiation. At altitude, the less-dense atmosphere provides much less protection from ionizing radiation. This radiation produces electrically charged atoms known as ions. An ion can react with body tissue and cause the above biological effects – and some of the effects are cumulative. A person on the surface is exposed to only 0.05% as much ionizing radiation as received by a person at 39,000 feet. A 13-hour New York to Tokyo flight generates 64.4 uSv. This means it would take 78 flights to get to the yearly-recommended maximum of 5 mSv, about 6.5 one-way trips, or just over three round-trips per month. Studies estimate that the average person's risk of dying from all forms of cancer is about 220 for every 1,000 or a 22% chance; The American Cancer Society puts it at 22.83%. After 20 years of high altitude flying, the risk increases to 225 for every 1,000 or 22.5% – 23.13% if you factor in the Cancer Society correction. The bottom line is this: if you fly a lot (78 flights of at least three or four hours each), at pretty high altitudes (above 40,000) and at higher (more northerly) latitudes, you are at "very slightly" higher exposure amounts than recommended. And you increase your risk by only about 0.30% (three-tenths of one percent) over those on the ground.

Warp Speed, Scotty

Mach (from Austrian physicist Ernst Mach) is a measure of speed relative to the speed of sound. Subsonic is a Mach below .75, transonic is from .75 to 1.2, supersonic is 1.2 to 5.0 and hypersonic is above 5.0. Low-altitude pilots that do not use Mach as a measure imagine that jet speeds are something that certainly must push you into your seat. Just as we know this to be untrue, that you don't perceive the speed, those that have been supersonic or hypersonic will tell you there is little perceptual differences at those velocities either. So what's all the hoopla about going really fast? Physics, my dear Watson; there are dangers where the Mach demon lives.

Mach tuck, Mach buzz (aileron buzz) or flutter, Mach Crit (critical), boundary layer separation and coffin corner are among the high-speed demons. Mach Crit is the lowest Mach number at which the airflow over some point of the aircraft reaches the speed of sound, but does not exceed it. Mach tuck is the result of the CG shifting aft due to transonic flight, which results in a nose-down moment. As the Mach number increases further, the resultant nose-down attitude causes Mach tuck to increase. Excursions past Mmo may also cause flow separation of boundary layer air over control surfaces. This can create an effect known as aileron buzz and may result in loss of control effectiveness. Your jet likely has an over-speed warning system to warn of Mach Crit, as well as an automatic system (if the autopilot is engaged) to prevent Mach tuck.



Cornered

Coffin corner is the altitude, at a constant gross weight and G-force loading (turns or turbulence will increase G), at which the stall speed is equal to the critical Mach number. At this altitude, it's difficult to maintain stable flight because any reduction in speed will cause the airplane to stall. And because the critical Mach number is the maximum speed at which air can travel over the wings without losing lift due to flow separation because of shock waves, any increase in speed will cause the airplane to lose lift, or to pitch abruptly nose-down. The "corner" refers to the triangular shape at the top right of a flight envelope chart where the stall speed and critical Mach number lines come together – going either faster or slower results in a stall.

I encourage you to continue this review by studying pressurization malfunctions, in-flight fires, emergency descents, and the effects of mountain wave, clear air turbulence and the Jet Stream. It can be challenging to fly in thin air where the daytime sky darkens and the Mach demon lives; a place not forgiving of rookie mistakes. You're a well-trained jet pilot; keep your head in the game and don't let the butt warmer cause you to think like a rookie. CJ

Latitude to Hawaii

Cessna Aircraft Company, a subsidiary of Textron Aviation Inc., recently demonstrated the trans-Pacific capability of its newly FAA-certified Citation Latitude, flying between the U.S. West Coast and Hawaii. The flights follow other recent long-range missions with the aircraft, including the first trans-Atlantic crossing in May and nonstop U.S. coast-to-coast flights earlier in July.

"With certification achieved, we see the Citation Latitude demonstrating its impressive capabilities and performance during common customer missions," said Kriya Shortt, senior vice president, Sales and Marketing. "Not only does this aircraft have exceptional mission capability, the all-new cabin experience allows passengers to take advantage of maximum comfort and productivity as they enjoy the flat cabin floor and six-foot-high cabin. Combined with its midsize acquisition price and low operating costs, the Latitude provides unmatched value and comfort for customers in the midsize class.

The Citation Latitude flew a crew of two pilots and five passengers on the 2,147-nautical-mile trip from Santa Barbara, California (KSBA) to Maui, Hawaii (PHOG), making a direct climb to 43,000 feet. Total flight time was 5 hours, 45 minutes, which included a 17-minute hold prior to arrival. On return, the aircraft covered an impressive 2,473-nautical-mile direct flight from Maui to Scottsdale, Arizona (KSDL) in 5 hours, 45 minutes. On both the outbound and return trips, the Latitude had fuel reserves far exceeding NBAA IFR reserves.

The Hawaii mission took place on the heels of impressive coast-to-coast trips earlier this month. The Citation Latitude flew the nonstop 2,442-nautical-mile trip from Santa Barbara to Bangor, Maine (KBGR), making a direct climb to 45,000 feet; its nonstop return flight to San Diego, California (KSAN) covered 2,397 nautical miles.

This aircraft made its first trans-Atlantic crossing in May, from St. John's, Newfoundland, to Valencia, Spain, en route to its debut appearance at the European Business Aviation Convention and Exhibition. Expanding international access and visibility, the Latitude will make its Latin American debut at the Latin American Business Aviation Convention and Exhibition in Sao Paulo, Brazil, in August, followed by additional tours in the Europe, Middle East and Asia regions later this year. For information, visit *www.txtav.com* CJ

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ForeFlight Mobile Announces Connectivity with Garmin Avionics

On July 16, 2015, ForeFlight, maker of the leading flight app for pilots, announced connectivity with Garmin avionics, broadening the flight planning, in-flight, and connectivity capabilities available to customers. When connected to Garmin Flight Stream, ForeFlight Mobile customers can now wirelessly receive ADS-B weather and traffic, precise GPS position data, and dynamic pitch and bank information on iPad or iPhone. Additionally, flight plan transfer capability is currently in development and will be available in a future app update.

"Through this ground-breaking collaboration, ForeFlight Mobile customers gain access to connectivity options that greatly enhance flight planning and in-flight experiences, unlocking even more value from their app and avionics investment," says Tyson Weihs, co-founder and CEO of ForeFlight. "We are excited to be working with Garmin to bring this and future capabilities to customers of both companies."

ForeFlight Mobile now connects to the Flight Stream 210/110, Garmin's Bluetooth® wireless gateway, and displays the full suite of ADS-B weather and traffic information received via the GDL 88/84. The Flight Stream 210, with its internal attitude sensor, powers ForeFlight's Synthetic Vision and adds a backup attitude capability with dynamic pitch and bank information. WAAS GPS position information from GTN 650/750 and GNS 430W/530W navigators, or GDL 88 with an internal WAAS receiver, can also be used to power features like ForeFlight Mobile's moving map, geo-referenced approach plates, and taxi diagrams to enhance situational awareness in the air and on the ground.

"We're pleased to welcome ForeFlight into Garmin's connectivity ecosystem, which will enable even more aircraft owners the opportunity to utilize the excellent benefits of Connext," says Carl Wolf, Garmin vice president of aviation sales and marketing. "Both Garmin and ForeFlight loyal customers will find this collaboration attractive as it emphasizes ForeFlight's commitment to serve their customers with a quality app, and Garmin's commitment to offering practical solutions that optimize the flying experience."

Support for Garmin Flight Stream connectivity is available with ForeFlight Mobile 7.2, now available for download on the App Store. For more information, visit *foreflight.com*/connect. 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
391	CHALLENGER 300
65	CHALLENGER 600
58	CHALLENGER 601-1A
133	CHALLENGER 601-3A
56	CHALLENGER 601-3R
279	CHALLENGER 604
5	CHALLENGER 800
169	CITATION 500
319	CITATION 525
284	CITATION BRAVO
151	CITATION CJ1
69	CITATION CJ1+
202	CITATION CJ2
160	CITATION CJ2+
390	CITATION CJ3
180	CITATION ENCORE
306	CITATION EXCEL
5	CITATION I
288	CITATION I/SP
478	CITATION II
50	CITATION II/SP
173	CITATION III
329	CITATION MUSTANG
138	CITATION S/II
257	CITATION SOVEREIGN
284	CITATION ULTRA
287	CITATION V
20	CITATION VI
104	CITATION VII
257	CITATION X
199	CITATION XLS
1	DIAMOND I
53	DIAMOND IA
3	DORNIER ENVOY 3
282	ECLIPSE EA500
47	EMBRAER LEGACY 600
8	EMBRAER LEGACY 650
158	EMBRAER PHENOM 100
82	EMBRAER PHENOM 300
123	FALCON 10
28	FALCON 100
25	FALCON 200
176	FALCON 2000
21	FALCON 2000EX
81	FALCON 20C
17	FALCON 20C-5
26	FALCON 20D
3	FALCON 20D-5
7	FALCON 20E
8	FALCON 20E-5
59	FALCON 20F
82	FALCON 20F-5
229	FALCON 50
8	FALCON 50-40
113	FALCON 50EX
135	FALCON 900
21	FALCON 900C
116	FALCON 900EX
98	GLOBAL 5000
112	GLOBAL EXPRESS
25	GULFSTREAM G-100
161	GULFSTREAM G-200
8	GULFSTREAM G-300
27	GULFSTREAM G-400
222	GULFSTREAM G-450
7	GULFSTREAM G-500
330	GULFSTREAM G-550
42	GULFSTREAM G-I
110	GULFSTREAM G-II
31	GULFSTREAM G-IIB
186	GULFSTREAM G-III
188	GULFSTREAM G-IV
317	GULFSTREAM G-IVSP
182	GULFSTREAM G-V
40	HAWKER 1000A
9	HAWKER 125-1A
2	HAWKER 125-1AS
1	HAWKER 125-3A/RA
2	HAWKER 125-400A
29	HAWKER 125-400AS
1	HAWKER 125-400B
4	HAWKER 125-600A
11	HAWKER 125-600AS
113	HAWKER 125-700A
50	HAWKER 4000
187	HAWKER 400XP
21	HAWKER 750
223	HAWKER 800A
2	HAWKER 800B
335	HAWKER 800XP
14	HAWKER 800XPI
67	HAWKER 850XP
131	HAWKER 900XP
4	JET COMMANDER 1121
6	JET COMMANDER 1121B
12	JETSTAR 731
11	JETSTAR II
51	JETSTREAM 31
40	JETSTREAM 32
15	JETSTREAM 41
15	LEARJET 23
26	LEARJET 24
5	LEARJET 24A
19	LEARJET 24B
53	LEARJET 24D
14	LEARJET 24E
9	LEARJET 24F
33	LEARJET 25
57	LEARJET 25B
7	LEARJET 25C
94	LEARJET 25D
6	LEARJET 28
28	LEARJET 31
172	LEARJET 31A
43	LEARJET 35
426	LEARJET 35A
21	LEARJET 36
34	LEARJET 36A
24	LEARJET 40
219	LEARJET 45
193	LEARJET 45XR
115	LEARJET 55
5	LEARJET 55B
12	LEARJET 55C
293	LEARJET 60
130	PREMIER I
16	SABRELINER 40
13	SABRELINER 40A
7	SABRELINER 40EL
3	SABRELINER 40R
24	SABRELINER 60
1	SABRELINER 60A
2	SABRELINER 60AELXM
12	SABRELINER 60ELXM
3	SABRELINER 60EX
1	SABRELINER 60SCEX
85	SABRELINER 65
1	SABRELINER 75
17	SABRELINER 80
3	SABRELINER 80SC
101	WESTWIND 1
4	WESTWIND 1123
45	WESTWIND 1124
76	WESTWIND 2

TURBO PROPS

CHIEF PILOTS & OWNERS

Aircraft Count

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

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354	CONQUEST II
49	KING AIR 100
502	KING AIR 200
12	KING AIR 200C
12	KING AIR 200T
203	KING AIR 300
3	KING AIR 300LW
588	KING AIR 350
34	KING AIR 350C
17	KING AIR 90
7	KING AIR A/B90
120	KING AIR A100
203	KING AIR A200
58	KING AIR A90
221	KING AIR A90-1
135	KING AIR B100
902	KING AIR B200
78	KING AIR B200C
63	KING AIR B200GT
2	KING AIR B200SE
3	KING AIR B200T
66	KING AIR B90
295	KING AIR C90
32	KING AIR C90-1
160	KING AIR C90A
316	KING AIR C90B
7	KING AIR C90SE
278	KING AIR E90
160	KING AIR F90
17	KING AIR F90-1
1	MERLIN 300
1	MERLIN IIA
29	MERLIN IIB
12	MERLIN III
20	MERLIN IIIA
49	MERLIN IIIB
14	MERLIN IIIC
5	MERLIN IV
13	MERLIN IV-A
13	MERLIN IV-C
105	MITSUBISHI MARQUISE
1	MITSUBISHI MU-2D
29	MITSUBISHI MU-2F
1	MITSUBISHI MU-2G
22	MITSUBISHI MU-2J
32	MITSUBISHI MU-2K
15	MITSUBISHI MU-2L
23	MITSUBISHI MU-2M
30	MITSUBISHI MU-2N
38	MITSUBISHI MU-2P
55	MITSUBISHI SOLITAIRE
673	PILATUS P-12
341	PILATUS PC-12 NG
549	PILATUS PC-12/45
154	PILATUS PC-12/47
18	PIPER 700P AEROSTAR
492	PIPER MERIDIAN
10	ROCKWELL 680T TURBO
6	ROCKWELL 680V TURBO II
7	ROCKWELL 680W TURBO II
9	ROCKWELL 681 HAWK
89	SOCATA TBM-700A
91	SOCATA TBM-700B
4	SOCATA TBM-700C1
115	SOCATA TBM-700C2
318	SOCATA TBM-850
22	SOCATA TBM-900
6	STARSHIP 2000A
51	TURBO COMMANDER 1000
27	TURBO COMMANDER 690
129	TURBO COMMANDER 690A
113	TURBO COMMANDER 690B
58	TURBO COMMANDER 840
16	TURBO COMMANDER 900
23	TURBO COMMANDER 980

TWIN PISTON

OWNERS

Aircraft Count

9	ADAM A500
1550	BARON 58
479	BARON 58P
137	BARON 58TC
5	BARON A56TC
142	BARON G58
43	BEECH BARON 56 TC
2	BEECH BARON 58 PA
217	BEECH DUKE B60
193	CESSNA 340
556	CESSNA 340A
120	CESSNA 402B BUSINESS LINER
64	CESSNA 402C
38	CESSNA 404 TITAN
288	CESSNA 414
374	CESSNA 414A CHANCELLOR
72	CESSNA 421
61	CESSNA 421A
454	CESSNA 421B
757	CESSNA 421C
66	CESSNA T303
124	PIPER 601P AEROSTAR
29	PIPER 602P AEROSTAR
465	PIPER CHIEFTAIN
28	PIPER MOJAVE
870	PIPER NAVAJO
24	ROCKWELL 500 SHRIKE
33	ROCKWELL 500A SHRIKE
69	ROCKWELL 500B SHRIKE
46	ROCKWELL 500S SHRIKE
8	ROCKWELL 500U SHRIKE
28	ROCKWELL 520 COMMANDER
15	ROCKWELL 560 COMMANDER
21	ROCKWELL 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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by **David Miller**

Pilots Make the Best Ceo's and the Best Lovers

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

That 's my takeaway from a report I read from researchers at Notre Dame's Mendoza College of Business and the University of Oregon. In a study that compared the relative success of 179 companies led by CEO's who are pilots and 2,900 companies led by non- pilots, researchers found that pilot-led companies tended to do better than those who do not fly. The so-called "Sensation Seeking" Scale developed in the 1970's measures behaviors exhibited by sensation seekers, and flying fits a category of that type of personality.

Sensation seekers are also prone to habitual drug use, sex, psychopathy, risk-taking and cognitive innovation. I didn't tell Patty about the drug and psychopathy stuff, but now I have an official study to convince her that, after 43 years of marriage, the sex has been great.

By the way, do you know what they call a psychotic pilot?

A Wing Nut…..

Have You Ever Made the Perfect Flight?

I haven't, although I am still trying. Once, in a flight in my Mustang, I hit the wrong button on the G1000 and put the #1 Com on the previous frequency. I didn't realize my error until all the stupid pilots kept referring to Fort Worth Center as Albuquerque. Oops.

How Did You Do on Your Last Flight?

Do you ever get sloppy? Make little mistakes? On your drive home from the airport, after you have finished texting, give yourself a mental report card. How many knots fast were you over the fence? Did you transmit like a professional or a high school student? How far off the yellow line were you during taxi? Did you leave something dangling on the airplane after engine start?

A friend of mine – we will call him Bob – tells an educational story about a preflight he did, When He Was With His Instructor, in his single pilot jet. In a little bit of a hurry, with his cell phone ringing constantly, they both finished the walk-around and closed the door, buckled in, and began to start the left engine.

Have you ever had a really noisy engine start? You know, the kind where you ingest something like a big red engine cover?

This cover was really cool. It had lots of folding metal parts. The engine was kind of like a Quisinart as it devoured the cover. A very expensive cover.

By the way, if you REALLY want to start a Mustang engine with a cover installed, make sure it's the rear plug. It won't even light off. Don't ask me how I know. What I learned from Bob's experience is that it always pays to take a second look. I count the red covers before I throw them in the baggage compartment and I do an extra visual around the airplane before I start. I even call it "Bob's" check.

Are You an Incredible Pilot or an Incredible Ceo?

Have you ever talked to a captain of a G650 or Global Express or Falcon 7X? I have. And I quickly realized that, as good a pilot as I thought I was, I am really just an amateur.

When I owned a business, I used to take off at 6 a.m. in my pilot mode and work all day in my CEO mode then fly back that night. This worked fine in my early flying days, until I bought a Duke and there was just too much to do. So I hired JC part-time to do the heavy lifting, fueling, weather, preflight, etc. I could work all day without worrying every 30 minutes about the weather. We briefed on departure and I got to enjoy the flying part.

Later, when we had the Saberliner and the Falcon 10, they required two-person crews and I got to learn from some very experienced captains who flew with me. Those were some of the most enjoyable flying hours of my career.

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