TWIN & TURBINE

FOR THE PILOTS OF OWNER-FLOWN, CABIN-CLASS AIRCRAFT

MAY 2015 $3.95 US

VOLUME 19 NUMBER 5

The Twin Commander Turboprops

The Eye Of The Pilot

Battling Squall Lines

Keep An Eye On The Fueling Process

CAPABILITIES THAT RUN DEEP

CELEBRATING OVER 40 YEARS as an FAA and EASA certified repair station, **Aerospace Turbine Rotables, Inc.** is one of the industry's most trusted MRO providers. AeTR's extensive aircraft system component repair and overhaul capabilities primarily serve the corporate, paramilitary and military markets. With **world-class customer service, component quality, and transactional value,** no other repair facility has overhauled more Beechcraft landing gear system components than AeTR.

To learn more, call **+1 316.943.6100**
or visit **turbinerotables.com.**

Aerospace
TURBINE ROTABLES, INC.

A First Aviation Services Inc. Company

TWIN & TURBINE

EDITOR
LeRoy Cook

EDITORIAL OFFICE
2779 Aero Park Drive
Traverse City, MI 49686
Phone: (660) 679-5650
E-mail: cookleroy@juno.com

PUBLISHERS
J. Scott Lizenby
Dave Moore

PRESIDENT
Dave Moore

CFO
J. Scott Lizenby

PRODUCTION MANAGER
Mike Revard

PUBLICATIONS DIRECTOR
Steve Smith

GRAPHIC DESIGN
Michael McCatty

ADVERTISING DIRECTOR
John Shoemaker
Twin & Turbine
2779 Aero Park Drive
Traverse City, MI 49686
Phone: 1-800-773-7798
Fax: (231) 946-9588
johns@villagepress.com

REPRINT SALES DIRECTOR
MEDIA COORDINATOR
ADVERTISING ADMINISTRATIVE ASSISTANT
Betsy Beaudoin
Phone: 1-800-773-7798
betsybeaudoin@villagepress.com

SUBSCRIBER SERVICES
Rhonda Kelly
San Juana Fisher
Diane Chauvin
P.O. Box 968
Traverse City, MI 49685
1-800-447-7367

COVER PHOTO
Photo Courtesy of
Twin Commander Aircraft, L.L.C.

TWIN & TURBINE WEBSITE
www.twinandturbine.com

Search for the MediaWire app
on your iPad. Issues of
Twin & Turbine are available for free
www.twinandturbine.com

Contents

MAY 2015 • VOL. 19, NO. 5

FEATURES

Twin & Turbine (ISSN 1945-6514), USPS 24432 is published monthly by Village Press, Inc. with advertising offices located at 2779 Aero Park Drive, Traverse City, Michigan 49686. Telephone (231) 946-3712. Printed in the United States of America. Periodical Postage Paid at Traverse City, MI.

SUBSCRIPTIONS: *Twin & Turbine* is distributed at no charge to all registered owners of cabin-class aircraft. The mailing list is updated monthly. All others may subscribe by writing to: *Twin & Turbine,* P.O. Box 968, Traverse City, MI 49685, or by calling 1-800-447-7367. Rates for the United States and its possessions follow: one year $29.95; two years $52.50. Canadian subscriptions are $15 per year additional, including GST tax. Overseas subscriptions are $30 per year additional, U.S. funds. Single copies $3.95.

ADVERTISING: Advertising in *Twin & Turbine* does not necessarily imply endorsement. Queries, questions, and requests for media kits should be directed to the Advertising Director, *Twin & Turbine,* P.O. Box 968, Traverse City, Michigan 49685. Telephone 1-800-773-7798. Website: *www.twinandturbine.com*.

MANUSCRIPTS: *Twin & Turbine* assumes no responsibility for unsolicited manuscripts, photographs, or art work. While unsolicited submissions are welcome, it is best to query first and ask for our Writer's Guidelines. All unassigned submissions must be accompanied by return postage. Address queries and requests for Writer's Guidelines to the editor.

POSTMASTER: Send address changes and inquiries to Twin & Turbine, Village Press, Inc., P.O. Box 968, Traverse City, MI 49685.

Greening Up

As I write this, the relentless grip of winter has receded and there is, finally, a solid week of spring weather showing its welcome face. Now we can get back to enjoying flying. Oh, sure, we did some aviating in the cold and slick times, but it was considerable work to accomplish. It's so much easier to just stroll out to the plane, do a walk-around in shirtsleeves and fire up to depart without a deicing bath.

The greening of the landscape reflects a change in our mood. Optimism is easier to muster when we aren't shivering. "Let's schedule some trips," is now a logical contemplation. The melting snowpiles reflect a dissolving of our cabin-fever lethargy. Airplanes are for flying, not hangaring.

At the same time, the aviation industry's attitude about the nation's economy also seems to be coming around, whether by acceptance of the status-quo, or with genuine improvement in our prospects. True recovery is being lagged, as always, by the pace of general aviation manufacturing. Still, flight activity is rebounding, and airplane owners are investing in upgrades to keep their airplanes useful. In the pre-owned market, there are still some real bargains to be had, but the trend is toward rebuilding value. An older aircraft with the latest engines, props, interior and panel can do the job of a newest example. All it takes is the application of sufficient Aviation Monetary Units (AMU's).

And so, the greening of general aviation is underway. We have all grown skeptical over the last half-decade, suspicious of the next move of governments or markets. With the annual green-up, though, we feel a little more bold and we remember why we decided to fly in the first place. It's certainly time to encourage new growth.

In This Issue

Our ardent contributor John Loughmiller has produced a seasonably-timeworthy piece about dealing with squall lines and thunderstorms, which we are happy to present in this issue. Every year we seem to jump from the ice season right into thunderboomer time.

We're also featuring coverage of the iconic Twin Commander turboprop, an aircraft that continues to serve well in a business-flying role, particularly when outfitted with newer engine models. At the same, these complex, high-performing airplanes require focused training and maintenance to deliver safe, airworthy service. Our story, therefore, covers not just the venerable aircraft but the organizations behind it, dedicated to keeping it in the air.

Kevin Dingman reviews the rules and procedures coming into play when a pilot suffers a communications failure. A silent cockpit requires knowledge and common sense to reach a safe conclusion. In "On Final", David Miller praises the utility of modern digital technology as he traces its use on a recent trip. And Tom Turner reminds us of the importance of verifying our fuel, in person. Lots of sage advice for everyone.

LeRoy Cook.
Editor

A single touch can ignite powerful passion.

The Pro Line Fusion® upgrade. A touch above the competition.

Flying your King Air® has never felt like this. Everything you desire with a single touch. Unprecedented control. Total confidence. And navigation so intuitive, it will change how you think about flying. All delivered on three stunning 14-inch displays that show you what you need, when you need it – with dazzling resolution and clarity. Cutting edge. Precision crafted. And all Rockwell Collins.

Visit us during EBACE, booth I073. rockwellcollins.com/prolinefusion-kingair

14-inch widescreen LCDs with advanced graphics and configurable windows

Touch screen or point-and-click navigation

Industry-leading synthetic vision

Graphical flight planning

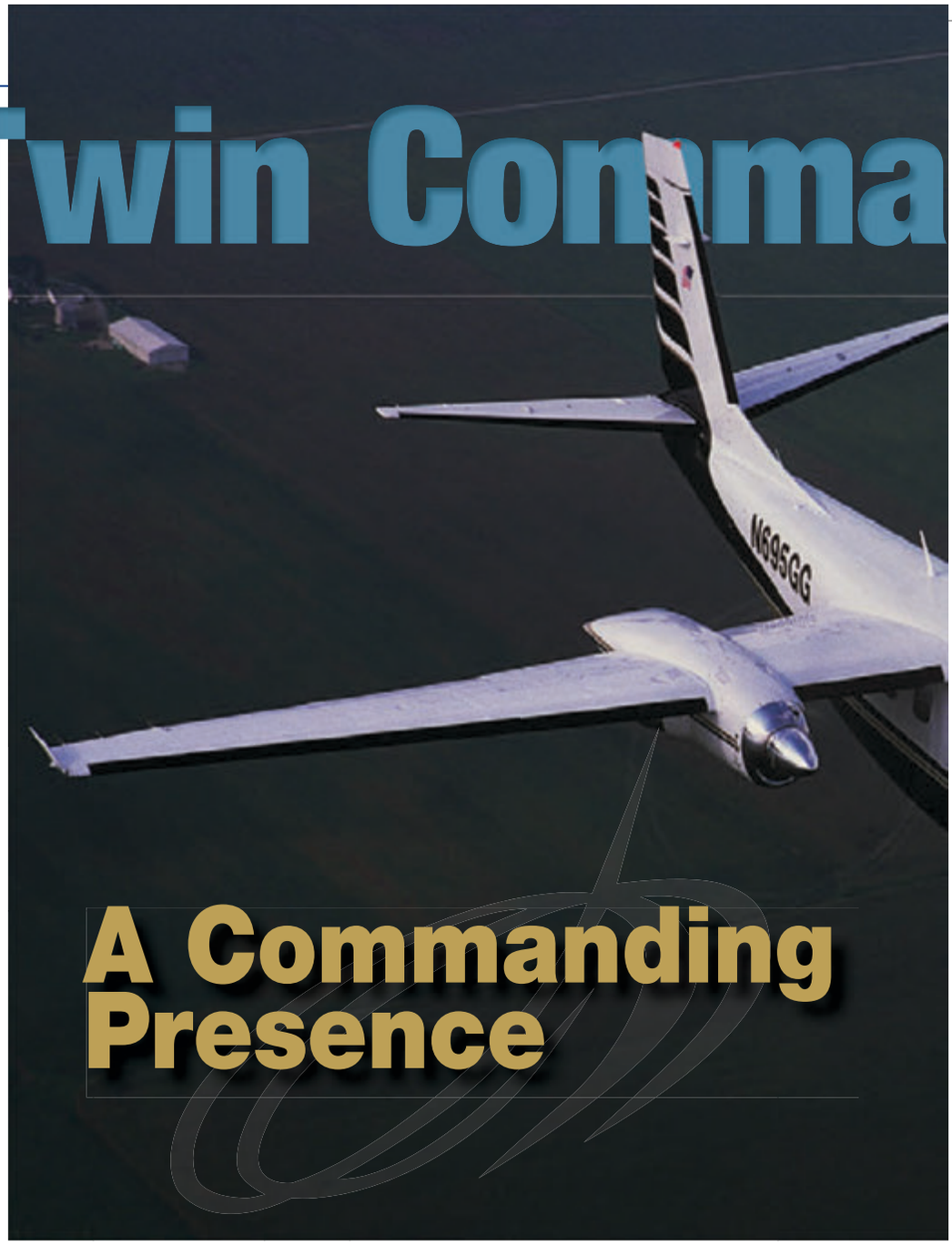
Scalable for easy upgrades

Rockwell Collins

Building trust every day

The Twin Comma

by **LeRoy Cook**



A Commanding Presence

During the winding down of massive wartime aircraft production at the end of World War II, military airplane builders and workers were suddenly faced with finding something else to do. Quite a few went to work on new civilian designs, employing techniques and materials that had been developed for the War effort. Aviation, it was expected, would find ready acceptance in post-war society.

Among these visionaries was Ted Smith, a Douglas Aircraft engineer who had most recently worked on the A-26 Invader light bomber. Smith could the see the need for a modern twin-engine business airplane, to be flown by executive pilots newly returned from wartime service. They were going to want fast, comfortable, all-metal airplanes, not tube-and-fabric types powered by radial engines. There was nothing available in that category, so Smith formed a team to design the first modern executive twin.

His rough prototype took to the air in 1948, powered by a pair of 260-hp geared Lycoming flat-six engines, the most powerful lightweight engines available at the time, and riding on borrowed maingear from a Vultee BT-13 basic trainer. It wasn't pretty, but it proved the concept; a high-wing twin with a tall tail and low-slung cabin. The only problem was finding venture capital to put it into production.

Smith's investor search finally led him to Oklahoma, where George Pew teamed up with brothers Bill and Rufus Amis, successful earthworks contractors with an enthusiasm for aviation. The Aero Design and Engineering Company was formed and a plant was built just outside Oklahoma City in Bethany, Oklahoma, adjacent to the present Wiley Post airport. With considerable modification from the old "guppy"-shaped prototype, the first Aero Commander model 520 was certificated and put on the market in 1952.

The Commander immediately shook up general aviation's Big Three – Beech, Cessna and Piper – who were suffering from the collapse of a post-war aviation boom that had burned out in only a year. It turned out that the market was not in light trainers and runabouts; it was in business aircraft, which weren't available as war-surplus or prewar leftovers. Beech rushed to develop the Twin Bonanza, Piper came up with the Apache and Cessna brought out the Model 310. But leading the pack was the Aero Commander, the original postwar light twin.

I learned to fly many-motored aircraft in a 1954 Commander 560, and it wasn't until I moved into other twins that I found out most of the other designs weren't nearly as gentle and forgiving as the tubby old Commander. The Aero Commander's simple systems demanded little of the pilot, and even a gear-up landing (particularly unforgivable, since the gear wells were visible right outside the cabin)

ander Turboprops

left the airplane more-or-less flyable as soon as it was jacked up and the wheels were extended. The Commander had its quirks, but it was loved by its pilots.

Aero Design and Engineering was acquired by Col. Willard Rockwell's Rockwell Standard company in 1958, anxious to turn the Commander line into a power player in general aviation. Rockwell proceeded to gobble up several small G/A manufacturers, seeking to build a broad line of singles and agplanes, among which were Volaire, Meyers, Call-Air and Snow. The hoped-for amalgamation wasn't successful, but it wasn't for lack of trying.

Meanwhile, the twin-engine Rockwell Commander's star shone brightly and the Commanders were developed into a full line, even evolving into a Jet Commander in 1965 to compete with the Lear Jet. The J-C was forced to be divested by an anti-trust ruling after Rockwell merged with North American Aviation, builders of the Sabreliner. Most observers could never understand how combining the disparate Jet Commander and Sabreliner could constitute a monopoly.

One of the most-attractive Commander developments was 1964's stretched Grand Commander 680FLP, which was a full six feet longer than the standard Commander. It sported a forward entrance door, mechanical pressurization and a 14-foot cabin behind a flight deck. Powered by 380-hp IGSO-540 Lycomings, the sleek 8,500-pound Grand Commander had everything but the muscle needed to make it fly, particularly on one engine.

By 1966, it was evident from the Beech King Air's success that turbine power was the logical next step for the Grand Commander. The model 680T, powered by brand-new 575-shp Garrett AiResearch (now Honeywell) TPE-311-43A turboprop engines, was certificated in September, 1965, beginning two decades of evolution in Turbo Commanders. The 1967 680V yielded 450 pounds more gross weight, wheelwell doors and larger exhaust ducts. The -V was followed in few months by a 680W with clipped wingtips and -43BL engines. A 681 was approved in March, 1969, dubbed the Hawk Commander as Rockwell tried putting bird names on all its lineup, finally graduating to the definitive model 690 in July, 1971.

The 690 benefited from the 717.5 shp of a TPE-331-5-251K engine,

AIRCRAFT FINANCING

— and more

1st Source Bank has over 25 years of experience as a leading national aircraft lender, and 150 years as a full service bank.

We know aircraft financing and we know banking.

The aviation lenders at 1st Source – experts in aircraft financing – give you the right advice and the right financing to get you airborne quickly. Our service is outstanding, with a full array of financial products and services to keep you coming back.

Whether you are a first time buyer, trading up or refinancing your current aircraft, give us a call. Strong, stable and personal, we'll keep your best interests in mind. Contact us at 574-235-2037 or at marketing@1stSource.com.

1st Source® Bank Member FDIC

1STSOURCE.COM/SFG

NBAA NFA NARA MEMBER

flat-rated from 840 shp, and 30 inches of additional inboard wingspan, with 850 pounds more gross weight. Through the '70s, the 690 series grew into 690A, 690B, and 690B-I and 690B-II versions, with engine TBO stretching out to 5,400 hours. Adding to the types confusion, a 690C appeared in 1980, but was marketed as the model 840, along with a 980, with slightly more shp, certificated as the 695. These JetProp models featured wet-wing fuel bays outboard of the nacelles to supplement the standard bladder cells, boosting optional fuel capacity by nearly 100 gallons. Wingspan was increased by 5.5 feet and small winglets were added. By now, North American-Rockwell had thrown in the towel as the G/A market imploded, selling off the Commander line to Gulfstream Aerospace in 1981.

In the early 1970s, Rockwell engineers had designed a from-scratch single-engine Commander series, planned to be adaptable to fixed-gear, retractable, turbocharged and high-performance variants, but after production lapsed under Gulfstream that project was sold to a Commander Aircraft company in the 1990s, and thus was born the "Twin Commander" label, to differentiate the widely-different Commander-named airplane lines.

During its tenure, Gulfstream marketed 900 (690D) and 1000 (695A) Commander turboprops, powered by engines of 748 and 820-shp respectively, before production ended in 1985. Because the airplane was simply too good to go away, the type certificate was eventually acquired by Twin Commander Aircraft Corporation, where it resides today. Support continues to be available from Twin Commander through 17 service centers, 12 in the U.S. and 5 overseas. Most impressively, a Grand Renaissance Commander upgrade was developed by Twin Commander that essentially takes the airframe down to its bare essentials, effectively remanufacturing the airplane.

Whether or not one wants to pursue the Grand Renaissance rebuild, it makes sense to upgrade to the TPE-331-10 engine configuration, as used in the 980, which retains horsepower to higher cruise altitudes. For older airplanes, a recurring-inspection AD on the center spar cap can be eliminated by installing a desirable mod. Also, AD #2013-09-05 mandates compliance with Service Bulletin 241, an intensive inspection for cracking in the aft pressure bulkhead, picture window frames and attachments. Accordingly, the relatively few Grand Renaissance Commanders that have been completed are highly sought-after airplanes.

Twin Commander Support

All through the Commander legacy, there was always one aftermarket go-to place relied on by Turbo Commander owners. Downtown Airpark, Inc. in Oklahoma City, located across town from the factory, offered complete service for the airplanes, from interiors to painting to avionics to overhauls. Shoehorned in among downtown Oklahoma City's buildings, between a railroad and power lines, DTA's 3200-foot runway saw much history during its existence. The little field closed in 2005, threatening to take a noted Twin Commander support base with it.

Fortunately, R.J. Gomez, himself a legend in Commander circles, was encouraged to relocate his DTA service crew to suburban Yukon's Clarence E. Page airport, where a 6,000-foot runway outside the Class C airspace offered room in a welcoming environment. Reborn as Legacy Aviation Services, Downtown Airpark's heritage lives on, about to celebrate its 10th Anniversary under the Legacy banner.

In its spacious new location, Legacy Aviation is in a position to be more than a Commander specialist. It is already servicing King Airs and has taken on Citation service as well. Twenty-four hour fuel service is available, part of an acquisition of neighboring Mid-Continent Airmotive in September 2014 that

added 17,000-square feet of extra space and full avionics capability. Legacy now has nearly 50,000 square feet of space in four hangars, with 22 employees.

Flying The Twin Commander Turboprops

On the ramp, Commanders are both intimate and commanding in stature. The airplane is low-slung, allowing single-step boarding into a fuselage riding only a foot or so above the pavement, but the broad 52-foot high-mounted wing and tall tail assert its presence. Nothing else looks like a Commander.

Preflighting is a mix of convenience and arduousness, in that the contents of maingear wheel wells are easily accessed, but the empennage must be observed from afar. The nacelles housing the Honeywell TPE-331 engines are sleek, faired into the big propeller spinners. Swing-down doors on the right side of the nacelles allow oil checking, with adjustable oil cooler doors located on the inboard sides. The exhaust flow from the engines is routed outboard into large augmenter tailpipes for noise suppression.

The Commander is a hydraulic airplane, using engine-driven fluid power for the landing gear, flaps, brakes and nosegear steering. A nitrogen blow-down system backs up hydraulic extension. The beefy maingear uses 8.50 x 10 tires and rotates 90-degrees as it retracts into the

aft portion of the nacelles, lying flat beneath sequencing clamshell wheelwell doors. An STC is available to remove the doors. However, Legacy Aviation has noted some cracking in the nacelle's trailing edge from turbulence behind the unfaired tire when the doors are removed.

The nosewheel is a 6.00 x 6 size, often using a 15-6.00 x 6 low-profile tire. It steers by applying hydraulic power through pressing the tips of the rudder pedals, just short of brake actuation. The trick is to simply hold the pedals even and wiggle your toes, rather than fan the rudder. Preflight normally includes removing an external rudder gust lock, since there's no nosegear linkage.

The nosecone holds only an avionics bay, radome and wheel well; baggage is easily loaded into a 600-lb compartment behind the cabin, reached through a door on the left side of the fuselage. Batteries and environmental apparatus are in the aft tailcone. The 15-foot vertical fin and steep-dihedral horizontal stabilizer are far overhead. Both elevators and the rudder are fitted with trim tabs.

The fuel system was always operationally simple, using center tanks to feed the engines, replenished from interconnected fuel cells and bays in the wings. Refueling is accomplished by overwing ladder access.

Entering the aircraft through the left-side door, forward of the propeller, is facilitated by a step that extends with the door's

SPECIFICATIONS

TWIN COMMANDER AIRCRAFT, L.L.C.
Commander 1000 (695A)

Powerplants	Honeywell TPE331-10-501K, 820 shp
Seats	8-10
Fuel	474 usable gallons

Performance

Certified ceiling	35,000 ft.
Single-engine ceiling	21,000 ft.
Max. cruise speed	290 kts
Stall speed	77 kts.
Takeoff distance (50 ft. obstacle)	2,131 ft.
Landing distance (50 ft. obstacle)	2,186 ft.
Max. range (w/reserve)	2,080 n.mi.
Climb rate-2 engines	2,802 fpm
Climb rate-1 engine	929 fpm

Weights

Ramp	11,250 lb.
MTOW	11,200 lb.
Zero Fuel	9,000 lb.
Landing	10,550 lb.
Empty, std.	7,289 lb.
Useful load	3,961 lb.

Dimensions

Wingspan	52.12 ft.
Height	14.95 ft.
Length	42.98 ft.
Cabin length	14.25 ft.
Cabin width	4.01 ft.
Cabin height	4.47 ft.
Baggage	600 lb.

Information: www.twincommander.com

opening. An STC to remove the step allows the door to fold flat for easier loading of bulky objects. A side-facing seat is usually installed across from the door, with club seating aft and a lavatory in the rear. The large picture windows introduced on the 690 returned to small rectangular panes when pressurization differential was increased on the JetProp 900 and 1000. An emergency exit is incorporated into the forward right-side window.

The cockpit is snug but convenient, once ensconced. Big transport-style yokes sprout from the floor, with rams-horn handlebars replacing the control wheels in the later 690-series airplanes. An overhead panel contains starting, fuel, lighting and manual trim wheels, flanked by eyebrow windows to add light and vision. The central pedestal holds power and condition levers, plus the autopilot head. An increasingly popular mod, developed by Twin Commander service center Eagle Creek Aviation Services, installs a Garmin 950 glass cockpit in the older Commanders, essentially a Garmin G1000 three-screen package paired with an S-Tec 2100 autopilot.

The TPE-331 engine is a single-shaft powerplant, so the entire engine must rotate to compress air for starting. A check of battery condition is essential, to make sure stored power is up to the task, and most operators will avail themselves of a cart start if it's offered. The sequence is fuel pump on, start, ignition on at 10% rpm, guarding the condition lever as acceleration continues and ITT rises; ignition goes off at 50% rpm and the engine stabilizes at 65%. The second engine start benefits from the generator-assist of the first engine, of course.

The Honeywell engines operate at a howling 41,000 rpm, so it's well to be a good ramp neighbor and move out as soon as idle is established. The propellers park in fine pitch, so a touch of reverse is applied to the power levers to unlock them for taxi, then eased forward to the edge of Beta range. Swinging the big Commander around comes naturally once getting accustomed to the power steering. Just pay attention to the position of the main tires back there, some 17 feet aft of the nosewheel.

Pretakeoff duties are short; overspeed and underspeed governors tested, flaps up and yaw damper off, avionics set, trim and controls checked and we're ready to go. The TPE-331's NTS (negative torque sensing), which drives propeller pitch toward near-feather if an engine fails, greatly relieves the pilot of fighting yaw in an emergency. NTS and torque limiter checks are done during start.

With the immediate response of the Honeywell engines, acceleration is strong, linked directly to throttle movement. The torquemeter target is initially low, then tweaked as airspeed builds. The big-tail Commanders have relatively low 90-knot Vmc and 100-knot rotation speeds, so the takeoff happens fast, accentuated by the feeling of speed from the low seat position. Bringing the nose up with a positive pull, then relaxing aft pressure to stabilize

climb attitude, gets one airborne is short order.

Climb power of 700 shp is max continuous with the -5 engines; once the gear comes up, there's little to do but climb at 140-160 knots. The Commanders are pilots' airplanes, stable as a brick when trimmed up, responsive and powerful. They are fun to hand-fly, lacking surprises, although the ailerons stiffen up at high cruise.

Initial rate of climb can be 3,000 fpm or more at 140 knots, but the deck angle is best moderated to less than 10 degrees for the sake of the passengers, using 180-190 knots. Quickly reaching the upper 20,000's, where best efficiency is found, cruise speed settles in at 260-280 knots or so, burning 600 pounds for the first hour, 500 pph thereafter. The TPE-331's are efficient turboprops, delivering excellent miles per gallon numbers. Many Commander turboprop owners seek RVSM certification, especially the later JetProp models that can reach the mid-30s.

Handling remains excellent, even at low speeds; if you want to stall the big Commander, feel free to do so. In landing configuration, the airplane will hang on into the seventy-knots regime and will unload predictably to regain normal flight. Normal maneuvering at 140 knots or so with 30-percent torque sets the aircraft up for an approach; gear speed is 200 knots for the 690 models, with half-flaps allowed at 180 knots and all the flaps below 140.

As in all flight conditions, the stable Commander rides down final at 120 knots on rails, with power response immediate from the Honeywell turbines. Threshold reference speeds are low, 100 knots or so, and power can be reduced to idle as you flare. The aft-mounted maingear trundles on and then you fly the cockpit on down to the runway, at which point ground idle can be selected. With 100-inch propellers and Beta on tap as desired, getting stopped in 3,000 feet or less is easy.

Once parked, the power levers are nudged aft to regain the start locks and shutdown is done. The door cannot be opened until the left engine stops, for safety purposes. If a quick turn is expected, the Honeywell-engine pilot will manually rotate the propellers a foot or so to turn the engine shaft during cooldown, when the shaft can otherwise be in a "bowed" condition. Some pilots spin the prop vigorously to draw cooling air through the engine. No restart is permitted until ITT is below 300 degrees.

The Commander turboprops remain viable, attractive haulers that deliver a lot of capability for their price. If serviced and flown properly, in accordance with Twin Commander's recommendations, nothing else will do their job. T&T

The Eye of

by **LeRoy Cook**

Preserving Vision For Flying

In the old days of close-quarters dogfighting between fighter pilots, the man with the best visual acuity came home the victor. By spotting the bogies before they could see him, he could get into position for the shot early in the game. Of course, diving down out of the sun negated such an advantage, and the enhancement of superior equipment was hard to beat. But, all things being equal, the eyes made the difference; vision is vital to pilots of all types of aircraft.

Today's aerial combat tends more toward radar lockons and missile launches to do the finish work. But the pilot's vision remains a paramount consideration, even in civilian flying. In our electronic-dashboard world, we may think that mid-range acuity, optimized for the instrument panel's displays, is more valuable than distant vision out the windscreen – until we have a near-miss with unreported traffic.

Taking care of one's eyes is definitely important, and flying doesn't make it easy. Cockpits are dry environments, and lighting is often less than optimum. Fatigue affects vision; the eyes tire along with everything else. Aging pilots are particularly susceptible to eyestrain from attempting to offset the natural progression of presbyopia, the loss of one's ability to focus at different distances.

Did You See What You Thought You Saw?

Accident investigations sometimes determine the cause of the accident to be "failure to maintain terrain clearance" or "loss of control for undetermined reasons". The pilot's apparent mistake could very easily have resulted from not seeing the altitude limit noted on the procedure or misidentifying the bearing to be flown from a fix. One local approach plate I use frequently has the VOR and ILS facilities almost co-located, with frequencies of 110.2 and 110.7, respectively. In dim light, or when working hurriedly at a single-pilot's pace, you can understand why it's easy to choose and dial-in the wrong number. If one doesn't verify the ID code, the lack of a glideslope while tracking inbound can be confusing.

Mistakes made when keying in routings on an FMS, hurriedly typing numbers with the "fat finger syndrome" that plagues many of us, can just as easily be blamed on not clearly seeing the readout. If available, having two sets of eyes to verify that the flight plan is entered correctly is critical; hopefully, one of the pairs will be younger, or better corrected.

And so, it is important to treat vision as the critical component of successful piloting that it is. Very likely, you will need corrective vision aids as your career progresses; it is, to put it in my father's terms, "part of growing up." Whether or not your medical certificate calls for "must possess corrective lenses for near vision", keep some reading glasses handy, to make your job easier. As these aids become more important, carry a spare set to replace a broken or mislaid one.

the Pilot

The problem with reading glasses is that your ability to accommodate differing distances can become more limited over the years. Instrument panels and overhead switch panels are at vastly different focal lengths. I've found progressive-correction eyeglass lenses to be a workable solution, allowing various distances to be brought into focus by rocking my head to the exact angle needed to look through the required section of the glasses. It takes time to adjust to progressives, but they do work.

A tri-focal lens, with corrections set for 12-inch, 30-inch and infinity, may work almost as well as progressive lenses. The places requiring the most neck-craning are (1) attempting to read labels on an overhead panel, when the close-up correction at the bottom of the glasses is needed, and (2) trying to look down at a ground feature through the side cockpit window, when the near-vision correction is in the way.

Making regular visits to your ophthalmologist is one way to stay ahead of the game. Regular pressure checks to spot glaucoma early-on is very important. Dry eye irritation is easily treated with eye-drops. If you use contact lenses, be careful to observe length-of-wear limitations and watch for signs of infection. Carry regular glasses with a current prescription to allow changing out of the contacts.

Never rub your tired eyes with your knuckles, particularly in a dry-eye scenario. Instead, massage the facial area around the eyes. When possible, close one eye at a time to briefly lubricate the eye with a drooped eyelid.

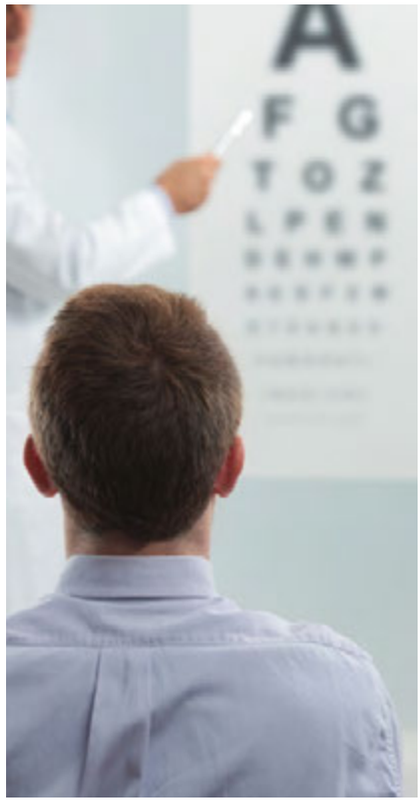
Avoid Unprotected Brightness

Most pilots know the importance of good sunglasses, particularly at high-altitude and above a sun-drenched cloud deck. Those of us who have had to deal with cataracts would advise fellow pilots to employ eye protection anytime you're out of the clouds. When about to descend into a low cloud layer on an approach, it's helpful to don the sunglasses to partially dilate the pupils, because the dark gloom below is going to require the most vision you can obtain.

Flash-blindness, or sudden exposure to a bright light when one's eyes are dark-adapted, can be a real night-flying hazard, particularly in single-pilot operation. Fully recovering from loss of night vision can take 30 minutes or more. In the days when dealing with thunderstorms in unpressurized aircraft meant getting up close and personal with lightning, young copilots were advised to drop their seat to the lowest position behind the glareshield, pull the bill of their cap down, and be ready to close one eye to save at least some of their vision.

The hazard of laser-pointing terrorism, a progression from the childhood prank of shining a flashlight up toward an airplane on its approach to landing, has required serious countermeasure actions lately. Looking directly into a laser beam can do serious eye damage; the natural reaction to an unexpected illumination in the cockpit is to look toward the light. Instead, it's important to focus away from it until it departs.

Ground operation at night on a busy airport presents many hazards, even with normal vision. Having a landing light or strobe flash turned directly into one's eyes can result in loss of acuity or depth perception. While taxiing at night, be as respectful as you can with your lights when around other airplanes. Most SOPs require the use of strobe lights while occupying a runway, to avoid any possibility of ATC or another pilot assuming the runway is clear, but give as much space as possible before hitting the switches. Douse the big landing lights as soon as they are not needed after rolling off onto the exit, especially if you see a taxiing aircraft ahead.



When can you do to enhance safety if low visibility is an issue? Keep the cockpit maplight or hand-held flashlight ready to verify a chart or diagram. If flashed by an external light, look toward the taxiway centerline, where your taxi light may be most effective, and maintain your orientation. Stop if you're not sure your wingtip is going to remain clear.

The opposite of low-light operation is flying sunward, when the bright glare pouring through the windshield obscures vital details. It helps to have a clean windshield, and freshly-cleaned sunglasses, as well as correctly-positioned sunvisors. Fog and mist with sunlight breaking through are difficult glare-producing situations, and, if forced to use a runway oriented into the sun, be particularly alert for looming hazards seen at the last second.

Fading visual acuity can be partially offset by experience, fortunately, but one has to understand the limitations that exist in later years. Take care of your eyes; they are key to success and survival in aviation. T&T

"When building my new panel, I chose the IFD540 because it's the newest and best-performing GPS/NAV/COM platform available. And with its integrated WiFi and Bluetooth, I don't have to add a bunch of extra wires and boxes."

Richard Sears IFD540 Customer
Piper Seneca II Owner

www.IFD540.com

IFD540 FMS/GPS/NAV/COM

AVIDYNE

Flying Made Simple™


GORMAN-RUPP and their
RAISBECK EPIC-EQUIPPED C90B...
QUIET. POWERFUL.
Raisbeck's EPIC Performance Package is available for all C90 and E90 King Airs.
info@raisbeck.com
(206) 723-2000
(800) 537-7277
www.raisbeck.com
RAISBECK
ENGINEERING


IMPRESSIVE.
N25GR
"It's undoubtedly the quietest
King Air I've ever been in, period."
Jeff Gorman
President/CEO
Gorman-Rupp Company
LJ-1440

Squall Line

By **John Loughmiller**

Now the Real Fun

Coping with supercell thunderstorms

Read any book about flying near thunderstorms and the standard advice will be to avoid the storm by 20 miles and don't fly under the anvil. You're also told to never try to out-climb building cumulonimbus cloud formations. Good advice, but is there anything specific that might help you avoid the grim reaper?

If the wheels on the atmospheric slot machine look like they will line up and cause you to hit the supercell thunderstorm jackpot, don't launch. Stay home. Penetrating a line of thunderstorms is never a good idea, even though you MAY survive if you are lucky and don't hit an active cell. Still, trying to fly through a squall line containing supercell thunderstorms, and/or their grumpy cousin, the tornado, is akin to suicide, as renowned test pilot Scott Crossfield unfortunately discovered.

Severe Thunderstorm Strategies

Before you actually depart, go online and satisfy yourself that a severe weather setup is not present or, if it is present, that it can be safely circumnavigated. If it's a 50% or less coverage situation, you might consider launching after reviewing the TAFs and METARs for all potential diversion airports along your flight path, so you can formulate a plan "B". But divert at the first indication – and I mean the very first indication - that plan "A" is coming unraveled. The thing you want to avoid is penetrating a line of severe thunderstorms in IMC. If you're certain you can maintain VFR and circumnavigate the severe TRW cells with at least 40 miles of separation from each cell, your odds for survival are much, much greater than any IFR penetration attempt, no matter what equipment you are flying and what avionics are onboard.

Do not ever– as in never – rely only on a DUATS or Flight Service briefing. You must get a legal briefing, so talking to FSS or logging on to get a DUATS brief is therefore required, but when potential severe weather is afoot, involve yourself in the process so you understand the dynamics present in the atmosphere.

For this type of weather in particular, once you're aloft you must do extensive enroute "nowcasting", meaning you must continually look at what is SUPPOSED to happen compared to what IS happening and adjust your plans accordingly. In essence, continually check on what's happening 100 miles ahead and 45 degrees to either side of your intended route and compare it to what the briefer said would happen. If the peanut butter and bread aren't coming out even, divert and live to fight another day.

A quick aside: There's a story that's been making the rounds about an airline first officer who was looking for a "soft spot" in a squall line that contained supercells. He asked ATC if anyone had penetrated the line near a particular fix. ATC said, "We had a 757 go through there about 20 minutes ago." The captain then dryly asked ATC if the five-seven ever came out the other side – and then he diverted. Diversion is the single best countermeasure you can take when things become dicey.

The Obligatory "There I was…." Story

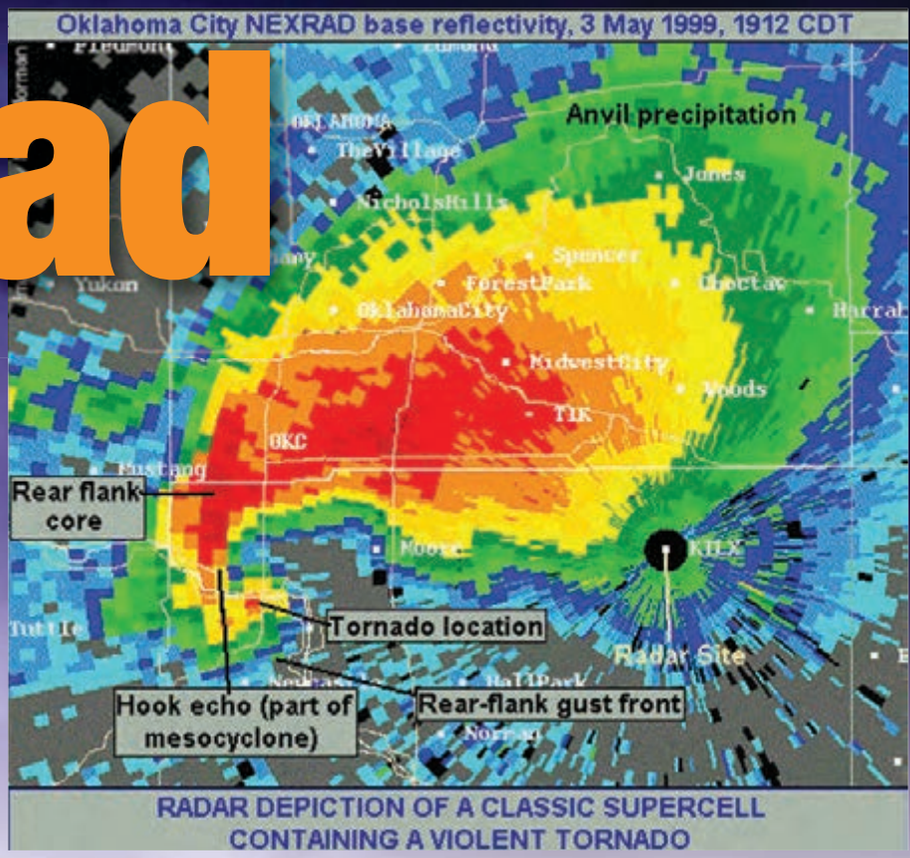
There's this thing called fate and it lies in wait for pilots every year. It could have gotten me some years back. My only defense was "nowcasting".

I was slated to fly from Dallas to Louisville one mid-April day. A squall line had come through Dallas in the wee small hours, prior to my launch time of 8 AM, waking me up with its violence.

A 7 AM look at the charts - you could still walk into a Flight Service Station in those days – indicated that the squall line had discharged the lift and moisture in the atmosphere along my route and there was nothing in particular happening on radar with the cold front that lagged about 300 miles behind the squall line. So, wheels up time came and off we went.

As we passed Memphis off to the southeast, I could see the back

Ahead Begins



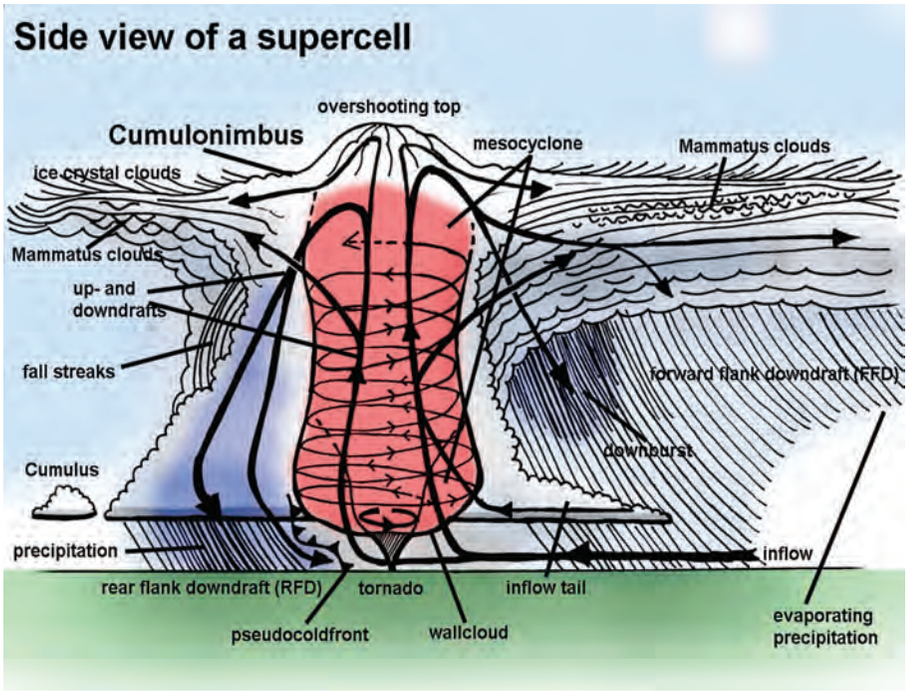
side of the squall line, whereas it should have been long gone. That meant it had slowed down. Looking northwest, I could clearly see the anvil tops of another line of thunderstorms. The front had found moisture to chew on and I was now in a tunnel between the slowing squall line and the onrushing front. It was totally clear where I was, but something told me that a trap was closing on me.

I called Flight Watch and they cheerfully told me that, yes, what I thought was happening was indeed happening. The front was catching up with the squall line and it was questionable whether I could make it to Louisville before that happened.

Long story short, I diverted to Evansville, Indiana, put the airplane in a hangar and watched the show from the safety of an FBO lounge.

A couple of pictures are worth a few hundred words

In case you ever find yourself in a bad situation in spite of your due-diligence, it helps to be aware of how a supercell thunderstorm works internally and also how it appears on radar.



Some may not have onboard radar but if you know what to ask, you can still discover some very useful information from Flight Watch (122.0 MHz on your radio dial). When they tell you what they see on their radar, their description will make much more sense to you if you've absorbed the imagery that follows.

Study the supercell diagram and learn where to expect roll clouds, in-flows and out-flows, gust fronts and tornados. (You're looking into the TRW from a vantage point southwest of the storm, so the tornado is directly in front of you.)

Next, look at the image from the Oklahoma City radar display. The radar display is oriented north up and the first thing you'll notice is that the southwest quadrant of the storm has a hook echo component – just where the supercell diagram shows a tornado would most likely be.

The hook echo is an indicator of a probable tornado, and something

you'll want to ask Flight Watch about when you contact them. If they don't see a hook echo on the storms ahead of you, ask if they see any storms with Bounded Weak Echo Regions. (The radar image has one just above and to the right of the hook echo, so you'll know what you're asking about.; it's the precip free area). A BWER indicates the possibility of internal circulation – a precursor to a tornado. If there is no hook but there is a BWER, the storm is still almost certainly a supercell. It may not have spawned a tornado yet but it could easily do so at any moment.

Ask if their radar display has Doppler capability. If the briefer says it does, ask if there is any rotation in any of the cells ahead on your flight path. A rotation component is also called a Mesocyclone. It's a signature of a supercell and an excellent reason to double the usual 20-mile exclusion zone for thunderstorms to at least 40 miles.

Also ask if they see any Line Echo Wave Patterns on the squall line and, if so, where are they along the line. A LEWP (also called a Bow Echo) indicates straight-line winds in excess of 70 mph. They can be associated with supercells but also occur within a plain-vanilla squall line. A LEWP will ruin your whole day, should you attempt a landing near one or decide to penetrate the line where one is located.

Finally, ask what the TRW coverage percentage is. If it's less than 50%, you can consider continuing, but have a way out and use it immediately if things change or if you can't maintain 40 miles separation. If there is more than 50% coverage, divert then and there.

Remember to reference your present location and destination to fixes, airports, navigation aids, etc., since Flight Watch has no idea where you are, where you're going, or your route of flight, until you tell them.

Further Reading

There's an excellent book on Severe Thunderstorms, and how to cope when they stalk the land, entitled "Severe Weather Flying" by Dennis Newton, ISBN-13: 978-1560270720. It's available on *Amazon.com*.

Under the heading of shameless self-promotion, yours truly has written a book entitled

"WeatherWise – Forecasting and Nowcasting Techniques for General Aviation Pilots", ISBN-13: 978-1475190199. It's also available from *Amazon.com* and the above strategy was adapted from one of the chapters.

John Loughmiller is a freelance writer, commercial pilot and CFII/MEI-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 twin. T&T

Twin Proficiency:

Watch & Learn

by Thomas P. Turner

The greatest single advantage of personal air transportation is saving time. Whether you use that time to make money – by beating a competitor to market, serving clients faster, or making more service and sales calls in a period of time – or to improve your lifestyle – by getting back from work in time for family events or creating getaways that could not be done any other way in the time available – you want to (and should) exploit and preserve the efficiency of personal aviation. However, there's one thing about flying yourself that you cannot afford to skip, even though, in a perfect world, it would be done without your help. You save a lot of time using a personal or business aircraft, but you cannot afford to let fueling operations go unsupervised.

From the NTSB:

During initial climb, the pilot of a Cessna 421C reported a loss of engine power. Unable to return to a runway, the pilot elected to perform a gear-up forced landing to an open field. The airplane was substantially damaged. A line person incorrectly fueled the airplane with 80 gallons of Jet-A instead of 100LL.

Two medium single-engine general aviation airplanes based at the FBO had been modified with turboprop engines requiring Jet-A fuel. The two airplanes were not required by STC to have the fuel filler opening modified, allowing the airplane to operate with smaller fuel filler openings, which did not comply with certification regulations. Line personnel at the FBO discovered that, by rotating the Jet-A nozzle and dispensing at a reduced pressure, Jet-A fuel could be dispensed without using the adapter. Despite having correctly fueled the accident airplane in the past, the line person mistook the accident airplane for one of the converted airplanes and dispensed Jet-A fuel.

The National Transportation Safety Board determined the probable cause of this accident to be: The failure of line personnel to ensure that the airplane was serviced with the proper fuel. Contributing to the accident was the Federal Aviation Administration's approval of a Supplemental Type Certificate (STC), which allowed an improper fuel filler opening, and the complacency in non-standard fueling practices by FBO line personnel.

Another NTSB report:

The pilot of an E55 Baron departed thinking the airplane had 115 gallons of fuel aboard, when it had 55 gallons of fuel aboard. The shortfall of 60 gallons was the result of a refueling request that the pilot made to a fixed base operator that did not take place and that the pilot did not verify had taken place. Fuel exhaustion occurred in both engines when the airplane was approximately 7,500 feet above an airport. The pilot spiraled down over the airport and entered the pattern for runway 14. He intentionally elected "to err on the side of landing long and not have any risk of being short." On short final, the airplane was "clearly high and fast, pretty much as expected, but not slowing, which was not expected." The airplane touched down approximately 1,000 feet prior to the end of the runway, overran the runway end, impacted a concrete irrigation channel about 350 feet from the runway end, and came to a stop approximately 200 feet past the channel.

The National Transportation Safety Board determines the probable causes of this accident to be: The dual loss of engine power due to fuel exhaustion as a result of the pilot's failure to adequately determine the amount of fuel aboard the airplane during his preflight preparation. A contributing factor was the pilot's misjudgment of distance/speed during the forced landing, which resulted in a runway overrun.

I've had to intervene twice to prevent a fueler from putting jet fuel into a piston-powered airplane. It was the style at the time for manufacturers to paint the word "Turbo" prominently on turbocharged airplanes. A well-meaning line staff saw the "Turbo" and confused it with "turbine", incorrectly assuming – potentially disastrously – that a turbo airplane takes turbine, or jet, fuel.

Why disastrously? Jet fuel contains far more stored energy than piston aviation gasoline. The spark of ignition in a piston powerplant releases so much energy that the engine itself cannot contain the explosion. It's called detonation and, as the name implies, it will detonate, or destroy, the engine in very short order. Misfueling accidents involving jet fuel contamination of piston airplane fuel systems, usually cause catastrophic engine failure almost immediately after takeoff.

Misfueling is being investigated as a possibility in the recent crash of a Piper PA46 Malibu Mirage at Spokane, Washington. The investigation has just begun, but responders report "a strong smell of Jet A diesel fuel" at the scene. Kerosene-based jet or diesel fuel has an odor that is very distinct from that of 100LL aviation gasoline. The NTSB has not published a preliminary report as of this writing in early April, but online news sources reported:

Inspectors who responded to the scene of a single-engine plane crash Sunday were concerned the plane may have been flying with the wrong type of fuel, according to a report from the state Department of Ecology. The pilot…crashed his Piper Malibu Mirage [after] just taking off from Felts Field [in Spokane].

Department of Ecology inspectors were called to the scene because of the fuel spill and noted a strong smell of "Jet A diesel fuel" in the air. [An] FAA aviation safety inspector expressed concern that the plane may have been running on jet fuel when it takes aviation fuel. Both types of fuel are sold at Felts Field by…the field's fuel concessionaire. The National Transportation Safety Board is investigating the crash and has not yet released preliminary findings.

The PA46 is a prime candidate for misfueling, because there are piston versions, requiring the use of 100LL aviation gasoline, and factory and aftermarket turboprop versions that must be serviced with jet fuel. A possible contributing factor: the aftermarket turboprop conversion is done by a firm based at the airport from which the accident airplane departed.

However, any aircraft can be misfueled at any airport on any given day.

Quality Control

There are several reasons to always personally observe the fueling of your aircraft. Greatest among them are to ensure that:

- The proper type of fuel is added to the aircraft,
- The proper amount of fuel is added to the aircraft,
- The fuel is added in the correct amounts in the correct tanks as you've ordered,
- Your fuel order is carried out at all, and
- The proper precautions are observed while fueling the aircraft, including electrical grounding, proper insertion of fuel nozzles into the tanks, prevention of water contamination in precipitation, delaying fueling when thunderstorms are in the area, and re-securing the fuel caps when fueling is complete.

Not all airplane fuelers will be well trained and familiar with the type

of airplane you fly. It's part of your pilot-in-command responsibility to ensure the aircraft is properly serviced. You can't really do this without personally supervising the fueling of your aircraft.

Putting 100LL Into Turbine Engines

Turbine engines are less affected by use of the wrong type of fuel, but there are adverse effects as well. Notably, most turbine engine fuel pumps and other components are somewhat incompatible with 100LL aviation gasoline. Turbine-engine fuel pumps seem to be especially susceptible to damage from unleaded aviation gasoline.

Consequently, there are limits to the use of 100LL in turbine-airplane Pilot's Operating Handbooks (POHs). The Beechcraft B200 King Air POH, for example, states:

Limitations On The Use Of Aviation Gasoline

- Operation is limited to 150 hours between engine overhauls.
- Operation is limited to 20,000 feet pressure altitude (FL200) or below if either standard boost pump is inoperative.
- Crossfeed capability is required for climbs above 20,000 feet pressure altitude (FL200).

It's obvious that there are some adverse effects of misfueling a turbine-powered airplane with leaded aviation gasoline. It's not as obvious to confirm that a fuel sample only contains jet fuel. Your only recourse when flying a turbine-powered aircraft is to watch the fueling process.

Detecting Misfueling

If, for any reason, you suspect the quality of the fuel you have added to your airplane, it's easy to detect jet fuel in aviation gasoline. The easiest way to check for Jet-A in 100LL is to dribble a little fuel onto a card or a paper towel. The sample should dry quite rapidly. If it's dry after two or three minutes (perhaps leaving a

blue stain), it was 100LL and you are good to go. If the card or paper towel is still damp and oily, it is at least partly jet fuel – and it's time to call a mechanic to de-fuel and decontaminate the airplane.

Some commercial products will warn of jet fuel contamination. For example, the GATS fuel jar instructions suggest using the differences in evaporative properties between 100LL and jet fuel as a test every time you check the fuel sumps. According to the instructions:

To test for jet fuel contamination, coat the separator screen with the fuel sample. This is done when the extracted fuel is returned to the aircraft fuel tank. After emptying the tester, turn the screen upright, so it can be blown on gently at a distance to avoid breathing in gas fumes. The heat in the exhaled breath will evaporate the AVGAS within roughly 30 seconds, regardless of the ambient temperature. AVGAS alone will leave the holes of the screen empty and the screen looking dry. Jet fuel, if present, will remain in some of the screen holes….

The GATS jar is widely available at pilot supply shops.

Watch and Learn

To confirm that the proper type of fuel is loaded in the proper amount in the proper tanks, and that the fueling process is done properly (i.e., electrical grounding, observing airplane limitations), it's necessary to personally watch the fueling process. Perhaps you're in a hurry to get to a business meeting, respond to a company crisis, or whisk your family or guests to that vacation destination. If you don't have time to watch the fueling process when you arrive, tell the FBO you don't want any fuel until you return. Plan to arrive a quarter-hour early to personally observe the fueling process when you depart. If you don't want to keep your passengers waiting, make an appointment to meet the fuelers during your stay, while your passengers do something else.

Your pilot-in-command responsibilities don't start when you board the aircraft and end as the propellers or turbines come to a stop. It takes a little time before and after a trip to ensure the airplane is ready for flight. One of the most important things you must do as pilot-in-command is guarantee you have enough of the right type of fuel in the tanks. Only by watching the fueling process can you learn whether it's being done correctly. 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.

From The Flight Deck

by **Kevin R. Dingman**

Can You Hear Me Now?

"NORDO." That's what it's called when we lose our com radios – No Radio. There was a time when the majority of aircraft arriving at what was to become AirVenture Oshkosh were without a radio. Heck, they were without the whole electrical system; the same goes for flying into most non-tower airports. We sometimes flew com-out missions in the military; a tactic to avoid detection and increase the likelihood of surprise. Today, not using your com radio is a bad tactic, it's surprising to ATC and other aircraft, and it's not humorous to the Feds.

In a case that went before the NTSB, this lack of humor was demonstrated when enforcement action was taken against an airline transport pilot because he continued for about 25 minutes after losing his radios on an IFR flight in VFR conditions, landing at his destination. The NTSB ruled that the pilot did not adequately explain why he failed to land as soon as practicable, given that he passed several suitable airports in VFR conditions. We all hope the NTSB used good judgment when deciding that this pilot flew NORDO too long, and in their consideration of suitable airports.

Twenty-five minutes seems brief, and depending on the size of the sector (Salt Lake from north to south, for example) and time of day, ten minutes between radio transmissions is not rare. And it may take another five for us to realize that we haven't heard anything for a spell, and still another ten minutes to descend. Also, aircraft capabilities require the analysis of many parameters for a field to be considered as a "suitable airport." Runway lengths, fuel and the proximity of a proper golf course not being the least of said parameters.

The Culprit

A com-out event is nearly unheard-of these days, because avionics have become practically bulletproof, and redundant radios and cell phones make the occurrence unlikely. Even so, other components can be the culprit: audio panel set wrong, volume too low, incorrect frequency, stuck mike and the one that happened to me. I was in a Bonanza 36TC east of ABQ, headed to PHX, and it was a daytime IFR flight, in-and-out of IMC. The overhead speaker quit and I didn't have a headset in the plane. Figures, right? The weakest link. My solution was to squawk 7600, maintain VMC, transmit my intentions in-the-blind, and land at Double Eagle near Albuquerque – and buy a headset.

Before you execute lost com procedures, do some trouble-shooting. In addition to the above, don't forget to try each com radio, each NAV radio (remember, we can listen on the NAV and acknowledge with the transponder), and try all cell and Sat phones as well as the internet if you have it. If you're still NORDO, squawk 7600 (we no longer switch back-and-forth to 7700, and we no longer fly a triangle pattern) and continue to transmit as if someone can hear you – use guard (121.5). And finally, when IFR, whether VMC or IMC, follow the lost com regulations.

The Rules

I apologize for getting all regulatory on you, but we really need to memorize certain things that are not aircraft-system related. Some are systemic and in need of common interpretation amongst us aviators; and sharing airspace after we lose com is among them. Here is what you and I agree to do:

1 VFR conditions. If the failure occurs in VFR conditions, or if VFR conditions are encountered after the failure, each pilot must continue the flight under VFR

and land as soon as practicable. Remember, for that guy above, the NTSB decided that 25 minutes was too long. On the other hand, the AIM has a clarifying note that says: "However, it is not intended that the requirement to 'land as soon as practicable' be construed to mean 'as soon as possible.' " But, on the third hand (all pilots should have three hands), the courts clarified this by ruling that: "A pilot may not take advantage of this rule to continue his IFR flight in VFR conditions to an airport of his liking, bypassing other airports and leaving air traffic guessing what he or she is going to do." My take on this regulatory back-and-forth is this: remember we are sharing the airspace, so don't push the envelope of aerodynamics or regulations. If you are com out, land the plane as soon as it's safe to do so. Pretty simple.

The rules are not so simple when the weather is bad. What if we're in IMC, and plan to remain in IMC all the way down to 200 feet? Here are those rules:

2. IFR conditions. If the failure occurs in IFR conditions, or if VMC cannot be maintained, each pilot must continue the flight according to the following:

(A) Route.

(1) By the route assigned in the last ATC clearance received;

(2) If being radar vectored, by the direct route from the point of radio failure to the fix, route, or airway specified in the vector clearance;

(3) In the absence of an assigned route, by the route that ATC has advised may be expected in a further clearance; or

(4) In the absence of an assigned route or a route that ATC has advised may be expected in a further clearance, by the route filed in the flight plan.

(B) Altitude. At the highest of the following altitudes or flight levels for the route segment being flown:

(1) The altitude or flight level assigned in the last ATC clearance received;

(2) The minimum altitude (converted, if appropriate, to minimum flight level) for IFR operations; or

(3) The altitude or flight level ATC has advised may be expected in a further clearance.

Consider the altitude decision this way: for each segment, try to get back to your assigned altitude – unless the MEA is higher in which case you must climb to the MEA. If the MEA is lower than your assigned altitude, stay at the higher assigned altitude. These rules can be confusing when you are required to climb to comply, but then descend again to comply on the next segment, so here's an example:

A pilot at an assigned altitude of 7,000 feet is cleared along a direct route that will require a climb to a minimum IFR altitude of 9,000 feet; he should climb to reach 9,000 feet at the time or place where it becomes necessary. Later, while proceeding along an airway with an MEA of 5,000 feet, the pilot would descend back to 7,000 feet (the last assigned altitude), because that altitude is higher than the MEA.

Once we arrive at our clearance-limit fix, we should descend at either the ETA we filed, or, if we are on time or late, we should descend right then. We accomplish this descent while holding at our clearance limit fix, and we descend to the lowest altitude allowed at that fix, but not lower than the IAF altitude of the approach to be flown. We then navigate to the IAF, descend in holding again if needed, align ourselves with the final approach course using published procedures, fly the approach, and land. We then watch for light gun signals through the tears in our eyes, and clean out our shorts when we get to the FBO. Simple enough, right? Almost everywhere, yes, it is. But, some of the new "descend-via" RNAV arrivals blur the ending a bit.

The PHLBO 3 into EWR is an RNAV arrival that terminates with a track/ heading out of the last point on the arrival then "expect radar vectors to final." This verbiage is listed after the track/heading into infinity. Contrast this to the AARCH 1 or KAYLA 1 at STL. These are also RNAV arrivals, but the "expect radar vectors" verbiage is immediately after a fix, and a fix is a clearance limit from which we may descend – you will still have to make up a procedure to align with final, though. The best solution is demonstrated by the PIGLT 4 into MCO. They publish a com-out procedure right on the arrival page that says: "…… to KAYWY, then turn left to intercept Rwy 36L final approach course, conduct approach." They leave out the teary-eyed light gun signals and dirty shorts part, but the procedure is great.

Ne-far-i-ous Adjective. Typically of an action or activity; wicked or criminal.

We don't think much about lost com because it happens so seldom. It's worth our time, however, to review the rules and have a plan before we get to that infamous clearance limit fix, or a nefarious track/heading on an RNAV arrival. If the radios get quiet, ask ATC if you're still in the right place. If still silent, check your switches, volumes, headset connections, try guard, and then, if you really are com-out, don't surprise ATC and the rest of us with a home-grown procedure. Fly the airplane, squawk 7600, transmit in-the-blind and follow the rules. Rest assured, we will get out of your way. Stay as close as possible to the regs though, lest the NTSB, the courts, or your brethren brand you as nefarious. 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

Daher Opens New Headquarters & Service Center In Pompano Beach, Florida

On March 20, 2015, Daher formally opened its new Airplane Business Unit's U.S. headquarters at Pompano Beach, Florida, marking the occasion with a ribbon-cutting ceremony by Chairman and CEO Patrick Daher and Pompano Beach mayor Lamar Fisher.

The event attracted more than 300 attendees and brought approximately 30 TBM aircraft to Pompano Beach Airpark (KPMP), coinciding with the TBM Owners and Pilots Association (TBMOPA) Safety Seminar.

The new facility includes a 32,000-sq. ft. structural steel building with high-strength structure and foundations, constructed to withstand winds up to 150 knots. Two temperature-controlled hangars will host the TBM Service Center for customers based in the southeastern U.S. It can accommodate eight TBM aircraft simultaneously, as well as a full spare parts inventory in a dedicated storage area.

This facility enables Daher's Airplane Business Unit to offer more services for TBM operators and customers, including avionics modernization, repair activities and full aircraft overhaul. KPMP is devoted to general aviation, with 160 based aircraft, an FAA Contract Tower, and three runways, one of which was recently extended to 5,000 feet. Generating an average of 160,000 movements annually, it's ranked as the 27th busiest airport in the U.S.

"Daher is a recognized industrial company in Europe, which aims at bringing innovative industrial solutions for our customers. Inaugurating this new location, the spearhead of the TBM family of aircraft, highlights our strategy to become well-established in the United States, in order to become a trusted partner for our U.S. customers," said Patrick Daher, Chairman and CEO of Daher.

"Our city is extremely honored that Daher has selected Pompano Beach Airpark," stated Mayor Lamar Fisher. "There are numerous benefits of having Daher in our community, including its positive economic impact. In the near future, we expect TBM pilots to refer to Pompano Beach as the official U.S. hometown for the TBM!"

Stephane Meyer, President and CEO of Daher's Aerospace and Defense division, added: "Daher's move comes at a time when our aerospace business is growing in the U.S., both in the aerostructures sector and with the demand for our TBM 900 very fast turboprop aircraft. The new facility at Pompano Beach Airpark will allow Daher to leverage the company's brand and resources as it meets the evolving demands of a growing customer base – a pillar of the company's strategic business plan."

Nicolas Chabbert, President of Daher's Socata North America, Inc. subsidiary and Senior Vice-President of the Daher Airplane Business Unit, said Pompano Beach Airpark was chosen because it continues Daher's presence within Florida's Broward County – where its U.S. operations have been located for 20 years.

"Our new Pompano Beach facilities give us the additional space we need, positions us to better serve customers for years to come, and reinforces our enthusiasm for what this business can accomplish in America," Chabbert explained. "Following the TBM program's great success, the fleet is growing – with more than 500 TBMs in the U.S. today. These aircraft will benefit from our new capabilities, such as avionics service that will complement our support and maintenance activities. After almost two decades at Fort Lauderdale-Hollywood North Perry airport, we are delighted for this relocation, which brings us to an airport with longer runways that can offer even more services."

Information: *www.TBM.aero* T&T

EN ROUTE

Quest Aircraft Company acquired "Setouchi Holdings Inc.", a member of "Tsuneishi Group".

On February 19, 2015, Quest Aircraft Company signed an agreement to be acquired by "Setouchi Holdings Inc.", a member of "Tsuneishi Group". Tsuneishi Group is a well-established global entity, with solid roots in shipbuilding, transportation and related industries.

"We are very excited to have a strong organization such as "Tsuneishi Group" believe in Quest, our products, and our philosophy, and to invest its resources in the company," said Sam Hill, Quest Aircraft CEO. "Over the last few years, we have experienced steady growth and with new financial capitalization and a shared understanding of the potential opportunities in the marketplace for expansion, we are looking forward to significant growth for Quest in the years ahead."

Setouchi Holdings, Inc. is one of the key entities of Tsuneishi Group. Its involvement in the aviation industry began with its subsidiary company, Setouchi Trading, Inc., which is an authorized KODIAK dealer.

Quest will remain headquartered in Sandpoint, Idaho, as will the manufacturing operations. The existing leadership team, led by Sam Hill, will continue to oversee and manage the organization. As production ramps up and growth in other areas of the company increases, plans for both physical and personnel expansion will be developed and implemented.

"Quest has positioned itself to be attractive to outside investors to help us grow the company, and we feel we have the perfect fit with Tsuneishi Group," continued Hill. "They have extensive experience in manufacturing along with other global capabilities which will benefit us greatly. In addition, their corporate philosophy is similar to ours in how they treat their customers and employees and in how they view their place in the world.

"They also believe strongly in the KODIAK, and want to help us make Quest the leading manufacturer of single-engine turboprops in the world," Hill added. "We are very enthusiastic about the future."

For more information, visit *www.questaircraft.com* T&T

EN ROUTE

Nextant Flies The Remanufactured G90XT Turboprop

Nextant Aerospace has announced the successful completion of the first test flight for the new G90XT turboprop. The company celebrated the landmark event with a rollout celebration at their headquarters in Cleveland, Ohio.

"This is a very exciting day for the team at Nextant and our customer base," said Nextant President and CEO Sean McGeough. "We announced this program just twelve months ago and we are on schedule for certification. We have great expectations for this aircraft and believe the new technology that it offers will be appealing to this market segment."

The G90XT by Nextant Aerospace is a remanufactured King Air C90A that features the new H75 engine by GE. The aircraft will benefit from several significant technology enhancements including a fully integrated GARMIN G1000 cockpit, electronic engine control with complete exceedance protection, single-lever power control technology for simplified operations and reduced pilot workload, digital pressurization, all new dual-zone air conditioning for enhanced ground cooling in warm operating environments, along with a significant interior upgrade for enhanced cabin comfort.

"We spent several months with existing King Air operators during our feasibility studies trying to understand what types of enhancements would significantly improve their ownership experience. We listened carefully and believe we are delivering a product that will have a large impact within this market segment," offered Mr. McGeough. "Like our previous aircraft, the 400XTi, we've tried to take a good aircraft and make it a great aircraft!"

Chief Test Pilot and Vice President of Flight Operations, Captain Nathan Marker, was at the controls of the G90XT for the first flight. "The increased power was very noticeable during the take-off run," stated Captain Marker. "I was also impressed by the lower noise levels in the cockpit. The change in position of the propellers relative to the fuselage, combined with the new engines, makes for a much quieter and more comfortable flight experience for passengers." In addition to the G90XT program, Captain Marker led the test flight program for the 400Xti jet. "Like we did with the 400XTi, we will spend the next several weeks running the aircraft through a full test flight envelope."

Nextant expects the flight test program to last approximately 6 weeks and anticipates certification for the aircraft in the second quarter of this year. Once certified, Nextant will begin delivery of production aircraft immediately.

For more information, visit *www.nextantaerospace.com* T&T

EN ROUTE

Phenom 300, the most-delivered business jet for the 2nd year in a row

Embraer Executive Jets delivered 73 Phenom 300 in 2014, making it the most-delivered business jet in the world, according to a report by the General Aviation Manufacturers Association (GAMA). Deliveries of this aircraft reached a total of 60 in 2013, also the largest quantity for that year.

"We are very grateful for our customers' preference for the Phenom 300, a truly revolutionary aircraft, designed with extensive customer input and feedback," said Marco Túlio Pellegrini, President and CEO, Embraer Executive Jets. "This achievement further reaffirms our commitment to deliver the highest level of customer support and services."

In just five years of operation, the Phenom 300 fleet has reached the 250-aircraft mark, having accrued a 57% market share in the light jet category. The aircraft is in operation in more than 20 countries and has accumulated close to 200,000 flight hours.

The Phenom 300 has a high-speed cruise of 453 knots and a six-occupant range of 1,971 nautical miles with NBAA IFR reserves. With the best climb and field performance in its class, the Phenom 300 is capable of flying at 45,000 feet and is powered by two 3,200 lb./thrust Pratt & Whitney Canada PW535E engines.

The Phenom 300's pilot-friendly cockpit enables single-pilot operation and offers the advanced Prodigy Touch Flight Deck.

For more information, visit *www.EmbraerExecutiveJets.com* T&T

EN ROUTE

Comp Air Aviation offering entire line on sale

Comp Air Aviation, one of the largest kit aircraft manufacturers in the world, supplying kit aircraft for more than 25-years, is putting its entire line of composite kit aircraft on sale.

Whether you are looking for the ever-popular and economical CA-6 and CA-4 six and four-place piston-powered models, or one of the highly sought-after high performance turbine aircraft, the CA-9, CA-10, CA-8 and CA-7, or the brand new retractable-gear CA-6.2 piston or turbine airplanes, they all go on sale for a limited time.*

At one time or another, most aviators have given serious thought about building and flying their own aircraft and now it can be done at a substantially-reduced price. Building your own aircraft is not only fun, but it is a very rewarding experience. Especially when the day comes to take that first test flight in an aircraft that carries your name as the manufacturer!

CA-9 About Comp Air Aviation

Comp Air Aviation is one of the oldest kit manufacturers in the world, with over 25 years of experience producing hundreds of innovative aircraft (over 200 with turboprop engines), incorporating modern construction techniques, advanced avionics installations, and adaptations to special operations.

*Offer expires June 2015 Website: *www.compairaviation.com.* T&T

Wing Jet Center Awarded Status As Service Disabled Veteran Owned Small Business

John Wing, CEO and Owner of Wing Jet Center at Lone Star Executive Airport (KCXO) in Conroe, Texas, was recently recognized for his service as an aviator during the Vietnam War by being awarded with the Service Disabled Veteran Owned Small Business status.

"We are proud of this distinction, we are proud of my father's service, and we are hopeful that customers are willing and able to help support businesses owned by our veterans," states Brian P. Wing.

Wing Jet Center excels at offering a private FBO experience and customer service for flight crews and their passengers, by recognizing and striving to exceed their needs. As part of the EPIC FBO Network, Wing Jet Center offers the convenience of accepting the EPIC Card.

The FBO's facilities are suited to accommodate any size corporate aircraft. Short or long-term 12,400 sq ft hangar space is currently available. A build-to-suit hangar space up to 22,000 sq ft, with additional office space and private gated parking lot, is also an available option. The airport has a control tower with radar, and is located only three miles from interstate 45 and twenty minutes from The Woodlands. U.S. Customs will be available on the field in late 2015.

For information, contact: *www.wingjetcenter.com* T&T

WING
JET CENTER

Ad Index

The Worldwide General Aviation

owner/operators and chief pilots of these airc

100%

TOTAL MARKET COVERAGE

JETS

CHIEF PILOTS & OWNERS

Aircraft Count	
4	AIRBUS ACJ319
32	ASTRA 1125
31	ASTRA 1125SP
63	ASTRA 1125SPX
51	BEECHJET 400
275	BEECHJET 400A
58	BOEING BBJ
391	CHALLENGER 300
65	CHALLENGER 600
58	CHALLENGER 601-1A
133	CHALLENGER 601-3A
56	CHALLENGER 601-3R
279	CHALLENGER 604
5	CHALLENGER 800
169	CITATION 500
319	CITATION 525
284	CITATION BRAVO
151	CITATION CJ1
69	CITATION CJ1+
202	CITATION CJ2
160	CITATION CJ2+
390	CITATION CJ3
180	CITATION ENCORE
306	CITATION EXCEL
5	CITATION I
288	CITATION I/SP
478	CITATION II
50	CITATION II/SP
173	CITATION III
329	CITATION MUSTANG
138	CITATION S/II
257	CITATION SOVEREIGN
284	CITATION ULTRA
287	CITATION V
20	CITATION VI
104	CITATION VII
257	CITATION X
199	CITATION XLS
1	DIAMOND I
53	DIAMOND IA
3	DORNIER ENVOY 3
282	ECLIPSE EA500
47	EMBRAER LEGACY 600
8	EMBRAER LEGACY 650
158	EMBRAER PHENOM 100
82	EMBRAER PHENOM 300
123	FALCON 10
28	FALCON 100
25	FALCON 200
176	FALCON 2000
21	FALCON 2000EX
81	FALCON 20C
17	FALCON 20C-5
26	FALCON 20D
3	FALCON 20D-5
7	FALCON 20E
8	FALCON 20E-5
59	FALCON 20F
82	FALCON 20F-5
229	FALCON 50
8	FALCON 50-40
113	FALCON 50EX
135	FALCON 900
21	FALCON 900C
116	FALCON 900EX
98	GLOBAL 5000
112	GLOBAL EXPRESS
25	GULFSTREAM G-100
161	GULFSTREAM G-200
8	GULFSTREAM G-300
27	GULFSTREAM G-400
222	GULFSTREAM G-450
7	GULFSTREAM G-500
330	GULFSTREAM G-550
42	GULFSTREAM G-I
110	GULFSTREAM G-II
31	GULFSTREAM G-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

on & Business Aviation Markets

rcraft *ALL RECEIVE* Twin &Turbine every month

Do you want your marketing message to reach these key decision makers?

It will when you advertise in Twin & Turbine

303	CONQUEST I
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

TWIN&TURBINE

John Shoemaker, Advertising Director
2779 Aero Park Drive • P.O. Box 968 • Traverse City, MI 49685-0968
(800) 773-7798 • (231) 946-3712 • Fax: (231) 946-9588
E-mail: john.shoemaker@VPDemandCreation.com • www.twinandturbine.com

ON FINAL

by **David Miller**

Thanks, Al Gore

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.

I read somewhere that Al Gore invented the Internet. And I believe just about everything I read. So, we have him to thank for most of all the cool aviation gadgets and apps that have come along in the past decade or so. I thought about Al as I drove to KADS (Addison) for an early morning mid-February flight to KHDC (Hammond, LA) and back. Thanks to Al's Internet, I was able to get loads of great info on the massive cold front that had passed through Dallas four hours before my 0600 wake up. And, whereas years ago all we had for a weather briefing was a phone conversation with an overworked Flight Service person, this morning I had reams of info to print from my desktop, compliments of *fltplan.com*. The KADS weather didn't look so great:

34016G30 1SM OVC 006 M01/M03.

As I pulled up to the hangar, I wanted to know the very latest local weather, so I called the ATIS recording on my blue-tooth cell phone from my car and got an even better picture. The front was moving southeast towards my destination. So, out popped my trusty iPad, with a wireless Internet connection, of course, and I could look at the forecast tops, possible SIGMETS, PIREPS, and icing forecast.

I was loving Al even more.

I had everything I needed, except the actual cloud tops. No one had ventured out yet to report. Perhaps the weather service could launch several hundred drones that would measure the tops and report back, using some new app.

Bad idea. Never mind.

We departed with all the anti-icing gear activated and climbed through light icing, clearing the mass of cold clouds at FL280 on the way to FL350, with a 75 knot tailwind. En route, I had a double dose of NEXRAD goodies and all sorts of current weather from my Garmin GTN 725 and my Collins IFIS system.

Isn't technology great? I don't know how we survived without knowing this stuff before Al. As we landed in Hammond, I knew I would have to go right back into the murk and shoot an approach at home, so I called the ATIS for KADS from my phone once again, as the engines wound down, to get the latest picture:

33022G28 13SM OVC012 M01/M02.

Taxiing from the FBO to the active, I had a huge picture of the airport diagram with my little moving magenta airplane right on the MFD, perhaps the best invention since sliced bread. Back home through the same weather, this time with a 110-knot headwind. I could check the METARS at a multitude of locations through the Garmin display, see exactly where the liquid precip changed to ice, and pick up a PIREP of moderate icing from a regional jet departing KDAL (Dallas Love). On the descent, virtually all of the traffic on this murky winter day was visible on several displays. Today, technology made for a much easier flight and significantly less stress. And I got home just in time to answer the doorbell.

It was a drone delivering my pizza.

Fly safe.

WOUNDED WARRIORS

THEY'VE GOT HEART
THEY NEED WINGS

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

Imagine somebody brings you together.

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

Find out how you can make a difference.

VETERANS AIRLIFT COMMAND

VeteransAirlift.org

952-582-2911

E^2 = Exceeding Expectations In Aviation Services.

"From nose to tail, "Stevens is my 'go to' for my Lear 35."

"I have counted on Stevens Aviation for over 10 years. They have kept my Lear 35 on the cutting edge, completing 27 STCs over the years including avionics upgrades, a new interior including a custom-made headliner with LED lighting, air frame modifications and a masterful exterior paint job. I have used all five Stevens facilities and know and trust the mechanics at each location. It is their professionalism, their pride in their work and their loyalty to me, to themselves and to Stevens that continually exceed my expectations."

Ralph "Hunter" Cuthbertson, III
Owner/Chief Pilot
SAI Flight Services

Stevens Aviation is a diversified aircraft service provider offering expertise in aircraft maintenance, modification and refurbishment, aircraft sales, aircraft management, flight services, and fixed base operations. You'll find our facilities in Greenville SC (GYH), Greer SC (GSP), Dayton OH (DAY), Nashville TN (BNA) and Denver CO (BJC). For more information, contact Paul Witt, Executive Vice President of Operations, at 864-678-6080 or pwitt@stevensaviation.com.

STEVENS AVIATION

www.stevensaviation.com