



Piper Twin Comanche

It's not the fastest light twin, but it's efficient, has pleasant handling and sports timeless good looks.

When we looked at the current Twin Comanche market, we found that owners generally prize the Piper Twin Comanche for the same reasons that they always have. It's a relatively affordable, economical and accessible twin with decent performance. There isn't much more to ask for. In many ways, it's one of the few twins that can claim to be not much more expensive than a single to own and operate, but that's only if you buy the right one. There are plenty of basket cases in the weeds. But there are some pretty nice ones, too, and you'll pay top dollar for them.

Prices of Twin Comanches have softened over the years, but they haven't plummeted, either. It's possible to find one with a spiffed-up panel and new paint for around \$80,000. Although some haven't had many panel upgrades, others have been upgraded to full glass and high-end custom leather seating. You'll pay big for those.

MODEL HISTORY

The Twin Comanche first saw the

light of day in 1963 and between then and 1972, Piper built about 2150 Twin Comanches in its Lock Haven, Pennsylvania, plant—the same factory that produced the venerable Cub. By any measure, the Twin Comanche was sleek and sporty compared to the airplane it followed, the dowdy, bulbous-nosed PA-23 Apache. (That airplane eventually evolved into the PA-23-250 Aztec, a strong airplane for Piper in its

Because of its stingy fuel burn, the Twin Comanche has excellent range and payload tradeoffs.

own right.) The Twin Comanche has two designations, PA-30 and PA-39.

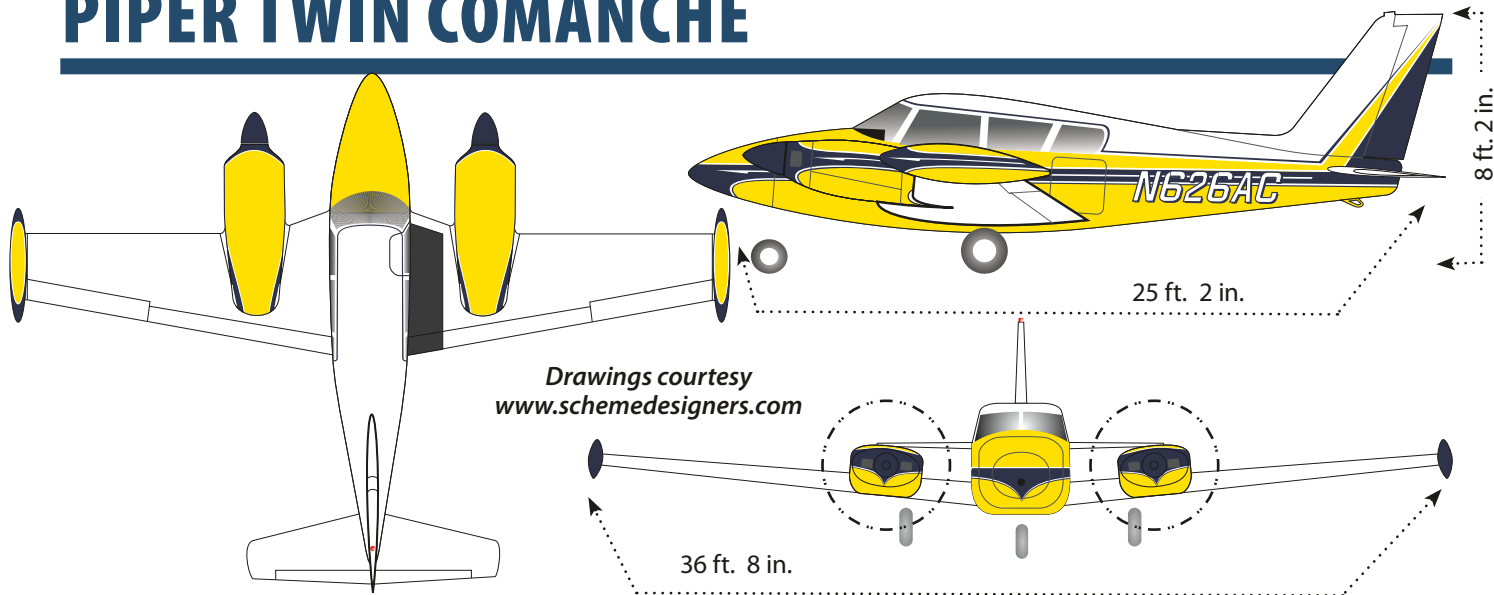
The first Twin Comanche shared two things with its slower predecessor, the Apache: It had four seats and the same basic 160-HP Lycoming O-320 powerplant. One difference is that the PA-30 has the injected version of the O-320, the IO-320-B1A. Cabin room was virtually identical in both airplanes.

But the Twin Comanche was clearly a different airplane. Compared to the Apache's short and squat looks, the "Twinkie" was rakish, with a sloped windshield, a pointed nose, tiger shark engine nacelles and even optional tip tanks. With cruise speeds as fast as 170 knots, along with miserly fuel burn, the Twin Comanche proved popular among private owners, flight schools and charter operators.

In 1966, Piper introduced a new Twin Comanche—the PA-30B. Although it has two extra seats, it really isn't a six-place airplane for anything but the shortest flights and the smallest people. The extra seats eat up the baggage space and the useful load of 1350 pounds allows just a half load of fuel if all six seats are filled. Given the airplane's low fuel consumption, half fuel is enough for 300 miles or so, but it's not realistic to think of the Twin Comanche as a six-place airplane. (There are windows for the fifth and sixth seat passengers, but

That's Carl Miller's award-winning restored 1964 PA30 in the lead photo.

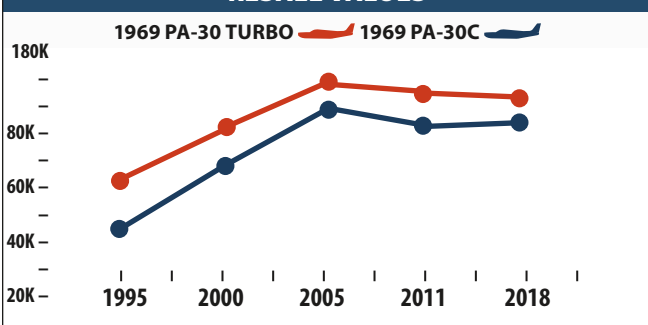
PIPER TWIN COMANCHE



SELECT MODEL HISTORY

MODEL YEAR	ENGINE	TBO	OVERHAUL	FUEL	USEFUL LOAD	CRUISE	TYPICAL RETAIL
1963-1965 PA-30	160-HP LYC IO-320-B1A	2000	\$25,000	90/120	1390	169 KTS	±\$62,000
1966-1968 PA-30B	160-HP LYC IO-320-B1A	2000	\$25,000	90/120	1350	169 KTS	±\$80,000
1966-1968 PA-30 TURBO B	160-HP LYC IO-320-C1A	2000	\$25,000	120	1317	194 KTS	±\$85,000
1969 PA-30C	160-HP LYC IO-320-B1A	2000	\$25,000	90/120	1330	172 KTS	±\$90,000
1969 PA-30 TURBO C	160-HP LYC IO-320-C1A	2000	\$25,000	120	1290	209 KTS	±\$100,000
1970-1971 PA-39 C/R	160-HP LYC IO-320-B1A	2000	\$25,000	90/120	1370	172 KTS	±\$85,000
1970-1971 PA-39 C/R TURBO	160-HP LYC IO-320-C1A	2000	\$25,000	120	1390	192 KTS	±\$95,000
1972 PA-39 C/R	160-HP LYC IO-320-B1A	2000	\$25,000	90/120	1370	172 KTS	±\$90,000
1972 PA-39 C/R TURBO	160-HP LYC IO-320-C1A	2000	\$25,000	120	1200	192 KTS	\$100,000

RESALE VALUES

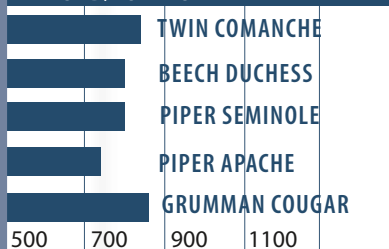


SELECT RECENT ADS

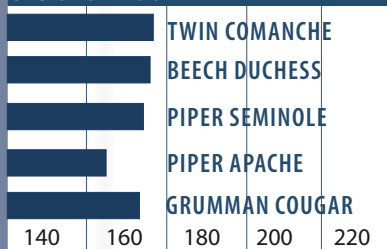
- AD 97-01-01** GEAR SIDEBRACE STUDS INSPECTION
- AD 94-13-10** STABILATOR TORQUE TUBE INSPECTION
- AD 83-19-03** LOWER SPAR CAP CHAFING
- AD 83-10-01** REPETITIVE FUEL-SYSTEM INSPECTION
- AD 77-13-21** LANDING GEAR COMPONENT INSPECTION

SELECT MODEL COMPARISONS

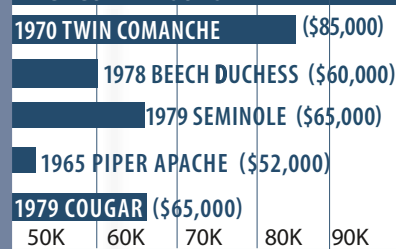
PAYLOAD/FULL FUEL



CRUISE SPEEDS



PRICE COMPARISONS





Modern avionics and a new instrument panel like the one in the 1969 turbo Twin Comanche shown at the top boost resale value. The one at the bottom has older Garmin navigators and a Sandel EHSI.

they're better at illuminating what's really a large baggage compartment.)

In an era when turbocharging wasn't common in light aircraft, Piper brought out the PA-30 Turbo B in 1966, with optional factory-installed RayJay turbochargers, boosting potential speeds to 190 knots in the mid to high teens. Nor were these the seamless, automatic wastegate turbos we're used to today. Each turbo had a wastegate controlled directly by a mechanical cockpit knob. Although such a system is cheap

and reliable, it imposes yet another cockpit duty on the pilot. By modern standards, when FADEC is in the offing, it's quite crude. For any pilot not used to this system, flying it can be like running a steam locomotive.

In 1969, Piper introduced the PA-30C, which offered minor improvements. Among these was a new instrument panel with an offset radio rack and flight instrumentation in the classic T-pattern, rather than Piper's traditional hodgepodge arrangement, which many of the earlier airplanes still have. The last of the Twin Comanches was the PA-39 series. Distinguished by its counter-rotating engines, this series was regarded by many as the finest of the Twin Comanche line and, say many owners, the one to buy. These are bargains at between \$75,000 and \$120,000.

Twin Comanche production ended

in 1972, a victim of both a declining market and Tropical Storm Agnes, which drove the Susquehanna River over its banks, flooding the Lock Haven plant. By then, Piper was already established in Vero Beach, Florida, but neither the single nor the Twin Comanche variants made the transition to Vero.

MARKET SCAN

With more than 2000 built, there are usually plenty of Twin Comanches to pick from in various stages of repair, restoration and upgrade. We think a prospective owner should be thinking in the \$70,000 to \$120,000 range. According to the *Aircraft Bluebook*, the PA-39 C/R—first year 1970—sells for about \$85,000, still a bit more than a 10-years newer Seminole but about the same as a Beechcraft Duchess. The *Aircraft Bluebook* value dropped \$10,000 since we looked at it roughly eight years ago. Still, depending on avionics and other major upgrades, that number could vary as much as \$25,000 or more.

Despite being longer in the tooth than the Duchess and Seminole, the Twin Comanche still enjoys the edge in both speed and efficiency, although Beechcraft fanatics will swear the Duchess wins for handling. We think it's easier to land gracefully.

But if money matters the most, the days of piston twin-engine airplane appreciation are long over; the game has turned defensive. In that regard, our sense is the Twin Comanche has done better than most, depreciating less than some other twins, almost surely because of its low operating costs. And even if the twin market isn't robust, there's always some demand from owners comforted by the notion of a second engine, accepting twice the fuel burn and more engine maintenance. There's never a free lunch.

PERFORMANCE

Depending on model and year, Twin Comanche owners report cruise speeds of 160 to 210 knots on 13 to 16 gallons per hour, all up. Our guess is that the median cruise is closer to the lower number than anything above 200 knots. Generally, airplanes with higher cruise speeds have various speed-boosting mods. An unmodified, normally aspirated

Look at the windshield and roof line of the Twin Comanche and you'll see the resemblance to the PA-24 Comanche single. The Twin Comanche's cabin isn't a huge dwelling at 44 inches wide, nearly the same as a Beech Baron.

Twin Comanche can best be thought of as a 160-knot airplane.

While it's true that this isn't faster than some modern singles, having the second engine is important to some owners. With backup vacuum and electrical systems, tackling low IFR or night operations is less stress inducing, even if the airplane isn't exactly stellar on one engine.

Like any light piston twin, the Twin Comanche will eke out a climb with one engine caged, but you won't suffer a nosebleed during the ascent. If everything is done just right and the weight isn't too high, look for about 200 FPM of climb, or a bit more. (Interestingly, the Diamond DA42 hasn't bettered that performance with its diesel engines, nor would we expect it to. The Lycoming-powered version, however, delivers a solid 350 FPM on one engine.)

When it was first introduced and thanks to its popularity as a multi-engine trainer, the Twin Comanche suffered somewhat of a tarnished reputation with regard to handling on one engine. On a number of training flights, V_{mc} demonstrations got out of hand (thanks, in part, to V_{mc} speeds being optimistically marked 10 knots lower than today). So, V_{mc} and stall speed could be nearly the same. This proved to be an unnerving and fatal experience for a number of unsuspecting students and their instructors. (Many of those instructors probably were on the green side themselves.)

The stall/spin syndrome was aggravated by the FAA's then ill-advised recommendation that V_{mc} maneuvers be performed at as low an altitude as possible—to get full asymmetric power. This, coupled with a wing that tended to lose lift all at once in a stall, helps explain the series of training accidents. This sort of carnage wasn't unique to the Twin Comanche, by any means. The fact that the training community has wised up since the 1960s probably does more than any factor in explaining why the plane has a typical



accident record and isn't considered especially nasty on one engine, despite the anemic climb rate.

On the PA-39—the Twin Comanche variant with counter-rotating props—stall strips that weren't standard on early models were installed on every airplane. Counter-rotating props provided an additional safety benefit by eliminating the critical engine. The FAA also issued an AD requiring that V_{mc} be increased to a more realistic 72 knots. Another feature on late-model Twin Comanches is interconnected aileron and rudder controls. Owners say it keeps the ball almost dead center without rudder coordination, during reasonable rates of turn and bank angles.

Overall, handling of the Twin Comanche is predictable with only one quirk: takeoffs and landings. Here, the aircraft can be a bit of a rascal. It's

difficult to obtain consistent, graceful landings because if held off the runway, the airplane tends to pay off with a jolt. And on takeoff, the Twin Comanche wants to fly before V_{mc} .

Developing techniques to deal with these peccadilloes is a frequent topic among pilots. For takeoff, owners learn to avoid pre- V_{mc} liftoffs by holding the airplane in ground effect until V_{mc} . This takes some deft handling, since it can lead to nervous skittering on the runway or porpoising. On landing, the Twin Comanche is a floater until, all at once, it isn't, with a thud passengers tend to notice. When the wing sheds its lift—all at once—the gear goes kerplunk! Generally, these rude arrivals are laid on the tapered, laminar-flow wing and stubby rear main gear. To make matters worse, the stabilator seems to have limited authority during the flare.



Owner tells us the Comanche's landings are safe, even if they're not pretty. The accident record isn't quite as convincing, but it's not exactly damning, either. Advice abounds on improving landings, including installing a smaller nosegear tire or raising the flaps during the flare to dump the lift and pin down the airplane.

RANGE, PAYLOAD

Because of its stingy fuel burn, the Twin Comanche has excellent range and payload tradeoffs. A few years ago, one owner wrote us gloating that with a 120-gallon capacity—thanks to tip tanks—he could fly halfway across the continent with fuel to spare. “Who could ask for more on a nickel budget?”

The first Twin Comanche carried 90 gallons in four wing tanks. Like the single-engine Comanche, it had four seats, with baggage space behind the rear seats.

Unlike other models, gross weights of Twin Comanches didn't evolve much. The first models had 3600-pound gross weights with empty weights of around 2300 pounds, for a useful load of 1300 pounds. With 90 gallons of gas aboard, that left 760 pounds—just enough for four people and some bags but not that much different from the load-hauling capability of many stout singles.

The PA-39 C/Rs have gross weights of 3725 pounds but empty weights of around 2500 pounds for even less useful load than the earlier models. With 120 gallons of fuel aboard, allowable cabin load declines to 500 pounds or so. But thanks to those economical engines, that much gas translates to seven hours of endurance and exceptional range. It's both practical and possible to offload fuel in exchange for cabin load.

MAINTENANCE

AD-wise, the Twin Comanche isn't a killer. The landing gear bungee cords are supposed to be replaced every 500 hours in service, or every three years, whichever comes first. Some TC experts say this should be done annually. The bungee cord AD was promulgated in 1977 to prevent the landing gear from collapsing after a manual extension. It also helps in retracting the landing gear and, when it's too worn out to do this, the gear circuit breaker is likely to pop.

Unusual for most models, the Twin Comanche has had some one-time ADs for structural issues. While we know of few accidents caused by breakups, owners have reported that aileron spars are especially fragile components, with cracks developing under the hinge brackets.

An AD to solve this problem required the installation of new hinge brackets. After compliance, the 100-hour inspections can be discontinued. However, reports from the field indicate that it would be prudent to continue examining this area.

The LoPresti Aviation cowling and spinner mod (top two images) is said to increase cruise speed up to 7 MPH. A typical Twin Comanche normally aspirated Lycoming engine overhaul is around \$35,000, bottom.



That's Len Duncan's PA-30B. It has RayJay turbochargers and he reports 175 knots at 17 to 18 GPH when flying in the teens.

The Twin Comanche's engines have an excellent service history, which goes a long way toward making the airplane relatively affordable as twins go. Like the airframe itself, the engines are the target of relatively few serious ADs and many of those are of the shotgun variety.

Our sweep of service difficulty reports found few smoking guns worth mentioning. Many of the complaints related to what can best be described as aging aircraft issues—old airplanes that haven't been well maintained. In turbo twins in particular, corrosion in engine mounts has caused problems in years past. Trouble spots are the areas where exhaust heat tends to weaken the metal.

On the normally aspirated models, heat fatigue problems on the engine mounts also have been reported. Other problems to watch: Magneto coils can develop resin leaks due to overheating, heat exchangers can become burned or cracked (this was the subject of an AD requiring an expensive 500-hour overhaul) and the spinners on the Twin Comanche's Hartzell props can develop problems.

MODS, OWNER GROUP

Twin Comanche owners agree that the International Comanche Society is a worthwhile organization. Members receive a monthly magazine, Comanche Flyer, and technical help from the society. Currently, the society has more than 3000 members,

with regional "tribes" throughout the U.S. For prospective Twin Comanche buyers, the society offers a book describing what to look for in a used Twin Comanche. The ICS can be reached at www.comancheflyers.com or by phone at 888-300-0082.

Although the list of modifications for the Twin Comanche isn't as long as it is for some airplanes, any airplane in service for four decades has been tinkered with. LoPresti Aviation offers an improved cowl, flap gap seals, spinners and spats. When we talked with LoPresti, it told us the cowl and spinner mod adds a total of 7 MPH in cruise. We're told there are over 400 speed kits in the field. Contact LoPresti at www.loprestiaviation.com or 772-562-4757.

Knots2U, another speed mod house, has a similar product line, along with windshield, lighting and nosebowl kits, to name just a few in Knots' large product line. Contact www.Knots2u.com or 262-763-5100. Hartzell is aggressive in offering new prop conversions for all aircraft, including the Twin Comanche. Contact 800-942-7767 or www.topprop.com.

OWNER FEEDBACK

Owing to its contemporary styling, performance, efficiency and comfort, a cult following among Piper Twin Comanche owners exists. Piper, with plenty of help from Ed Swearingen, got it right the first time. There are seven variations of the model, ranging from naturally aspirated IO-320 engines, to turbonormalized versions, four-place seating to six-place seating, plus an STC'd version with 200-HP engines. But for all intents, these are really four-place airplanes.



READER SERVICES

TO VIEW OUR WEBSITE

Visit us at:
www.aviationconsumer.com

FOR QUESTIONS ABOUT YOUR SUBSCRIPTION:

Phone us at: 800-829-9081

TO CHANGE YOUR MAILING OR EMAIL ADDRESS, RENEW YOUR SUBSCRIPTION OR TO CHECK PAYMENT STATUS, VISIT OUR ONLINE CUSTOMER SERVICE:

Log on at:

www.aviationconsumer.com/cs

To change your address by mail, attach your present mailing label to this form (or a copy of this form), enter your new address below and mail it to:

THE AVIATION CONSUMER

P.O. Box 8535
Big Sandy, TX 75755-8535

Name _____
 Company _____
 Address _____
 Address 2 _____
 City _____
 State _____ Zip: _____
 Email _____

To order or renew a subscription, enter your name and address above and check the subscription term you prefer:

- 1 year (12 issues) \$69
- 6 months (6 issues) \$34.50
- Check enclosed AMEX
- MasterCard Visa

Card # _____
 Expiration Date _____
 Signature _____

YOUR RENEWAL IS JUST A CLICK AWAY!
www.aviationconsumer.com

TWIN COMANCHE MISHAPS: OTHER

We have been of the opinion that the Twin Comanche got an unfair rap when it came to developing a reputation for a high rate of V_{mc} LOC (loss of control) accidents. We felt that was because the airplane came of age in the 1960s when the FAA was tacitly encouraging V_{mc} demonstrations at low altitude and there wasn't much time for an instructor to catch a student who fell off the training tightrope—and the Twin Comanche was a popular multi-engine trainer.

However, after going through the 100 most recent Twin Comanche—PA-30 and PA-39—accidents, we do have a concern about the rate at which pilots lost control after power was lost on one engine, whether due to a mechanical issue (several were due to lousy or no maintenance), contaminated fuel or absence of fuel.

We counted 15 V_{mc} -related crashes, eight following power loss shortly after takeoff and seven in other phases of flight. We noted that in many of the accidents the pilot had not taken action to follow the emergency checklist to maximize the chance of continuing the flight—by doing such things as feathering the prop on the offending engine, retracting the gear and/or retracting the flaps.

In addition, we saw two accidents where an instructor chopped power on one engine on the takeoff roll and the student didn't close the throttles in time to keep from running off of the runway—and the instructor didn't or couldn't react fast enough to keep it from happening.

Based on our experience in looking at aircraft accident reports on a monthly basis, a combination of engine/mechanical-induced and fuel-related power loss events leading to 30 reported accidents is not out of line. What got our attention was that half of those events led to a V_{mc} LOC crash, most of which were fatal. Because V_{mc} LOC usually results in a violent roll off—often beyond the

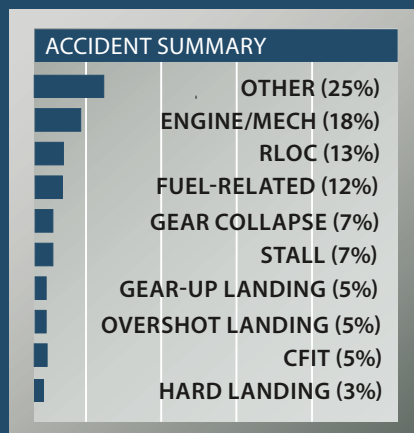
vertical—the subsequent impact is rarely survivable because the aircraft hits inverted, steeply nose down, or both.

We have flown the Twin Comanche and like its efficiency and handling, but the LOC following power interruption numbers indicate to us that it is essential for any pilot who flies one to take regular and frequent recurrent training that emphasizes single-engine procedures and airplane performance under different loadings and density altitudes.

There were seven stall accidents in the reports we reviewed, most either after takeoff (some over gross) or while maneuvering below 1000 feet AGL.

Gear collapses and gear-up landings accounted for 12 incidents—there wasn't enough damage to categorize them as accidents. In nearly half, the pilot did not follow the fairly precise instructions in the emergency gear extension checklist and could probably have extended the gear. In others poor maintenance doomed the extension attempt or caused the collapse while a couple of pilots simply forgot to fling out the Firestones.

We have no sympathy for the pilot who selected “gear up” prior to beginning the takeoff roll and then let the airplane get a little light on the wheels, which allowed the retraction system to lower the airplane to noisy contact with the runway.



A potential new owner will likely fret about spare parts for a 50-plus-year-old airplane. To date that has not been a problem. Things that rotate (engine, prop, governor, pumps) are easily overhauled. Webco refurbishes the fuel selectors, Matt Kurke of Comanche Gear (www.comanchegear.com, 239-593-6944) refurbishes the landing gear motor/transmission. The only exception is if the airplane has suffered a gear-up landing or had a gear collapse because there are few shops that have the tooling to fabricate new ribs/formers/longerons.

The easiest way for the new buyer to determine if the plane had a previous gear incident is to remove the lower wing root fairing, and with a flashlight and feel, determine if there is a skin splice along the fuselage at the chord line. When the planes were built, Piper used a continuous skin from the door sill to same location on the pilot's side.

A stock normally aspirated Twin Comanche with minimum speed mods will typically cruise at 190 MPH (166 knots) at 8000 to 9000 feet. The turbocharged models do best between 16,000 to 17,000 feet, resulting in typical cruise speed of 213 MPH (185 knots), but at the expense of a much higher fuel burn.

My airplane is a bit unusual. Not only have I installed the majority of the mods that I believe are effective, but I've created a number of my own. In particular, attention has been focused on cooling drag, which is the third highest drag component after skin friction and form drag. In smooth air and standard conditions running maximum manifold pressure and 2450 RPM, I see 175 knots indicated at 9000 feet.

The landing gear, when properly maintained, is very robust and trouble free. Problems arise when maintenance is deferred. Every 1000 hours the nosegear and the main landing gear toggle link assemblies are removed from the plane for detailed inspection and measurement. This should only be done by a highly qualified shop with Comanche experience.

Upon reassembly, the gear is timed and proper preload adjustments made. If the friction drag on the main gear conduits is excessive, new conduits from Webco or Piper are installed. I recommend that every five years the preload should be determined and

any adjustments made. The flexible conduits creep due to compression loads when the gear is down.

Using a clamp-on ammeter, excessive friction is present when the gear is cycled on jacks and a current draw greater than 20 amps is measured. I also recommend changing the bungees every year since their purpose is to reduce the load on the gear motor/transmission during the retraction cycle. There is a companion AD to inspect the toggle link pivot pins.

The original seats (especially the early models) are not exactly comfortable. Modern Piper seats from other models are easily swapped out (Lance/Saratoga/Seneca/Cherokee should work). I have high-back seats from a Lance in my 1964 Twin Comanche.

Most normally aspirated Twin Comanches have an empty weight close to 2400 pounds when modern electronics, lightweight starters and alternators are installed, and when attention is paid to weight uppers (heavy paint, unnecessary equipment and excessive baggage).

The plane is almost able to carry four 170-pound occupants and full fuel. It's a certified gross weight issue, not one of aerodynamics. With tip tanks, the gross weight becomes 3800 pounds.

The Twin Comanche is a reliable, easy to maintain aircraft with minimal system complexities. Plus, Piper's replacement—the Seminole—lacks the speed, burns more fuel, climbs much slower and lacks the Twin Comanche's service ceiling.

Hans Neubert
Anaheim, California

My Twin Comanche was the AOPA 2004 win-a-twin sweepstakes airplane. I bought this aircraft six years ago from the man who won it. The real costs of the annual inspections are hard to determine because I have been doing upgrading throughout the years that I have owned this bird.

During my ownership I have rebuilt or replaced many airframe and control items including the landing gear motor and transmission, all of the engine control cables (mixture, prop, throttle and alternate air), fuel selectors, rebuilt the air boxes, trim drum, gas heater gas valve and completed the 1000-hour gear inspection. That



being said, what a normal annual would cost is difficult for me to determine. As for the modifications that I have done, they include changing the wheels and brakes to accommodate hubcaps on the main gear wheels.

I reworked the instruments and avionics, adding a Garmin G600 PFD, a GTN 750 navigator, GDL88 ADS-B and GDL69 SXM receiver, JPI 960 engine monitor, a Quattro standby EFIS, USB ports, autopilot altitude preselect, an AoA indicator, readback recorder for ATC communications, wingroot fairings and trailing edge fillets.

I also added LED strobes and nav lights, engine cooling baffles for increased cooling and speed—which had the best result of any speed mods I retrofitted.

Last, I added MT three-blade props. I like the way they look but have not flown enough to know the difference between the MTs and the Hartzell Q-tip props that were on previously.

As for performance, N204WT has tip tanks for a total of 120 gallons of fuel. I plan for around 16 GPH. In cruise, I lean to around 7 GPH per engine and see 165 knots.

The endurance is much longer than my body's, but staying in the air without fuel stops will definitely reduce your block-to-block times. The useful load is 1325 with the tip tanks—a little less without them, but also a little slower with them.

I believe the best resource for information about Comanches—twins or

N204WT shown above was already rebuilt in 2004 for the AOPA sweepstakes, but new owner Dave Winters has been upgrading and replacing systems over the last six years.

singles—is the Airworthy Comanche forum at www.forums.delphiforums.com. There are many Comanche-savvy contributors who seem to know everything there is to know about Comanches. Kristin Winter is the mastermind keeping the forum going. Hans Neubert has written the book on Twin Comanche speed mods and performance at www.comanchepilot.com, plus there are many other experts. Another resource is the International Comanche Society (ICS).

The Twin Comanche is a solid airplane, a pleasure to fly and is fast and efficient. I also owned a single-engine Comanche and the operating costs were not much different than the twin. But, the maintenance of the Twin Comanche is more.

Still, as far as owning a twin-engine airplane, I think the Twin Comanche might be the most affordable.

Dave Winters
via email