FLEXIBLE FLYER

THE PIPER LANCE STORY; A TAIL TALE

BY MARK M. LACAGNINA

PHOTOGRAPHY BY ART DAVIS AND MARK LACAGNINA

continued

LANCE

Not all Lances have T-tails. The original model lasted three years before "jet-age technology" struck.

It was biennial flight review time, circa 1978, and we were sweltering in the cramped confines of the trainer, waiting for a break in the steady stream of arrivals so that we could take the active. The instructor was conducting a running critique of the landings, and it was not helping to soothe my pretest jitters at all.

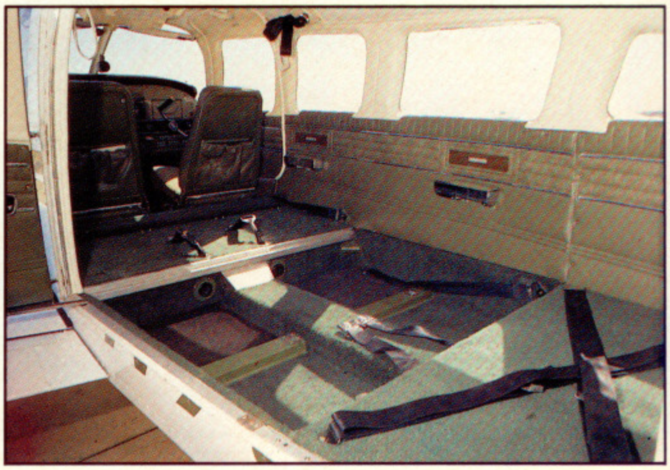
One airplane came sizzling in, nose down on short final. "Hey, a strafing run. He's going to float halfway down the doggone runway." He did.

The next landing was a greaser, picture-perfect. "Not too bad. That's the way we're going to do them, right?" He punctuated his prognostication with a jab to my ribs.

"Well, I sure. . ."

. . .hope so. The sentence trailed off in astonishment as a big single lumbered in, exhibiting some rather bizarre gyrations. Only after the airplane regained semblance of normal flight in the go-around was the silence broken. "That, my friend, is the new Lance," the instructor announced dourly. "Piper really ruined a good airplane with that doggone T-tail."

At the time, I surmised (correctly, as it turns out) that he was basing this conclusion on a chat with someone who knew someone else who actually had flown the airplane. The fact is that some pilots, used to the docile handling characteristics of the original Lance and its predecessor, the Cherokee Six, did not like the way the T-tail Lance II handled. Pilots new to the airplane found that it springs up into a nose-high attitude on rotation, that it requires a relatively large amount of asphalt to get airborne and that it just



The Lance is just right for a church picnic. Leave the seats in, and carry the choir. Take the seats out, and haul the proverbial piano.

does not seem to have enough stabilator authority during the landing flare.

For better or worse, The Word got out. Sales of new Lances, which previously had been quite high against strong competition from the Beech Bonanzas and the Cessna 210 Centurion, began to sag. Resale values of pre-owned Lances plummeted.

The sour grapevine grew pretty tenacious roots. Today, resale values for Lances—T-tail or not—remain well below those for competitive airplanes. While this is a bad situation for owners, it is a good one for pilots looking for an airplane with the load-hauling capabilities and roominess of a light twin and the operating economies of a high-performance single. Typical prices vary from $30,000 for a Lance to about $55,000 for a well-equipped and well-maintained Turbo Lance II.

Should the T-tail be avoided? The answer is a qualified no. Tail configuration should be no obstacle once you recognize the fact that the Lance II handles a bit differently than the Lance and requires some extra preflight planning. A thorough check-out in either airplane, of course, is highly recommended. After a half-dozen takeoffs and landings and some slow flight and stall work in a Lance II, you may wonder why the T-tail fuss got started.

Introduced in 1975, the Lance marked Piper Aircraft's return to the production of high-performance, six-seat singles. Basically a retractable-gear Cherokee Six, the airplane filled a void that was created when Hurricane Agnes visited Piper's factory in Lock Haven, Pennsylvania, in 1972 and destroyed most of the production tooling for the Comanche series of airplanes.

The FAA approved the addition of the Lance to the original type certificate for the PA-32-260 Cherokee Six in February 1975. The PA-32R-300 Lance, the PA-32RT-300 Lance II and the PA-32RT-300T Turbo Lance II are the last of Piper's airplanes to retain the fat, constant-chord "Hershey bar" wing. The wing, as well as the engine mounts, was modified to accommodate retractable landing gear. The wing spar also is heavier and allowed gross weight to be raised from the Cherokee Six's 3,400 pounds to 3,600.

The Lance's main landing gear is similar to the Seneca's, and the nose gear comprises components from both the Seneca and the Arrow. The landing gear is hydraulically actuated by an electric pump located beneath the forward baggage compartment. The gear is held in the retracted position by hydraulic pressure and in the extended position by mechanical down locks.

The airplane was fitted with the Arrow's automatic gear-extension system, which includes a pressure-sending probe on the left side of the fuselage. If the pilot forgets to extend the gear manually, the system automatically will extend the gear at airspeeds between 81 knots and 103 knots, depending on power setting and altitude. If the pressure probe senses that the engine is delivering full power, the system will prevent the gear from being retracted at up to about 81 knots.

The system is a nice back-up, but do not bet your insurance premiums and maintenance reserves on it. One *Pilot* staffer found that a high-power, high-drag approach could trick the system into not extending the gear.

The Lance is powered by a 300-horsepower, six-cylinder, fuel-injected Avco Lycoming IO-540 engine and a two-blade, constant-speed Hartzell propeller. Recommended time between major overhauls (TBO) of the engine is a relatively high 2,000 hours. Average cost per overhaul is about $11,000.

There are two interconnected fuel tanks in each wing, and they hold a total of 564 pounds (94 gallons) of usable fuel. Each inboard tank has a sight gauge to indicate quantities below 25 gallons. The fuel selector has three positions: Left, Off and Right. The simplicity of the Lance's fuel system is spoiled by its fuel strainer sump drain system. According to the operating manual, you are supposed to place a container beneath the belly-mounted drain and hold down the drain lever for about 18 seconds while cycling the fuel selector. But to do this, you need the long arms of an orangutan, since the drain lever is mounted in front of the spar behind the copilot's seat and the fuel selector is below the center of the instrument panel. It also presupposes that you can place the container (and I have yet to see a Lance with a suitable container aboard) directly under the drain.

The usual result is an incomplete effort and a puddle of fuel underneath the airplane. Smokey the Bear would take a very dim view of this situation.

The cabin of the Lance is roomy and comfortable. It is a little more than four feet in both width and height. Initially, all six seats faced forward, and a jump seat for the center row was offered as an option. In 1977, club seating, with the center seats facing aft, was added to the options list. It proved to be very popular, as 85 percent of the airplanes were ordered with this arrangement.

There are two baggage compartments: one between the engine and the panel; another behind the rear seats. Both can hold up to 100 pounds. One particularly useful feature is a removable panel in the forward compartment that provides access to the instruments, avionics and vacuum pump filter.

The Lance II and Turbo Lance II were introduced in 1978. Piper beat the drum of "jet-age technology" when it unveiled the T-tail, a configuration designed to keep the stabilator above propeller and wing wash. The new stabilator, 23 percent smaller and lighter than the previous one, would reduce induced drag and increase speed, the company said. Actually, the increase does not amount to much—maybe a knot or two at certain altitudes. At optimum altitude, 8,000 feet and 75-percent power, the normally aspirated Lances cruise at about 158 knots while burning 16 to 18 gallons of fuel per hour. Endurance is about five hours with reserves. At 11,000 feet and 65-percent power, cruise speed is about 145 knots, fuel burn is 14 to 16 gph,

Lock Haven Airmotive offers nose-mounted louvers to take the heat off the Turbo Lance.

HONING THE LANCE

With fewer than 2,000 units built during a five-year production run, it is not surprising that the Lance series of airplanes has not attracted a lot of attention from the tweakers. Our search turned up seven companies that currently offer modifications for the airplanes.

Inflatable door seal kits are available from Bob Fields Accessories of Santa Paula, California, (805/525-6236). Costs of silicone composite seals range from $410 with an automatic inflation unit to either $277 or $207 with a manual inflation unit mounted either on the panel or on the front door. The company can install the system in about five hours and guarantees the seals for as long as the customer owns the airplane.

Cypress Aviation in Lakeland, Florida, (813/644-0428) offers auxiliary fuel tanks for the original Lance model. The modification, which costs $3,500 installed, consists of 15-gallon bladder tanks for each wing.

Gap seal kits and installations are available from Knots 2 U, Incorporated, of Wilmette, Illinois, (312/256-4807). The company claims the modification adds five knots to cruise speeds. Flap and aileron seals for the Lance cost $995, installed, or $750 for a kit. There is an extra charge of $100 for airplanes with serial numbers from 1 through 450 due to the external corrugation of their aileron skins. Flap, aileron and stabilator seals for the T-tail Lance IIs cost $1,625, installed, or $1,225 for a kit.

Cooling louvers for Turbo Lance IIs can be installed by Lock Haven Airmotive Corporation of Lock Haven, Pennsylvania, (717/748-5582). The $1,000 modification involves removal of the airplane's cowl flaps and installation of fixed louvers on both the bottom and top of the engine cowl. If an owner chooses to retain the flaps and have louvers installed only on top of the cowl, the cost is $900. The company claims

Mission-capable, this Turbo Lance is equipped with a hot prop, two-axis autopilot, weather radar, Loran receiver, engine-temperature monitor, fuel totalizer and standby electrical system.

the modification decreases cylinder head temperatures by 50°F during normal cruise. Lock Haven Airmotive plans to offer the modification in kit form, also.

Norton Company of Akron, Ohio, (216/296-9948) offers a radome kit for all Lance models. The $2,130 kit includes a wing-mountable radome and housing for Sperry weather radar units.

Fuel management systems are available from two companies: Silver Instruments of Hayward, California, (415/676-5900) and Symbolic Displays of Irvine, California, (714/546-0601).

Silver Instruments offers Fuel-Guard and Fuel-Tron systems for the original Lance. For $795, the Fuel-Guard unit provides a digital display of fuel flow and total fuel used. For $1,330, the Fuel-Tron unit provides additional displays of fuel remaining and flight time remaining at the current power setting. It also provides a visual warning when only 48 minutes worth of fuel remains in the tanks. The customer has the option of displays in either gallons per hour or pounds per hour.

Symbolic Displays's CF-1000 fuel management system can be installed in the normally aspirated Lance or Lance II. The $1,748 unit displays fuel flow, fuel remaining, fuel used and time remaining. The customer has the choice of either a circular or a rectangular display.

—Anne W. Studabaker

and endurance is about 5.7 hours with reserves.

Takeoff performance differs substantially, however. Under standard conditions, the Lance uses about 1,380 feet of runway for a normal (zero-flap) takeoff. The T-tail Lance II, on the other hand, requires about 1,650 feet of runway; and the operating manual cautions that if the airplane is loaded to a CG forward of 85 inches (96 inches is the limit), the ground roll will increase by 25 percent.

Most pilots consider a short-field takeoff as standard operating procedure when flying a T-tail. This involves using 25 degrees of flap and overriding the autogear system so that the pilot can retract the gear manually after lift-off. Under standard conditions and with a lightly loaded airplane, the short-field procedure reduces the ground roll by about 200 feet. However, the cautionary note still applies. If the takeoff weight is above about 3,000 pounds or if the CG otherwise is forward of 85 inches, the pilot can expect to use more than 1,800 feet of the runway during takeoff. A temperature of 15°C above standard raises the sea level ground roll by more than 700 feet.

Recommended rotation speeds of the Lance and Lance II vary between six and 10 knots, and the latter has a tendency to pitch up abruptly once its stabilator has attained enough effectiveness to unstick the nosewheel. Nevertheless, one pilot who has flown both models extensively observed, "The T-tail is different and takes some getting used to. That's all. . .no big deal."

The T-tail does have some advantages. Pitch changes with changes in gear and flap configuration are much less pronounced. It also adds a bit of flair to the Lance's stationwagon-with-wings appearance.

The Turbo Lance II is powered by a 300-hp Lycoming TIO-540 engine, which has a recommended TBO of 1,800 hours, and a two-blade Hartzell prop. The airplane is distinguished from its stablemates by its long nose and elliptical, "Big Maw" airscoop. Unlike the normally aspirated models, the Turbo Lance has cowl flaps and a single exhaust stack, rather than three. The wastegate of the AiResearch turbosupercharger and the butterfly valve in the fuel injection system are interconnected mechanically to the throttle control. The pilot must advance the *continued*

throttle periodically during climb to maintain a constant power setting.

At maximum operating altitude, 20,000 feet, the Turbo Lance II cruises at about 175 knots at 75-percent power while burning approximately 16.5 gph. At 65-percent power, cruise speed is about 158 knots, and fuel burn is approximately 14 gph.

Piper built about 1,884 Lances before discontinuing the series in 1980. The Lances as well as the Six were replaced with the Saratogas, which have conventionally mounted stabilators and tapered wings.

The Lances have been the subjects of several major airworthiness directives. They are: 76-11-09, which requires rerouting the fuel lines to prevent them from chafing on the main-gear wheel wells; 76-15-08, modification of nosegear trunnions to prevent gear collapse; 76-18-04, replacement of leaking fuel selector valves; 76-16-08, replacement

LANCE

The T-tail did not ruin a good airplane. It is different, that's all.

of both engine oil coolers to prevent engine failure from oil starvation; 78-22-07, replacement of control-column stop sleeves to ensure adequate control travel; 79-13-04, replacement of leaking copper fuel-flow indicator tubes with stainless steel units; 79-26-04, modification of rudder to prevent skin cracks; 80-14-01, replacement of leaking fuel tank vents; 80-14-02, replacement of throttle linkages to prevent separation; 80-20-05, replacement of cracked turbosupercharger exhaust couplings; and 81-24-07, which required modification of the aircraft's landing gear down locks.

Recent service difficulty reports indicate problems arising from broken alternator support brackets, corrosion on rudder torque tubes, frayed and broken stabilator trim cables, broken nose-gear down locks, cracked brake disks, cracks in rudder skins (after AD 79-26-04 was complied with) and corrosion of engine mount tubes, engine cowls and exhaust shrouds that developed after paint was blistered by turbocharger heat.

Updraft cooling provided by the cowl flaps on the Turbo Lance II does not appear to be adequate. The owner of the Turbo Lance in the accompanying photographs has had his cowl flaps replaced with cooling louvers. (For information on this modification, see "Honing the Lance," p. 46.) It is interesting to note that cowl flaps were replaced with cooling louvers on the bottom and top of the engine cowls on the turbosupercharged Saratoga models.

The owner, William G. Schaffer of Washington, D.C., AOPA 239993, said the new cooling louvers allow him to lean the airplane's fuel/air mixture to peak during cruise and save about two gallons of fuel per hour. Previously, if leaned to peak, the engine would run too hot. Schaffer, who flies his airplane, N3001A, extensively for business, also has had his Lance equipped with an RCA weather radar system, a Morrow Loran C receiver, an electrothermal propeller deicing system and a Hoskins fuel totalizer.

N75196, the other Lance in the accompanying photos, was purchased new in 1976 by Robert A. Woodbury of Nokesville, Virginia, AOPA 619264, and now is co-owned by Merle L. Parde, AOPA 573648, of Arlington, Virginia. Although he describes his first experience with the airplane as "distasteful" (a rather expensive AD had not been complied with by the factory before delivery), he has since found the Lance to be relatively trouble-free and a pleasure to fly. Woodbury, a fastidious pilot who demands that everything be working and working properly, estimates that annual inspections of his airplane have cost an average of about $1,000. In addition, he sets aside about $800 each year for maintenance.

Woodbury also owns a Piper Clipper and a Cessna 310. He flies the Clipper for fun and the 310 to stay sharp on multi-engine procedures. The Lance is the workhorse. He flies it occasionally for business and often on long trips with family and friends. Woodbury said his airplane's cruise performance and fuel consumption are much better than the specifications published by Piper. This could be attributed to the careful maintenance and operation that his Lance enjoys.

Despite the utility and generally good flying manners of the Lance, the lingering reputation of the T-tail will serve to keep resale values down. This is all the better for pilots looking for an airplane with the load capabilities and comfort of a twin, and with the economies of a single. □

Model	**Lance**	**Lance II**	**Turbo Lance II**
Base price	$48,300 to $54,640	$58,990 to $64,060	$67,000 to $72,760
Current market value	$30,000 to $48,000	$34,000 to $58,000	$38,000 to $60,000
	Specifications		
Powerplant	Avco Lycoming IO-540-K1G5D 300 hp @ 2,700 rpm	Avco Lycoming IO-540-K1G5D 300 hp @ 2,700 rpm	Avco Lycoming TIO-540-S1AD 300 hp @ 2,700 rpm
Recommended TBO	2,000 hr	2,000 hr	1,800 hr
Propeller	Hartzell, 2-blade, constant speed, 80 in	Hartzell, 2-blade, constant speed, 80 in	Hartzell, 2-blade, constant speed, 80 in
Length	27 ft 8.2 in	28 ft 4.2 in	28 ft 10.8 in
Height	9 ft	9 ft 6.4 in	9 ft 6.4 in
Wingspan	32 ft 9.8 in	32 ft 9.8 in	32 ft 9.8 in
Wing area	174.5 sq ft	174.5 sq ft	174.5 sq ft
Wing loading	20.6 lb/sq ft	20.6 lb/sq ft	20.6 lb/sq ft
Power loading	12 lb/hp	12 lb/hp	12 lb/hp
Seats	6 or 7	6	6
Cabin length	10 ft 5 in	10 ft 5 in	10 ft 5 in
Cabin height	4 ft 1 in	4 ft 1 in	4 ft 1 in
Cabin width	4 ft 1 in	4 ft 1 in	4 ft 1 in
Empty weight std	1,980 lb	2,003 lb	2,071 lb
Max takeoff weight	3,600 lb	3,600 lb	3,600 lb
Max useful load	1,620 lb	1,597 lb	1,529 lb
Max payload w/full fuel	1,074 lb	1,051 lb	942 lb
Max landing weight	3,600 lb	3,600 lb	3,600 lb
Fuel capacity (usable)	588 lb/98 gal (564 lb/94 gal)	588 lb/98 gal (564 lb/94 gal)	588 lb/98 gal (564 lb/94 gal)
Oil capacity	12 qt	12 qt	12 qt
Baggage capacity	200 lb/27 cu ft	200 lb/27 cu ft	200 lb/27 cu ft
	Performance		
Takeoff distance, ground roll	960 ft	960 ft	960 ft
Takeoff distance over 50-ft obst	1,660 ft	1,690 ft	1,660 ft
Rate of climb, sea level	1,000 fpm	1,000 fpm	1,000 fpm
Power/altitude	75%/5,000 ft	75%/5,000 ft	75%/10,000 ft
Cruise speed	153 kt	154 kt	162 kt
Range w/45-min rsv	780 nm	780 nm	800 nm
Fuel consumption	108 pph/18 gph	108 pph/18 gph	111 pph/18.5 gph
Power/altitude	65%/10,000 ft	65%/10,000 ft	65%/15,000 ft
Cruise speed	147 kt	147 kt	158 kt
Range w/45-min rsv	825 nm	825 nm	850 nm
Fuel consumption	96 pph/16 gph	96 pph/16 gph	105 pph/17.5 gph
Power/altitude	55%/13,000 ft	55%/13,000 ft	55%/20,000 ft
Cruise speed	138 kt	138 kt	150 kt
Range w/45-min rsv	860 nm	860 nm	940 nm
Fuel consumption	84 pph/14 gph	84 pph/14 gph	90 pph/15 gph
Max operating altitude	—	—	20,000 ft
Service ceiling	14,600 ft	14,600 ft	—
Landing distance, ground roll	880 ft	880 ft	880 ft
Landing distance over 50-ft obst	1,708 ft	1,710 ft	1,710 ft
	Limiting and Recommended Airspeeds		
Vx (Best angle of climb)	87 KIAS	87 KIAS	82 KIAS
Vy (Best rate of climb)	92 KIAS	92 KIAS	92 KIAS
Va (Design maneuvering)	132 KIAS	132 KIAS	132 KIAS
Vfe (Max flap extended)	106 KIAS	109 KIAS	109 KIAS
Vle (Max gear extended)	129 KIAS	129 KIAS	129 KIAS
Vlo (Max gear operating) Extend	129 KIAS	129 KIAS	129 KIAS
Retract	106 KIAS	106 KIAS	106 KIAS
Vno (Max structural cruising)	152 KIAS	150 KIAS	150 KIAS
Vne (Never exceed)	191 KIAS	191 KIAS	191 KIAS
Vs1 (Stall clean)	57 KIAS	53 KIAS	53 KIAS
Vso (Stall in landing configuration)	52 KIAS	52 KIAS	52 KIAS

All specifications are based on manufacturer's calculations. All performance figures are based on standard day, standard atmosphere, at sea level and gross weight, unless otherwise noted. —, not applicable.