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Turbo Dakota: The Bottom Line For Upper Altitudes

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TURBO DAKOTA

CROSS COUNTRY

Ocean to ocean in a high-flying Piper that carries a low price.

by William Langewiesche

photography by Berl Brechner

HAVING LEFT behind the busy Los Angeles skies, I thanked center for traffic advisories, turned off the radios and dropped down to 4,500 feet, heading up California's mountainous coast. I was flying Piper's new Turbo Dakota from San Diego to San Francisco late one afternoon on the first leg of a trip that would lead across the continent. No one could have demanded a more agreeable first flight: the headwinds were light, the air smooth, and the airplane flew graciously. Cutting inland to avoid Vandenberg Air Force Base, I overflew the tiny Lompoc Valley, where farmers grow flowers for their seeds. Passing by San Luis Obispo, I came to the shoreline again, close over the eerie isolation of Big Sur, where ocean swells move landward in rhythmed furrows.

The Turbo Dakota's cockpit was relatively quiet at 70-percent power, and the visibility from the pilot's seat was all I could ask for. With a fuel flow of 12 gallons an hour, the 200-horsepower Continental was pulling only 130 knots from the airframe, and I knew the low altitude was wasting the airplane's turbocharged capabilities. By going higher and reducing the drag through thinner air, I could have found more speed and better mileage. But for once, I abandoned efficiency to watch the evening fog move inland and muffle the forests of coastal redwood. And less than an hour after sunset, I turned on final over the glittering lights of the San Francisco Bay area.

The Turbo Dakota is, quite simply, a fixed-gear version of the Turbo Arrow. Piper introduced the Turbo Dakota last spring, not to fill some obvious gap in its product line, but rather to offer its customers a variation on the normally aspirated Dakota. At lower altitudes, the straight Dakota outperforms it, but with the ability to pull 75-percent power at its 20,000-foot maximum operating altitude, the Turbo Dakota outshines its older brother in high-altitude cruise ability. Fuel consumption was one reason Piper engineers put a 200-hp engine in front of the Turbo Dakota. They had originally contemplated turbocharging the straight Dakota's 235-hp engine, but they decided that, in this case, it was not brute power that would make the airplane a success, but its ability to go high. The ability to cruise where the air is thin can make more sense for a fixed-gear airplane than for an aerodynamically clean retractable: with the gear hanging down, creating a sizeable drag, it is relatively important for the airplane to fly at high altitudes, where air resistance is minimized.

I departed San Francisco, en route to Blythe, south on the Arizona border. Climbing through 3,000 feet of local stratus, I broke into the midmorning sunshine and, maintaining 75-percent power and 110 knots for the cruise-climb, the airplane indicated 700 feet per minute through 10,000 feet. Oxygen mask strapped on, I leveled off at 17,000 feet, angling southeast across the state, with the Tehachapi Mountains far ahead on a hazy horizon. I flew at a leisurely 65-percent power and found true airspeeds

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An efficient machine for traveling: from Phoenix one afternoon to New York the next.

just under the book values at 140 knots. The winds were moderate, and my groundspeed varied between 160 and 180 knots. Playing a mountain wave north of Palm Springs, I talked to ATC and moved up to 19,000 briefly. At the same power, the true airspeed increased four knots. The airplane was performing well. I landed at Blythe, 465 nautical miles and just under three hours from departure.

The book gives a 65-percent-cruise fuel flow of 10.8 gph at best-economy mixture and 12.7 at best-power setting, 100° rich of peak EGT. I flew leaned to peak and found a fuel flow of 13 gph on an indicator that was out of calibration. In fact, after refueling at Blythe, I found that the average consumption for the trip had been 11.2 gph, which included the fuel burned during takeoff and climb-out. With 72 gallons of usable fuel, the Turbo Dakota provides about six hours of cruise, which at its relatively high true airspeeds translates into a satisfying range for serious, long-distance IFR.

The Turbo Dakota, I discovered, is an efficient machine for traveling: after I picked up a passenger, we left Phoenix in the early afternoon and, after a good night's rest in Kansas, arrived in New York late the following afternoon. The airplane proved comfortable throughout the long hauls, and it handled the bumps and bad weather with easy confidence.

During the trip, we cruised most often at 11,000 or 13,000 feet, since we could get by without much bottled oxygen at those altitudes. The airplane, a factory demonstrator, was equipped with a Scott Executive Mark III oxygen tank, mounted cleverly like an armrest between the rear seats. Unfortunately, the bottle was small for our purposes: at 15,000 feet, a single person could expect 4.7 hours from the system, and two people could expect only half of that. As a result, we flew at relatively low altitudes, saving the bottle for infrequent mind-clearing sips and for the possibility that, at some point ahead, we would have to outclimb nasty weather. Although we lost some free

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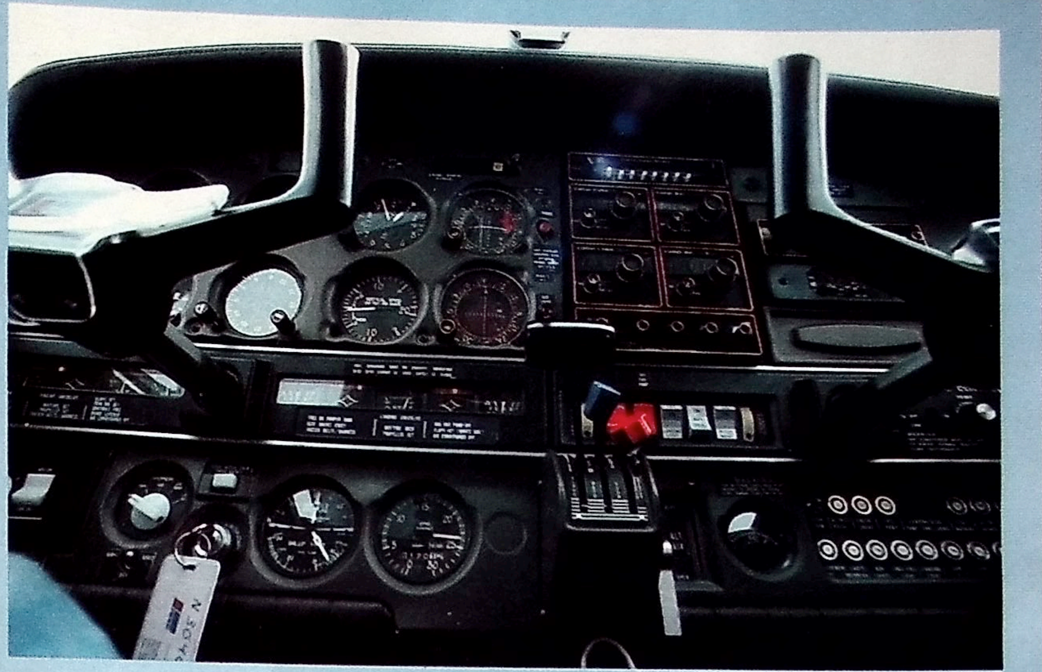

With turbocharging, you get an overboost warning light, electric primer and manifold pressure gauge that counts up to 48; otherwise, the panel's predictably Piper.

airspeed by not moving up 5,000 feet, we gained it back by avoiding the delays of replenishing the tank. I found myself wanting more oxygen, and were the airplane mine, I would certainly strap in another two bottles. It seems a shame to have a four-seat, turbocharged airplane without a four-person oxygen supply to equal the fuel supply.

Even at 11,000 feet, with temperatures above standard, the airplane gave an honest 135 knots at 65-percent power. By increasing the power to 75 percent, we could bring the speed up to 145, but it hardly seemed worth the noise, engine heat and fuel consumption, which went up two gallons an hour. At 13,000 feet, nearer to the airplane's natural home, the moderate power setting turned out a cruise of over 140 knots, and a 75-percent setting gave 150 knots.

Along with efficient, high-altitude cruising, turbocharging also brings the benefits of increased performance at airports with high density altitudes. Some of an airplane's problems at mountain airports stem from the higher true airspeeds needed to fly, but most of its difficulties can be related to the powerplant. For a normally aspirated engine operating out of a high-altitude airport, the air is too thin for it to develop more than a token of its rated horsepower. The Turbo Dakota, however, will develop full rated power (41 inches of manifold pressure) up to a density altitude of 12,000 feet. As a result, loaded to gross, operating out of an airport with a 10,000-foot density altitude, the airplane can depart over a 50-foot obstacle in 2,200 feet. The equivalent distance at sea level is a mere 1,400 feet. The straight Dakota needs 2,950 feet at an 8,000-foot density altitude, although at sea level it demands only 1,300 feet. These numbers naturally assume a paved, level runway and a no-wind condition.

After liftoff, the Turbo Dakota moves up at well over 800 fpm, at the best-rate-of-climb airspeed, with full power. The rate of climb drops below 800 fpm only above 10,000 feet, and at 15,000 feet, the airplane is still capable of 600 fpm. Flying the airplane several hundred pounds below gross, as I did, it was easy to read the VSI at well over 1,000 fpm. But the airplane is not really designed for prolonged, full-power climbs. For proper engine cooling, the manual recommends a cruise-climb at 75-percent power, with an airspeed a good 20 knots above Vy. The result is a consistent 500-fpm climb, right up to the flight levels. Even so, the airplane I flew ran very hot during the climbs, and I usually leveled off with the temperature gauges against the redlines. What is more, I found that even in cruise, the engine ran uncomfortably hot, at times limiting the percentage of power available.

All turbocharged systems present engine-cooling problems, largely because the intake air is compressed, therefore hot. In addition, by maintaining a high horsepower output at altitudes where the air is thin, the question of moving enough cooling air over the engine becomes more critical. Manufacturers have dealt with the problem in a variety of ways—by redesigning the engine cowling, for example, or by adding larger cowl flaps—and always at the cost of aerodynamic efficiency. A large percentage of an airplane's total drag is associated with air cooling the engine, so engineers must always work out a compromise between a design that is aerodynamically clean and one that cools well.

Piper used the same cowling for the Turbo Dakota as it did for the Turbo Arrow, and, convinced that the airflow was adequate for cooling, the engineers decided not to add cowl flaps. To some extent, the tendency of the engine to overheat was predictable: the Turbo Dakota is a good 20 knots slower than the Turbo Arrow, and the ram air cooling through the cowling must be correspondingly less effective. The manual warns that for maximum engine life, the cylinder-head temperatures should not exceed 460°, the redline on the indicator. I had to cut short a climb several times to keep the needle within the limits. Piper also points out that temperatures should be below 400° during high-performance cruise and 350° during economy operations. But in the cruises, the temperature never dropped below 400°, even at the lower power settings. And at high altitude, even with 65-percent power and a mixture slightly richer than peak, the cylinder-head temperatures hovered around 430°.

I later asked Piper about the heat, and it was explained as an exceptional injector problem with the specific airplane I had been flying. To prove this point, I was taken flying in another Turbo Dakota and shown a full-power climb to 7,000 feet and 10 minutes of cruise at 75-percent power. The temperatures were indeed lower: during the climb, the heads went to roughly 440°, where they stabilized. And in the cruise, the temperature dropped to about 400°. Had we gone to higher altitudes where the turbocharger must work harder, no doubt the temperatures would have risen. Still, there was no doubt that this second Turbo Dakota ran considerably cooler than did the first.

Although the Turbo Dakota carries 50 pounds less than the straight Dakota, Piper is marketing its new airplane as a weightlifter. The Turbo Dakota I flew had an equipped empty weight of 1,852 pounds,

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The airplane flown for this report was equipped with full Collins IFR avionics, including dual navcom, ADF and transponder; Narco DME 195, autopilot, encoding altimeter, oxygen, air conditioning and other airframe options normally ordered on this type of aircraft. All performance figures are calculated from the pilot's operating handbook, at gross weight and standard temperature.

Standard price	$41,980
Price as tested	$74,290
Engine	Continental TSIO-360-FB, 200 hp
Prop	two-blade, constant-speed, 76-in. dia.
TBO	1,400 hrs.
Length	25 ft.
Height	7 ft. 7 in.
Wingspan	35 ft. 5 in.
Wing area	170 sq. ft.
Max ramp weight	2,900 lbs.

Max takeoff weight	2,900 lbs.
Standard empty weight	1,563 lbs.
Max useful load	1,337 lbs.
Empty weight as tested	1,852 lbs.
Useful load as tested	1,048 lbs.
Max landing weight	2,900 lbs.
Wing loading	17 lbs. per sq. ft.
Power loading	14.5 lbs. per hp
Max usable fuel	72 gals./432 lbs.
Max rate of climb, sea level	880 fpm
Max rate of climb, 8,000 ft.	820 fpm
Max operating altitude	20,000 ft.
Max speed (15,000 ft.)	162 kts.
Cruise, 65% power at 8,000 ft.	132 kts.
Cruise, 65% power at 18,000 ft.	148 kts.
Fuel flow at 65% power	11 gph
Endurance at 65% power, no reserve	7 hrs.
Stalling speed, clean	67 kts.
Stalling speed, flaps down	59 kts.
Turbulent-air penetration speed	122 kts.

which encompassed just about every option in the book, including a 70-pound air conditioner that I considered a wasteful luxury. The useful load worked out to 1,048 pounds, and with full tanks, the cabin payload was 616 pounds—enough for three 170-pound people and 106 pounds of baggage. Without the air conditioner, the airplane would have been capable of carrying maximum fuel and four 170-pound people.

The airplane's handling characteristics are well established, since they are nearly identical with those of the other four-seat Piper singles with the tapered "Warrior" wing. I found the elevator forces pleasingly light and the control excellent. The ailerons were solid, perhaps a little heavy, which is what a pilot needs in an IFR ship. So little rudder coordination was needed in cruise that I flew with my feet on the floor. During climbs, however, a lot of right rudder was necessary, and Piper has equipped the airplane with a bungee rudder-trim control that is easy to use. The airplane stalls at 66 knots with no flaps and 59 knots with full, 40-degree flaps. The stalls in all standard configurations were docile, and the ailerons remained effective throughout the maneuvers. In most cases, the airplane shudders nose-high in the stall, although I did get it to pitch down on several occasions after particularly sharp entries.

Piper expects that only those customers with routine high-altitude requirements will choose the Turbo Dakota over the normally aspirated version. At the lower altitudes, the straight Dakota is a better performer, and its 2,000-hour TBO is attractive compared to the 1,400-hour mark assigned to the turbocharged Continental. In addition, the straight Dakota lists for $900 less than the Turbo. But for pilots who really need the ability to fly high and climb well out of mountain airports, the Turbo Dakota will seem worth the price. The airplane does, after all, give all the advantages of turbocharging to a relatively low level of aircraft sophistication. And that is refreshing. □

Take a Turbo Arrow, lock the gear down and put back the conventional tail, and you get the new Turbo Dakota.