


TURBO 'TOGA

A new turbo system carries the Piper Saratoga to the flight levels

BY THOMAS B. HAINES



How times change. In the 1970s, turbocharging light airplanes was as popular as bell-bottoms, disco, and leisure suits. Every general aviation manufacturer stuck a blower on just about every model offered. When the big GA market crash hit in the early 1980s, the first to go were the niche airplanes, namely the turbo models. Mooney soldiered on through the late 1980s with the 252 (recently reintroduced as the Encore) and later the Bravo, nee TLS. Piper produced various versions of the Seneca with its twin turbo Continental engines. But aside from that, manufacturers mostly shunned turbochargers. ■ Lately, though, the airframers have revisited the idea of turbocharging, only this time they have taken the time to do it right. The 1970s turbo systems were mostly marketing ploys with cheesy fixed or manual wastegates, begging to be overboosted by all but the most deft-handed pilots. Mooney first got it right with the 252, which included an automatic wastegate controller. Commander

Aircraft followed suit in 1995 with the 114TC. The latest entrant is the Saratoga II TC, The New Piper Aircraft's turbocharged version of the venerable PA-32.

The automatic wastegates on today's models simplify life greatly for the pilot by allowing full-throttle takeoffs without concern for overboosting. The automatic systems also maintain selected manifold pressures in cruise and descent.

In developing the Saratoga II TC, though, Piper didn't just opt for putting a turbo system and automatic wastegate on the existing Saratoga II HP. Instead, the TC variant gets a different model of the Lycoming IO-540, some cowling tweaks, and a host of interior and panel refinements. Introduced in July, the TC is a 1998 model, as are the

standard conditions.

The last time Piper offered a turbocharged variant of the PA-32 was 1987, when it appeared in the form of the Turbo Saratoga SP. Like others of the day, the Turbo Saratoga utilized a fixed wastegate, leaving the detailed power management to the pilot.

Show time

Almost every pilot has at least a little Piper PA-28 time, making for an easy transition to the PA-32, which utilizes many of the same systems. The Saratoga and its PA-32 ancestors are easy airplanes to like because they're so comfortably big inside and forgiving in flight. Piper made giant strides in improving the line in 1993 when it introduced the Saratoga II HP, which included a number of aerodynamic refinements, a new interior, and a complete rework of the instrument panel.

For 1998 the HP and TC get additional interior tweaking in the form of additional cubby holes for storing flight manuals and charts and—most noticeably—the removal of the aft-facing seat behind the copilot. Instead of six seats, the 1998 airplanes come standard with five seats and an executive console.

The woodgrain console, which debuted on the Seneca V, includes a sliding desktop, drink holders and cooler, storage drawers and trays, and power outlets for a notebook computer. Buyers can opt to equip the console with an AM/FM/CD stereo tied into the PS Engineering audio panel/intercom system. The stereo system adds \$1,095 to the TC's base price of \$398,200. The HP's base price is \$378,900. Another option pairs the stereo system with a videocassette player and a swiveling color LCD screen (no word on whether the electrical system will handle a popcorn popper). That package adds \$6,380 to the price. A flight phone garners \$9,100. If you need the sixth seat, Piper offers a \$1,990 credit for the console.

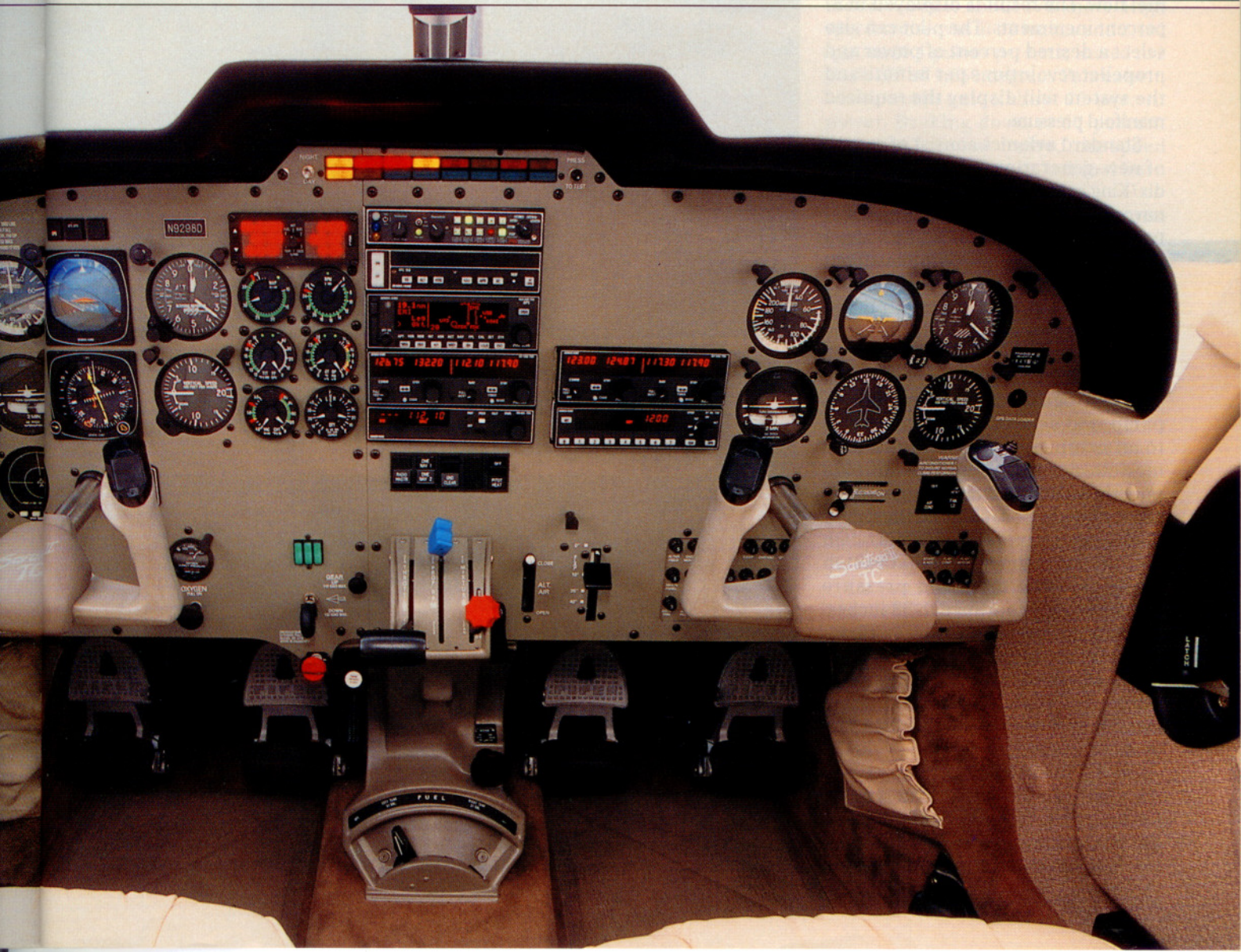
According to Larry Bardon, director

With the turbocharger, the TC can maintain 100-percent power all the way up to 12,000 feet.

normally aspirated HP models currently being produced. The new HPs earn the same interior and panel enhancements as those on the TC.

The TC flies behind the IO-540-AH1A engine. Like the IO-540-K1G5 on the HP, the TC's engine produces 300 horsepower. However, the TC churns out max horsepower at 2,500 rpm, compared to the HP's 2,700 rpm, making for a quieter ride in the TC. With the turbocharger, the TC can maintain 100-percent power all the way up to 12,000 feet, at which point output begins to decrease. As in other normally aspirated airplanes, the HP's power output is reduced any time it is operated from an airport at or above sea level under warmer-than-





of marketing and sales, about 25 to 30 percent of Seneca V customers have opted for the executive console. About 10 to 15 percent want the complete entertainment package as well.

As it did with the Seneca V, Piper brings new technology to the panel by installing sophisticated engine instrumentation from Flight Line, Incorporated. The six round analog gauges include manifold pressure, tach, turbine inlet temperature/fuel flow, oil temperature/pressure, vacuum pressure/cylinder head temperature, and left and right fuel quantities. A panel at the top of the stack depicts any of the parameters in a digital format. The pilot selects the outputs to be displayed digitally by turning a knob. The system also digitally displays information on the electrical system, outside air temperature, and fuel to destination or next waypoint. Most unusual is the ability to display percent of power being used, based on the system's measurement of manifold pressure, rpm, OAT, pressure altitude, and fuel flow. The result is displayed in 5-percent increments. The pilot can also select a desired percent of power and propeller revolutions per minute and the system will display the required manifold pressure.

Standard avionics consist of a stack of new-generation AlliedSignal Bendix/King equipment, including a pair of navcoms, a horizontal situation indicator, a KLN 89B IFR GPS, KT-76C transponder, DME, KFC 150 autopilot/flight director, and the PS Engineering audio panel with marker beacons and six-place stereo intercom.

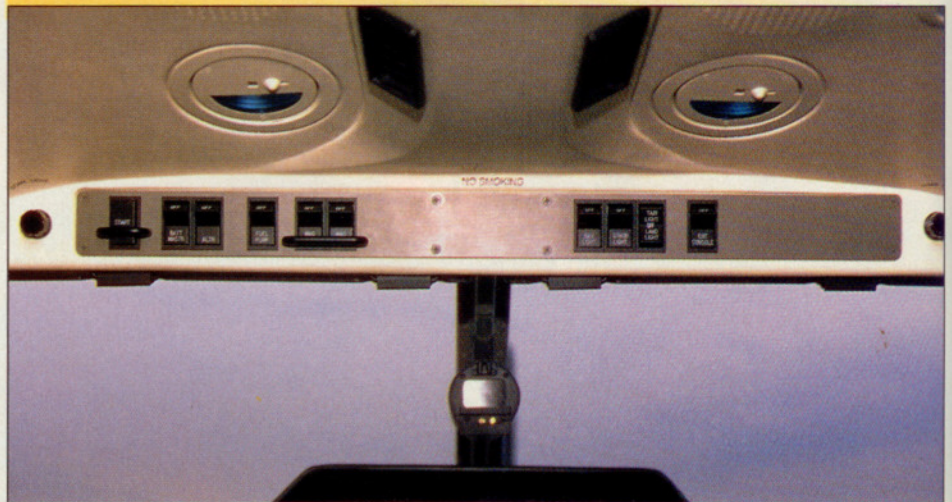
Fly high, fly fast

The Saratoga's starter, magneto, fuel pump, and light switches were moved to an overhead panel with the 1996 models. A push of the Start button puts the new lightweight, high-speed starter into action, slinging the three-blade Hartzell propeller in a hurry. On takeoff, shove the throttle to the stop and watch the manifold pressure gauge smoothly advance to 38 inches. There is no surging over the last couple of inches of throttle movement—just a very linear increase in power. Rotate at about 70 knots and climb smartly away with an initial climb rate of about 1,000 fpm.

All the levers can stay forward for the climb, another workload reliever for the pilot. Throughout a climb to 11,000 feet and later to 13,000 feet, we saw consistent climb rates of near



Saratogas are easy airplanes to like because they're so comfortably big inside and forgiving in flight.





1,000 fpm after a takeoff at about 66 pounds below the max takeoff weight of 3,600 pounds. We backed the throttle off a fraction of an inch so that we could use the optional air conditioning—much appreciated on the 95-degree day. The a/c compressor saps a couple of horsepower, and the radiator door creates a bit of drag. In order to give the pilot all the performance available, a microswitch shuts the system down when full power is commanded. The a/c quickly cools both the cockpit and cabin.

Besides the new engine instrumentation and the turbo installation itself, what's most impressive about the new Saratoga II TC is the performance. The new airplane is more than 10 knots faster than the old Turbo Saratoga. We saw cruise speeds at or better than those published in the pilot's operating handbook.

At a pressure altitude of 10,700 feet, the TC turned in a "high cruise" speed of 182 knots true airspeed; book speed at that altitude is about 178 knots. High speed cruise was at 33 inches and 2,400 rpm on 20.4 gallons per hour, leaned to a peak TIT of 1,650 degrees Fahrenheit, which works out to about 75-percent power. Backing down to 65-percent power or "normal cruise," the speed decreased to 171 knots, but fuel burn sank to 16.9 gph.

Up at 13,000 feet, high-speed cruise worked out to 184 KTAS on 20 gph at 32 inches and 2,500 rpm. According to the book, the same power can be achieved with 33 inches and 2,400 rpm, but the speed decreased a couple of knots to 182 and fuel burn went down to 19.6 gph. Apparently the propeller is a bit more efficient at 2,500 rpm.

The POH calls for 186 KTAS at 15,000 feet, which seems eminently reasonable, although we didn't go that high. With the optional built-in oxygen system, the use of altitudes up to the low flight levels seems quite practical with the Saratoga TC.

On two separate flights, passengers commented that the aft cabin was very quiet and comfortable in flight. Lumbar support in the front seats, a leather interior, reading lights, and an excellent ventilation system are features reflecting that Piper has done a good job of making the Saratoga a supremely comfortable airplane, especially for long flights.

With 102 gallons of usable fuel, the airplane has an endurance of more than five hours at lower power settings. An airplane with virtually every option,



such as N9298D shown here—which includes the fully stocked entertainment center, air conditioning, Insight Strike Finder, copilot instruments, and built-in oxygen—weighs in at 2,594 pounds, leaving just over 1,000 pounds for payload. Top off the tanks with 592 pounds of fuel and you can carry two people and 75 pounds of baggage. Leave some fuel behind and two adults

and two or three kids will be quite comfortable on long trips. The Saratoga provides lots of luggage space with aft and nose baggage compartments.

From the factory

Because of its value, comfort, and versatility—and the fact that Piper has continued to make steady improvements in the model, the Saratoga is predicted to be the company's best seller this year, displacing the Mirage, according to Bardon. Piper will produce 64 Saratogas this year, 26 of them TCs, compared to

54 Mirages. In 1998, Saratoga production will climb to 75, 40 of those to be TCs. This year, Piper plans to deliver 217 airplanes, up from last year's 183 units; production will climb to 224 in 1998.

Bardon reports that most Saratoga buyers use their airplanes for personal and business flying. No wonder. With its unique combination of comfort and performance, the Saratoga II TC is surely one of life's finest personal possessions. □

E-mail the author at thomas.haines@aopa.org

The New Piper PA-32R-301T Saratoga II TC

Base price: \$398,200
Price as tested: \$442,590

Specifications

Powerplant	Lycoming TIO-540-AH1A 300 hp @ 2,500 rpm
Recommended TBO	2,000 hr
Propeller	Hartzell constant-speed, three-blade, 78-in diameter
Length	27 ft 11 in
Height	8 ft 6 in
Wingspan	36 ft 2 in
Wing area	178.3 sq ft
Wing loading	20.2 lb/sq ft
Power loading	12 lb/hp
Seats	5/6
Cabin length	10 ft 4 in
Cabin width	48.75 in
Cabin height	42 in
Empty weight	2,381 lb
Empty weight, as tested	2,594 lb
Max ramp weight	3,615 lb
Max gross weight	3,600 lb
Useful load	1,219 lb
Useful load, as tested	1,006 lb
Payload w/full fuel	627 lb
Payload w/full fuel, as tested	414 lb
Fuel capacity, std	107 gal (102 gal usable) 621 lb (592 lb usable)
Oil capacity	12 qt
Baggage capacity	Forward 100 lbs, 7 cu ft Aft 100 lbs, 17.3 cu ft

Performance

Takeoff distance, ground roll	1,200 ft
Takeoff distance over 50-ft obstacle	1,800 ft
Max demonstrated crosswind component	17 kt
Rate of climb, sea level	1,190 fpm
Max level speed	195 kt
Cruise speed/endurance w/45-min rsv, std fuel (fuel consumption)	
@ high-performance cruise	186 KTAS/3.7 hr
15,000 ft	(133 pph/23 gph)
Max operating altitude	20,000 ft
Landing distance over 50-ft obstacle	1,520 ft
Landing distance, ground roll	640 ft

Limiting and Recommended Airspeeds

V _X (best angle of climb)	85 KIAS
V _Y (best rate of climb)	95 KIAS
V _A (design maneuvering)	134 KIAS
V _{FE} (max flap extended)	110 KIAS
V _{LE} (max gear extended)	132 KIAS
V _{LO} (max gear operating)	
Extend	132 KIAS
Retract	110 KIAS
V _{NO} (max structural cruising)	167 KIAS
V _{NE} (never exceed)	191 KIAS
V _{S1} (stall, clean)	67 KIAS
V _{SO} (stall, in landing configuration)	60 KIAS

For more information, contact The New Piper Aircraft, Inc., 2926 Piper Drive, Vero Beach, Florida 32960; telephone 561/567-4361; fax 561/778-2144. World Wide Web (www.newpiper.com).

All specifications are based on manufacturer's calculations. All performance figures are based on standard day, standard atmosphere, sea level, gross weight conditions unless otherwise noted.

PERFORMANCE

from the ground up



High performance. Maximum comfort.
Innovative technology. Total quality.

That's what has made us the industry leader for more than 20 years.
Our headsets and intercoms deliver superior quality,
unmatched reliability and guaranteed satisfaction—
all backed by Sigtronics' Sound Care.

To hear for yourself, see
your authorized Sigtronics dealer.

Sigtronics,
performance from the ground up.



SIGTRONICS CORPORATION • 949 N. Cataract Avenue #D • San Dimas, California 91773 • (909) 305-9399 • Fax (909) 305-9499

WRITE IN NO. 52 ON READER SERVICE CARD