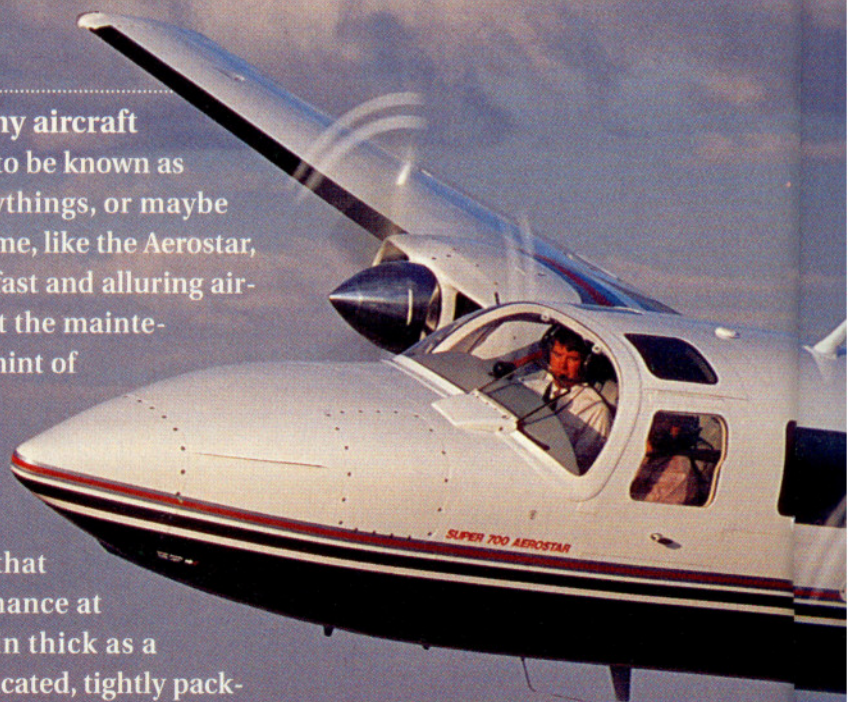


# The Aerostars

It's not by accident that many aircraft gain a reputation. Some come to be known as docile, Sunday afternoon playthings, or maybe heft-hauling utility players. Some, like the Aerostar, gain a clear-cut distinction as fast and alluring airplanes that will eat you alive at the maintenance shop or at the slightest hint of relaxed vigilance on the controls. As with any reputation, there is a certain element of truth to the Aerostar fame—it is a quirky airplane that provides outstanding performance at the expense of a safety margin thick as a Super Cub's wing. It is a complicated, tightly packaged mechanism that will not tolerate lackluster maintenance. ■ Aerostar pilots say that properly managed—both from the maintenance and pilot-proficiency standpoints—Ted Smith's speedster is no more burdensome than any piston twin. At least parts and support are readily available, thanks to the Aerostar Aircraft Corporation, a company that is joined at the hip to the Machen outfit in Spokane, Washington. (The company recently completed a move to Coeur D'alene, Idaho, netting a larger shop and more commodious production facilities.) Aerostar makes just about every wear item on the airplane, with many that have been upgraded from the original specifications. Moreover, the company has all the factory tooling stored and a stockpile of new/old stock spares; in theory,



BY MARC E. COOK

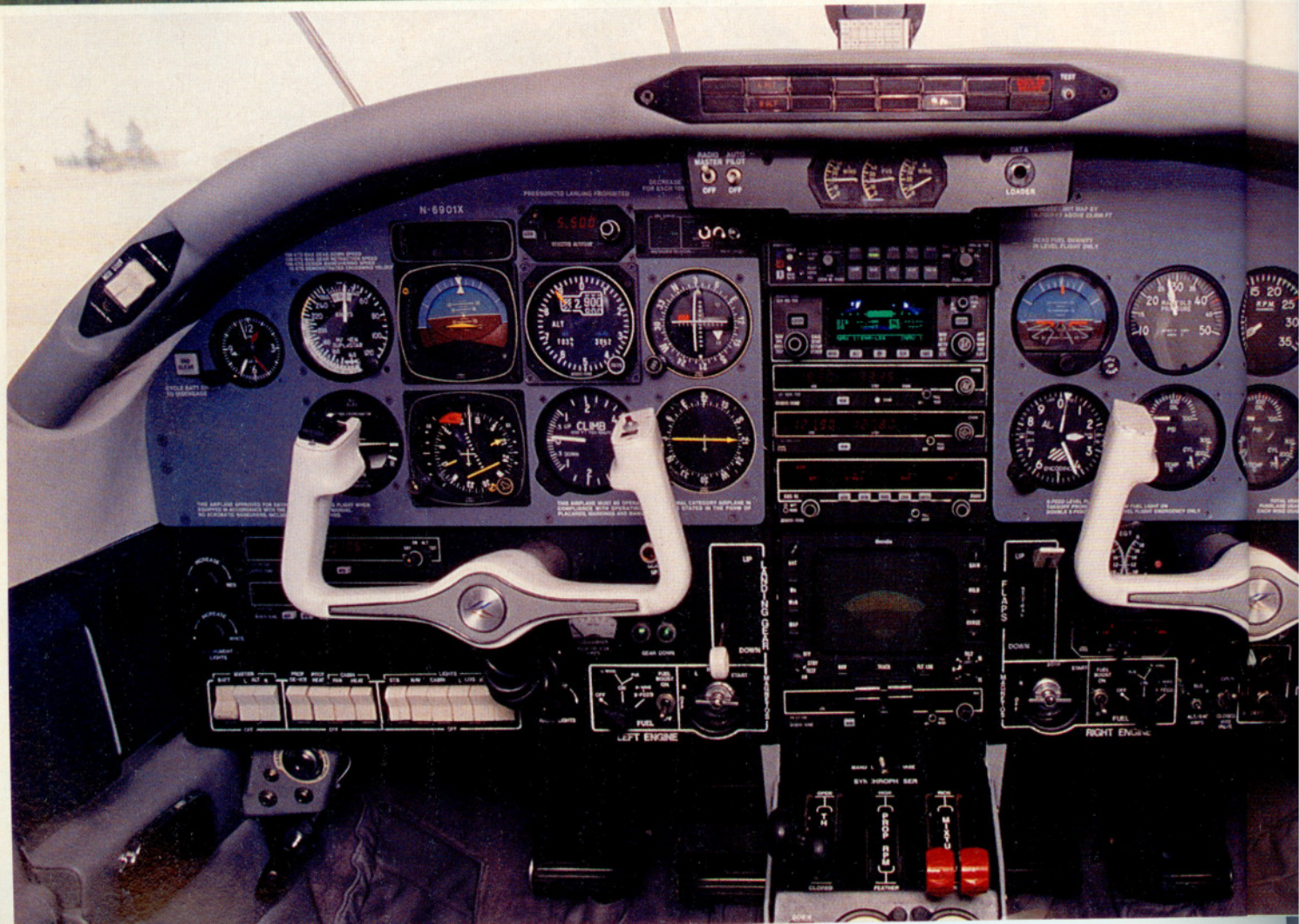
PHOTOGRAPHY BY MIKE FIZER





Smith's sexy twins continue to wow performance-minded pilots









a hard-to-find part could be produced by the company at any time. Cost, naturally, is the controlling issue. And because the company principals were part of Machen, a well-known mod house for Aerostars, many of the aftermarket goodies came in house. Machen continues to sell engine upgrade kits (boosting power by as much as 70 horsepower total) and intercoolers.

General aviation was booming when Ted Smith, formerly of Douglas Aircraft and designer of the Aero Commander twins, started on the Aerostar. But there weren't a lot of all-new designs. Cessna continued to tweak the 310, while the 340 and 414 were still a few years away; Beech evolved the Baron, although the long-body 58 was still on the horizon; and Piper soldiered on with the Aztec. Into this crowd of familiar airplanes burst the Aerostar in 1969. Stemming from a model initially flown with a pair of 180-horsepower Lycomings, the 600 that finally arrived in time for the moonshot wore instead a pair of 290-hp Lycomings. Its sleek lines; unusual mid-

Van Nuys, California, airport through 1970. (The original "skunk works," kept open after the new plant came on line, wasn't even on the airport.) Smith and company built straight 600s and the turbocharged 601s through 1970, at which time American Cement sold the firm.

The design languished—in part because of an early decade slump in aircraft sales—until 1973, when Smith bought back in and restarted production in Santa Maria, California, on both the normally aspirated 600A and the turbo 601A. Smith and his engineers have come under fire for their choice of turbo system on the 601—a pair of Rajay (later Rotomaster and now part of Consolidated Fuel Systems) turbochargers breathing on an otherwise unchanged Lycoming. Known as turbo-normalizing, the process retains the high compression ratio of the nonturbo engine and uses only 30 inches of boost for maximum power. While this setup is generally good for efficiency, it exposes the engine to greater risk from detonation and preignition, thanks to higher

## Capable of better than 210 knots at optimum cruise, the Aerostar blew the doors off similarly powered twins.

fuselage wing; tightly cowled engines; and single, pilot-side access door immediately set it apart from the other twins.

So, too, did the airplane's performance. Capable of better than 210 knots at optimum cruise, the Aerostar blew the doors off similarly powered twins. A fairly tight cabin, combined with excellent attention to aerodynamic detail, helped to make the most of the available thrust. Compared to twins of similar weights, the Aerostar has less wing area, which results in higher approach speeds but a delightfully solid ride in turbulence.

Perhaps it's not surprising that such an iconoclastic airplane as the Aerostar should also have a turbulent corporate history. After getting the airplane certified in 1968, Smith sold controlling interest to American Cement. Production continued in a new facility at the

combustion pressures. Smith also insisted that no cowl flaps would be used, creating another cooling compromise—although in theory a well-developed cooling scheme doesn't need flaps, the reality is that normal wear and tear tends to overcome good design. (Piper's 700P model finally used cowl flaps.) It's important to put historical context in place: At the time, few companies were using turbo systems designed by the engine makers, opting instead for add-on kits for nonturbo models. Against this backdrop, it's easy to understand Smith's motives.

Although the 600 and 601 models sold relatively well for a small company, the Aerostar line really took off with the introduction of the 601P in 1974. Adapting the rectangular-section fuselage to pressurization wasn't easy, but the company managed to bring the pressure differential up to 4.25 psi without creating



*The Aerostar's instrument panel proves roomy enough for basic avionics, but the gadget-obsessed may feel slighted. Triple fuel gauges (above radio stack) came as part of an AD.*





*With solid handling and speed, the Aerostar's in-flight performance fulfills rampside promises.*

any life-limited parts. Both the 601P and the new-for-1977 601B received a 2.5-foot increase in wingspan, which aided high-altitude performance and upped climb rate to the extent that problems with marginal oil cooling were alleviated. In addition, the old electrically actuated manual wastegates were replaced with engine-oil-driven controllers that helped to provide automatic overboost protection.

With pressurization, the 601P could slide along at better than 230 knots at 25,000 feet, with a cabin altitude of 11,000 feet. Again, the Aerostar had a significant performance margin over everything else in the horsepower class. Burning about 40 gph at high cruise, the 601P posted a basic endurance of about four hours without reserves.



In 1978, Ted Smith died and Piper Aircraft soon took over the Aerostar line, moving it to Vero Beach, Florida. Through the late 1970s, Piper continued to tweak the airplane, resulting in the 602P, with a different, more robust turbo system. Piper also pushed through approval for flight into known icing. As

a culmination of field experience and with the aim of further opening the performance margin, Piper introduced the 700P in 1984. With a pair of intercooled, 350-hp Lycomings, the Aerostar's cruise leapt to nearly 260 knots, with additional capacity in the turbo system to easily maintain power and cabin pressure to



25,000 feet. Only 25 of the 700Ps were made.

Through all the evolution, the Aerostar has remained a quirky airplane. Its fuel valves, for example, are electrically operated. (Smith didn't want to run the fuel lines all the way into the cockpit.) Nosewheel steering is accomplished with a small electric motor and a set of switches on the pedestal—some later models have a second set on the glareshield—although the rudder and brakes will keep the airplane straight through most of the takeoff and landing roll. The wing skins are unbelievably thick—0.050 inches, twice the normal wing-skin thickness for airplanes of this weight—making the airplane amazingly solid. You can tell in the ride: Turbulence that tosses other twins merely shakes the Aerostar's wingtips slightly.

If the airplane has a widely acknowledged shortcoming, it's the cabin. Tight for four and baggage—there is no nose locker—the Aerostar is

seriously cramped with all six seats filled. (Many Aerostars can't hold six humans and full fuel anyway because the typical full-fuel payload is around 1,000 pounds.) Most owners remove one of the seats in the middle row to provide extra legroom. Indeed, the rear-most seats are perhaps the best—next to the pilot's, of course—because they

are farthest from the engines and thereby the quietest. With one of the center seats removed, it's almost luxurious back there. Of course, you have to crawl over the pilot's seat to get back there because there's just the one door ahead of the wing, and it's none too large.

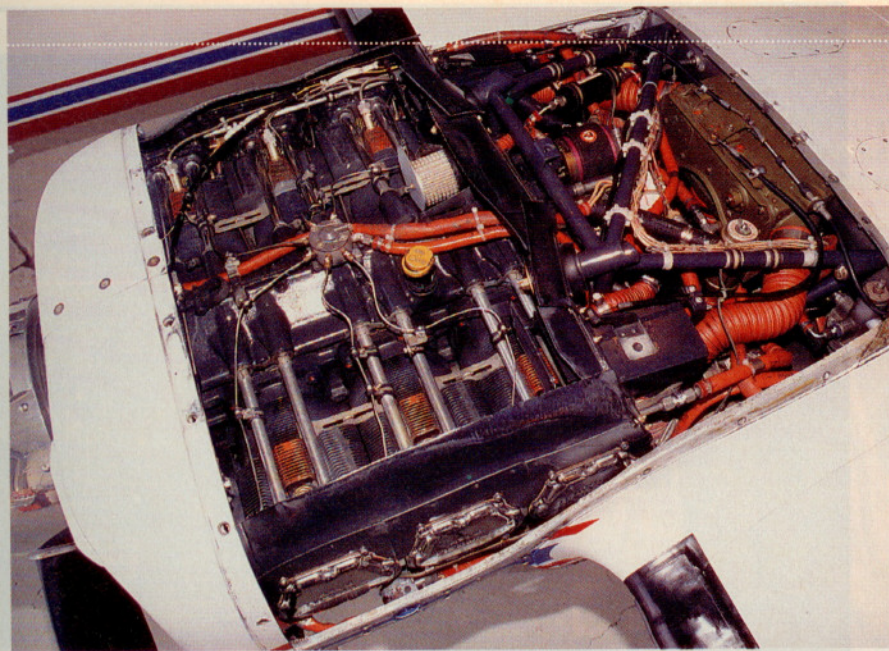
In flying the Aerostar, you must first cast off the hangar talk of its being a



*Mid-fuselage wing and compact nacelles are partly responsible for the Aerostar's performance.*







*Piper-built 700Ps use 350-hp Lycomings and booted, three-blade props. Condition of the engines and accessories is a critical pre-buy focus.*



widow-making hot rod. Yes, it is responsive; the pushrod control system is solid, and the airplane has good stability in all axes when properly trimmed. No surprises there. And, with 700 horsepower in the later models, things tend to happen fast, so you must be spring-loaded to do the right thing when an engine quits during critical phases of flight. Engine-out maneuvers in the Aerostar aren't difficult if you pay attention to airspeed control.

Systems management is the priority in flying the Aerostar. The big Lycomings demand a certain amount of attention, although the later airplanes, with improved turbo systems, are more stable and easier to set precisely. Cabin pressurization is automatic but still benefits from some attention. And you'll need to keep an eye on the fuel system. Compared to that of other airplanes, the Aerostar's fuel system seems totally inscrutable. The original 180-hp airplane had a single fuselage tank, but with the larger engines Aerostar realized that more tankage was necessary. Some of the wing bays were sealed to hold 62 gallons a side; the fuselage tank contains 41.5 gallons. But it's the way the



system works that'll get your attention. Both wing tanks feed into chambers near their outlets, which in turn feed a common chamber with the fuselage tank. Normally, both engines feed from this common chamber. One quirk is that sometimes the wing tanks don't feed evenly—thanks in part to the scant two degrees of wing dihedral—leaving

noticeable imbalance. Some pilots have tried to correct this imbalance with crossfeed—using the fuel from the opposite wing tank alone, bypassing the fuselage tank and its associated common chambers. Unfortunately, it's easy to unport a wing tank that's nearing empty; several engine stoppages have occurred during maneuvers on cross-feed. A 1984 airworthiness directive forced Aerostar owners to revise the gauging system so that the quantity in the fuselage tank can be ascertained.

As with any complicated airplane, a prepurchase inspection is crucial. Jim Christy, vice president of Aerostar Aircraft Corporation, suggests finding a mechanic who knows the airplane well. "There are a lot of little things that are done a certain way in the Aerostar that someone unfamiliar with the airplane would never catch," he says. More to the point, spend the greatest amount of time looking at the engines, and the exhaust system in particular. You can call the Aerostar factory to get a list of service bulletins to check against your candidate airplane; compliance with the latest of these bulletins greatly improves the desirability of any given airframe. "We've seen a bit of, how should I say it, deferred maintenance. The Aerostar is not the kind of airplane that will let you get away with that."

Beyond examining the engines carefully, Christy recommends taking the airplane on a demo flight at 25,000 feet. Here, you're looking for stability of the turbo system and whether it will make rated manifold pressure at altitude. "That's the first giveaway that the exhaust system needs work," says



Christy. Also make note of temperatures and fuel flows, which should correlate to the book figures closely.

The airframe itself has proven rugged, although you should look for signs of abuse and corrosion. (There is a service bulletin regarding corroded aileron pushrods where they pass behind the engines; check for compliance on this issue.) Also understand that the nosewheel is the weak link in the landing gear, so look for signs of past collapses and note any shimmy on the takeoff or landing. Left unchecked,

shimmy will do serious damage to the Aerostar's nosegear.

Given that Aerostar Aircraft owns the rights and tooling to the design, Christy gets asked often if it will ever go back into production. "As a piston twin, no," he says. "But we've been working on designs for a stretched version using two Williams fanjets that we'd sure like to see in production." With 1,200 pounds thrust each, these prototype Williams engines, in between the small FJX/II and FJ44s used on the CitationJet, could power the Aerostar to some 400 knots.



Pressurization controls inhabit the center console. Generally, the layout of the Aerostar cockpit is straightforward and easy to learn.

Christy believes that, with comparatively modest outside funding, the project could result in an economical twinjet; predicted list price is \$1.7 million.

For considerably less, you could have a used piston version now. Prices start at about \$75,000 for the nonturbo 600 and go over the \$200,000 mark for the later 601Ps. There's a big jump with the last 602Ps and the big-engined 700P; the latter tops \$350,000 in average condition. Budget well for routine maintenance, too. Depending upon model, the Lycoming engine on your Aerostar will cost between \$18,000 and \$30,000 to overhaul. Nonturbo airplanes have a 2,000-hour TBO, and turbo models carry an 1,800-hour TBO. It's likely that a pressurized model will need a top overhaul midway to TBO.

Spend much time with Aerostar owners and their airplanes and the background to the reputation starts to unfold. A lot of pilots like the macho image and are loathe to dispute it. Still others, initially wooed by the supposedly wicked side of the airplane, have come to appreciate it for what it is: an unusual airplane that demands a bit of respect but mostly nothing more than a casual knowledge of its workings and a willingness to keep the maintenance up to par. So much for reputations. □

For more information, call Aerostar Aircraft Corporation at 800/442-4242 or visit the Web site ([www.aerostaraircraft.com](http://www.aerostaraircraft.com)). E-mail the author at [marc.cook@aopa.org](mailto:marc.cook@aopa.org)

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