pilot flight check: TED SMITH's AEROSTAR 601

75385

This high-performance, turbocharged airplane is designed for the businessman who wants to get there efficiently, comfortably, and fast

by DON DOWNIE / AOPA 188441

We were level at 25,000 feet approaching Blythe, Calif. The airspeed evened out at 200 mph indicated. Enter an outside air temp of -25° C and that computes to 305 mph true. Power settings were full-to-the-firewall, with turbochargers holding 28 inches of manifold pressure, or 80% power. With this top-of-the-green power setting, our fuel consumption was approaching 33



Aerostars on the ramp at Palomar (Calif.) Airport. Photos by Don Downie.

AEROSTAR continued

gph, but the Aerostar will true out well over 300 mph.

At a comfortable 65% power (22 inches mp and 2,400 rpm), we were still trueing at a very respectable 275 mph. No wonder Los Angeles Center called back "Jetstar N7538S" rather than "Aerostar 38 Sierra."

Ted Smith's brainchild first flew at Van Nuys, Calif., back in November 1966, and was later sold to American Cement, then resold to Butler Aviation. For a short time after that, the Aerostar was an orphan, but Ted Smith bought it back.

Today the airplane, pampered and improved, is alive and well and being manufactured in Santa Maria, Calif. The present six to eight units produced per month go to a well-established dealer organization of six companies with one overseas subsidiary. Present plans call for production of one Aerostar a day by the end of 1975.

At 25,000 feet over the lower Colorado River, my check pilot, Jack Francis—of North County Aviation at Palomar (Calif.) Airport—and I sat faceless behind two Scott constant-flow oxygen masks. The cabin was comfortable and surprisingly quiet as we gobbled up more than 41/2 miles per minute at flight level 250, normally the exclusive domain of the jet set.

Outside, the chrome prop spinners carried a thin crusting of ice left over from a climbout through broken cumulus buildups. At the moment, we were topping all the weather, but our 34minute climb from sea level had penetrated some rather lumpy buildups. The Aerostar 601, turbocharged version of the standard Model 600, handled the turbulence particularly well and had no tendency to dutch roll. Stability augmentation is certainly no requirement for this fast bird.

Prior to takeoff, I had had an extensive preflight briefing at the plush new quarters of North County Aviation, West Coast dealer for the Aerostar. The Palomar tower was calling for Special VFR because of a fog bank hanging off the west end of Runway 24.

On a first flight, I had been cautious in power application for the two IO-540, 290-hp Lycomings. With all power levers forward, we rotated well past VMc as the airspeed passed through the 90 mph mark. The Aerostar has a unique little "rocking chair" movement as weight transfers from the main gear slightly aft to the center of lift. Probably I'd never have noticed this if Jack Francis hadn't told me in advance; it's a subtlety that has no application to operating the aircraft.

After breaking ground with climbout established, I pulled up on the prominent gear handle mounted on the panel directly in front of the pilot. Complete retraction takes only four seconds with the 1,300-psi, engine-driven hydraulic system.

I started a climbing right turn to comply with our Special VFR clearance for a north downwind departure. Since our speed was rapidly increasing past the 130-mph mark, even with 20° takeoff flaps, our turning radius extended and we were promptly on instruments at 300 feet.

This wasn't really part of our game plan for a pilot on his first flight in a strange-to-him airplane. I pointed at the IFR panel in front of me and said "Monitor!" without turning my head. We completed the climbing 180° turn and soon popped out into the sunshine to start our climb to 25,000 feet.

We crossed over the Palomar Observatory as the Aerostar held a steady 1,700fpm rate of climb. As soon as the conventional throttles hit the stops (at about 2,000 feet), we began to hold our 29 inches mp and 2,500 rpm by "toggling in" the two pairs of Rajay turbochargers.

A simple electric toggle switch actu-

Specifications	
Engines	2 Lycoming 10-540 series, 290 hp @
Seats Length Height Usable cabin length Cabin width Cabin height Wingspan Wing loading @ gross Power loading @ gross Gross weight Empty weight Useful load Fuel capacity (usable)	2,575 rpm, turbocharged 6 34 ft 10 in 12 ft 1.5 in 12 ft 6 in 3 ft 10 in 4 ft 0 in 34 ft 2.5 in 170 sq ft 33.5 lb/sq ft 9.8 lb/hp 5,700 lb 3,730 lb 1,970 lb 174.5 gal
Oil capacity Basic IER price	6 gal ·
Performance	\$140,000
Cruise speeds Max power, 25,000 ft 75% power, 25,000 ft 65% power, 25,000 ft	312 mph 294 mph 275 mph
Range 70% power, 20,000 ft, 30-min reserve	1,410 mi
Fuel consumption 70% power, 20,000 ft 65% power, 20,000 ft	29 gph 27 gph
Rate of climb, sea level 2 engines, gross wgt 1 engine, gross wgt	1,800 fpm 400 fpm
Service ceiling 2 engines, gross wgt (100 fpm) 1 engine, gross wgt (50 fpm)	30,000 + ft 14,000 + ft
Stall speed, gear and flaps down	79 mph
Takeoff distance Ground run Over 50-ft obstacle	1,095 ft 1,520 ft
Landing distance Ground run Over 50-ft obstacle	932 ft 1,800 ft

AEROSTAR 601

The Aerostar's fully IFR panel has a King Silver Crown TSO'd avionics package as standard equipment.



ates the waste gate on each pair of turbochargers, and you merely flick at them every thousand feet or so to keep the manifold pressure up. The two turbochargers on each engine are interconnected so that only 30% of boost is lost if one of the two turbos malfunctions. Single-engine ceiling with turbos is above 14,000 feet.

As a personal preference, I'd prefer a throttle override, or even a separate set of throttles, to control the turbochargers at altitude. However, I'm sure that the electric-toggle-switch control system would feel completely comfortable after a few high flights.

In the event of a complete electrical failure and depletion of the batteries mounted in the tail of the Aerostar, the turbo waste gates maintain position and can be controlled easily by conventional throttle usage. An automatic "pop off" valve prohibits accidental overboosting if the manifold pressure exceeds 291/2 inches.

I had ample time during climbout to explore the fine control touch of the 601. All controls are torque-tube and bell-crank for a silky-smooth touch and elimination of any tendency to flutter. Later I talked with a former airline captain and Aerostar owner who must remain nameless, since he detailed just how smoothly the 600 series rolls around a point. And why not? The ship is stressed for +4 and -1.6 at a full gross weight of 5,700 pounds.

The nosewheel is completely separated from the rudders to maintain a light control touch. On the ground, nosewheel steering is handled by an electric toggle switch that actuates a two-way hydraulic cylinder for left or right turns. Since this horizontal toggle switch is similar in size and movement to the rudder trim actuator, I found it fairly easy to try to line up with the runway on my first takeoff with my right hand on the rudder trim. It doesn't work very well.

Later, Ted Smith told me that a conventional airline-type nose-steering wheel, mounted to the left of the pilot, was under consideration.

With full fuel, 175 gallons, and two of us aboard, our takeoff weight had been more than 300 pounds below gross weight. Originally the Aerostar had been designed to carry its complete fuel load in a fuselage tank just aft of the cabin. Now wet wings outboard of the engine nacelles carry 661/2 gallons each, so there's ample space to add more fuel at any time the Aerostar team, or some energetic STC engineering group, wants to go for turboprops or a fan-jet engine.

Ted Smith advised us that an airframe is now waiting for French Turbomeca engines of 1,500/2,300 pounds' thrust, with production planned within a year. Smith says there will be 100% commonality of parts for the fan-jet version. As it is now, all three Aerostars (basic Model 600, turbocharged Model 601, and pressurized Model 601P) are completely interchangeable.

Heavy gauge .050 skins eliminate much complex internal structure. The high-speed wing is rigid and designed without flex. Engine thrust lines are parallel with the line of flight and not canted. Ailerons are interchangeable, and the entire structure is corrosionproofed before assembly. A Hartzell synchrophaser not only fine-tunes propeller rpm but also assures that each No. 1 blade is at the identical angle with its counterpart to avoid any annoying propeller beat.

The latest achievement of the Aerostar team is the pressurized 601P. Owner of the first 601P is race driver Bobby Allison, and it's the third Aerostar for this fast man on the ground.

At this writing, the "stock" 600 without turbos retails for \$124,000 with a complete King avionics package and full IFR equipment. Addition of turbos ups the retail cost to \$146,000, while the pressurized model costs \$186,000.

Most nonturbocharged models are sold in the East, where mountains really don't come too high. On the West Coast, however, North County Aviation has handled more than 15 Aerostar sales in the past months, and all but one has been turbocharged. It is expected that 20% of the Aerostar production will be the basic Model 600, while another 20% will be turbocharged and 60% will be pressurized.

While the Aerostar comes out of the factory as a complete flyaway package, North County Aviation automatically orders a Bendix FCS810 autopilot, prop sync, and hydraulic pump for the right engine.

When we leveled off at 25,000 feet, we were still climbing at 700 fpm. Actual service ceiling is 30,000 feet at 100 fpm, but many pilots prefer a 25,000foot ceiling with a constant-flow oxygen system.

I climbed back to the second row of seats to preserve. the instrument panel on film and found the 7-inch aisle amply wide even for a 6-foot-2-inch frame. The big picture passenger windows give a fine panorama of the sky beyond.

After checking speeds at various power settings at 25,000 feet, we headed west for Big Bear and started a letdown toward the 6,750-foot-high airport. It takes considerable doing to get this smooth airplane down from altitude while keeping the engines warm, unless you want to drop the gear and come down "dirty."

With our fuel aboard, we had more than a 1,400-mile range at 65% power. If you want a 30-minute reserve, you can cut back to 60% (20 inches mp and 2,300 rpm) at 15,000 feet and still true out at 255 mph.

Slow flight, stalls, and single-engine work with the 601 are completely comfortable. There's no need for an audio stall warner or a military stick shaker.

The Aerostar behaves like any other well-brought-up airplane and gives an ample shudder before her wing stalls. With gear and flaps down, stalling speed is just under 80 mph, power off.



North County Aviation check pilot Jack Francis demonstrates easy access to the Aerostar's 290-hp Lycomings.

Since the wing loading is fairly high, 33½ pounds per square foot, the stall is brisk, but can be controlled easily, even through a series of wheel-back oscillations. Add power and release a little back pressure and you're right back to flying again. You can fly out of a full stall without loss of altitude by application of 20 inches of manifold pressure.

I asked my check pilot if he would cut an engine when I wasn't looking, to find out how long it would take me to figure out what was going on. In normal cruise at 12,500 feet, he snapped back the mixture on the left engine. There was a noticeable tuck of the nose to the left, but mild application of right rudder kept everything in line as we doublechecked where the power loss was and feathered the propeller.

Jack Francis explained that the docile single-engine handling of the Aerostar can lull new pilots into an unexpected situation. He explained that he had inadvertently flooded an engine during a high-speed descent at low altitude, and neither he nor his sales prospect realized they had an engine out until the level-out numbers began to fall out of line. Neither rpm nor manifold pressure, fuel flow nor oil pressure with a windmilling propeller gave any hint that an engine was out as the speed dropped. The skid ball was displaced only a portion of its width, and Francis used the unorthodox procedure of checking his EGT to find out which engine was cold.

"Once you point out this possibility to a new Aerostar pilot, he'll never get into a problem, and once he understands that nothing violent occurs when an engine is cut, he'll be even happier about the airplane," says Francis. We slipped down through predictably turbulent air on the lee side of Mt. San Gorgonio near Palm Springs. The 601 continued to be a pleasant surprise because of its smooth ride in rough air. A call to Big Bear Unicom revealed that Runway 7 was in use, so we slowed to 180 mph, the very healthy gear-down speed.

The Fowler flaps, which add 12% to the wing area when they're fully extended, can come into play at 150 mph. The gear has no manual up-locks and will fall free to a down-and-locked position at speeds below 150. The nose gear retracts forward so that air loads above 150 mph will keep the wheels in the wells. Wheel cover doors, similar to those on the P-51, keep mud and snow out of the wheel wells on the ground. There are no cowl flaps.

There is a very slight nose-down pitch as the flaps come out. Francis suggested 120 mph down final approach, with 30° flaps. "Once you have the runway made, add full flaps and start back slowly on the power," he advised.

There is no friction lock on the Aerostar throttle quadrant, and all power controls work just a little stiffly, as they should. The quadrant is strictly conventional, with large throttle handles at the left, medium-height prop controls in the center, and very short mixture controls at the right. It would be extremely difficult for a distracted pilot to grab the mixtures rather than the props on his first power reduction, both because of the length of the handles and the amount of muscle required to pull the mixtures back to idle cutoff.

We were a little hot and high on final into Big Bear and used a combination of aft wheel pressure and trim to





Swept tail is a distinguishing feature of Ted Smith's turbocharged twin.

flare. Previously, Francis had commented, "You can't bounce an Aerostar because of the 4-inch landing gear struts." As we dropped onto the Big Bear runway in a safe but sloppy landing, he reminded me that the 601 had not bounced.

Even with brisk application of back wheel, the nose gear tends to come down quickly with no passengers or baggage aboard. With an aft CG, it would be an easy matter to hold the nose off the ground and pick up aerodynamic braking. However, Francis pointed out that wheel braking is improved with the nosewheel on the ground and the aircraft weight on the main gear.

We made the parking lot turnoff without heavy braking and shut down to talk things over.

There are so many truly fine points about the Aerostar that it's strictly presumptuous for a brand-new 601 pilot to nitpick. However, I'd like see arm rests added to the front seats, particularly on the right side.

The pilots' seats do not have a vertical adjustment, and visibility over the nose in climb just after takeoff is a bit restricted unless you put your head almost to the top of the cabin. There was perhaps a half-inch difference in padding of the two front seats of N7538S, and this difference was readily noticeable.

The fore-and-aft seat rails have the same basic design as those in my 1952 four-placer, and stick or jam about as easily.

There is no aileron trim, and it would take cross-feed fuel manipulation after any single-engine work to correct wingheaviness. It's purely a personal observation, but the mag switches on 38S, Aerostars production model No. 186, were 180 degrees out of phase for me. The long end of the handles was actually the pointer of the selector switch. Francis reported that some owners had reversed these switches.

And when you can't find anything more basic than that to gripe about, you've been flying a mighty fine airplane.

We fired up, taxied out and took off from Big Bear. Since we could pull 67% power at this altitude without turbos, we didn't use them until we were climbing right over the top of 11,502-foot Mt. San Gorgonio, on a southerly heading directly toward Palomar.

Just like any other high-performance machine, the Aerostar requires that the pilot stay ahead of it. "Things happen faster in the Aerostar," said Francis, and it sounded like an advertising slogan.

We called Palomar Tower and were advised that the visibility was 3 miles for Runway 24. We would be landing directly into a late-afternoon sun that was sinking rapidly into a layer of heavy, salty haze.

Since Palomar has only a VOR approach, we elected to come straight in, with the demonstration pilot calling off visual check points. There's a drag strip for racing perhaps two miles out on

final, and we made a 10° right turn to line up with the runway.

Again, there was the caution "You're a little hot and high" as we approached the numbers. I eased back on the power and dropped the nose slightly to eliminate the high sink rate that can occur with rapid power reduction on a highly loaded wing. We had plenty of float remaining in ground effect and rolled past the first turnoff, but the Aerostar behaved admirably under my heavyhanded "driving."

Aerostar estimates that 90% of its owner-pilots are businessmen first, then pilots. Not more than 10% of the Aerostars are flown by full-time flight crews, according to Jack Francis.

The factory is now setting up a pilot indoctrination program for both mechanics and flight crews. Until this new program is in full operation, it's up to each dealer to give his own Aerostar transition. The 601 is so straightforward and predictable that a good checkout, even for a relatively low-time pilot, should be no great problem. Right now, Francis is teaching a local pilot who purchased his Aerostar without any previous multi-engine experience.

The sleek Aerostar is in a price range that keeps it from being everyman's airplane. It certainly fills the bill, however, for the man or woman who wants to go places efficiently, comfortably, and in one heck of a hurry. \Box