

Pilot report - Piper Aerostar

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There is absolutely nothing about the Aerostar to suggest it is a slow aeroplane. Like so many slingshot general aviation aircraft, it perches uncomfortably on its stalky undercarriage leaving its swept-back tail, pointy nose and shoulder-height spinners to announce to any observer that this thing goes like hell.

The Aerostar however, is not without compromise nor does it suffer fools gladly. But whilst everything is happily turnin' and burnin' the aircraft is one of the world's greatest handling twins. What is curious is that it represented a major departure for Piper, indeed the aircraft would have been more at home if it had been taken over by Mooney because this is surely what they would have come up with had they expanded upon their fast single-engined line.

By some twist of fate, in 1978, Piper decided to purchase the design rights from Theodore R. 'Ted' Smith, The Aerostar's creator. The aeroplane had already been in production since 1969. Ted Smith set up his company in 1966 after working for Aero Commander and probably disillusioned by his previous employer's prevarications on improving their twin-piston and turbine line, decided he could do it better. It was to be the start of an exceedingly turbulent production history that has left a profound legacy upon many present Aerostar owners.

The original Aerostar 600 was to only the start of a range consisting of single-engined models and ultimately a jet-powered version. The singles never left the drawing board, and only recently the Aerostar has emerged with plans to install two rear-mounted fanjets. Ted Smith had a clear idea of what he was after. The design began as it ended using a mid-wing, six-seat, circular-section fuselage layout. It also featured a jet-like swept tail and an airstair cabin door in front of the wing - not unlike the Aero Commander's business jet designs.

The prototype model 300/400 first flew in 1966 but was used for certifying the first production 600 version with a pair of Lycoming IO-540 engines. These engines were flat rated at 300hp each, hence the '600' name tag given to the first model. In 1968 Ted Smith sold his business to the American Cement Company who took over production of the 600 with a vision of joining the existing boom in light aircraft manufacturing. The acquisition wasn't a great success. American Cement had plenty of money but its lack of aviation expertise led to quick disagreement. The following years Butler Aviation took over. Butler at the time were the owners of Mooney and they threw the whole lot together under the name of Aerostar Aircraft Corp in 1970 with the auspicious intention of moving 600 production to the Mooney plant at Kerrville in Texas. In a complete reversal, Butler had insufficient funding. No Aerostars were subsequently built during 1971 and 1972.

Ted Smith bought back his design rights in 1972 after 130 Aerostars had been completed. Smith then went ahead and built a pressurised model, the 601P. He also built a prototype 700 Superstar with 350hp Lycoming IO-540M engines, though this wasn't to see the light of day until some years later.

In 1978 Piper decided to purchase the Aerostar. The company wanted to widen its high performance product line. This wasn't the first time Piper had flirted with Ted Smith. In 1949 Piper had approached him whilst he was an engineer at Douglas. Piper wanted to get into the piston-twin business and they were interested in Smith's high-wing design. As it turned out a pusher design was purchased, the Bauman Brigadier B250. This was eventually passed over in favour of the Apache. The Brigadier ended its days amongst the rafters at Lock Haven and Ted Smith's design evolved into the Aero Commander.

Piper continued to manufacture the 600A, 601B and 601P in California before eventually moving production to Vero Beach. The 1977 601B version was identical to the 'A' but with a thirty inch increase in wingspan. The 'B' version was also given a useful 300lb gross weight increase and brought the specifications up to the same level as the pressurised model.

Although the basic design features of all Aerostars have remained unchanged throughout the years, the late seventies saw a number of other detail modifications. Amongst them was a deft paperwork exercise in increasing the aeroplane's zero-wing-fuel limitation from 5,400 pounds to 5,900. Flap extension speed was raised by 18 knots and an improved, automatic wastegate system was introduced to replace the two Rayjay turbochargers. The aircraft has also come in for a fair share of criticism regarding its fuel system. After suffering a number of double engine failures due to fuel mismanagement, the FAA stepped in in the early eighties with Ads designed to prevent these incidents.

In 1981, the 602P version was launched. This benefited from Lycoming-developed turbochargers and although they successfully ended persistent engine-detonation problems associated with the Rayjays, they also resulted in a lower cruise speed.

In 1984 Piper introduced the long awaited 700P. Unfortunately, the writing was on the wall for many general aviation manufacturers and only twenty-six were built before Piper finally suspended Aerostar production later that year.

In 1991 Ted Smith once again bought back the type certificate and thus the design rights. His intention was to replace the piston engines with two Williams FJ44 turbfans. However, this project has yet to see the light of day. It is rumoured that the Jet-Aerostar concept has been resurrected again but no details have yet been released.

Today, Aerostars have become coveted items and few come on the market for resale. There is a very enthusiastic owners association in the USA who hold annual fly-ins and publish a regular magazine. There are currently eight South African Aerostars and one US-registered example in the region.

The Aerostar is a diminutive aeroplane. Its size and somewhat delicate appearance belie its huge inherent strength. Ted Smith designed the aircraft to comfortably exceed sixties Part 23 construction specifications. Whilst many manufacturers were satisfied in meeting the +3g threshold, the Aerostar was built to withstand up to +6g. It is one of only two twins in the world specially cleared to perform airshow aerobatics (the other is the Ted Smith-designed Aero Commander, flown for years by famous flying personality Bob Hoover). The prototype was flown to 500 miles per hour in a descent and is said to be capable of 800 miles an hour without displaying any dangerous flutter characteristics. It was also Smith's intention to dramatically reduce the aeroplane's component count and the most striking evidence of this is the commonality of tail surfaces. Both horizontal stabilisers and the fin share the same part numbers and are all fully interchangeable. Each wing consists of under 50 'detail parts'. Skin thickness is double that of more common aircraft. The reason for this was to provide greater stiffness to the outer structure than the innards. It was estimated that an Aerostar should take no more than 1800 hours to build - some 400 hours less than a Beech Baron or Cessna 310. Both the American Cement Company and Butler Aviation were unwilling to apply Smith's manufacturing doctrine - American Cement simply employed too many people and Butler used unfinished airframes as collateral to borrow capital. Moreover, American Cement ordered a huge stock of spare wings and tail surfaces - many of which are still around.

A clamshell door at the front allows access to the cabin. At first sight it appears that passengers must climb over the front seat in order to get into the cabin. However, the front seat unlatches and slides forward so that the squab is underneath the instrument panel. A step is incorporated into the lower door and entry is perhaps easier on the Aerostar than almost any other light twin. Once the passengers are installed, the seat slides back again to provide access for the front occupants. Latching the door closed is a very important checklist item. It has been said that an opening top clamshell is the easiest way to kill an Aerostar pilot. This is not because the door is likely to become detached but because the first instinct is to reach out and pull it closed again. In this case the airflow takes over and forces your arm into the propeller arc. Not nice.

N7478S is a short-wing, normally aspirated 600. It is operated by Wonderboom-based Dirk de Vos, a well known aviation personality and better known as the owner of clip winged Harvard ZS-WFD. His Aerostar is a standard 1969 model and is undergoing an interior refurbishment. Dirk also happens to be in the aircraft sales industry and being partial to high-performance light aircraft, he has become somewhat of an

Aerostar expert and loves to sell them.

The manual recommends starting the right hand engine first as this is where the hydraulic pump is located. The battery is placed at the far end of the tail with a ground power plug in the tailcone itself. Instrument panel layout is almost entirely conventional. However, the panel does have a number of interesting features. On the right hand side and immediately left of the copilots control column is an elevator and rudder trim indicator - unusual for a light twin. The trim adjustment itself consists of two small rocker switches on the centre pedestal. Below these is another rocker switch - a horizontal one, used for steering the nosewheel. It's curious that such an important task is delegated in such a modest way. Nevertheless the system works well and is easy to get used to. There is also a minimum fuel warning light (of which more later) and a similar warning system for cabin heater failure. There are no cowl flaps.

As most Aerostar pilots have discovered at some stage, it is advisable to take off with flaps. Forgetting to do so can be a frightening experience on a short strip as the aircraft will seemingly roll forever. Furthermore, the angle of attack needed to climb away from a flapless takeoff can be alarming. Aerostars need a positive control movement to raise the nose as the aircraft rests on the ground with a negative angle of attack. Those familiar with the aeroplane will know to maintain a partial easing back on the column approaching rotation speed.

This is to be expected considering the small wing area. With an engine failure at VMCA, the Aerostar needs to be accelerated to 130 knots for best single engine rate of climb. Under cruise conditions, owners consider the aeroplane's single engine handling to be excellent. This eases the transition to final rotation. Minimum single engine control speed (VMCA) is a highish 97 knots IAS (or 84 with recommended wing vortex generators).

Ted Smith made another major departure from conventional light twin design. He installed push-rod controls which has bestowed fabulous handling upon the Aerostar. Similar to a Mooney, the control column throw from full left to right aileron is a short 180 degrees. Predictably, response is instant. The aeroplane was designed with minimal dihedral. This also contributes to the handling though makes the Aerostar demanding in an IMC environment. The aircraft has no aural nor visual stall warning system, however, at about seven knots over the stall speed there is a very obvious airframe buffet - enough to provide a clear reminder that things are about to unwind. The stall itself is benign provided all the controls are neutralised, however, add some rudder or aileron and the Aerostar will drop a wing.

Owners report performance figures close to what the pilots operating manual advertises. Speed is the aeroplane's biggest attraction. A normally aspirated 600 will cruise at a little over 210 knots at 7,500 feet on an ISA day. The combined fuel burn under these conditions is 33.4 gallons per hour giving a range of just over 1,000 nautical miles. This makes Cape Town an easy hop from Durban or Johannesburg.

The Aerostar's fuel system has been the subject of some criticism over the years. The aircraft has three tanks - one in each wing and a central fuselage tank mounted mid-way up behind the rear cabin bulkhead. The system holds 165.5 gallons of useable fuel. The intention was to use tank vents to maintain an equal level of fuel throughout the system. As the wing tanks depleted however, fuel feed would come from the fuselage. It is important to always have fuel in the central tank and although the system is designed to accommodate this, a number of accidents have followed simultaneous engine failure caused by uneven feeding. The number of Aerostar incidents caught the attention of the FAA who issued an airworthiness directive mandating the use of a low fuel warning light for the central tank. In 1979, the FAA issued a further AD forcing owners to install a triple fuel gauge - one for each tank. The AD also called for fuel cap inspections as it was suspected that negative pressure was responsible for restricting fuel flow causing premature depletion of the fuselage tank. All these important ADs are a feature of the past - however, insurance companies cast a nervous eye at low-time pilots wanting to fly an Aerostar. It is very important to understand the aeroplane's systems and handling idiosyncrasies when one of them fails - including the engines. The good news is that training schemes have been set up for the aircraft, including a course run by Flight Safety. In many cases the insurance companies are reluctant to provide cover unless one of these programs has been completed by the owner or pilot.

In flight, the view from the front seats is spectacular. Being ahead of the engines, pilots can see directly downwards and upwards through the eyebrow windows making circuit work and map reading a delight.

Passengers are not quite so lucky as they are seated next to the wing roots but the big windows provide lots of light. Although a six-seat club layout was never offered as a factory option, some owners chose a five-seat club setup with one of the central seats removed and a fold-out table installed.

Landing the Aerostar is straightforward provided it's remembered how small the wings are. Cut the throttles too early and the aircraft will settle instantly. This makes it easy to place on the numbers - but only if it's done at the correct height. The aircraft is more sensitive to throttle setting on approach rather than pitch input, so early attention to speed is a good way of handling most approaches.

There is little doubt that the Aerostar is both challenging and an enormously satisfying aircraft to fly. The light twin business was notoriously fickle and the 1.089 Aerostars built must surely be one of Ted Smith's highest accolades. As a twin, it has something to suit most - turbocharging, pressurisation and the availability of even more speed by adopting a small but significant number of modifications. The potential for greater speed has been harnessed by modification specialist Machen Conversions in the USA. For Aerostar owners wanting something a little extra, Machen manages to push the cruise speed up to 270 knots using a pair of 325 or 350hp Lycomings and calling the aircraft 'Superstar'. Piper themselves ended production with their own 700P version using contra-rotating 350hp engines. If this doesn't thrill pilots sufficiently there's always the new jet-powered version.

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Note: PlaneCheck often has some nice [Piper Aerostars for sale](#)