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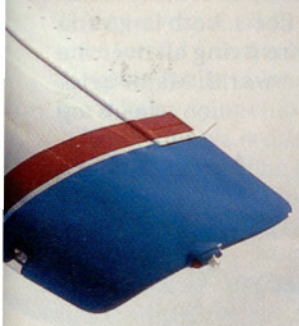
FlightSafety

Lord of the light twins

The New Piper's Seminole began life 26 years ago as one of a new breed of multiengine trainers. Over the years, its competitors, Beechcraft's Duchess and American General's Cougar, have dropped by the wayside. Today the Seminole and the Beechcraft Baron reign as the world's only light twins in current production. The Seminole's total sales have topped the 683 mark; some 147 were sold in the past four years (with 2002's 60 deliveries holding the all-time annual sales record). Its closest competitor would be Diamond's diesel-powered DA42 TwinStar—a canopied, turbocharged, 270-horsepower (135 hp per side) airplane being built in Austria. The DA42 was unveiled with much ballyhoo in 2002, but has yet to be certified.

The Seminole was built with an eye toward safety. In the light twin's glory years of the 1950s and 1960s, flight instructors and designated examiners had little federal guidance on practical test standards. In attempts to provide real-life engine-out experiences, some instructors used poor judgment and went too far. Hair-raising drills such as engine cuts right after takeoff, stalls with a windmilling engine, and engine-out stalls in turns sometimes made engine-out practice all too real. Multiengine training accidents began to mount.



One reason why earlier multi-trainers tended to bite back has to do with their behavior near V_{MC}. V_{MC}—defined as the minimum airspeed at which directional control can be maintained with the critical engine inoperative—in pre-Seminole days meant uncommanded rolling and yawing at airspeeds well above the stall.

Students practicing their V_{MC} demonstrations would put the left, or critical, engine (the one that, were its power lost, would create the most adverse handling characteristics) at a zero-thrust setting, advance the right engine to full power, then reduce airspeed by pitching up. At or near V_{MC}—marked by a red radial line on the airspeed indicator—students would begin to notice the onset of an uncontrollable roll and yaw toward the "dead" engine, in spite of full opposite rudder. If not caught in time, or if the loss of control happened suddenly, or if the student botched the recovery by letting airspeed bleed off or leaving the good engine's power on, the result could be a roll to the inverted. Sometimes this ended with fatalities, especially in cases where instructors cut an engine right after takeoff and students allowed airspeed to drop to V_{MC}—or lower.

By the late 1970s, Piper and Beechcraft decided to tame V_{MC} by installing counterrotating propellers on their

BY THOMAS A. HORNE

PHOTOGRAPHY BY MIKE FIZER

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new multi-trainers. This eliminated the critical engine and lowered V_{MC}. In the Seminole's case, V_{MC} is 56 KIAS—just one knot above the 55-knot stall speed in the landing configuration and one knot below the clean stall speed.

Never mind that the Wright brothers used counterrotating propellers on their historic 1903 *Flyer*. Counterrotating propellers were billed as a newly discovered antidote to the V_{MC} rollover, and they caught on. The reduced p-factor and lift moments from the right propeller—thanks to its "new" counterclockwise rotation design—meant less violent rolling and yawing at V_{MC}, or any other asymmetric-power condition. Do a V_{MC} demonstration below 4,000 feet msl or so in a Seminole, and you're much more likely to approach a conventional stall before any dangerous rolling sets in. Above 4,000 feet, the airplane may not be as polite. Stall speed is a constant, but V_{MC} decreases with altitude because asymmetric thrust decreases with altitude. At some point, V_{MC} falls below stall speed. Enter a stall with asymmetric power above that altitude, and you could be faced with a potentially nasty stall, one with a dangerous roll-yaw combination.

But the fact remains: Seminoles continues to be one of the tamest, friendliest light twins ever built. They're the unchallenged mainstays of many multiengine training fleets, both large and small, and they're flying all over the world. Major aviation schools top

riendliest light twins ever built. They're the unchallenged nd small, and they're flying all over the world.

the list of big-volume customers. Some of the schools that use Seminoles as their flagships include: Embry-Riddle Aeronautical University (18 Seminoles); FlightSafety International (25); University of North Dakota (14); Pan Am Academy (17); Delta Connection Academy (seven); and the biggest operator—Airline Transport Professionals Inc. (ATP)—with a whopping 76 Seminoles. The overseas market is strong, too. I once ferried a Seminole all the way to Bangkok, Thailand, where it now serves in a military flying club.

The Seminole is designed with simplicity in mind. The fuselage and wings are virtual clones of Piper's Arrow single-engine retractable, which explains why some call the Seminole a "Twin Arrow." The flaps are mechanical, and are actuated by the same stone-simple floor-mounted hand lever used in scads of earlier Piper singles, as well as the new 6X and 6XT. Two 55-gallon fuel tanks (protected by firewalls) live in huge nacelles behind the engines, and there are only three fuel selector positions: On, Off, and Crossfeed.

The only quirky system is the Janitrol gasoline-fired heater, mounted in the nose cone. It can overheat without a vigorous flow of outside cooling air. After landing, you have to remember to shut off the heater and run its fan to keep it from overheating. There's a squat switch that is supposed to prevent an overheat, and an annunciator that warns of a too-hot Janitrol, but the idea of a gasoline heater out there in the nose by its lonesome sometimes makes me worry. On the other hand, it *does* put out the cabin heat.

Although they mainly serve in multiengine training fleets, Seminoles also make great airplanes for personal and business flying. That second engine provides the peace of mind that many pilots demand for night, instrument, and overwater flying, as well as trips in mountainous regions. Late-model instrument panels come with Garmin GNS 430s as standard equipment, and a great layout—complete with an annunciator panel that warns of overheats of the gas-fired Janitrol heater.

Beginning with the 2000 model year, New Piper made some really nice improvements over the original design. The panel is clean and uncluttered, with a Garmin GNS 430 GPS/nav/com as standard equipment. A horizontal situation indicator (HSI) and second GNS 430 are part of the very popular optional avionics package, which lists for an extra $30,780.

The battery master, magneto, fuel pump, and external light switches have been moved from a pilot's sidewall panel to front-and-center locations on the instrument subpanel. Large dual-pointer manifold pressure and tachometer gauges now are stacked vertically, which puts them right in the pilot's—

and instructor's—line of sight. Pre-2000 models had these stashed above the pilot's right knee. Newer models also have a nice annunciator panel, including that Janitrol overheat warning.

The propellers' unfeathering accumulators are other great standard features of newer Seminoles. These store oil pressure, then release it to the prop hub when you want to unfeather an engine. To do an airstart, all you do is advance the prop lever at the appropriate airspeed (100 to 120 knots) and the accumulators start the props turning. Sure beats the old design,

SPECSHEET

New Piper Seminole PA–44-180 **Standard equipped price: $424,900**

Specifications

Powerplants .....Lycoming O-360-E1A6D, 180 hp
Recommended TBO .....2,000 hr
Propellers .....Hartzell constant speed, full feathering, 74-in dia
Length .....27 ft 7 in
Height .....8 ft 6 in
Wingspan .....38 ft 6 in
Wing area .....183.8 sq ft
Wing loading .....21.1 lb/sq ft
Power loading .....10.5 lb/hp
Seats 4
Standard empty weight .....2,603 lb
Max ramp weight .....3,816 lb
Max takeoff weight .....3,800 lb
Standard useful load .....1,197 lb
Payload w/full fuel .....549 lb
Max landing weight .....3,800 lb
Fuel capacity, std .....110 gal (108 gal usable)
660 lb (648 lb usable)
Baggage capacity .....200 lb, 24 cu ft

Performance

Takeoff distance, ground roll .....1,040 ft
Takeoff distance over 50-ft obstacle .....2,200 ft
Accelerate-stop distance .....2,060 ft
Max demonstrated crosswind component .....17 kt
Rate of climb, sea level .....1,375 fpm
Single-engine ROC, sea level .....212 fpm
Cruise speed/range w/45-min rsv (fuel consumption, ea engine) 7,000 ft
@ 75% power, best power mixture, 164 kt/ 610 nm .....(11.6 gph)
@ 55% power, best economy mixture, 143 kt/ 750 nm .....(8.7 gph)
Service ceiling .....15,000 ft
Single-engine service ceiling .....3,800 ft
Landing distance over 50-ft obstacle .....1,490 ft
Landing distance, ground roll .....770 ft

Limiting and Recommended Airspeeds

V_R (rotation) .....75 KIAS
V_X (best angle of climb) .....82 KIAS
V_Y (best rate of climb) .....88 KIAS
V_{XSE} (best single-engine angle of climb) .....82 KIAS
V_{YSE} (best single-engine rate of climb) .....88 KIAS
V_{MC} (min control w/one engine inoperative) .....56 KIAS
V_{SSE} (min intentional one-engine operation) .....82 KIAS
V_A (design maneuvering) .....135 KIAS
V_{FE} (max flap extended) .....111 KIAS
V_{LE} (max gear extended) .....140 KIAS
V_{LO} (max gear operating)
Extend .....140 KIAS
Retract .....109 KIAS
V_{NO} (max structural cruising) .....169 KIAS
V_{NE} (never exceed) .....202 KIAS
V_{S1} (stall, clean) .....57 KIAS
V_{SO} (stall, in landing configuration) .....55 KIAS

For more information, contact The New Piper Aircraft Inc., 2926 Piper Drive, Vero Beach, Florida 32960; telephone 772/567-4361; fax 772/978-6584; or visit the Web site (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.

The trip proved that the Seminole is as fine and capable a cruising machine as it is a trainer.

which calls for using the starters to uncage the props.

My most recent Seminole time was in a trainer operated by ATP. ATP offers packaged courses aimed at earning advanced certificates and ratings, as well as *ab initio* training that takes you from ground-pounder to airline transport pilot.

ATP has its own operations manual, and flying the school's Seminoles means learning its procedures and checklists. Some, like limiting V_{LE} and V_{LO} to 120 knots (instead of the pilot's operating handbook's 140 knots), are meant to spare the airplane from unnecessary wear and tear. Others are to make you fly the airplane with a disciplined professionalism.

As an instrument flying platform, the Seminole is exemplary. Thanks to the T-tail there's little in the way of pitch changes and retrimming requirements with configuration changes. Use the proper target values and the airplane behaves well during instrument procedures.

Cruise speed? Single-engine climb performance? Range? These values are about what you'd expect from a light piston twin. The book says you can see speeds as high as 168 KTAS at 75-percent power, but in my experience this is often optimistic. Single-engine climb, posted as 212 fpm, is as lackluster as any light piston twin. But with temperatures below standard and a light load, you can see single-engine climb rates pushing 400 fpm. Single-engine work? In spite of the counter-rotating engines there's more than enough asymmetric thrust to give students strong legs.

Landings are uncomplicated, and using short-field techniques (full flaps, 75 KIAS or slightly less over the fence, depending on weight) can produce breath-takingly carrierlike landing distances.

Although aimed at the training market, the Seminole also appeals to a cadre of owner-operators who simply want a late-model multi for peace of mind when flying at night, over mountains, or over water. I can understand that. One of the best flying adventures I ever had was in a Turbo Seminole, only 87 of which were built. I flew N8264F, a demonstrator loaded with options—even weather radar—on a huge loop around the Caribbean, stopping at Stella Maris, South Caicos, Great Inagua, St. Thomas, St. Croix, Antigua, Martinique, Jamaica, and the Cayman Islands. The trip proved that the Seminole is as fine and capable a cruising machine as it is a trainer.

That was way back in 1981, when the Seminole was still a fresh concept and there was debate about whether the design would hang in there for the long run.

Now we have the answer. AOPA

i Links to additional information about The New Piper Seminole may be found on AOPA Online (www.aopa.org/pilot/links.shtml). Keyword search: Seminole.

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