RETURN OF THE LIGHT TWIN TRAINER

Simple complexity in the newest light twin

BY THOMAS A. HORNE

Remember light twins? They were in their glory from the 1950s to the late 1970s, but by the mid-1980s, production of new light twins had come to a screeching halt.

The need for light twins has continued unabated. For many Part 135 operators, light twins fill the demand for hauling moderate-size loads. They can handle short fields in style. They also serve admirably as multiengine trainers and make sense for those who want the reassurance of a second engine when flying at night, over mountains, or across long stretches of water. But time has taken its toll. The great majority of light twins are pushing 20 years of age, and many of those on the used market have seen thousands of hours of hard work. The light twins used by many fixed-base operations and flight schools are nearing the ends of their useful lives as trainers and need to be replaced.

Take the experience of the University of North Dakota, for example. In 1985 its Center for Aerospace Sciences bought three used Beechcraft Duchesses for use as multiengine trainers. By spring of this year, each had accumulated 3,200 hours of wear and tear. The center wanted new airplanes to replace the Duchesses, but there was a slight problem: No manufacturers were building light twins specifically suited to training. The upshot was a decision by Piper Aircraft Corporation to resume production of the Seminole. As of October 1989, UND had taken delivery of eight brand-new Seminoles and held options to buy another 40. For its part, Piper committed to building an initial production run of 100, with each airplane equipped according to UND's specifications.

The 1990 Seminole represents a union of traditional features and some significant improvements. The airplane still has the reliable simplicity of the 180-horsepower, normally aspirated, carbureted Lycoming engines used in the original Seminole production run (467 normally aspirated and 87 turbocharged Seminoles were built between 1978 and 1982), and the dimensions and performance characteristics of the new Seminole are virtually identical to the earlier models. Production of Turbo Seminoles is still suspended.

The Seminole was designed to be the quintessential step-up airplane for Piper devotees wanting to move into twin-engine flying. Its panel, controls, interior layout, and basic wing design are virtually the same as those of Piper's Arrow series of single-engine retractables. For those who know the Arrow and other airplanes in the PA–28 series, the Seminole cockpit will be familiar country.

But the new Seminole cockpit is more user-friendly and has some big changes. For one, the glareshield has been extended aft, which eliminates the kind of distracting reflections that plagued earlier Seminoles, especially during night flight. The panel is flat black—no more Royalite—and the electrical switches are of the large, rocker-type design. Another

welcome change is the placement of the manifold pressure and propeller rpm gauges. They used to be on the pilot's subpanel, just above the right knee, where the pilot's view of them was obstructed by the control yoke. With the new Seminole, they are front and center, just to the right of the altimeter and vertical speed indicator.

Also included as standard equipment are two new annunciator lights, one

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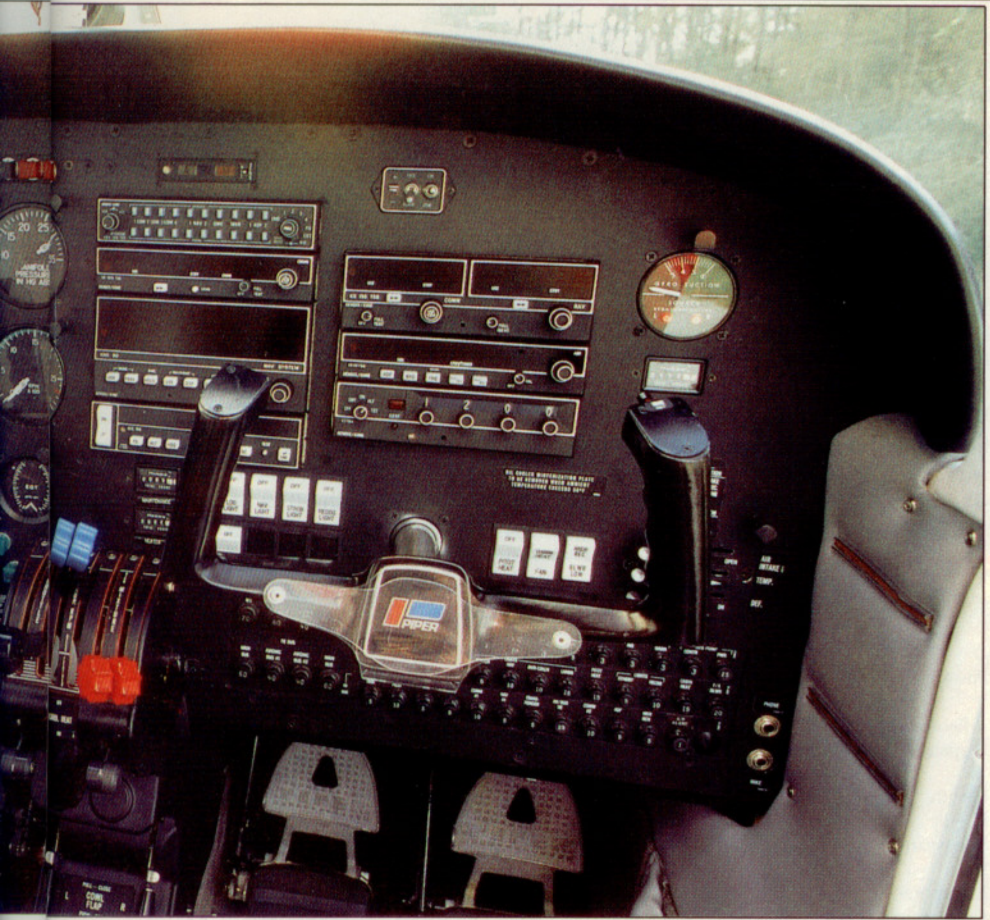

warning of low voltage in the electrical bus and another to signal overheating of the Janitrol heating unit. There is also a Hobbs meter for keeping track of the heater's time in service.

In response to feedback from numerous flight schools, Piper has also included an illuminated push-button switch that mutes the gear warning horn. It's located just above the attitude indicator and comes in very handy when practicing slow flight and steep, reduced-power descents.

Engine priming in the new Seminole is easier and more precise, thanks to its electrical priming pumps. Earlier Seminoles required the pilot to operate manual primers; now you simply turn on the electric fuel pumps, then depress push-button primer switches located on either side of the rocker-type starting switch. This admits a small charge of fuel into the carburetors.

Each new Seminole comes equipped with a full complement of Bendix/King avionics, including a KY 197A com radio, KNS 80 RNAV, KX 155 number-two nav/com, KR 87 ADF and timer, an HSI, and a Mode C transponder. UND also specified that a KMA 24H audio panel and intercom be installed, and this is a real plus. The intercom includes not just pilot and copilot stations, but two additional ones for the rear-seat passengers. Although intended to help share the learning experience at UND (where two students fly on every training flight), this intercom will be appreciated in any application. All occupants can easily converse and without the tangle of wiring so common to portable intercoms.

UND also asked for unfeathering accumulators, so these, too, are part of the standard package. Accumulators trap oil pressure in a special cylinder and make restarting a feathered engine safer and less mechanically aggravating to the starter motor and other components. To unfeather, just move the propeller control forward. The propeller begins instantly to windmill, the force of air loads being augmented by the extra boost provided by the accumulator's oil pressure. It's a better design because it sure beats grinding away with the starter.

The Seminole's electrical system has also been reworked. Like the changes to the instrument panel, its new configuration reflects a drive toward more standardization among Piper products. Gone is the 12-volt system of old, replaced by a more powerful and safer 24-volt, multiple-bus arrangement. In addition to a main electrical bus, there is a tie bus, number-one and -two avionics buses, and a nonessential bus. The two alternators feed electricity to both the main and tie buses, making it easier to isolate faults and redirect power to any component from either alternator. Pulling the nonessential bus's circuit breaker allows the pilot to immediately shed the electrical loads created by unnecessary components. This means that in a low-voltage situation, the pilot need only perform one action.

Just as the Seminole's panel reflects the influence of more recent Seneca panel designs, so does its electrical system borrow heavily from that of the Malibu. It's all part of Piper's plan to implement some findings from human factors research in aircraft design.

The Seminole is the first Piper light

airplane to adopt the multiple-bus electrical system. Eventually, the basic elements of this design will be incorporated into all new Piper singles.

I recently had the opportunity to fly the new Seminole for an extended period of time. I had not flown a Seminole for nearly four years, and the reacquaintance was a pleasant one. My flight in September took me from Minneapolis's Flying Cloud Airport to Piper's headquarters in Vero Beach, Florida. Along the way, stops were made in Terre Haute, Indiana, and Chattanooga, Tennessee.

At Flying Cloud, a cold front had definitely put an end to summer. Temperatures were in the mid-40s, but with surface winds gusting to 40 knots, it felt colder. At times like this, you appreciate the Seminole's two single-point fuel sump drains, located on the fuselage just aft of the right flap's trailing edge.

The engines started on the first turns of the propellers; soon all checks were finished, and it was time to take off from Flying Cloud's Runway 27R.

The Seminole is a good performer on takeoff, but that 40-knot headwind made for an elevator-like departure profile. In no time flat, I was past the 75-knot rotation speed, off the ground, and climbing at the Seminole's Vyse (single-engine best-rate-of-climb speed) of 88 knots. This speed, incidentally, is the same as the airplane's Vy, its two-engine best rate of climb; likewise, its Vxse (best single-engine angle of climb), 82 knots, is the same as its Vx.

The first leg involved dodging cumulus build-ups and a great deal of flying in IMC. The Seminole's ailerons make for smooth banks (their differential deflection angles—23 degrees up and 17 degrees down—minimize adverse yaw) and a light feel. In the clouds, the airplane makes a very stable instrument platform, and during the approach phase, virtually no pitch changes occur with flap and gear extension.

Landings are uncomplicated: Slow the airplane to 88 knots by using approximately 16 inches of manifold pressure, extend gear and flaps, and adjust glidepath using power. In the flare, the Seminole, unsurprisingly, behaves very much like a heavily loaded Arrow.

Somewhere around Bowling Green, Kentucky, the weather fell apart, and I had to shoot an ILS approach to Chattanooga's Runway 20. I found that 18 inches of manifold pressure and one notch (10 degrees) of flaps provided a comfortable approach speed of 100 knots. Extending the gear at the outer marker provided a 500-fpm descent, and from then on, it was a simple matter to track the HSI's indications by means of small corrections. I broke out at 500 feet agl and brought it in for an acceptable landing (seven on a scale of 10) on the rain-covered runway.

The next day, I flew from Chattanooga to Vero Beach in the hazy aftermath of an evening of thunderstorms. At 7,000 feet, the outside air temperature was 15 degrees Celsius, the throttles were wide open, manifold pressure was 23.5 inches, and the propellers were set at 2,500 rpm. I set the mixtures for 100-degrees rich of peak exhaust gas temperature and saw an indicated airspeed of 145 knots. True airspeed worked out to be 165 knots—right on book. After three hours, I taxied up to Piper's ramp.

The flight provided plenty of food for thought. The Seminole does have the complexity and capability needed in a multiengine trainer, but it does not assault the unwary with the tricks so often associated with this breed.

Yes, there is powerplant redundancy, but counterrotating propellers and other design enhancements yield a Vmc (single-engine minimum-control airspeed) of 56 knots, just one knot above stall speed. This means that the Seminole is less likely to bite back (i.e., spin out of an asymmetric, slow-flight condition) when practicing single-engine work than it is to enter a conventional stall.

At a respectable cruise true airspeed of 165 to 170 knots, the airplane burns a total of 20 gallons per hour—not bad considering that some big singles perform about the same. In terms of range and load-carrying capacity also, the Seminole rivals many utility singles. At 75-percent power and 162 knots, the airplane has a 695-nm range and 45 minutes of reserve fuel. At 55-percent power, range increases to 765 nm. That's 4 hours 36 minutes endurance for the 75-percent setting and 5 hours 5 minutes at 55 percent.

At $225,900, the 1990 Seminole is not exactly inexpensive. Still, its price is far below that of some new singles. Remember, too, that the price includes a great deal of equipment that would ordinarily be optional. Considering the airplane's relatively low operating costs, it should be just the ticket for commercial operators as well as FBOs who have a need for a new, economical twin.

The airplane requires many of the same actions as more complex twins, but it does not overwhelm. The new electrical system requires that pilots hit the books harder to understand its higher complexity, but the work is worth it. The new electrical system prepares the multiengine student for the next level of sophistication. Even better, it gives the pilot more alternatives in an electrical emergency.

Whether you are a prospective multiengine student or a pilot wanting to invest in a new light twin, the new Seminole is worth checking out. Well-equipped, safer, and stylish to boot, it's hard to find an unkind word about such a well-engineered airplane. □

Piper PA-44-180 Seminole
Base price: $225,900

Specifications	
Powerplants	two Lycoming (L)O-360-E1A6D, 180 hp @ 2,700 rpm
Recommended TBO	2,000 hr
Propellers	Hartzell HC-C2Y, 74-in diameter, constant-speed, full-feathering
Length	27.6 ft
Height	8.5 ft
Wingspan	38.6 ft
Seats	4
Empty weight	2,536 lb
Gross weight	3,800 lb
Useful load	1,280 lb
Fuel capacity, std	110 gal (108 gal usable) 660 lb (648 lb usable)
Oil capacity, ea engine	8 qt
Baggage capacity	200 lb, 26 cu ft
Performance	
Rate of climb, sea level	1,340 fpm
Single-engine ROC, sea level	212 fpm
Max level speed, sea level	168 kt
Cruise speed/endurance w/45-min rsv, std fuel (fuel consumption, ea engine)	
@ 75% power, best power 8,000 ft	162 kt/4.6 hr (70.2 pph/11.7 gph)
Service ceiling	15,000 ft
Single-engine service ceiling	3,800 ft
Limiting and Recommended Airspeeds	
Vmc (min control w/one engine inoperative)	56 KIAS
Vsse (min intentional one-engine operation)	82 KIAS
Vx (best angle of climb)	82 KIAS
Vy (best rate of climb)	88 KIAS
Vxse (best single-engine angle of climb)	82 KIAS
Vyse (best single-engine rate of climb)	88 KIAS
Va (design maneuvering)	135 KIAS
Vfe (max flap extended)	111 KIAS
Vle (max gear extended)	140 KIAS
Vlo (max gear operating)	
Extend	140 KIAS
Retract	109 KIAS
Vno (max structural cruising)	169 KIAS
Vne (never exceed)	202 KIAS
Vr (rotation)	75 KIAS
Vs1 (stall, clean)	57 KIAS
Vso (stall, in landing configuration)	55 KIAS

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. □