



Affordable aerobats

Pitts Special: Cheap thrills, no frills
BY DAVE HIRSCHMAN

Pitts biplanes dominated U.S. and international aerobatic competition in the 1960s and 1970s before eventually being eclipsed by bigger, faster, more powerful monoplanes in the late 1980s and beyond.

PHOTOGRAPHY BY CHRIS ROSE

Now that their glory days are over, however, stubby Pitts single-seaters are being discovered by sport flying enthusiasts who prize their lively handling, mechanical simplicity, unique place in aviation history, and affordability.

Two-aileron Pitts S-1Cs are available on the used market with prices beginning in the low \$20,000s, and four-aileron S-1D, S-1E, and S-1S models can be purchased in the low to mid \$30s. That seems a bargain for airplanes so iconic that one—formerly owned and flown by the late aerobatic champion and airshow performer Betty Skelton—hangs over the entrance to the Smithsonian National Air and Space Museum's Udvar-Hazy Center, and three more (the former Red Devils) are enshrined at the EAA Museum.

Aside from the purchase price, however, there are other hurdles that aspiring Pitts pilots must overcome to enjoy these diminutive, demanding aircraft. Insurance companies typically require pilots get at least 10 hours of dual instruction in a two-seat Pitts before providing coverage for single-seat models. (Bill Finagin in Maryland and Budd Davison in Arizona have specialized for years in providing Pitts transition training.)

This specialized instruction helps pilots become accustomed to the Pitts hallmarks of rapid acceleration and deceleration, short coupling, light control forces, and a near total lack of forward visibility in the landing attitude.

Tailwheel proficiency is a must, and it should come in airplanes that are similarly blind on the ground. Skills acquired in Champs or Citabrias with unobstructed forward views don't count unless the pilot flies from the back seat (preferably with a tall, broad-shouldered companion wearing a sombrero in front to block the view ahead).

The Pitts has long been a rite of passage for aerobatic pilots, and the standard by which other aerobatic airplanes are measured. Flying a single-seat model for the first time brings sweaty palms, cotton mouth, and tingling anticipation akin to a student pilot's initial solo. Pilots recount their first Pitts flights vividly and in great detail many years afterward.

Former EAA Chairman Tom Poberezny, a member of the world champion 1972 U.S. Aerobatic Team, says his first flight in a Pitts S-1S was an awakening that altered the course of his life. He and his father later built a Pitts in which he competed with great success and flew for years with the Red Devils aerobatic team.

"That flight opened a whole new world for me," he said at the time his former Red Devil airplane joined those of fellow team members Gene Soucy and

Baggage space is minimal (below) with just enough room for a change of clothes, toothbrush, and a credit card. Cockpit instrumentation is bare bones, too. The clear sight gauge on the right shows fuel quantity.





Photo © Bob Williams
The 1300 AC instrument panel features
many of the same instruments as the
1300 AC.

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Alt. Static

ALT. AIR

N300RF

SPECSHEET

Pitts Special N300RF

Built 1983/1995

Price: \$30,000

Empty weight	806 lbs
Gross weight.....	1,150 lbs
Engine	Lycoming O-360 A4K, 180 hp
Wing span	17 feet, 4 inches
Length.....	15 feet, 6 inches
Height.....	6 feet, 6 inches
V _{NE}	203 mph
V _{SO}	60 mph
Rate of climb	2,600 fpm
Fuel capacity	20 gallons
Service ceiling.....	24,000 feet

Charlie Hillard above the EAA Museum lobby. "It was exhilarating and amazing to think that one airplane could have so much aerobatic performance. The responsiveness of the controls was far beyond anything I had experienced before."

Modest beginnings

Curtis Pitts, a self-taught aircraft designer, made the original S-1 from pieces scraped together during World

War II. The prototype weighed just 600 pounds and had a paltry 55-horsepower engine.

He later offered what he called the S-1C model; the C stood for Continental as he thought a 100-horsepower O-200 engine would provide enough power for most pilots. He was wrong, of course, and the vast majority of the biplanes sported four-cylinder Lycoming engines, many of them boosted to 200 horsepower or more.





The biplanes reached their heyday in 1966 when Bob Herendeen flew one to victory in the World Aerobatic Contest. And their winning streak continued into the next decade when Hillard won the 1972 individual world championship and the U.S. team won the team title, all flying Pitts biplanes.

Biplanes had been around for many years when the S-1 was born, but Pitts was the first to combine a swept top wing and a straight bottom wing in a way that allowed the bottom wing to stall first whether the airplane was upside down or right side up. He even went so far as to patent the concept.

Pitts began selling plans for the S-1 in the early 1960s, and he later sold the rights to Doyle Child. Child sold them to Frank Christensen in 1981. Production continued in Afton, Wyoming, under Christen Industries, and currently Aviat Aircraft.

The single-seat, four-aileron S-1S and later the S-1T won FAA type certification along with the two-seat S-2A, S-2B, and S-2C models. Aviat still builds them on demand and refurbishes existing airframes, although the number of biplanes the company turns out is small compared to its popular Husky line of backcountry aircraft. Plans for the S-1S and the S-1C are currently available through Steen Aero Lab in Palm Bay, Florida.

The Pitts remains extremely competitive in the Basic, Sportsman, and Intermediate levels of IAC competition, and a few do well in the Advanced category. It's rare to see a biplane of any kind flying Unlimited.

Flying it

Climbing into a Pitts requires some contortions. Step onto the left wing, grab the handhold in the center of the top wing,

and swing your right leg over the canopy rail and into the deep hole that is the cockpit. Stand in the seat with both feet and lower yourself down, way down, into the straight-backed seat. Tighten the five-point harness as snug as you can, and then tighten it some more.

Visibility from the cockpit is limited by the broad nose and high and low wings, but the airplane's hypermaneuverability allows pilots to search the sky through narrow gaps. High engine torque on takeoff means the right main tire (above left) wears out quickly. A wooden "bayonnette" (above right) stabilizes the flying and landing wires, and keeps them from humming in flight.

There's minimal VFR instrumentation, and a fuel sight gauge shows the quantity of avgas in the 20-gallon tank between your knees. A panel-mounted compass is the sole means of navigation. The only instrument that seems like a luxury is a vertical speed indicator, and it's handy for showing the airplane's impressive rate of climb as well as helping the pilot hold a constant altitude while decelerating for competition spins.

Engine start is normal for a Lycoming, and the raw, popping, no-muffler sound of the straight exhaust stacks quickly overpowers even the most modern noise-cancelling headsets. (It's a good idea to wear foam earplugs underneath.)

Taxiing at a busy airport requires nearly constant S-turns, and the steerable tailwheel lurches whenever you stab a toe brake. The engine run-up checklist is exceedingly short with only magneto and alternate air tests, then a scan of the engine temperature and pressure gauges. There's no constant-speed prop to cycle, cowl flaps to position, or electric fuel pump to manage. This airplane,

like so many of its brethren, has a manual standby fuel pump. If the engine-driven fuel pump fails in flight, you can theoretically limp home manipulating the standby pump with your left hand.

The pretakeoff checklist is similarly brief. Set the elevator trim, close the canopy, announce your intentions, and line up with the runway centerline.

With the elevator neutral, steadily add full power and right rudder. Keep your eyes outside, and expect to feel like a circus performer being shot from a cannon. Initial acceleration and the accompanying crescendo of sound are mind numbing, and the tailwheel starts to rise on its own at about 30 mph. Hold a tail-low attitude and the main wheels lift off the ground in about 600 feet at about 70 mph. The rapid acceleration continues through 100 mph as you raise the pitch attitude to about 20 degrees, and the VSI shows a 2,500-fpm climb.

This airplane has a cruise prop with 60 inches of pitch (and 76 inches diameter). But even so, it spins a rapid 2,700 rpm during climbout. At 3,000 feet, reduce the throttle and hold 2,500 rpm and 140 mph to the practice area.

The wings seem impossibly short, yet they have no trouble holding the airplane aloft. Turns are crisp and taut, and with no linkage between rudder and aileron, it's a cinch to hold the nose on a point while banking sharply left and right.

The full-deflection roll rate is quick, but somewhat less than the 220 degrees per second that the Pitts performance figures claim. (This airplane lacks aileron

spades, so perhaps adding them would quicken the rate to attain the advertised figure.)

Loops, Immelmans, half-Cubans, and other over-the-top maneuvers are typically entered at about 160 mph, and a three-G pull (and full throttle) provides plenty of energy at the apex of each figure. Even on a warm summer day, the Pitts holds its altitude through a series of a dozen consecutive aerobatic maneuvers.

Sustained inverted flight requires forward stick pressure and a slight nose-up attitude. From my seating position, placing the leading edge of the top wing on the horizon nets a vertical speed indication of zero.

Power-off stalls break crisply at 60 mph, and recovery is instant when back-pressure is relaxed. Inverted stalls require holding full forward stick, and the break takes place at 64 mph. Unaccelerated, upright spins left and right are standard,





A hand-painted emblem on the vertical stabilizer shows pride in the designer (lower left). The Pitts is an airplane the pilot “wears,” and the cockpit (left) with a parachute and five-point harness is extremely confining. Four ailerons and a short wingspan give the Pitts a quick roll rate, and oversized control surfaces make it extremely maneuverable in every axis. The starburst paint scheme (above) matches the brash design.

but the rotation in this particular airplane is noticeably faster to the right. Recovery from fully developed spins, both left and right, takes place with opposite rudder and forward stick in less than two turns.

Returning to the airport, it's time for the most notable portions of any Pitts flight: approach and landing.

Trim for 100 mph on downwind, then reduce the power and pitch for 90 mph on base and 85 mph on final. A curving approach keeps the runway in sight until the flare, and then the runway almost totally disappears from view.

Maintain your alignment using peripheral vision and keep working the stick aft for a full-stall landing. The tail-wheel touches down an instant before the mains. Although still light on its feet, the airplane sticks and the main wheels

carry progressively more weight. As the airplane decelerates through about 30 mph, it tends to dart left and right, and quick taps on the rudder pedals (not the brakes!) are required to keep it straight.

Once clear of the runway, sliding the canopy full open brings a welcome rush of fresh air. No matter how many times you've done it before, every Pitts landing is exciting, and they all require a pilot's full attention.

In the early 1990s when I had just begun flying a Pitts, I was practicing touch-and-go landings at my home field (General Dewitt Spain Airport in Memphis, Tennessee) one still morning. When I put the airplane away after about a dozen trips around the pattern, a veteran Pitts pilot took me aside and warned me against the practice.

“Don't do any more landings in a Pitts than you absolutely have to,” he said. “No one ever completely masters them, so touch and goes only tempt fate.” (I regarded that piece of advice as overly fatalistic then, but I've since come around to the old sage's way of thinking.)

Curtis Pitts, who died in 2005 at age 89, famously said that there was “no such thing as a twitchy airplane—only twitchy pilots.”

By that he meant that his airplane's extreme responsiveness instantly results

in the airplane doing exactly what the pilot commands it to do. And there lies the problem: Most pilots tend to over-control. It can be hard to find an existing Pitts aircraft that hasn't been damaged in a ground mishap, and high insurance rates for hull coverage are a direct reflection of the inherent hazards.

Many Pitts owners and pilots express a certain ambivalence about their airplanes. They are the first to point out that the straight-back seats are job security for chiropractors (a dose of Advil should be part of every preflight ritual); the cockpits get hot in the summer and freezing cold in winter; and the engines are crammed so tightly under the cowl that they can be very difficult to work on. But they absolutely adore the way their airplanes respond instantly and energetically to every command, and they treasure the excitement that each flight brings.

Davisson, the veteran Pitts instructor and aviation writer who has produced volumes on the distinctive airplanes, describes them in hyperbolic terms. “There are Pitts Specials and there are other airplanes,” he says, “and the two shouldn't be confused.”

ACPA

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