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PIREP: Pitts/Aviat S-1-11B (Aviat-Modified Super Stinker)



Budd Davisson, EAA/Sport Aviation, May, 1998

S-1-11B: Super-Duper Stinker

As I turned off the runway on to a taxiway, my mind hardly heard me as I automatically spoke to ground control. Most of my brain was doing arithmetic of an entirely unrelated nature.

A voice inside my head was saying, "Okay, so I can probably build up an IO-540 for around \$15,000. It doesn't have to be a 300 hp version. And all the tubing won't cost \$1,000. The wing wood may go close to \$2,000. Cover costs might..." By the time I pulled up in front of the fuel pits and Aviat's Lou Meyer and VP of Engineering and Special Projects, Ed Saurenman met me, I already had an approximate total of what it would cost to build one of their unbelievable S-1-11B/Super Stinkers from scratch. This airplane is the Super Stinker on steroids, a Super-Super Stinker, and I wanted one badly.

It's no secret I have a thing for Pitts Specials. It's also no secret that at different times I have professional ties to Aviat. Yes, I have predisposed opinions, but I dare anyone to step out of that airplane and not have similar thoughts to mine: This is one very serious airplane. Kirby Chambliss summed it up after flying it when he reportedly said, it flew as if it was a monoplane with an extra wing. Coming from a confirmed monoplane pilot and National Champion, that's saying a lot.

But, let's not get too far into the aerobatic accolades before recognizing several other aspects of the airplane that may well be more important than the fact that it is of unlimited competition caliber. First of all, the airplane is the only unlimited type airplane we know of that can be scratch-built from a set of plans. What this means to the

homebuilder is that costs can be kept to an absolute minimum while the final result is of world class quality. By utilizing Aviat-built components, the project can be moved a long a lot faster, but that's not necessary for the budget-minded builder. Also, the builder doesn't have to be an acro-nut. He can just want a simple, great flying airplane that he can say he built himself.

In the cost control department we find big variables like the engine itself. The version I flew and which lit my gotta-have-it wick was powered by a high end, Monte Barrett custom IO-540 with 10.5:1 compression and a bunch of other custom do-dads that pumped it up to more than 305 hp on the dyno. And it felt like it. Talk about a stump-puller! But with an airplane this light (1090 pounds empty), you don't need that much engine. In fact, when I flew the Super Stinker in 1994, when it first came out, it was powered with an stock 0-540 reportedly putting out around 230-240 hp and it was still a killer machine.



In some ways, building up a six-cylinder Lycoming these days, is no more expensive than building a four-cylinder. Ask anyone who's building an RV-6 how hard it is to come up with a low-cost rebuildable core for a four-cylinder Lycoming versus the cost for a low-end six cylinder. Cores for the low-compression 235 hp 0-540 go for a comparative song with the 250 hp version only slightly more. Don't want to burn so much fuel? Bring the go-fast lever back a notch or two.

A lot of costs can be cut right at the power-plant.

The prop is another area where costs can be cut. The factory's S-1-11B had the top dog of aerobatic propellers bolted up front, the Hartzell composite aerobatic series. This is a very expensive propeller. Very expensive! The prototype Super Stinker, however, had a garden variety, two-blade, aluminum Hartzell on board and, other than the stresses it puts on the crank in aerobatics, is still a good choice. Between the two would be the three-blade composites from either MT or Hoffman (available from Steen Aerolab).

By doing a little shopping, this airplane could be scratch-built for less than \$30-35,000 in Sunday hell-raising form. The airframe alone shouldn't top \$10,000 leaving the final cost question being one of engine and prop. Using the professionally-built components from Aviat raises the price but cuts the building time by an estimated 60-70%. Almost every builder would have to purchase the heavy, spring aluminum gear from Aviat as it is beyond the backyard builder's shop capabilities

But, not everyone wants an unlimited aerobatic airplane. What about those of us who don't care about aerobatic competition? I'm going to make a flat statement here: This airplane is so much fun to take off and land that if you do nothing more than dropping the hammer on takeoff to get your adrenaline pumping, the project would be worth the effort.

On my first takeoff out of Scottsdale, I can honestly say I wasn't prepared for the effect of smoothly moving the noise lever to the stop. As the Monte Barrett Lycoming began pumping out the ponies, I had the illusion I was desperately hanging onto the controls just to keep from being left behind. I had to concentrate to keep the throttle forward so inertia wouldn't bring my hand back unintentionally. But, we're getting ahead of ourselves.



There have been a lot of changes in the airplane since Aviat bought the rights for the airplane. Since we flew the airplane in Homestead, Florida right after Curtis Pitts finished it (see Sport Aviation, May, 1994) the design has gone through several ownership changes before landing at Aviat. During the in-between stages, Ed Saurenman, who then was a partner in Certification Specialists in Wichita, put his CAD-CAM expertise to work and produced a complete set of very thorough drawings for the Super Stinker. Those are the plans Aviat is now selling.

When Stuart Horn took over Aviat in January of 1996, one of his goals was to return the name Pitts Special to the glory it had enjoyed in years past. His first step was to purchase the rights to the Super Stinker. His second step was to spend a lot of time with competition oriented people, both inside and outside of his company, to revise the lines of the airplane to make them more easily judged in international competition. These changes were primarily cosmetic and straighten out the lines of the airplane by flattening the belly and squaring off the lower rudder surfaces. At the same time they went to a rakish, flat-wrap windshield and laid the seat back 20°. The end result is a long, really snarky looking airplane that, if you put your hand up to visually block the top wing while looking at its side view, it could easily be a monoplane. The plans they offer have Super Stinker outlines while the finished components have S-1-11B cosmetics. Aerodynamically and structurally, they are the same airplane.

The second I stepped down into the airplane to fly it, the laid back seat was an obvious change. In fact, I could have used another cushion under me for visibility but it was close enough. Lou pulled the prop through a few times and we cranked it. The high compression was obvious even at idle.

The Haigh, locking tailwheel of the Super Stinker has been replaced by a tiny steerable unit on a Doug Dodge tapered rod spring which makes ground handling much more convenient although I knew I'd have to pay more attention on landing.

The inverted "J" control stick, with its reverse curve and dangling stick grip proved to be a fatigue problem from the start. Lou said it was left over from early test programs and was on its the way out. Configured the way it is, even on taxi there's no way to slide your hand down the stick and rest your arm on a knee. It sounds like a minor point but I was surprised how tired my arm and hand were after I returned from the flight.



Rolled out onto centerline with the throttle coming up, I was treated to the most amazing acceleration I've ever felt in an airplane. Actually, it may have been the most acceleration I've felt in anything which includes some fairly serious drag cars. I would have grinned, but was a little nervous because it was obvious the airplane was getting ahead of me. The tail blew



itself off the ground as soon as I relaxed back pressure and the airplane was off the ground and screaming upward before I had time to think about it. This was one takeoff where I was definitely behind the curve.

Later I did the math: At that weight and power, the power loading was under 4.5 pounds/horsepower. No wonder it was a rocket ship!

I glanced at the airspeed almost as soon as we left the runway and the needle was racing through 100 mph. I guessed the best rate to somewhere around 90 mph, but the deck angle was already ridiculous so I settled on 110 mph as a climb. There was no VSI, but I had nearly 3,000 feet between me and the ground by the time we hit the other end of the 7,000 ft runway. Aviat claims 4,000 fpm and later timed climbs showed the rate of climb may actually be higher than that. Now I was definitely grinning!

This was truly astounding performance. More important, other than feeling I was behind the airplane, the skill required during takeoff had actually been minimal. The airplane had tracked straight ahead and my primary duty had been to simply grit my teeth and hang on.

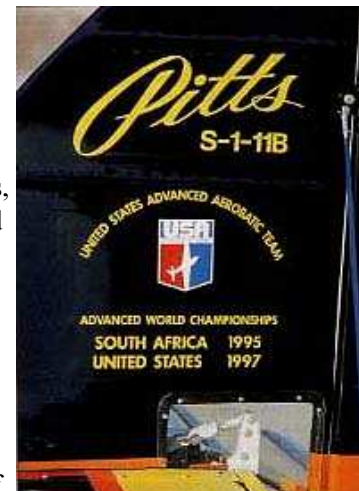
As soon as it was off the ground, the quick ailerons made themselves known. Break-out pressures around neutral are low and, because I couldn't rest my arm on a leg, turbulence made the weight of my hand on the funny shaped stick a factor. The wings jinked a few degrees left and right before I got the message: be gentle. I'm glad they're changing the stick.

The S-1-11B includes what has become known as "Super Stinker Wing Technology." When designing the wings, Curtis incorporated his patented method of using a thicker airfoil section on the bottom wing so the top one would always stall first. This is the way all symmetrical-wing Pitts are designed. However, when doing this for the Super Stinker, he came up with a unique aileron design that gives light, quick pressures and phenomenal roll rates without resorting to shovels which would hang below the ailerons. Basically what he did is hinge the symmetrical ailerons well back on their chord to get the pressure down and then profiled the nose of the aileron in such a way that the sizeable aileron-to-wing gap decreases to zero as the aileron is deflected. This gives a slightly lower roll rate near neutral but seals the ailerons for max effectiveness as full deflection is neared. It's like having on-demand power steering.

Curtis also used Super Stinker technology on the new wings he designed for Aviat's newly certified follow-on to the S-2B, the S-2C, and the difference really shows in that airplane. The new wings and Ed Saurenman-designed tail give the S-2C completely different, and much better, handling than the earlier airplane.

Out in the practice area with the -11B, the first thing I did was play with the ailerons, which is another way of saying I played with tumbling my own gyros, it goes around so fast. Aviat says the roll rate is somewhere around 400°/sec, give or take a little. From my perspective, as the horizon was ripping around, all I can say is that at max deflection it is at the upper limits of my own ability to see what's happening. The horizon seemed to be coming around to level just about the time I thought I'd actually gotten the aileron against the stop.

The airplane is dead neutral on every axis, so you don't leave it unattended for long periods of time. Duck your head to study a chart for too long and you'll find yourself pointed somewhere else when you bring your head back up.





The airplane's aerobatic capabilities are so far beyond my own that it made my feeble efforts seem...well...effortless. The inside-outside pressures aren't perfectly balanced, but are so close that when doing rolling 360° turns, hitting the points was no sweat and I wasn't conscious of having to fight pressures while pushing the stick forward. Outside loops, from either top or bottom seemed to happen almost automatically because it clawed its way up the backside so easily. Its vertical maneuvers seemed especially easy. Doing vertical rolls has never been one of my strong suites, but it seemed to settle into an up line and give me all day to get it right before going for the ailerons. I'm always amazed when I get two vertical rolls out of anything, but here it was child's play. Three was just as easy and I was going in at only a little over 200 mph and could easily fly away at the top.

The snaps took a little while to figure out because it has so much aileron. It rolls so fast, its hard to tell which is snap and which is aileron in the roll. I was going to try some without aileron, but got side tracked.



The most impressive part of the airplane (other than its willingness to keep going up hill) was the absolute lack of any kind of rolling inertia. It starts and stops rolls instantly. Instantly! Point rolls in any direction, up, down or anywhere in-between, are so easy they should be illegal.

I found the semi-supine seating to be interesting but I didn't know how interesting until I got back on the ground. The airplane has one of those new fangled digital, electronic "G" meters and I couldn't tell how much "G" I was actually pulling because the meter was in recording mode or something. I was using pulls and pushes that felt more or less normal to me and was absolutely no more aggressive than usual because I have a bad habit of making myself sick. So, I was just flying to my usual limit. Later, when Lou checked the "G" meter, I had put 8 positive

and 5.1 negative on it. That really surprised me. At no time did I feel as if I was working the airplane that hard because my body wasn't feeling it.

Coming back into the pattern, I initially had to work to get the speed down to an acceptable pattern speed. This meant pulling back to about 14" of manifold pressure which was still about 130-140 mph. It wasn't until the throttle was practically closed that speeds came down to 110-120 mph where I wanted them.

On my initial landing, even though I was in as close as I would be for a normal Pitts, power-off landing, it became immediately apparent, power-off with that big prop out there wasn't going to work. The second the power was against the stop, the airplane decelerated and pushed me forward in the seat and the ground started up immediately.

With just a touch of power, the airplane rode through a turning approach as though it was on rails. I used 110 mph initially with 100 mph over the fence. As I intersected centerline and rolled wings level, I slowly killed the power. The airplane settled into a three point position for a few seconds then dribbled onto the ground with a firm series of clunks and a slight scream from the tiny tailwheel bearing.



Out of three or four tries, all but one saw me kissing gently off the mains and getting a little hippity-hop. Fortunately, the spring gear is nice and stiff so I had no problem telling what the airplane was trying to do. The airplane was amazingly well behaved, especially considering I was working with an 8 knot, quartering tailwind which always makes tailwheel airplanes do quirky things on landing. Naturally, as soon as I quit, the tower changed runways.

The first touch and go was really a hoot and will stick in my mind for a long time. I was working on ironing out the hippity hop and, without thinking, briskly moved the throttle to the stop for the go part of a touch and go. Instantly the airplane

slapped me on the back side and was in the air. Instantly! I knew a 152 was somewhere ahead of me, also in a touch and go, so I slid to the right where I could see him. I was trying to keep the nose up so I wouldn't catch him, but I'd forgotten the throttle was still against the stop and all of Monte Barrett's pumped up ponies were still roaring at full bore. I caught sight of the 152 quickly growing bigger to the left of my nose and I was already well above him. I hurriedly asked the tower for an early crosswind and ripped into a tight turn across behind the 152 as soon as they rogered. I glanced at the altimeter as I came behind the Cessna: Pattern altitude is 1,000 feet and I was already at 1,500 feet barely half way down the runway. Rock and Roll!!

At the Aviat Fly-in at the factory in Afton, Wyoming in October of last year (this year it's the second weekend in September), several pilots evaluated the 11B and all were impressed. That however was at 6,000 MSL altitude. They ought to try it down here. At 1,500 ft MSL it is an amazing airplane.

Even though most of the talk about the airplane centers on its aerobatic capabilities, I keep coming back to its possibilities for the average sport pilot. Especially those on a budget. It would cost little more to build this airplane than any other single place biplane and less than almost any composite kit. Although a two-blade Hartzell prop would raise the costs over other projects with fixed pitch props, that would be partially offset by the lower cost of the six-cylinder core.

For those builders in a hurry, the components offered by Aviat Aircraft are all in finished form. The fuselage is finish-welded, epoxy coated and ready for installing systems. The same is true of all other welded components. The wings are assembled and ready for cover. Aviat Aircraft, however, wants to make it clear, they are only making these specific components, not kits.

SPECIFICATIONS	
Seats	1
Empty Weight	1,090 lbs.
Maximum Weight	1,500 lbs.
Competition Weight	1,350 lbs.
Wing Span	18 ft.
Length	18 ft. 2 in.
Height	6 ft. 2 in.
Wing Area	110.3 sq. ft.
Engine	IO-540 Lycoming
Propeller	Hartzell HC-C3YR-1A/7690
Max Fuel	35 gals.
Oil	12 qts.
Landing Gear	Spring Aluminum
Tailwheel	Steerable
Wing Loading	12.2 lbs./sq. ft.
Power Loading	4.5 lbs./hp
PERFORMANCE	
At competition weight (1350lb.)	IAS @ sea level w/300 hp
Never Exceed Speed	199 kts (229 mph)
Stall Speed	56 kts (64 mph)
Max Speed	181 kts (208 mph)
Rate of Climb	3,200 fpm

As homebuilt airplanes go, the S-1-11B/Super Stinker is low-demand in the building department and, once the thrill factor is overcome, only slightly more demanding than a Citabria to takeoff and land. However, it would be absolutely imperative for those who have no time in something with a lot of power and light controls to get some dual instruction in a two-place Pitts before attempting a first flight. All the Champ or Cub time in the world isn't going to help.

Roll Rate 300-320°/sec

The S-1-11B is a comfortable airplane and cruises at anything you want depending on the amount of fuel you want to burn. It's hard to get it much below 150-160 mph in cruise at any logical power setting and Lou Meyer says he flight plans 190 mph (165 knots) at 21-22" which is down around 55% power. It holds 35 gallons, so, with a "normal" 250 hp, O-540 burning 13 gph, or less, at normal, not reduced, power settings, you've got a solid 2.7 hours of fuel.

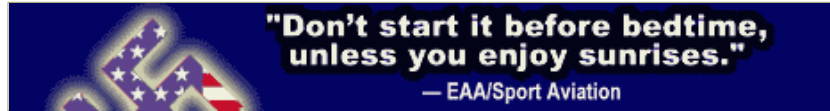
Aviat Aircraft is still offering plans for the old Pitts standard, the S-1S, which is a huge amount of airplane for those wanting performance on four cylinders. However, for those wanting the absolute ultimate in homebuilt amazement, the S-1-11B is going to be hard to beat. Of course, it's a Pitts. So what else did you expect?

For more information, contact:

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SPECIFICATIONS

Seats 1
 Empty Weight 1090 lbs
 Maximum Weight 1500
 Competition Weight 1350
 Wing Span 18 ft
 Length 18 ft. 2 inch.
 Height 6 ft. 2 inch.
 Wing Area 110.3 Sq. Ft
 Engine IO-540 Lycoming
 Propeller Hartzell HC-C3YR-1A/7690
 Max Fuel 35 Gal
 Oil 12 qt.
 Landing Gear Spring Aluminum
 Tailwheel Steerable
 Wing Loading 12.2 lbs/sq. ft.
 Power Loading 4.5 lbs/hp
 Performance
 At competition weight (1350lb.)IAS @ sea level w/300 hp
 Never Exceed Speed 199 kts (229 mph)
 Stall Speed 56 kts (64 mph)
 Max Speed 181 kts (208 mph)
 Rate of Climb 4,000 fpm
 Roll Rate 400°/sec



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