FLIGHT REVIEW

KITFOX WITH A ROTEC

America's favorite "cute" airplane finally gets a real (Australian) radial on the nose.

BY MARC COOK

A traditional "bump cowl" highlights the Rotec's very radial-ness.

Performing flight evaluation must look pretty cool from the outside—arrive at the manufacturer's place of business, hang out a bit, drink coffee, fly to your heart's content, and go home. Ah, no.

The reality is quite different. Instead, you arrive slightly late from the previous, hectic assignment because of headwinds, fret about the local weather for flying and the quality of the sunlight for photos later, tour the facility, shoot about 700 photos (knowing you'll delete 675 of them later), prepare the camera ship for air-to-air later in the day, dump a prodigious amount of data onto a digital-video camera's slightly unreliable SD card and, somewhere in there, wolf down a Subway lunch. Fun? Of course. Glamorous? Not in the least.

This illustration is presented to help you appreciate the sybaritic glory of this day with the Kitfox group and the Rotec-radial-powered model. We—Paul Bertorelli and I—performed all of the usual duties, and had just completed our air-to-air photo shoot. These missions are almost always scheduled for first or last light to help make the subject appear more dramatic in the cold-eye digital cameras we now use, and it's common to complete the flight right at the edge of darkness, dog tired, ready for a quick dinner and a hotel-room bed.

But on this day, Kitfox's owner, John McBean, began to pull the Rotec machine into the hangar and stopped, peered out to the west. "Marc, we have 15 minutes of sunlight," he said, smiling conspiratorially. "We need to go for another flight."

I didn't need to be asked twice. We clambered aboard the bright yellow Kitfox, the seven-cylinder, 110-horsepower Rotec R2800 still ticking toward cool from the previous flight, and fired her up. I've flown in enough radial-powered aircraft to appreciate that there's a specific starting sequence. Bringing a Pratt & Whitney to life requires knowledge, skill and finesse—and a fair bit of luck. In essence, though, McBean flipped the master on, checked to see that the glorious natural-finish wood Sensenich prop was clear, and let it crank. Three or four blades later, the Rotec was alive, making all the right clattering and clanking sounds you expect from a radial engine, only in a higher scale. Stands to reason, actually: The "2800" in the Rotec's nomenclature isn't cubic inches,

Looks bigger than a regular-edition Kitfox, doesn't it? Well, it's not. Aside from the new gear, the airframe is identical to the other Super Sports from the firewall aft.

Photos: Marc Cook, Paul Bertorelli

it's cubic centimeters. At 2.8 liters, the Rotec has less displacement than the six-cylinder in the Nissan Altima inevitably tailgating you on the highway.

As we taxied for takeoff, the view over the nose had become familiar. Where the usual Rotax slope—made possible by the compact Rotax 912S currently the most popular engine for the Kitfox—provides excellent visibility, you're forced to be more cautious with the Rotec's wonderfully anachronistic ring cowling blocking the way. There's just enough gap between the back of the engine and the boot cowl that you can see a sliver of sky between chunks of finned aluminum cylinders, an unexpected pleasure for the mechanically inclined.

It's a tidy installation of a nicely finished but generally conventional (if quite small) air-cooled radial.

Get in the Box

Fitting a radial engine is always a compromise. In the Kitfox Super Sport, the prop flange is very close to where it is with the 912S. You don't want to go messing with thrust lines any more than you have to on an established design, but you must also balance forward view and prop clearance. The Rotec Kitfox finds a happy center here.

Visual deception continues, as the Rotec appears to be significantly larger

A Cub Driver's View of the Kitfox

"Classic" is really just a polite word for old in the same way that "legacy" is the less insulting definition of obsolete. Both words endure to describe airplanes, and classic is usually followed by taildragger. Two come to mind, the J-3 Cub and the Aeronca Champion. The tail-dragging Kitfox may share shards of DNA with these old airplanes, but you'd have to look hard to find it.

As much as I love my yellow J-3, if it's put beside the Kitfox, the latter is just a better airplane. Period. That's not to say I like everything about the Kitfox, but it has a lot going for it that the ancient Cub can't touch.

Let's start with performance. On a cool day, if I do everything right in the Cub, I can be at about 400 feet by the time I get to midfield in the downwind. The Kitfox climbs three times as fast, and you have to throttle it back smartly to avoid climbing out of the pattern as you turn out of the crosswind.

The Kitfox is nearly twice as fast the Cub. *Twice*. That means the 150-mile cross-country you'd need a calendar for in the Cub is a $37 burger in the Kitfox. The fuel burn is about the same.

The Continental 65 found in many of the early Cubs is the quintessential sculpted lump of iron: a pair of tractor mags, a simple updraft carburetor and cylinders stuck in the breeze. It gives the phrase "stupid simple" a bad name. Obviously, the Rotax 912 can make no similar claim. For one thing, it has a starter. For another, electronic ignition displaces the mags and, by comparison, it has jewel-like complexity. There are two things about the Rotax I don't like. (Cue the chainsaw joke.) The exhaust note doesn't make my blood curdle and, with its composite prop, I don't like the Tonka Toy throttle response. The Cub's heavy wood club provides a properly civilized delay between throttle command and actual thrust, though the latter is sometimes in such short supply that you learn to get comfortable with treetops swishing just under the wheels. Cub drivers learn drendology from the crown down.

For an airplane designed in the 1930s, without benefit of wind tunnels, composites and modern materials, Bill Piper and Walter Jamouneau got a lot right on the J-2 and J-3. Then again, they missed some things. The brakes suck, the front seat is a rack, and the trim system—a rope on a crank—is more imaginary than useful. Of course, such oddities are what make older airplanes so charming.

But much of the charm comes from dragging the tail, and while I'm loathe to utter the cliché about real pilots and tailwheel airplanes, I secretly believe it. And the Kitfox lacks nothing in the hairy-chest

Kitfox owner John McBean almost said "no glass," but couldn't resist the Garmin GPSMAP 696 moving map. The rest, alas, is pretty basic.

Comfortable sling seats offer reasonable room for large occupants. The seats don't adjust, but the rudder pedals do.

and heavier than the flat-four Rotax, and would seem to be stubbier—a big, round engine without a lot of depth. Not quite, as most radials place the accessories such as carburetor or injection, ignition, fuel pump and vacuum-pump drive directly behind the crankshaft. In fact, the Rotec, at just shy of 26 inches deep—prop flange to carburetor throat—is almost 4 inches deeper than a department. In some ways, it's more challenging to fly than the Cub, in some ways less.

The more part first. Takeoffs in the Kitfox are nothing like what a Cub or Champ driver would expect. The gear on the Fox is farther forward than it is on a Cub, and this makes the tail surprisingly heavy. While you can pick up the tail of a Cub and manhandle it into a hangar, you're not going to do that with a Kitfox. This manifests itself on takeoff roll as a lazy tail rise. The Cub's tail launches almost in the prop wash, but the Kitfox will roll down the runway a piece, and it requires a lot more forward stick pressure than you'd imagine to get it lifted.

Meanwhile, those full-span flaperons are digging in, providing more roll authority than you have elevator, and they will happily point you into the tulies if you don't keep them dead neutral. (I didn't and they did.) An older airplane like the Cub has sloppy control circuitry and relatively small surfaces, so it has no equivalent effect. I noticed that even when experienced Kitfox pilots take off, they tend to walk the wheels a little in a way that a Cub pilot won't, thanks to those effective flaperons.

On the other hand, where landing a Cub well is a practiced art, it's much easier in the Kitfox. For one thing, you can see better. Everywhere you look, there's clear plastic and a view of the outside world, which provides visual cues that the Cub lacks. Furthermore, the Kitfox has just enough float to provide a little energy cushion to massage the touchdown. But in the Cub, if you get the nose a little too high and try to arrest the sink with a hint of pitch, it will just sink faster, giving power off wheelies the feel of an autorotation: Timing has to be perfect.

The Kitfox has brakes worthy of the name, and the old Cub doesn't. But I find that the Cub handles easier on the ground, probably because of that light tail. Recovering to straight in a taxi turn takes a touch in the Kitfox, but it's easier in the Cub, even with its crappy brakes.

Ergonomically speaking, the Cub's front seat is horrible, the back little better, though it has lots of leg room. Some older Cubs—like ours—have been fitted with shoulder harnesses, but the Kitfox has nicer ones in standard, side-by-side seating. During taxi, you can't quite see over the nose in the Kitfox, but you can see around the corner of the glareshield, so S-turns are more a nice-to-do than the survival exercise they are the Cub. The Kitfox also has a giant baggage compartment, the Cub a breadbox-size canvas sling.

If I owned both of these airplanes, I'd probably fly the Kitfox three to one against the Cub. Love the old J-3's charm, but I don't love having no choice other than 65 knots. One thing, though: When you park a Cub on a ramp, people are attracted to it like flies to honey. "Is that a Piper Cub?" Yes, dear, it is. It'll be awhile before the Kitfox enjoys that kind of on-sight recognition.

—Paul Bertorelli

912. And at approximately 240 pounds dry (including major accessories), it's no lightweight; the Rotax installation is some 80 to 100 pounds lighter overall despite needing coolant and a radiator. Both have gear-reduction drives, too; the Rotec's is a 3:2 ratio using planetary gears. When the engine is at max power (3600 crankshaft rpm), the prop is turning a leisurely 2400 rpm.

For reasons of appearance, McBean fitted a lovely all-wood Sensenich fixed-pitch prop that he admits is not precisely the ideal diameter and pitch for the airplane. Despite having 10% more power, the Rotec Kitfox is a tad slower than a 912-motivated Super Sport. You can blame the prop and the additional cooling drag of the radial for the bulk of that. It's also possible that there's more thrust to be had by fine-tuning the single Bing carburetor that feeds the R2800.

So, Who Cares?

Again: Who cares? McBean and his crew built the Rotec airplane not for speed or efficiency or cost...or anything as mundane as that. No, they constructed it because it is extraordinarily, undeniably cool. Any protracted discussion about performance and weight distribution should end right there.

Compromises in payload, center of gravity or fuel consumption become utterly moot once you've pushed the throttle forward on takeoff. Even though the Rotec Super Sport isn't feathery by Kitfox standards, it's still a light aircraft. You could build it to the 1320-pound LSA maximum, but the structure can handle a max-gross weight of 1550 pounds with upgraded landing gear. What's more, there are engineering documents clearing the Kitfox to weights beyond that.

Still, 110 hp in a 1320-pound airplane makes for a spirited weight-to-power ratio, and the Rotec Super Sport doesn't disprove physics. Acceleration is good—though the 912S feels just as snappy, something I'd put down to weight differences as well as to perception. The Rotec feels like it's loafing, hardly breaking a

Flaperons continue to be a Kitfox design hallmark. They move individually for roll and extend together for flap effect.

This large baggage bay can hold 150 pounds.

Part of the cold-start ritual is to rotate the prop by hand to ensure the lower cylinders have not filled with oil. Yes, just like the big radials.

sweat as it kicks out a true-to-life radial soundtrack and a vibration signature that's pure round engine—engrossing, delightful, wicked good fun. The Rotax 912, on the other hand, is a box full of angry insects: a smaller engine, turning faster, working hard to get the job done.

Cost and tone are not related. Indeed, the Rotax engine, in its basic form, is more expensive than the larger Rotec radial, but differences in the firewall-forward package and other items you'll need to complete the installation bring them to near parity.

The heavier Rotec means the tail comes up a bit quicker and then you're rewarded with your first really good view of the runway centerline. Count to three, and you're off. The first impressions are of a far more substantial airplane than the 912-powered Kitfox and, again, I think much of that is subjective. A heavier engine will move the empty

KITFOX SUPER SPORT

Price	$18,895
Estimated completed price	$35,000- $60,000
Estimated build time	1000 hours
Number flying (at press time)	3800
Powerplant	Rotec R2800, 120 hp @ 3600 rpm
Propeller	two-blade, fixed-pitch
Powerplant options	Continental O-200, Lycoming O-235, Rotax 912

AIRFRAME

Wingspan	30 ft 8 in
Wing loading	12.1 lb/sq ft
Fuel capacity	27 gal
Maximum gross weight	1550 lb (1320 lb optional)
Typical empty weight	800 lb
Typical useful load	750 lb
Full-fuel payload	592 lb
Seating capacity	2
Cabin width	43 in
Baggage capacity	150 lb

PERFORMANCE

Cruise speed	110 mph (95 kt) TAS 5000 ft @ 75% of max-continuous, 6.6 gph
Maximum rate of climb	N/A fpm
Stall speed (landing configuration)	41 mph (36 kt) IAS
Takeoff distance	290 ft
Landing distance	290 ft

Specifications are manufacturer's estimates and are based on the configuration of the demonstrator aircraft.

CG forward, which improves longitudinal stability, all else being equal. While the Kitfox's mix of light and responsive ailerons and heavier, resolutely stable pitch feedback remains, the balance is tilted away from mini-fighter toward something like a Waco missing a wing.

Stately

On our late-afternoon flight, we leveled off at 500 feet (or so), throttled way back and enjoyed the view. McBean is too close to the project to appreciate the subtleties, I think, and that's easy to understand. Your mind locks onto development of items such as landing gear, cooling configurations, carburetor jetting—to say nothing of wondering how the heck to market the airplane. That might explain his surprise when I looked over and said, "Stately." "What?" "Stately," I repeated. That's what it is. A solid, quiet, tamer Kitfox (at least in the air). I had the mental image of a hawk, circling slowly, barely moving its wings. McBean looked back like I'd just kicked him in the kneecap. "Damn. That's the

It just wouldn't be right to put a plastic propeller on a radial, would it?

Cub-like maingear is new with the Rotec installation, and can be ordered for any taildragger Kitfox.

What's in the Box

Kitfox Aircraft breaks the Super Sport kit into four major segments. Fuselage, wing and landing gear make up the firewall-aft part, with a second kit for the engine/firewall-forward components. Currently, Kitfox sells the Super Sport kit for $18,895 firewall-aft. To that, add $4295 for the engine-component kit. The aft portion includes the 4130 steel-tube fuselage cage (add $675 for powder coating) with all the fittings in place for either trigear or tailwheel configurations. Also included in this kit are things like seat shells and shoulder harnesses, windshield and side windows. The wing kit can be had in basic form or as a quickbuild (add $1295), plus you can have the wing pre-rigged to the fuselage for $395. Engine, avionics, interior fabrics, covering and paint are extra.

—M.C.

An airfoil-shaped horizontal stabilizer is optional—as opposed to a simple flat surface. It improves low-speed response.

word. I've been trying to describe it, but that's the essence, isn't it?"

With the sun well below the mountain range to the west, we circled back over the horses in the field just beyond the runway fence—they were nonplussed—and made a nice wheel landing in the now-still air. The Rotec version debuted a new style of landing gear that's as much for reducing weight—on the order of 8 pounds less overall—as for keeping the nostalgic lines going. In place of the

Grove-built, U-shaped aluminum gear that's been extremely popular on the regular Kitfoxes, the company fitted a new steel-tube, Cub-like affair with spring cartridges underslung. It's a little more work to build than simply bolting up the Grove gear, but it definitely looks the part.

More changes for the basic Kitfox Super Sport arrived with the Rotec. A new leading-edge treatment for the fabric-covered wing eliminates the decorative rib "humps" and replaces them with a composite leading-edge skin that extends back to 12% of wing chord; it's secured under the fabric. McBean's hope was to reduce stall speed and improve cruise speed, two points he intends to verify with a 912S installation to eliminate the Rotec variable.

Lexan doors combine with a full overhead glass panel to provide exceptional in-flight visibility.

Pushing Back, Looking Forward

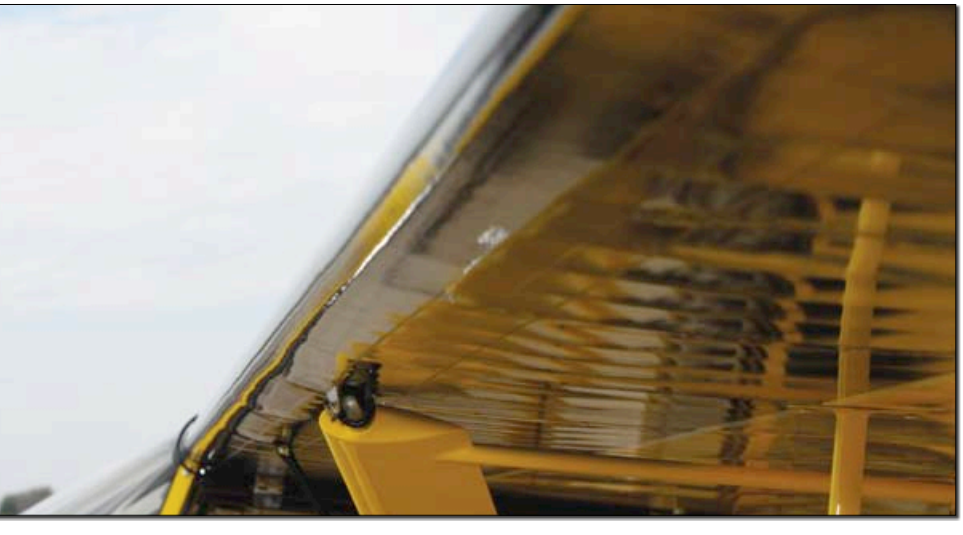
We rolled the Rotec Super Sport into the hangar and watched a droplet of engine oil form in the exhaust stack. "Yep," McBean said, walking away to find a rag and a drip pan. "It's a radial."

No sane pilot would question the pure "rightness" of the Kitfox carrying a true radial engine, nor would any industry watcher think that it will be the company's volume leader. "In a lot of ways, we did this to see if we could," says McBean. "It was a fun project, and we've had great response." Right there is reason enough to embark on a project like this—it's the halo effect. Pilots and potential builders will see the retro-yellow Kitfox, find themselves standing in front of it at airshows, nodding and saying, "Neat."

The buzz generated by this bee-yellow Kitfox is allowing the company to continue its development efforts. McBean says a number of new items are in the works, though he's a bit coy about their actual form. He says that revisions to the Kitfox's wing could help dramatically improve its STOL capabilities, and that he's been looking into some advanced composites—take that to read carbon fiber—to help reduce empty weight. Approximately one factory-built SLSA rolls out of the Homedale, Idaho, shop every other month, contributing to the bottom line and providing another opportunity for the company to refine the kits. There's nothing like having to build your own product to instigate small but useful updates.

So is this Rotec-powered Super Sport the best Kitfox ever built? From a dispassionate point of view, no, probably not. But is it the coolest thing you've seen in a long time? If you don't think so, we respectfully suggest you check your pulse. ✝

For more information, call 208/337-5111, or visit www.kitfoxaircraft.com. Find a direct link at www.kitplanes.com.



Kitfox introduced a new smooth wing that no longer uses the scalloped leading edge. This one is composite under the fabric.