LSA the Homebuilt Way

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Kenny Johnson's clipped Super Cub

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Some dreams take longer than others, even the simple ones. In the case of New Haven, Kentucky, scratchbuilder Kenny Johnson, EAA 37494, just getting his private pilot certificate took 40 years. But, along the way, and well before he got his certificate, he discovered that building airplanes was something he enjoyed so much that he couldn't *not* do it.

Kenny configured the airplane for front-seat solo, as in a Super Cub.

Kenny's urge to fly started about the same as it did for many—shortly after birth.

He remembers, "As a kid I used to cut school to go out to the airport where they'd let me sit in a tired old Waco cabin biplane. I'd sit there by the hour, holding that control wheel—when they are that big, they are a control wheel not a yoke—literally daydreaming my way across the country."

Kenny says he started taking lessons and logged his first 10 hours in Cubs and Champs. "But, then I turned the big 16," he laughs, "and discovered cars…and probably girls. The net result was that I didn't fly again for years." Even so, he and a friend decided to build two Stits Playboys. By the time they were done, he was in his 30s, married, and thinking of his responsibilities. "The Playboy had an A-65 in it, and it never did develop good oil pressure," Kenny says, "which was probably just as well, as I sold it to build our house."

Cars have always competed with airplanes, but with Kenny it went further than just being interested in tearing up and down the streets. He started building street rods and restoring Corvettes, and one thing led to another. "I set up my own shop rebuilding totaled cars for a living, and that's pretty much the way my life developed," Kenny says. "I officially retired the first of June (2009), and from the day I started work to today, I've always figured out a way of making money on my own, usually by building stuff to sell."

EAAers don't have to be told that the urge to create mechanical contrivances is as much a disease as a skill. People who like to build don't actually like it, they *love* it, and once the airplane bug has taken a chunk out of someone's brain, the two passions, building and aviating, pretty much take over a person's life.

"By 1995, I hadn't flown in forever and still hadn't gotten my pilot's license," Kenny says. "But, I'd look back at building that Playboy so many years before and remembered how it felt to be building something that flew. It's a great feeling, so I decided to start building a Hatz biplane."

Kenny chose the scratch-build route for a number of reasons. He needed LSA capability, liked the short wings and aluminum ribs of the Tri-Pacer wings and, most of all, he wanted to do it all his own way.

CHANGE IN PLANS

He was making headway on the Hatz and had even found time to earn his pilot certificate (almost exactly 40 years from when he took his first lesson) when doctors found cancer in his neck and, Kenny says, everything slowed down for a while.

"When I got back on the Hatz it was obvious I'd probably have to go the sport pilot route for medical reasons, so I started thinking about rebuilding the Hatz that way, but didn't," Kenny says. "I had an O-320 on it and put about 60 hours on it before selling it, and it proved my decision not to build it as an LSA to make sense. It was just too slow and too cold for me. Incidentally, the gentleman who bought the airplane bought it sight unseen, and it eventually won Reserve Grand Champion at Biplane Expo 2007."

Kenny started looking for a light-sport aircraft (LSA) project before he sold the Hatz, but Pete Yarger, who he built the Playboys with, had wanted to put Tri-Pacer wings on a Cub. "The more I thought about it, the more I liked it. They were about the length of a clipped Cub's wing, but they had aluminum spars, and they had flaps," Kenny says. "I got to thinking about it and realized I could easily build a Cub fuselage from Wag-Aero's plans and adapt these wings to it. Because of the flaps, I was essentially building a Super Cub, but with much shorter wings."

"I was essentially building a Super Cub, but with much shorter wings."

The local owner of a set of very bedraggled Tri-Pacer wings told Kenny that "…if you can use them, you can have them," and Kenny was well on his way to his clipped-wing Super Cub LSA.

The left wing was essentially destroyed. He salvaged the fittings and drag wires, but had to make up new compression tubing and hinges. The ribs were a tedious repair due to the soft aluminum T-sections being held together with tiny rivets, so Kenny formed new ribs and used

Photos courtesy Kenny Johnson

The landing gear is an un-Cub-like arrangement borrowed from the Hatz biplane design. A local man offered a set of Tri-Pacer wings for an attractive price: free. The engine is a Lycoming O-235-L2C with about 600 hours left on its TBO.

a completely new spar with aluminum tube tip bows. "It looked so good," Kenny says, "so I completely rebuilt the right wing so at least they'd match."

Kenny didn't have a set of struts, so he made those up from scrap 0.049 chromoly streamlined tubing. "I got rid of the clevis at the end and capped them off. I filled them with oil and sloshed it around to make them truly rustproof," he says.

The wings came complete with ailerons and flaps, and those were much less trouble than the rest of the wings. He extended the flaps 3 inches so they would go all the way to the fuselage and eliminate the gap.

Wag-Aero had been selling plans for its famous Cub-like Cuby for decades, and those gave Kenny a starting place for his fuselage, even though the J-3 fuselage in the plans was significantly different than the Super Cub fuselage Kenny pictured in his mind.

"The primary difference between a J-3 and a Super Cub PA-18 fuselage is the structure in the top of the cabin and the way the wings attach," he says. "On a J-3, the fuselage tubing comes to a point in the middle over the passenger's head in the front seat and forms a triangle with the wing fittings on the top. The Super Cub has an X-brace structure in the top of the cabin, and the attach fittings are on the outside above the win-

Kenny moved the baggage compartment aft one bay, but wishes he'd also widened the fuselage to Super Cub dimensions for more leg room up front.

Besides looking good in the grass, Kenny's creation is what a lot of pilots would love to own–the equivalent of a short-wing Super Cub that still qualifies as a light-sport aircraft.

dows. The spar spacing is fairly close to being the same, so I took a bunch of pictures and measurements on a PA-18 and made everything to fit the Tri-Pacer wings."

When asked how much angle of incidence he has, he says, "…some!"

CUSTOMIZATION

One of the beauties of scratchbuilding is that since you're starting with a pile of raw tubing and a set of plans, you can do pretty much anything you want, even though you're working to a pre-existing design. Kenny took advantage of that freedom to customize the fuselage to his own taste and needs.

"I moved the baggage compartment back one bay," he says, "and moved the elevator bell crank back the same amount. Then I eliminated the jackscrew and the movable stabilizer and put a trim tab on the left elevator. I also put a strut on the leading edge of the horizontal tail to reduce the number of wires. I then made the first of two mistakes that I wish I could do over."

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Rather than going with the Super Cub's mass and aerodynamically balanced elevators, Kenny decided to make the elevators simpler with no balance area at all. "I now wish I hadn't done that," he says. "The stick pressures in flare become much higher than I wish they did. Who knows, next winter I may pull the tail off and modify it. It's not a huge change, and I think I should do it."

The other things he would have done differently?

"I definitely should have widened the fuselage to Super Cub width. I don't know why I didn't," he says. "That couple of inches would have given me much more foot room. I moved the engine as far back as I could and set the airplane up to solo from the front seat like a Super Cub, rather than the back like a J-3, and the wider fuselage would have been nice."

A casual examination of the landing gear shows it isn't the usual Piper bungee gear. Kenny says he really liked the coil spring system on the Hatz, so he copied that suspension system and reports that it works well.

PARTS SURFING

But he couldn't have done it all without the Internet. "I absolutely depended on eBay for a lot of the parts, including the engine. It was an O-235-L2C from a C-152 or Tomahawk. It had 1,800 hours on it and is a 2,400 TBO [time between overhauls] engine, so I just cleaned it up and put it in. It's running really strong, and I think it'll run past TBO with no problem. Even if it doesn't, it'll take me forever to fly 600 hours."

EBay also yielded the wheels from a Cherokee 140, three props (it took him a while to get exactly what he needed), the spinner, the tail wheel, and other minor components.

"The eBay brake rotors were a little rusty, so I chucked them into my wood lathe, turned it on, and took my body grinder to them while they were turning," he says. "They came out clean and true. I tend to do things in a very basic way, like bending the rib flanges over a die I made from a fence post."

The crossover exhaust (made from mild steel tubing) was another hand-fabricated unit, and the windshield is stock Super Cub.

"I bought the windshield before I started the boot cowl, so I could make sure they fit together."

WAKE-UP CALL

What Kenny glossed over was that before he got back into airplane building, he started sky diving and by 2000 had made 832 jumps. Then, out of nowhere, he got a hard awakening.

"I was diagnosed with cancer in my neck. At the time, I thought that cancer and sky-diving accidents are both things that happen to other people, so I quit sky diving," he says. "All the medical stuff slowed down my progress on the Hatz at the beginning, but getting back into building was good for me. Then in

2003, when I started the Cub, I'd made a solid decision to stay LSA with my license, and the Cub was perfect for that. Also, by the time I was done I could say that no one else had touched the airplane except the guy I had build the wing tank and the fuselage tank."

He says he also owes a lot to his wife of 45 years, Linda. "Without her support, it's doubtful that any of this would have happened."

Now that he has it finished, he says it's everything he dreamed it would be. Fast enough to get him where he wants to go (105 mph honest cruise), and it fits his mind-set. Lots of fun, a little different, and something he can point at and proudly say, "I did it all myself." Something a lot of us wish we could say. EAA

Budd Davisson is an aeronautical engineer, has logged more than 4,000 hours of dual-given in his Pitts, has flown 300 different aircraft types, and has published four books and more than 2,500 articles. He is editor-in-chief of Flight Journal *magazine. Visit him on* www.AirBum.com.

PERFORMANCE DATA

Make & Model:
Super Cub Sport

Certification:
experimental amateur built

Length: 23 feet, 3inches

Wingspan: 28 feet, 6 inches

Height: 7 feet

Maximum Gross Weight: 1,320 pounds

Empty Weight: 878 pounds

Fuel Capacity: 30 gallons

Seats: 2

Powerplant Make & Model:
Lycoming O-235 L2C

Horsepower: 115

Propeller Make & Type:
Sensenich M74Dm-0-50

Cruise Speed/Fuel Consumption:
105 mph/7 gph

Equipped for: Day VFR

V_{NE} 140 mph

V_{SO} 35 mph

V_Y 65 mph

Bonnie Kratz