

BREAKING THE MOLD



BUILDING THE
ULTIMATE BACKCOUNTRY FLYER
- THE RAT CUB

BY JIM BUSH

PHOTOGRAPHY BY JACK FLEETWOOD

Rat Cub partners Don Wade (left) and Greg Simmons.



KING RAT

From a distance, the rust-colored airplane parked near the Brown Arch during EAA AirVenture Oshkosh 2018 looked more like a decomposing relic from the past. It was tarnished, torn, and beat-up looking. It sported a faded numeral 2 on its fuselage, a menacing black-colored rodent on the cowling, and visible tears and duct tape repairs on the wings, elevator, and rudder. Broken cables and wires protruded from the airframe waiting their turn for either repair, replacement, or another roll of duct tape to hold them in place. There was even a big sticky piece of pink bubble gum strategically placed under the wing tank to hold the fuel in. The tops of the wings fared no better with rusted brass-colored modern vortex wing generators and a worn-out piece of duct tape placed next to the top wing

fuel tank with the handwritten reminder "DON'T FORGET THE CAP!! AGAIN!"

Gazing inside, the scene wasn't much better with its antique leather saddle seat looking like it came off an old pony express rider's horse. An old distressed-looking brass panel housed modern instruments, switches, radios, and an assortment of scattered gadgets. I searched in vain for the placard warning anyone who dared climb aboard to "Make sure your tetanus vaccination is up to date."

As I scratched my head wondering who abandoned this hunk of junk sitting on ginormous Alaskan Bushwheel tires on this prime piece of real estate, I turned and saw the culprit smiling at me from 5 feet away.

"Name's Greg. What do you think of my Rat Cub?"

Before I could even get a word in with dozens of questions popping in my mind, he shot back.

"It's kind of a metaphor for this Carbon Cub that has been unchained and morphed into a 'street rod of the skies,'" he said. "Sit under the wing and I'll tell you all about it."

LEARNING TO FLY ALL OVER AGAIN

GREG SIMMONS, EAA 9023439, of Tulsa, Oklahoma, will readily admit that aviation took a foothold on his life at an early age when he would ride shotgun in his father's Cherokee 180 as they roamed the western states buying cattle. Greg was tickled with airplanes but didn't take them seriously until he graduated from college and started a construction business with a partner in the Tulsa area.

"My business partner Pete already had a little bit of flight time, so we decided to get our pilot's licenses by renting a 152," Greg said. "Unfortunately, the best-laid plans of mice and men are no match for Mother Nature, especially in the Oklahoma region. We kept getting canceled by the flight school so Pete, who moves fast, called me one day and said, 'I found this really nice Cherokee Six.' And that was my path to the sky, or so I thought."

Greg had more than 100 hours of flying around the pattern that first year but never got around to getting his certificate. That was until "speedy Pete" nudged him and said, "Hey, I found this nice Baron 58." Greg knew the Baron would be a better cross-country airplane for their business, so he finished his private training in record time. Greg eventually progressed in ratings and endorsements and flew the pants off the Baron, logging 1,500 hours before the partners upgraded to the jet world.

"We progressed to an old Citation 500, and from there we jumped from several different CJs [Citation jets] through the years," Greg said. "We just kept going bigger and bought a Lear 35 and then a Lear 45, and now we're flying a Challenger 300. Funny thing was I thought this was flying — going from point A to B on autopilot. That all changed when I was introduced to the tailwheel side of flying."

Through a stroke of providence and friends who knew where the real fun of flying resided, Greg was offered a chance to buy into a Piper Super Cub. With zero hours logged flying tailwheels, Greg got checked out and in the process found out what his feet were used for.

"Man oh man, I finally found out where the fun is," Greg said. "That Cub ended up being my weekend airplane, and some weeks the weekend kept getting longer and longer. You're low, you're slow, and you can land on unimproved places like pastures, dirt roads, and things like that."

Greg said he found a new appreciation for flying and actually enjoyed it more.

"When you jump in a fast airplane, it's all good and everything, but you take off and you land, and there's nothing in between," he said. "And when you're flying a tailwheel airplane it's like taking a drive in a classic car with the top down."

RAISING A RAT



This is not your run-of-the-mill Carbon Cub. Keeping it light was first and foremost for Greg and Don along with the retro paint scheme.

Check out the digital edition of EAA Sport Aviation for more photos of the Rat Cub.

PHOTOGRAPHY BY JIM BUSH



BACKCOUNTRY FLYING BUSHWHACKER

AS GREG'S TOTAL TIME in tailwheels began to climb, he wanted his wife, Pat, and their young boys, Cameron and Connor, to experience his thrills and adventures as well. Greg joined the Baja Bush Pilots and ventured across the border into Mexico and the Sea of Cortez as his explorations took him to extremely remote destinations that were easily accessible by Super Cub.

"When both Cameron and Connor were barely old enough to see over the hood of the Cub, I started putting them in the front seat and teaching them how to fly," Greg said. "Every weekend I'd go out and bum around with the boys, taking turns flying them around and teaching them some tailwheel flying."

As Greg's boys grew, he knew it would be only a matter of time before he added another backcountry flyer into his stable. Greg had been following the progression of the Carbon Cub at CubCrafters and liked what he was seeing. He liked it so much he placed an order for one at the SUN 'n FUN International Fly-In & Expo so he could have it in time to give it to his boys as a Christmas present.

"My thought was that this would be a great platform for the boys to get their private in," Greg said. "I've become a big believer in the fact that if you can fly a tailwheel airplane, you can master anything else. So, it was real important to me that they learned on a tailwheel."

As the boys progressed and Cameron got his certificate while Connor was taking instruction, Greg became acquainted with Scott Warren, a CubCrafters dealer. Scott introduced Greg and his tribe to what these airplanes were truly intended for — backcountry flying.

"One of our first adventures we were invited to was joining 20-some airplanes — all Carbon Cubs — as we flew around Lake Michigan and Mackinac Island," Greg said. "The boys loved all of it, camping out with your airplane and exploring our great country from the air."

The adventures only continued for the Simmons boys as another Carbon Cub was added to the family stable as they explored the backcountry of Arkansas and all the backwoods strips they could handle.

"Man, it was either uphill, downhill, or side-hill," Greg said. "We were landing on riverbeds, pastures, dirt roads, and anything we could get in and out of, all true STOL stuff. For me, it was all about crafting the airplane to fit the profile. It's all about managing energy. Everything from steep approaches, to a lot of dogleg rights and lefts, and making those decisions quickly as you deal with shifting winds and the challenge of landing in either off-airport situations or at STOL competitions."

When you're not challenging yourself as a pilot, you can get complacent, Greg said.

"You're just driving the bus at that point in time," he said. "But if you put yourself in these positions safely, and know how to manage it, you become a more confident pilot. It's the reason why I wanted to create the ultimate backcountry/STOL flyer."

GREG AND DON WANTED SOMETHING THAT LOOKED LIKE IT WAS AN OLD RAT ROD OR ALASKAN BUSHPLANE THAT HAD BEEN SITTING OUT IN THE PASTURE FOR 50 YEARS.

PHOTOGRAPHY BY JACK FLEETWOOD

BREAKING THE MOLD

BUILDING THE ULTIMATE RAT ROD OF THE AIR

GREG KNEW he liked the DNA of the Carbon Cub along with the handling characteristics he and his boys had become accustomed to. With that in mind, Greg knew he didn't want to re-invent the wheel with a clean sheet STOL design. Two years ago, Greg and his partner Don Wade began scheming on how to create their ultimate STOL airplane.

"Both Don and I wanted the best-producing STOL aircraft out there," Greg said. "In my mind, nobody has a better platform for that as far as weight-to-power ratio than CubCrafters does. Basically, Don and I knew that the lighter the better with added horsepower would be our starting point. One of the things that I've learned when I started out with the 180-hp Super Cub — which weighed 1,350 pounds — was it was heavy. And then when we went to Carbon Cub with the 184-hp engine on it, the weight dropped to around 1,000 pounds, an awesome performing airplane. So, in order to take off shorter, we knew that the lightest airframe and most horsepower we could bolt onto the front would be the ultimate flyer."

Greg and Don began with the proven bones of a Carbon Cub fuselage and wings and began researching the best engine/propeller combination possibilities. The criteria were simple: fuel injection for constant power, ample cooling, and something that turned 200 hp at a minimum. They found their dream combination with the new Aero Sport Power O-375. The engine comes equipped with parallel-valve NiC3 tapered fin cylinders, Slick magnetos and harness, a Sky-Tec lightweight inline starter, carburetor, fuel pump, camshaft and lifters, oil sump, connecting rods, balanced crankshaft, ring gear, inner-cylinder baffles, spin-on oil filter adapter, and vacuum pump adapter housing.

"We worked with Aero Sport on finding a solution to our needs," Greg said. "Not only did they provide an engine that outperformed my expectations, especially in combination with the SDS fuel management system, it was everything I hoped it would be and more. It's balanced and polished with a counter-rotating crank on it and just a lot of other little tricks. The fuel management system allows us to keep all the cylinder heads the same temperature. And we can program the management system to perform with the fuel that goes into each cylinder, so everything's running the same temperatures."



SPECS

AIRCRAFT MAKE & MODEL:	CubCrafters Carbon Cub*
CERTIFICATION:	E-AB
LENGTH:	23 feet, 3 inches
WINGSPAN:	34 feet, 3 inches
HEIGHT:	8 feet, 4 inches
MAXIMUM GROSS WEIGHT:	1,320 pounds
EMPTY WEIGHT:	892 pounds (depending on equipment)
FUEL CAPACITY:	24 gallons
SEATS:	2
POWERPLANT MAKE & MODEL:	Aero Sport Power O-375 Parallel Valve
HORSEPOWER:	200
PROPELLER:	Catto composite two-blade climb prop
CRUISE SPEED/FUEL CONSUMPTION:	96 mph/5-6 gph
STALL SPEED:	32 mph
RATE OF CLIMB:	Up to 2,100 fpm
TAKEOFF DISTANCE:	60 feet
LANDING DISTANCE:	245 feet, 53 feet in competition

*RAT CUB: SPECIFIC SPECS WILL VARY.



Cameron and Connor Simmons take a break from flying the family Rat Cub.

To pull their airplane through the air, they decided on a Catto climb propeller. Greg admits it's not the fastest rig in the world, but it's not terrible either.

"It will pull you along at 100 miles an hour," he said. "It may not be the fastest airplane out there, but I can pull you out of anywhere with that prop."

To ensure they kept the airplane as lightweight as possible, Greg and Don knew they would have to limit what they bolted on inside the fuselage. The rear seat was one option, along with the rear stick — both can be bolted back inside within minutes if the mission requires it. Another weight-saver was the use of a 24-gallon wing tank instead of the 44-gallon extended fuel tanks found on the Carbon Cub.

Besides being lightweight, Greg and Don also wanted it to be able to land as slow as possible. Adding that last requirement meant a tire, braking system, and robust gear legs that can not only absorb rough landings but can also stop on a dime and still provide spare change once the dust settles. To accomplish all of that, the duo selected 31-inch Alaskan Bushwheel tires mounted on Beringer rims, lightweight gear legs, and brakes.

"The Beringer's gear is lighter weight than the standard 3-by-3," Greg said. "They also make a very nice braking system for immediate stopping. To assist with that, I only use 8 pounds of pressure in the bush wheels. With the combination we have, we can drop that thing from 10 feet in the air and it'd absorb it. It won't bounce. That's key in STOL competitions when you're trying to hold that tail back and trying to get the airplane to settle down."

As they become competitive, people have a tendency to just mash the brakes.

"The next thing they know, they get a prop strike," Greg said. "So, having a braking system that's smooth and operational while you got all that going on is a really important part of the process."

By adding the big tires, Greg and Don found that the angle of attack of the wings increased by more than 3 degrees in the three-point attitude, which is of real benefit when dropping it in on those short landings and three-point takeoffs. With the airplane rigged, it was time for covering options. Greg and Don went with the Poly Fiber system along with star gloss primer. As they debated paint schemes, Greg knew he wanted something that not only stood out in the crowd but also would match the anticipated performance of the airplane.

LOOKS THAT KILL

WHEN IT CAME TIME for final paint, Greg's main caveat was "this thing needs to be themed."

"I kept thinking like an old rat rod car," Greg said. "I'm like, rat rod? No — Rat Cub. And so we called an acquaintance, Mike Dusold, owner of Dusold Designs out of Lewisville, Texas."

It turned out Mike is one of those guys who lives by a motto of, "If the paint will stick, I can paint it." Greg and Don wanted something that looked like it was an old rat rod or Alaskan bushplane that'd been sitting out in the pasture for 50 years. They also wanted the airplane to look tired and ragged without telling anyone what was under the cowl.

"I'm like, it needs to be an evil-looking rat, like breathing fire and all this stuff," Greg said. "I found this evil-looking rat with chains on it and fire coming out of it, and Mike re-created that along with the faux tears, broken cables, bubble gum, and duct tape. Every time I look at the airplane today, it seems like I find another hidden gem. The funniest thing is to watch somebody walk up to it at an airport and feel it, see if that duct tape is real. It's definitely an attention getter."

With the theme set, it was time for Greg and Don to turn their attention to the Rat Cub's interior. To keep the rustic theme they decided on a worn-looking leather

front seat with matching grommets. With the seat done, the focus turned to the front panel, which Greg was going to leave bare aluminum.

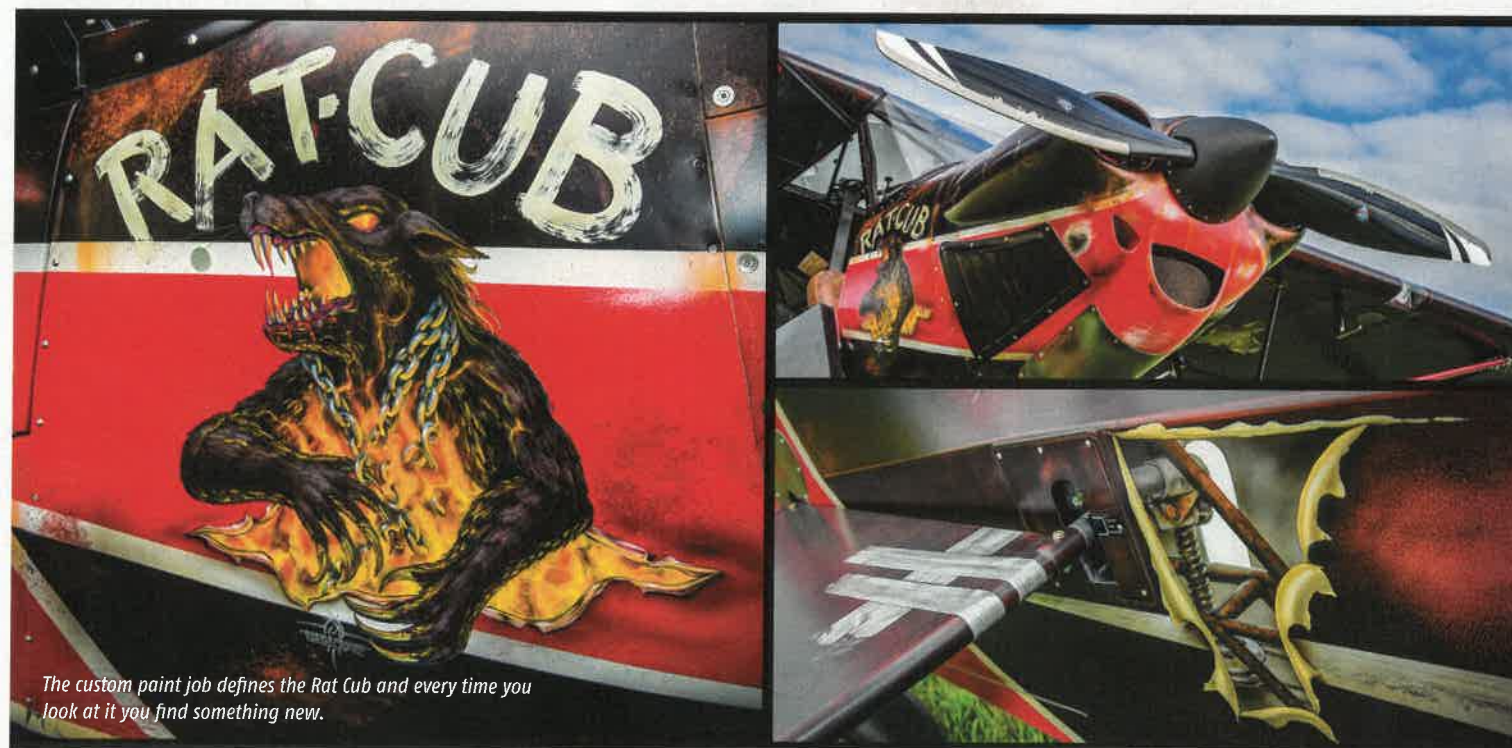
"That all changed when Don's brother Ron suggested a patinaed copper panel instead," Greg said. "It's very rustic looking and adds to the looks along with the functionality."

Sticking with the lightweight signature of the Rat Cub, Greg and Don chose the Garmin G3X package with built-in VFR WAAS GPS. This small compact unit provides primary flight display and multifunction display capability, plus an optional, highly configurable engine indication system display.

"When Don and I set out to build the Rat Cub, we knew we were going to break the mold," Greg said. "Because now we have an airplane that's really much more than a bunch of sticks, tubing, and carbon fiber. We've taken an airplane that is top-notch in every form, every fashion, by giving it that retro look. But, in the air, it's a whole other ball game."

Look for the Rat Cub to strut its stuff at the Twilight Flight Fest at the Fun Fly Zone during EAA AirVenture Oshkosh 2019. **EAA**

Jim Busha, EAA 119684, is an avid pilot and longtime contributor to EAA publications. He is EAA director of publications and editor of *Warbirds* and *Vintage Airplane* magazines, and the owner of a 1943 Stinson L-5.



The custom paint job defines the Rat Cub and every time you look at it you find something new.