

CubCrafters' Newest Model: Easier To Fly And Easier To Build

BACKCOUNTRY FLYING MOVES FORWARD WITH INNOVATIVE DESIGNS AND FACTORY ASSISTANCE

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Maybe it's the heightened visibility of the Valdez Short Take Off and Landing (STOL) competition, persistent messaging from the Recreational Aviation Foundation or just some aerial extension of the back-to-nature movement, but interest in bush flying and STOL aircraft is trending. Surely, neo-Cub manufacturer CubCrafters belongs on the list of contributing factors.

The "Reimagined" Piper Cub

Originally founded to provide aftermarket upgrades to the Piper Cub, CubCrafters (CC) began creating composite, "better than original" versions of the iconic bush plane—the Top Cub, Sport Cub S2 and Carbon Cub SS—in the last decade. Its amateur-built kit Carbon Cub EX, introduced in 2010, furthered the refinement process. Wrapped around a chromoly-steel cage, the airframe is stronger than the original Super Cub, yet weighs almost 300 pounds less and has fewer than half the parts. Lauded for its STOL performance, high useful load and smart design enhancements, the EX nonetheless had room for improvement. First, the heavy stick forces needed for controlling roll could make a flight feel like an arm-wrestling contest; and secondly, you had to build the EX yourself—no factory-built equivalent existed. CC has answered both issues with its next-generation EX derivatives: the do-it-yourself CarbonCub EX-2 and the CarbonCub FX, an owner-built model made at the factory through CC's new builder-assist program.

Debuted at Sun 'n Fun in spring, the EX-2 features G-Series ailerons, flaps (slotted) and tail, together lightening lateral controllability, while also reducing an already impressive stall speed of just over 30 mph. Scott Warren of Warren Aircraft, a CubCrafter dealer in Denton, Texas, pointed out design highlights during our preflight inspection of N18FX at South Lakeland Airport (X49), where CC repositioned the airplane after displaying it at Sun 'n Fun for most of the week.

In a prelude to the differences between the reimagined aircraft and its inspiration, the first item on the preflight is powering up the Garmin G3X panel via the integrated back-up battery system (IBBS), as it takes a few minutes for the system to boot and the

AHARS to align. That provides sufficient time to sump the tanks, check the oil, and inspect cables and attach points.

The empennage size is unchanged, but new adjustable elevator stops allow greater down elevator trim and enhanced trim authority at either end of the CG envelope. The ribs now incorporate Z-channel construction, so fabric can be riveted to the airframe rather than rib-stitched, simplifying and speeding construction.

The EX-2 and FX also introduce a versatility designers of the original Cub never could have imagined: The aircraft can be certified at a 1,320-pound max gross weight (or 1,430 on floats), qualifying as an LSA, even with its 180 hp CC340 engine. Or it can be certified up to a 1,865-pound gross weight, providing a 900-pound useful load for ultimate bush utility.

"About 40% of customers are in the market for an LSA, because they're worried about losing their medicals," said Warren, "and about 60% want the [full gross weight] airplane because of its performance and reputation." Buyers worried about their medicals can initially certify the EX-2 at the lower weight, and if the third-class medical requirement goes away, re-certify it at its higher allowable gross weight.

CC's updated designs also recognize that today's average pilot is larger than he/she was when the Cub was introduced more than 75 years ago. The EX-2's horizontally split bi-fold door is 11 inches wider than a Cub's, has about four inches extra room top to bottom, and is set lower in the fuselage, easing entry and egress. Inside, the cabin is four inches wider than a Cub's. Though functional and spare, the interior is comfortable and modern. Where left uncovered, the airframe's polished checkered composite structures create their own design highlights.

Flying The EX-2

N18FX was equipped with CC's top-of-the-line Executive Glass touch panel, centered by a 10.6-inch Garmin G3X Touch flight display system, and incorporating Synthetic Vision, an AOA (angle-of-attack) indicator, GTR G200 VHF Comm and the optional Garmin autopilot. This is far from the stripped-down essence of a bush plane that defined the original Cub's ethos and appeal, but times change, and while the EX-2 can rough it, most buyers

SPECIFICATIONS

Engine: 180-hp Aerosport Power CC340

Airfoil: Modified USA 35(B)

(same as Super Cub)

Wing loading: 7.4 lbs./sq.ft. @1,320 lbs; 10.44
lbs./sq. ft. @1,865 lbs.

Power loading: 7.33 lbs./hp @ 1,320 lbs;
10.26 lbs./hp @1,865 lbs.

Seats: 2

Length: 23 ft. 3 in.

Height: 8 ft. 4 in.

Wingspan: 34 ft. 3 in.

Wing area (sq. ft.): 179

Cabin width (in., @pilot position): 30

Cabin height (in., @pilot position): 52

Empty weight (lbs.): 950

Gross weight (lbs.): 1,865 or 1,320

Fuel: 25 gals. (24 usable) standard tanks

44 gals. (40 usable) long-range tanks

Oil (qts.): 5

PERFORMANCE

Takeoff distance (ft.): 60

Landing distance (ft.): 245

Rate of climb (fpm): up to 2,100

Fuel consumption (gph): 5-6

Endurance (hrs.): 4; 7 w/ long-range tanks

Max range (miles): 450; 750 w/ long-range
tanks.

Vno (mph): 101

Vne (mph): 141

Vso (mph): 32

Vs1 (mph): 40

** Performance numbers assume optimal
conditions; actual numbers will vary.*

CubCrafters' EX-2: Passport to adventure

PILOT **REPORT** | CARBON CUB EX-2



Garmin's G3X Touch Flight Display System is a popular option.

live comfortably and enjoy flying that way, too. "There are a few guys that have saved up enough [to buy a Carbon Cub], and it's a lifelong dream of theirs, but the majority are pretty well off," Warren said. "Most have their own businesses and have been very successful. They like life and adventure, and this airplane goes hand in hand with both."

Warren himself fits that description. The Colorado native began crop-dusting at 18, then moved to Texas and flew charter before coming aboard Southwest Airlines more than 25 years ago, and along the way, he has owned a Cub restoration business. When he's not in the left seat of a B-737, Warren's apt to be in a Carbon Cub. "One is my office job, and one is my fun job," Warren says. "I'm not going to tell you which is which."

After priming, the Titan engine fired up, and with standard one notch of flaps, we rolled onto the turf runway, lined up and advanced the throttle, the tail coming up almost simultaneously. Published takeoff distance is 60 feet and max rate of climb is "up to 2,100 fpm." We settled for a more moderate deck angle on climbout, and with the airspeed bouncing around 65, we ascended at 700-plus fpm up to 2,500 feet, and headed south.

At cruise power of 2,250 rpm, expect to see about 115 mph, even with 29-inch tundra tires, according to the company. In level flight, the top of the cowl slants downward, providing great forward visibility. But, using the traditional Cub sight picture of keeping the nose on the horizon produces a climb. Warren suggested keeping the leading and trailing edges of the wings roughly parallel with the horizon to maintain altitude.



G-Series control surfaces feature adjustable elevator stops for improved pitch stability and aerodynamic flaps with repositioned pivot arms for enhanced low speed handling.



A bush plane for the 21st century

Simulating The Backcountry Experience

The area to the south of the airport was predominantly scrubland—bush country—with tracts segmented by large berms, creating vast earthen rectangles. Slowing to a little more than 90 mph to check out the EX-2's handling, we lined up on one of the berms and did 45- and 60-degree turns, and then Dutch rolls to the left and right. The difference from the EX (which I flew for comparison) was immediately noticeable: a light and harmonious control feel replaced the muscled maneuvering its predecessor needed.

The enhanced maneuverability extends through the full (and expanded) operating envelope, with the EX-2 even more docile and controllable in slow flight, particularly with flaps extended. The G-series features aerodynamic control surfaces in place of the flat flaps and ailerons of the EX. Additionally, the flaps' pivot arms have been relocated and dropped relative to the wing, forcing high-pressure air from below the wing over the flap, helping airflow remain attached to its surface and increasing lift. CC was "still testing the stall speed" to determine the improvement the redesign produced, Max Platts, the company's kit marketing coordinator, had told me back on the ground, but we were at 27 mph indicated before the EX-2 started to shudder. "That's about as slow as it wants to be," Warren announced.

With a stall speed like that, and its short takeoff run, it seemed you could put the EX-2 down just about anywhere, I said to Warren. Apparently, he wanted to prove me right. "Tell you what," he said, "my airplane." He lined up over a berm heading northward, pulled the power and began a descent. This wasn't going to be a standard approach, but if you're flying

a traditional pattern, the first notch of flaps can be deployed at 80 mph, and the airplane slowed to 50 on the downwind. Fly base at 40 to 45 mph and add another notch of flaps. Fly the final at 35 to 40 and bring in the third notch of flaps, and keep the nose pointed down and power in. "We can lose speed really quick," Warren noted. "It's not a floater."

The crests of the berms, about the width of a rail bed, were some 15 feet high, studded with scrubby vegetation and occasional small trees. Lengthwise, the landing spot was no challenge, as the narrow embankment appeared longer than most runways, but the steep drop on either side represented the kind of operations and challenges Carbon Cubs are designed to take on. As the berm grew in the windshield, the Garmin began to protest: "Obstacle ahead, pull up...Caution...Obstacle ahead, pull up. Obstacle! Obstacle! Pull up! Terrain, terrain, pull up, pull up." Vegetation sounded a tattoo on the belly of the EX-2 as we settled on the berm for just a moment before Warren throttled up, the tail rose, and we were back in the air.

Building The EX-2

As kit-built aircraft go, CC has made the EX-2 about as easy and economical to construct as possible. The aircraft comes in three kits—fuselage, wing and finishing—each containing every necessary nut, bolt and part, and priced at \$25,000. The parts are fabricated on CNC mills and routers for precise and consistent fit. Options for pre-configured instrument panel and firewall forward needs are also available from the factory. Build time is estimated at 800 to 1,200 hours. Attesting to its ease of construction, the EX-2 is on the FAA's National Kit Evaluation Team list of

eligible amateur-built aircraft kits.

For those who'd like professional help—or want to accelerate the process—the Carbon Cub FX Builder Assist program takes a unique approach to construction. Instead of assisting a builder in assembling parts from a kit, technicians help builders fabricate the parts themselves. Buyer/builders spend five eight-hour days at the company headquarters in Yakima, Wash., fabricating and assembling steel, aluminum and composite aircraft components. The company then uses those parts to assemble what it calls "a factory-perfect Carbon Cub" with selected options. (The FX is equipped with a 180 hp CC340 engine and long-range fuel tanks; extended baggage and 3x3 extended HD landing gear are standard.) About 50 days after the first session, the builder returns and applies the finishing touches to the aircraft. Two days are allotted for final assembly and preparation for the airworthiness inspection, and a day for the inspection, certification and a minimum of two test flights by company test pilots. The buyer also receives a one-year warranty, an unusual guarantee for an experimental amateur-built (E-AB) aircraft.

Yet, many pilots who'd like this level of performance just don't have the time or inclination to build an airplane, with or without expert assistance. If you're among them, keep your fingers crossed. John Whitish, the company's marketing manager, says CC hasn't ruled out creating a factory-built version at some point in the future. Meanwhile, the evolution of the Cub will continue. "We have a long list of ways we can continue to keep improving this airplane," Randy Lervold, CC's president had told me before the flight. "That's what we do at CubCrafters."

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