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MAY/JUNE 2006

Huge Fun in the
New **SPORT CUB**



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CubCrafters SPORT CUB

Big Fun in a Light Airplane

by John T. Kounis
photos by George A. Kounis

I must admit that I wasn't expecting an exciting ride when I first stepped into CubCrafters' new SPORT CUB for a test flight. After all, it is a *Light Sport Airplane*. Ever since I upgraded from a 100-hp Cessna 150 to a 120-hp Cessna 152 more than 25 years ago, I've continually set my sights on more power, more speed, and more weight. Now, my 300-hp Cessna 185 makes me feel like I need regular trips to the gym to strengthen my biceps just so I can land it. Would I enjoy flying the SPORT CUB, an airplane with 100 hp?

What I discovered is that the SPORT CUB is fun. *Lots* of fun. As soon as I sat in the wide, comfortable cockpit, the airplane fit me like a glove. This nimble aircraft that stalls at 36 mph and can take off and land in the space of a football field reinforced the fun of flying.

It was exciting to land on grass strips, fly over meandering riverbeds, and take in views of the wildlife scurrying beneath the trees. While a modern glass panel showed me everything I needed in one place, refined aerodynamics let me relax and just fly the plane; I didn't have to be too careful with the rudder. Flying the SPORT CUB took me back to the essence of what flying is all about.

The CC11-100 SPORT CUB is CubCrafters' new entry into the Light Sport Aircraft (LSA) market. But the word "Light Sport" seems to be a misnomer. With a 34.8-ft. wingspan and a 30-inch-wide cabin (four inches wider than a Super Cub at the shoulders), there doesn't seem to be much that is "light" about it. That is, until you think about 4 1/2-gallon-per-hour fuel burn and 1,320-lb. gross weight.

SPORT CUB Design

The SPORT CUB is a rag-and-tube, tandem-seat taildragger, so the casual observer may compare it to a Super Cub (especially given CubCrafters' extensive experience with that line of aircraft). However, comparing a SPORT CUB to a Super Cub is like trying to compare a 2006 Jeep Wrangler to a 1940s Willys Jeep. The SPORT CUB is an entirely new airplane designed from scratch that makes extensive use of modern avionics, design techniques, and composites such as carbon fiber simply not available when the original Cub was designed.

When CubCrafters embarked on the SPORT CUB design, several employees contributed a dollar to a pool that would be won by the person who guessed the closest weight of the final SPORT CUB. "I was really happy to lose my dollar," says

CubCrafters President Jim Richmond, "because I had guessed 920 lbs." The prototype SPORT CUB weighed 870 lbs. With further refinements, CubCrafters has shaved 30–45 lbs. off that weight. Production SPORT CUBS should weigh in around 825 lbs., yielding a 495-lb. useful load.

In order to streamline the introduction of new airplanes, testing requirements have been relaxed by LSA regulations. However, CubCrafters chose to employ the more rigid protocols that they had developed as a result of their work on the TOP CUB, which they certificated under FAR 23 Amendment 55 in December 2004 (see sidebar). "Only one test is required by LSA rules, the flight control test. Everything else can be done by analysis," says Jim. "We elected to do both analysis and physical testing like we did on the TOP CUB. The testing revealed places where the analysis had been overly pessimistic, meaning we could save a few pounds, or places where it had been overly optimistic, meaning that the design needed to be reinforced for safety." For example, CubCrafters reinforced their wing spar after it failed a test at a 1,430-lb. gross weight (the maximum permissible under LSA rules for a float plane). It's surprising

that this spar is currently in use on PA-18s flying at a 1,750-lb. gross weight.

Jim flew the first prototype SPORT CUB to EAA AirVenture Oshkosh in July 2005. He made the 1,350-nm flight from Yakima, Wash., to Oshkosh, Wisc., with only one fuel stop. Though the prototype SPORT CUB had a total of 36 gallons of fuel on board, that flight validated the economical operation of the O-200. The company started taking deposits at the show for 2006 deliveries, and more than 75 have been accepted to date. The first production SPORT CUB rolled off the line in April 2006 and was on display at the EAA Sun 'n Fun Fly-In in Lakeland, Fla. The first customer deliveries are anticipated this month.

Wing & Flight Controls

As a result of testing and iterative engineering changes, CubCrafters has achieved a remarkably light yet strong wing for the SPORT CUB. Each wing weighs in at only 44 lbs., but has been demonstrated to support nearly 4,400 lbs. (This 100-to-1 ratio is the equivalent of a 180-lb. man supporting six 3,000-lb. cars.) The only steel fittings in the wings are the nuts, bolts, and some wires; all other fittings are machined aluminum. The wing struts are extruded aluminum. The ailerons and flaps are aluminum-skinned and are interchangeable from left to right, cutting in half the required inventory, tooling, and design time, without affecting the flight characteristics. Vortex generators assist low-speed maneuverability, making the airplane responsive all the way down to the V_{S0} of 36 mph at gross weight—in a strong wind, you could hover down to a landing.



Flaps are a \$4,900 option that I would highly recommend. Not only do they reduce stall speed by 10% (and therefore, landing distance by more than 20%), they make it a lot easier to fly a steep approach. The flap handle is above the pilot's head, in the left corner of the windscreen ahead of the front door post. This somewhat

unconventional location places the handle much closer to the flaps, shortening the cables and simplifying the system, thereby also decreasing the weight. Jim points out that the flap handle location is also safer, since the pilot does not have to bend down and lose sight of the runway to extend the flaps.

COMPARING A SPORT CUB TO A SUPER CUB IS LIKE TRYING TO COMPARE A 2006 JEEP WRANGLER TO A 1940s WILLYS JEEP.





Above: Responsive controls and low fuel burn at typical speeds of 90 to 110 mph as well as good visibility make the SPORT CUB fun to fly. Below: Standard vortex generators improve controllability, especially at low speeds of 50 to 60 mph typical on approach to short strips. Opposite: The prototype airplane we flew, N502CR, was equipped with optional 8.00 x 6 tires and a McCauley metal propeller.

The standard fuel system has one 12-gallon tank (11 gallons usable) in the left wing. An optional tank in the right wing extends endurance from 2.5 to 5 hours for \$1,100. According to Vice President Todd Simmons, not a single customer has ordered a SPORT CUB without the second fuel tank option.

Fuselage and Seats

The first thing you'll notice about the SPORT CUB is the wide cockpit. The fuselage is four inches wider than a Super Cub. A two-piece composite door that is 11 inches longer than a stock Super Cub door (eight inches farther forward and three inches to the rear) provides easy entry and exit. Photographers will like that the doors can be opened and closed in flight.

The front seat is a lightweight, carbon fiber design that substantially exceeds ASTM crashworthiness requirements (leather seats are optional). The floorboards and seat pedestal are a single composite component that is both strong and light. The front seat slides fore and aft about three inches on the pedestal. In the rear is what the company calls a "disappearing" sling seat. Since it is suspended by reinforced straps from the steel frame of the airplane, it can quickly stow up and out of the way, yielding a very large rear baggage area. To me, it looked like a hammock, but it is quite comfortable, and when I asked about the strength of the seat, Jim reassured me that it is stronger than it looks, as the stiffness in the seat is created by carbon fiber rods sewn into the seat back. During testing, the

aircraft routinely had up to 1,140 lbs. of lead on the rear seat and in the baggage area, and passengers up to 6 ft. 6 in. and 330 lbs. have comfortably sat in the rear seat.

Behind the rear seat is an 11.6-cu.-ft. baggage area with a 110-lb. weight limit, as well as a 6-cu.-ft. upper extended baggage

area with a 20-lb. weight limit. Both areas are accessible from the aircraft cabin. With the rear seat stowed, baggage volume increases to a whopping 46 cu. ft. (In comparison, the cargo volume of a 2006 Ford Explorer is 45.1 cu. ft.) All cargo areas have been tested to withstand 18 Gs.

THIS NIMBLE AIRCRAFT THAT STALLS AT 36 MPH AND CAN TAKE OFF AND LAND IN THE SPACE OF A FOOTBALL FIELD REINFORCED THE FUN OF FLYING.



On the outside, the most notable departure from the classic Cub shape is in the cowling. A new fiberglass cowling encloses the entire engine, doing away with the classic “bug-eyed” look. Though some Cub purists may miss the old look, they’ll welcome the added 20-mph cruise speed possible with the redesigned cowl. The air box is incorporated into the new cowl, eliminating the air filter cylinder under the cowling on Super Cubs.

CubCrafters also paid attention to the aesthetic details, coordinating both exterior and interior design. In addition to the standard Cub yellow, customers can order an optional two-tone paint scheme that features curved stripes in gold and gray. Inside, the



side panels are textured in some areas and smooth in others. The smooth areas lead up to the throttles. “The interior is designed like a new car,” says Jim, “It’s a stylized, old-school design.”

Avionics

Several panel options are available. The standard panel is rather basic; it includes the instruments required for VFR flight (airspeed indicator, altimeter, compass, tachometer, oil temperature gauge, and oil pressure gauge), a Garmin SL40 VHF transceiver, a low voltage warning light, and an inclinometer (the “ball” part of a turn and bank indicator). The Deluxe VFR Panel (Panel A) for \$9,900 includes a Garmin 396 GPS, a Garmin GTX327 transponder, a VSI, a turn and bank indicator, a fuel primer, and Bose headset wiring and jacks in the wing root. I would choose at least this panel, due to the safety of having a gyro instrument, GPS capability, and a transponder (since my airport is inside the 30-nm ring around a Class B airport, I couldn’t even fly home without a transponder).

CUBCRAFTERS SPORT CUB CC11-100

BASE PRICE: \$99,500

CubCrafters SPORT CUB is a light sport aircraft with a big-airplane design. With a 34.8-ft. wingspan and 30-in wide fuselage, it looks and feels like a production general aviation airplane. The conventional gear, low stall speeds, short takeoff and landing distances, and good power loading make it a fun and versatile airplane to fly.



SPECIFICATIONS

POWERPLANT	100-HP CONTINENTAL O-200
RECOMMENDED TBO	1,800 HR
PROPELLER	SENSENICH 72x44 WOOD MCCAULEY 70x45 METAL (OPTIONAL)
LENGTH	23.3 FT
HEIGHT	8 FT 4 IN
WINGSPAN	34 FT 9 IN
WING AREA	176 SQ FT
WING LOADING	7.5 LB/SQ FT
POWER LOADING	13.2 LB/HP
LANDING GEAR	CONVENTIONAL TAILWHEEL
SEATS	2
CABIN WIDTH	30 IN (AT PILOT POSITION)
CABIN HEIGHT	52 IN (AT PILOT POSITION)
STD EMPTY WEIGHT	825 LB
MAXIMUM GROSS WEIGHT	1,320 LB / 1,430 LB (FLOATS)
MAX USEFUL LOAD	495 LB
MAX PAYLOAD W/FULL FUEL	351 LB
FUEL CAPACITY	12 GAL (11 GAL USABLE) – SINGLE TANK (STD) 24 GAL (22 GAL USABLE) – TWO TANKS (OPT)
OIL CAPACITY	6 QT
BAGGAGE CAPACITY	130 LB

PERFORMANCE

TAKEOFF GROUND-ROLL	250 FT
TAKEOFF OVER 50-FT OBSTACLE	950 FT
RATE OF CLIMB, SEA LEVEL	800 FPM
MAX LEVEL SPEED, SEA LEVEL	122 MPH
CRUISE SPEED	105 MPH
FUEL BURN	4-5 GPH
ENDURANCE	2.5 HR (SINGLE TANK) / 5 HR (TWO TANKS)
MAX RANGE	225 MILES (SINGLE TANK) / 450 MILES (TWO TANKS)
SERVICE CEILING	14,000 FT
LANDING OVER 50-FT OBSTACLE	1,000 FT
LANDING GROUND-ROLL	200 FT

LIMITING AND RECOMMENDED AIRSPEEDS (MPH)

V _X	55
V _Y	65
V _A	100
V _{NO}	110
V _{NE}	138
V _{S0}	36
V _{S1}	40

ALL SPECIFICATIONS ARE BASED ON MANUFACTURER’S CALCULATIONS. ALL PERFORMANCE FIGURES ARE BASED ON STANDARD DAY, STANDARD ATMOSPHERE, SEA LEVEL, GROSS WEIGHT CONDITIONS UNLESS OTHERWISE NOTED.

FOR MORE INFORMATION, CONTACT CUBCRAFTERS, INC., 1918 S 16TH AVE., YAKIMA, WA 98903, (509) 248-9491, WWW.CUBCRAFTERS.COM.



CUBCRAFTERS CHOSE TO EMPLOY THE MORE RIGID PROTOCOLS THAT THEY HAD DEVELOPED AS A RESULT OF THEIR WORK ON THE TOP CUB.

A significant number of customers choose the top-of-the-line Deluxe “Flat Panel” (Panel B) that delivers sophisticated glass-panel technology for \$17,900. It includes all the capabilities of Panel A, along with a Dynon FlightDEK-D180 EFIS & Engine Management System with a seven-inch display. The primary display is an artificial horizon, with airspeed and altitude depicted as vertical tapes to the left and right, and a heading display across the top. Engine parameters such as RPM, oil temperature and pressure, cylinder head temperatures, and exhaust gas temperatures are also shown to the right of the flight displays. For \$2,100, customers can upgrade the Garmin GTX327 to a GTX330 that enables traffic alerts on the Garmin 396. The panel is surprisingly compact and versatile. It displays a wealth of information that was unheard of as little as ten years ago in such a small space.

Initially, I was surprised at the decision to use the Garmin 396—a handheld unit—instead of a panel unit such as the GNS 430 and 530. Jim explained that the 396 has the same size display as a 430, but is much more economical. The optional NEXRAD weather, satellite imagery, extensive weather products, and even XM Satellite Radio make it especially attractive. As an added benefit, you can remove it

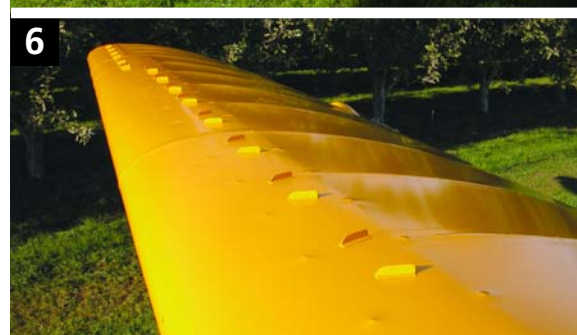
after you land and use it to navigate on the ground, too.

Landing Gear

Standard Super Cub-style landing gear with bungee suspension and Grove wheels and brakes supports the airplane. A departure from the Super Cub tradition of heel brakes, the standard aluminum rudder pedals are equipped with toe brakes. Since many pilots (including me) have trained in aircraft with toe brakes, I’m sure this is a welcome enhancement for most. In addition to the standard 6.00 x 6 tires, landing gear options include 8.00 x 6 (\$200) and 8.50 x 6 (\$600) tires, as well as a Scott 3200-type tailwheel assembly from Alaskan Bushwheels (\$1,450).

Flying It

I had an opportunity to fly the prototype SPORT CUB, N502CR, during a CubCrafters fly-in at their factory in Yakima, Wash. The principal difference between it and the production models to be delivered was that the empty weight was roughly 60 lbs. heavier. Other refinements made since then include relocation of the flap handle, toe brakes, electric trim, an adjustable front seat, upgraded interior, and a more modern glass panel. With Jim in the back, me in the front, and roughly half tanks, we were





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1. The optional Deluxe VFR Panel includes a turn and bank indicator, VSI, fuel primer, Bose headset wiring and jacks in the wing root, as well as a Garmin 396 GPS, GTX327 transponder, and SL40 VHF transceiver

2. The two-piece, composite door is eleven inches wider than a Super Cub door, allowing ease of entry and exit.

3. A 100-hp Continental O-200 engine with dual exhaust is standard. It burns only 4-5 gallons per hour in cruise.

4. Optional 8.00 x 6 tires, improve rough and soft field performance.

5. The movable horizontal stabilizer is actuated by electric trim controlled by a switch on top of the pilot's stick.

6. Vortex generators come standard and improve low-speed handling.

7. The fiberglass cowl eliminates the classic Cub "bug-eyed" look and increases cruise speed 20 mph. The air box is incorporated into the underside of the cowl. The 70-in. McCauley metal propeller is optional (a 72-in. Sensenich wood propeller is standard).

8. The flap handle, shown here in the extended position, is at the top left of the cockpit, allowing the pilot to keep the runway in sight while extending or retracting flaps.

about 100 lbs. over the gross weight of certificated SPORT CUBs (we were flying in the Experimental category, so it was legal). We taxied out as I did a quick dance on the prototype's heel brakes to steer toward the runway (thank God the production model has toe brakes). Once we reached the runway and we pushed the throttle forward, the Dynon EFIS



came alive with airspeed and engine data.

The prop pushed enough air over the rudder to make it immediately effective, and little foot pressure was required to stay on centerline. Acceleration was more than I expected for 100 hp. (The power loading of a SPORT CUB is 13.2 lb/hp, which is better than a Cessna 172—and a Cessna 172 won't lift off at 45 mph either.) Just 100 or so feet down the runway, the controls started getting firm. I raised the tail with minimal P-factor, and we reached flying speed of 45 mph not long afterward. I simply eased off the forward stick pressure, and the airplane flew itself off the runway.

After a 100-ft. obstacle climb at a V_X of around 55 mph, I accelerated to a V_Y of about 65 mph. The rate of climb was between 600 and 800 fpm, which is respectable for a 100-hp airplane that was over gross. I pointed the nose toward the practice area and leveled out to cruise. I had to crank the trim knob on the prototype several turns each time I changed trim, but it required little effort to turn. (The elevator trim in the production model is electric, with the switch located on top

of the pilot's stick.) Wide open, with the nose level, the airspeed settled in at around 110 mph indicated at 3,000 ft. at 2,750 rpm. However, it felt more comfortable to back off the throttle a little and cruise at about 90 mph indicated.

After a couple of clearing turns, we put the airplane through its paces, starting with steep turns. Control forces were light, and the airplane can literally be flown in all regimes with just two fingers. Adverse yaw is minimal—much less than the Citabria in which I did my first tailwheel training. We rolled back and forth from a 60-degree left bank to 60-degree right bank. Then, from a 60-degree bank, I pulled back on the stick to a stall. The stall was gentle, and the airplane recovered immediately as soon as back pressure was released. The airplane felt solid and stable; it just didn't feel like what I thought a 1,320-lb. light sport airplane would feel like—it felt more like a "real" airplane.

After a short while, I got the hang of the airplane, so we headed back to Buena, a private grass strip south of Yakima. En route, we reduced power and flew low

Above: The SPORT CUB underwent more comprehensive testing than required under LSA regulations, including a 6-G test of the wing, subjecting it to more than 2 tons of force.

Below: In addition to "Cub yellow," a blue, green, or red two-tone paint scheme is optional.





Since I was used to heavier airplanes that require a more assertive flare lest you smite the ground, it took a little getting used to the SPORT CUB's light weight. I tended to balloon or float, and it took two or three landings to change my technique. I learned to skip the roundout that I usually do at hangar height, and delay my flare until I was closer to the ground. Then, I would keep it flying a foot or so off the ground until the airplane just settled onto the runway. This technique netted a greaser every time.

After spending the last ten years of my career muscling a 300-hp, 3,350-lb. airplane around, I rediscovered the fun of flying with the SPORT CUB. It was fun to relax and fly an airplane that goes where you point it, that does not have much adverse yaw, and that can be flown with two fingers. With its stability

and big cabin, it was hard to believe that it was a Light Sport Airplane. And with today's fuel prices, it's great to know that I had all this fun while burning less than five gallons an hour. ■

CubCrafters is taking orders now for new SPORT CUBS. A deposit of \$2,500 confirms a delivery position (currently for February 2007 due to the present backlog) and locks in the price. Deliveries are anticipated to begin this month and the backlog is anticipated to eventually diminish to 12 to 16 weeks. As of January 1, 2006, the base price of a SPORT CUB was set at \$99,500, (509) 248-9491, www.cubcrafters.com.

PASSENGERS UP TO 6 FT. 6 IN. AND 330 LBS. HAVE COMFORTABLY SAT IN THE REAR SEAT.

over a meandering river. The airplane was nimble and easy to whip into steep banks to follow each curve of the river. Treetops passed under our landing gear as we flew along at 90 mph. This airplane is good at dishing out fun in large doses.

With no traffic ahead of us, we cruised into the downwind leg at 90 mph. Abeam

the touchdown point, I reduced power, slowed to 80 mph, and extended full flaps. Continuing to slow down to 60–65 mph, the airplane felt solid—most likely a result of the VGs doing their job. We crossed the fence at 50–55 mph, and the airplane continued to be solid and responsive throughout the flare.

The Birth of the SPORT CUB

CubCrafters has been in the “Super Cub business” ever since owner Jim Richmond started selling rebuilt surplus L-21s (military versions of the PA18-135) in the early 1980s. In the 1990s, the company started manufacturing brand new TOP CUBs, using Piper's original Super Cub type certificate under the FAA's “Spare & Surplus Parts” rule. The aircraft was essentially an improved Super Cub, sporting many of the mods desperately needed for safety and performance. The TOP CUB program evolved until CubCrafters received their own FAA type certificate to manufacture CC18-180 TOP CUBs under FAR 23 Amendment 55 in late 2004. This was only the sixth general aviation type certificate issued to an aircraft manufacturer since 1985 (see our TOP CUB review in the Nov/Dec 2005 issue).

In their quarter century of design and development, CubCrafters has learned a lot about the strengths and weaknesses of the Super Cub design, so when they decided to create their own light sport aircraft, they started with a clean slate. This allowed them to do things the right way from the very beginning, taking advantage of modern materials, manufacturing techniques, and avionics that have substantially improved since the first Cub was designed. They drew on their experience with FAR 23 certification of the TOP CUB, utilizing the same rigid protocols and testing. The result is an aircraft with substantially more engineering and validation than is required under LSA regulations.

