



THE OTHER SPARTAN

The rare one—the C2-60.

BY JAY MILLER

I first saw NC11908 in June 1975 at the very busy Antique Airplane Association Fly-in in Denton, Texas, where it stood out from its surrounding peerage. As rare, nicely restored or uniquely painted as those airplanes were, none had the simple and unencumbered aesthetic qualities so perfectly personified by this one airplane.

With its bright orange wings and maroon fuselage, it sat on the newly laid asphalt ramp like a praying mantis awaiting the arrival of its next meal.

The rare three-cylinder Jacobs L-3 radial engine was mounted almost apologetically on its nose. I never had seen an L-3 before, and I was unsure that this sample was authentic. But close examination of the crankcase-

mounted brass nameplate labeled "Jacobs Aircraft Engine Company, Camden, New Jersey," confirmed that it was legitimate.

Painted on the aircraft's vertical fin in crisp beige/yellow letters was the word "Spartan." I was one of those common-airplane people who had grown up with only one image of a Spartan: a big, exceptionally fast, bright and shiny, four- or five-place, closed-cabin, all-metal, monster-radial-engine monoplane that even today—some 35 years after the last example rolled from a Spartan production line—represents the pinnacle in the world of single-engine light aircraft.

There was no way this fragile-looking, homely, fabric-covered, barely two-place flying machine could be related to a Spartan. But mounted halfway up the starboard side of the barren cockpit's instrument panel was a small

metal plate inscribed with the definitive statement as to this airplane's identity and ancestry.

The words were there for all to see. It was unquestionably a product of the Spartan Aircraft Company, Tulsa, Oklahoma—only it was not all-metal, it was not bright and shiny, it was small, and its radial engine was not by any stretch of the imagination monstrous. My Spartan image destroyed forever, I decided to do some research.

The small monoplane was the design of Spartan President Lawrence V. Kerber and Engineering Vice President Rex B. Beisel. They conceived the Model C2-60 in 1930 as an inexpensive, uncomplicated, economical training and sport airplane. The initial C2-60 production run was scheduled to complete 25 aircraft. By the time the approved type certificate (ATC) was granted by the Civil Aeronautics Authority on

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July 1, 1931, production was well under way. The effects of the Depression curtailed production, however; and, before the end of the year, the C2-60 line had been dismantled, having produced fewer than 20 units.

The C2-60 differed from most designs of its day primarily by being a monoplane rather than a biplane.

The clean, almost round, 22-foot-5¼-inch fuselage was built up of



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welded 4130 chrome-moly and 1025 steel tubing, with gusset plates at all high-stress points. The framework was faired to shape with formers and fairing strips, then fabric covered and doped. Standard color for the fuselage was maroon.

The immense (for its fuselage size) 40-foot-span wing, normally painted orange, consists of two solid-spruce spar beams. These were attached to

spruce and plywood truss-type wing ribs and a drag truss system consisting of double, parallel tension members. The wing framework was built in two halves. The leading edge was covered with Duraluminum sheet, bent to the requirements of the Clark-Y airfoil curvature; and the 161.8-square-foot (with ailerons) structure was covered with fabric and doped. The wing has two degrees of incidence and four de-

grees of dihedral; total chord is 54 inches. Not a true cantilever structure, the wing was braced externally with parallel, streamlined, steel flying wires.

The two 11.4-square-foot (each) Frise-type ailerons were built up with spruce frames and Duraluminum leading and trailing edges. The actuation system is pulley and cable. The C2-60 is not equipped with flaps.

The 90-inch-tread landing gear consist of two rigid, vertical N structures with forked front legs. Each N is mounted on the bottom of the wing. The landing gear has no shock absorbers. Instead, the 19 x 9-3 Goodyear low-pressure (three-pounds-per-square-inch) Air-wheel tires were supposed to suffice. But flying in and out of grass and earth strips revealed this system to be inadequate. Besides the main gear, the C2-60 is equipped with a skid-and-tailpost tail-gear made of a spring-steel main suspension unit and a Duraluminum skid.

The C2-60's 15.5-gallon fuel tank is mounted above the top fuselage longerons, ahead of the cockpit and aft of the engine firewall.

Tail surfaces of the aircraft were built of welded-steel tubing, with steel channel sections serving as ribbing and structural support members. Horizontal and vertical tail surfaces are braced by eight flying wires (two to each exposed surface set); trim is ground adjustable.

Cockpit décor lives up to the C2-60 manufacturer's name. Comfort was an afterthought. The small bench seat supports the airplane's two occupants safely—but not comfortably. The panel usually was furnished with airspeed indicator, altimeter, oil temperature gauge, tachometer and throttle.

Other standard C2-60 equipment included dual control sticks, a rudder bar, a Hamilton Standard Model 25V1-4 propeller, an exhaust collector ring, a fire extinguisher, a fuel shutoff valve and a small storage compartment.

The C2-60 was a relatively inexpensive airplane for its day. Prices varied between \$2,245 and \$2,395, depending on options.

Perhaps the C2-60's most interesting technical feature is its motorcycle-sized three-cylinder, air-cooled Jacobs L-3 radial engine (ATC No. 75). Rated at 55 horsepower, it is a good match for the 1,195-pound gross weight airplane.

According to the figures submitted for its ATC approval, the L-3 weighs 170 pounds and has a 190.8-cubic-inch displacement, a 4.13-inch bore, a





4.75-inch stroke and a compression ratio of 4.8:1. It has two Scintilla magnetos and a Stromberg NAS-3 carburetor.

In practice, the Jacobs proved to be a delicate powerplant. Time between overhauls ran from 200 to 300 hours.

One nice characteristic of the L-3/C2-60 combination is its glide ratio; engine failures rarely led to disaster. With a power loading of about 21.73 pounds per horsepower, the C2-60 is not much more than a powered glider.

Today, just a few short months away from its golden anniversary, only two examples of the Spartan C2-60 are known to have survived. One still is flyable—NC11908. George Goodhead was responsible for its restoration.

Goodhead grew up in Tulsa, watching C-3 biplanes under assembly at the Spartan Aircraft Company. In 1937, he enrolled in the Spartan School of Aeronautics' 10-hour solo flying course. Two hours of dual instruction in a C2-60 were enough to endear this airplane to him for the rest of his life. Though he finished his private license training in a Piper Cub, the memory of the diminutive Spartan did not fade.

A successful businessman and a

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member of the Antique Airplane Association, Goodhead decided in 1958 to find a C2-60 and placed a "C2-60 Wanted" ad in the *AAA News*. Soon after, he received a letter from Eastern Airlines pilot Bob Beitel, who had a good selection of C2-60 parts and a fuselage stored in Tiffin, Ohio.

Goodhead first had all the metal parts sandblasted and zinc-chromated, and then he and a friend built new fuselage fairings and installed new elevator and rudder control cables and a new instrument panel.

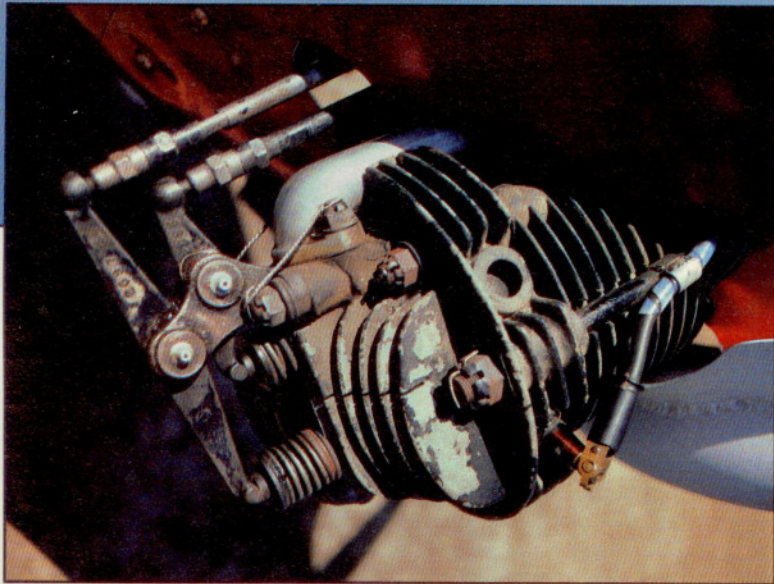
His search for a Jacobs L-3 engine, including another ad, netted no response. So on a hunch, Goodhead wrote to the Jacobs Aircraft Engine Company of Pottstown, Pennsylvania.

The company did have one Jacobs L-3 engine. It was part of Jacobs's en-

gine museum, which was being dis-banded, and had been on display for 25 years. The *zero time* L-3 was for sale for \$500. Goodhead negotiated a \$400 price, then turned it over to another friend to have it cleaned. It then was mounted on a test stand and, on November 25, 1960, was run for the first time.

Beitel had given the Hamilton Standard metal prop to M.V. Williams of Gibson City, Illinois, who, after much persuasion, agreed to sell it for \$150. Goodhead sent it to the Spartan propeller overhaul shop for a complete check-out and cleanup.

That left only the wings to be built. By the time Goodhead had acquired the airplane, few wing parts and no information remained. In his early research, however, he had stumbled across a few odds and ends in the way



of wing fittings drawings, which allowed him to proceed with some of the more difficult metal work.

The big break came when he discovered that another C2-60—NC11016 (airframe No. 3)—was being restored by Bruce Molleur of Greenland, New Hampshire. Molleur had a complete set of wing spars, which Goodhead used as patterns for making new spars. In exchange, he made a set of landing-gear fittings for Molleur.

Molleur's airplane was completed and test flown. It finally ended up in the hands of Richard Jackson of Rochester, New Hampshire, but engine problems grounded it in the late 1960s.

Five years had passed by the time Goodhead reached the wing construction stage. During that time, several other restoration projects had begun to make things a bit crowded in the Goodhead garage, so he turned the C2-60 project over to J.O. Payne at the Spartan School of Aeronautics.

The engine was mounted, a new engine cowl built, the wing completed, Piper Cub brakes and wheels installed (a safety consideration) and the airframe covered with Grade A fabric and finished in butyrate dope.

On April 24, 1967, NC11908 was approved by the Federal Aviation Administration. The same day, it was flown by Goodhead's friend, Gene Chase.

"The only faults I uncovered," Chase reported, "were that the airplane was a little out of rig and the engine had a rough spot between 1,100 and 1,500 rpm. Straight-and-level flight could only be accomplished by holding considerable back pressure on the stick, maintaining moderate right rudder and holding a little left aileron."

The faults Chase found were corrected easily, and several further test flights were made. Goodhead then checked out in the type after a 30-year break, finding it to be just as nice a light airplane as any he ever had flown.

Not long after, Goodhead placed it on display at the Experimental Aircraft Association Museum in Oshkosh. But by the early 1970s, space was at a premium, and all aircraft not owned by the museum were returned to their owners. Chase found a home for Goodhead's C2-60 with his friend Bert Mahon, who was looking for a docile aircraft in which his wife Mary could learn to fly. The deal was consummated on September 21, 1972, and the Mahons flew the unique machine (at a

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40-mph groundspeed) back to Tulsa.

Four years later, they received an invitation to move it to the Justin Time Airport in Texas. Only antiquers are allowed on the field, only antiquers can become owners, and only five owners are allowed. A slot very rarely opens.

The Mahons are pleased with the move. Their Spartan, Waco and newly acquired Cessna 195 fit right in.

When I visited the Mahons, Bert gave me a flight in NC11908. Entering the cockpit is not easy. There is about two feet between the instrument panel and the seat back—getting in is an acrobatic feat unmatched since Houdini's strait-jacket slither.

There is little shoulder room, too. Under normal conditions, this would be somewhat of an inconvenience, but with the C2-60 it is an attribute—there is no heating, and, on even a mildly chilly day, any warmth one can obtain from a fellow crewmember is better than no warmth at all.

Starting the engine is fairly conventional for a 1930s vintage flying machine. It consists primarily of pulling the prop through a few times, turning on the magnetos and propping it again. After the engine had warmed a bit, we taxied off to aim the Spartan into the steady Texas breeze.

The taxi experience was an education in itself, as the rather stiff, noncushioning gear-mounts revealed themselves at their best. We bounced and bumped along for five minutes (or so it seemed) before getting three quarters of the way across the grass strip.

Mahon checked the mags and the temperature and the oil-pressure gauges. Then suddenly we were loping down the yellow grass. I knew the wings had taken hold when my vision began to stabilize and those stout landing-gear N-struts were forced to acknowledge their uselessness.

I would have to say that one of my fondest recollections of the C2-60 flight was looking directly ahead through the small plexiglass windscreen and seeing the top cylinder of the Jacobs sitting there all alone, with those two rocker arms popping and snapping up and down as if they were the busiest little metal parts in the world. It is a sampling of mechanical aesthetics one rarely has a chance to see these days.

We hurtled skyward at a not particularly lip-parting 500 or so feet per min-

ute and leveled off at "Flight Level 2." The noise and the wind were elements to be dealt with, but they were also a part of the Spartan's beauty. For the sheer sport of it, I poked an entire arm into the slipstream—I had been wanting to do that in an airplane for years, but always had found a door in the way before.

Mahon turned the feather-light controls over to me, so I could log a few minutes in complete control of the world's only flyable C2-60. Not too surprisingly, I found the airplane to be pleasant and not overly sensitive in yaw, pitch or roll. In fact, I would say

SPARTAN C2-60

Base Price \$2,245(1930)

Specifications

Powerplant	Jacobs L-3 55 hp, 3 cyl
Wingspan	40 ft
Length	22 ft 5 in
Height	6 ft 11 in
Wing area	162 sq ft
Wing loading	7.38 lb/sq ft
Power loading	21.73 lb/hp
Empty weight	731 lb
Useful load	464 lb
Payload w/ full fuel	371 lb
Gross weight	1,195 lb
Fuel capacity	15.5 gal
Oil capacity	6 qt

Performance

Maximum speed	93 mph
Cruise speed	81 mph
Landing speed	39 mph
Climb @ sea level	750 ft first min
Ceiling	13,000 ft
Range @ 3.5 gph	320 sm

Based on manufacturer's figures

the Spartan had just the right amount of feel for an airplane of its weight.

My only complaint—a common one among airplanes with small engines—was that the Jacobs did not quite have the power necessary to make the big-winged C2-60 perform.

After enjoying myself for about 10 minutes, I returned the controls and contented myself with looking out along the expansive wings and watching those rocker arms—what rhythm.

Mahon turned final about three quarters of the way down the strip. We landed and slowed to taxi speed—which was not very hard to do from a stalling speed of just under 40 mph.

It is a typical story. The Spartan, Goodhead and the Mahons personify antique airplanes and all they stand for. One can hope that it will remain typical for many years to come. □