A Quarter Scale aircraft for .60 engines from the "Golden Thirties." The Monocoupe will reward your efforts with scale-like flight that is stable and graceful.

Monocoupe 90 A

by Tony Lombardo and Don Palumbo

MONOCOUPE 90-A
TYPE: R/C Standoff Scale
WINGSPAN: 95 inches
WING AREA: 1309 square inches
LENGTH: 58½ inches
ENGINE: .60
RADIO: 4-channel

• During the pre Depression, post WW-I era, the world of aviation grew at a phenomenal rate in the United States as well as abroad. By the year 1926, airplanes were already emerging as more than just war machines, or an interesting "toy" for the idle rich. Aircraft were being designed to meet more specific needs, and the newly formed N.A.C.A. was providing the technology base for improved design methods and aerodynamic theory. New records for speed, endurance and altitude were being set on an almost daily basis by those courageous men and women who learned to fly the fragile machines by simply jumping into the pilot's seat. Don Luscombe was just such a man, and like many other pilots of that era, he saw a bright future for aviation.

Don Luscombe detected a need for a lightweight monoplane wherein the pilot and his passengers could ride in comfort without having to wear heavy clothing to keep warm. His concept of the ideal airplane for the sportsman pilot met with considerable skepticism among those who believed that a pilot had to have the wind in his face in order to properly control an airplane. The Belgian's Demonty and Poncelet had produced an eyesore of a monoplane with an enclosed cabin in 1924, and although somewhat underpowered, it served as the real inspiration behind Luscombe's dream plane. Upon presenting his ideas to the membership of the Davenport Flying Club, he received $5,000 in financial backing and formed the Central States Aero Co. in October 1926. Don Luscombe hired Clayton Folkerts, who happened to be hedge-hopping in Dubrique in a home-built gull-winged monoplane, as his technical right-hand man.

Work on his dream ship began shortly thereafter, and within 4½ months the first "Monocoupe" prototype rolled out of the hangar. Luscombe invited E.K. (Rusty) Cambell (of Moline Airport fame) to make the first flight. Cambell was elated with the way the Monocoupe performed, saying "You don't fly it—you just wish it!" Everyone was surprised at the Monocoupe's speed and the ease of control. Soon after that first flight C.S.A. began booking orders. The word spread quickly about the Monocoupe's superb performance and even Col. Charles Lindbergh ordered one to be equipped with brakes (a first for a light monoplane).

The growth of C.S.A. was phenomenal. In 1928 there were 275 Monocoupe Model 70s produced and 10% of all licensed aircraft in the United States were Monocoupes. In 1929 the company was reorganized, with Luscombe becoming the President and General Manager of Mono Aircraft Corp.

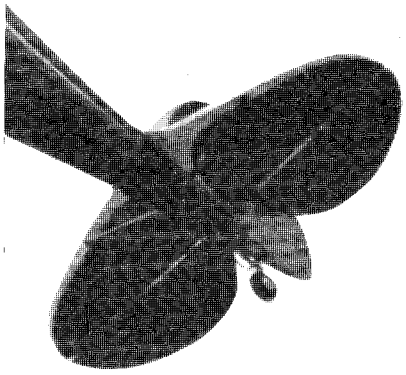
Various models of the original Monocoupe were produced, with most of the changes up front to accommodate newer engines. In January 1930 the Model 90 arrived on the scene with its 90-horsepower Lambert R-266 powerplant. The plane was later retrofitted with the 110-horsepower Warner to produce the Model 110 in June of that year. Monocoupes continued to dominate the racing scene with 1st places in 11 of 15 events entered that year. They also took 1st places in 3 cross-county derbies, and Benny Howard was so impressed by the 110 that it became the basis for his 1934 DGA-6 ("Mr. Mulligan") design.

THE MODEL DESIGN. Our model of the Monocoupe 90-A is exactly ¼ scale, spanning 95 inches. A good off-the-shelf .60 displacement engine flies it beautifully when it tips the scales at about 9 pounds even. The only difference between our model and the original aircraft is that no flaps are used on the model, although these could easily be incorporated if you had the desire.

A wealth of information on the prototype aircraft is available in the book *Of Monocoupes and Men* by John Underwood, published by Heritage Press, Box 167, Glendale, California. Modelers having a reasonable level of skill will have no difficulty in building this model. The aircraft almost flies itself, so just about any flier who can handle a Kadet, Falcon or similar performer will have sufficient skill to fly this Monocoupe. Scale-like flight and breathtaking aerobatics are well within the model's abilities.

CONSTRUCTION NOTES. Take a few moments to study the plan before beginning. It is not a hard aircraft to assemble, but there is enough of it. You'll need a flat working surface and straight, true wood as specified by the plan callouts. It is a good idea to cover the plan with plastic wrap to shield it against glue drippings and resulting adhesions.

The wing is built in three sections, a flat 9" center-section and the two main panels, joined by the 3/16" plywood braces. Cut a full set of ⅛" C-grained wing ribs accurately, and find the straightest leading edge and spar stock possible. The panels will assemble in typical fashion, and the Clark Y flat-bottomed section over most of the chord length makes it easy to position the ribs. Note that the tip ribs lie above the plane of the remainder of the wing, but the top spars are straight. It is easy to shim these ribs up parallel to the building sur-



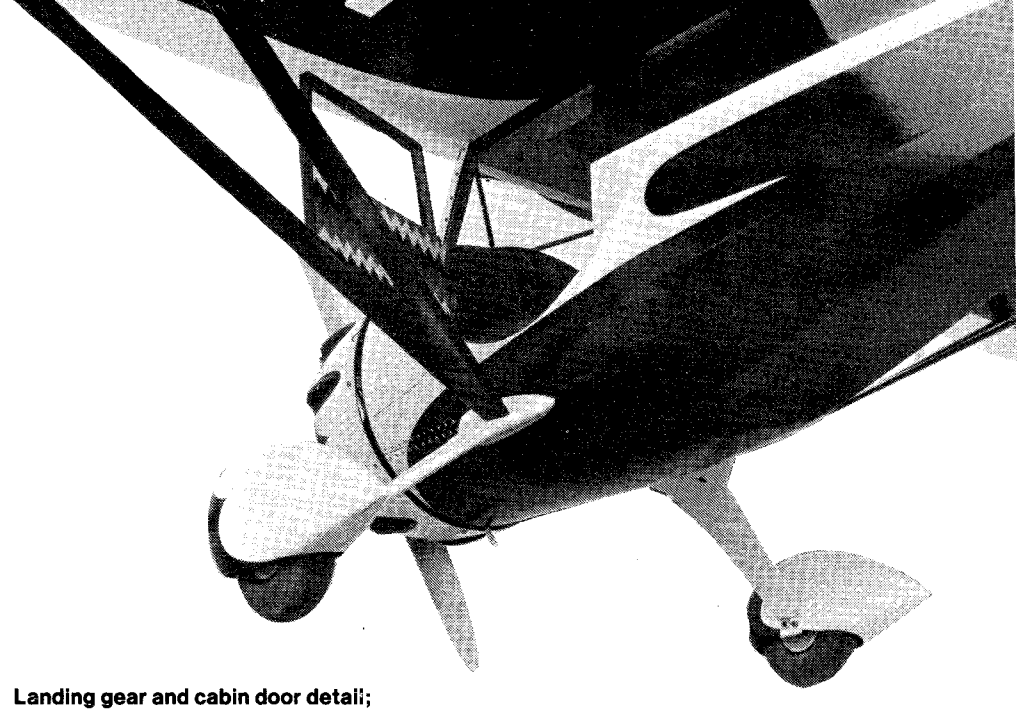
face until they are even with the top spars. Level the top spars appropriately prior to cementing them in place.

Once the basic wing structure is joined by the plywood gussets, it is time to consider the ailerons, the bellcranks and connecting linkage, wing strut mount positions, servo mount, and the sheeting and capstrips that complete the structure.

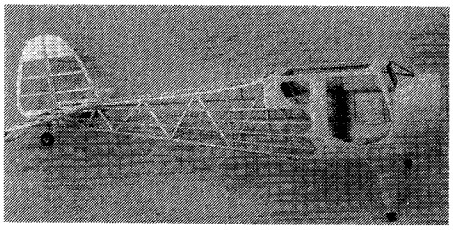
Trim and sand the leading edge carefully to a smooth airfoil, and check all joints and edges for smoothness. Little defects become very visible when you cover and finish an aircraft.

TAIL SURFACES. Some 3/8" thick stock is used for all the tail surfaces. The plan callouts specify the sizes and it is important to make good glue joints in every case. Wrinkles creep in when you don't. Try a small plywood insert as a solid base for the rudder and elevator horns. If they're mounted to nothing but soft balsa, you're liable to develop slop and play later

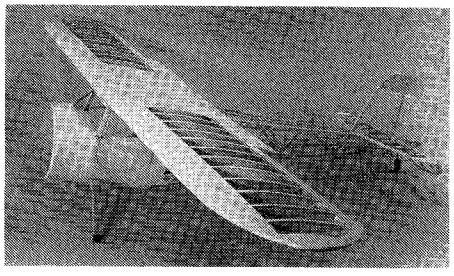
(Plans on next two pages; text continued on page 111.)



Landing gear and cabin door detail; fiberglass parts are available; see text.



Well-designed structure is always a nice sight; framework is light and strong.



Lightweight structure makes ship a very practical 60-powered quarter scaler.

Tony Lombardo and Al Walter pose the big bird; graceful Monocoupe lines evident.

Cowling details hide the craft's model engine very effectively; nice details.

This gives a good indication of Monocoupe size; big but practical.

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on, lessening response to control inputs. Both stab and fin leading edges should be rounded off, while elevator and rudder trailing edges are best airfoiled more, requiring some additional trimming and sanding time. The results are worth it. A typical music-wire crossbar joins the elevator surfaces. You may elect to hold off on the hinging of surfaces until the covering has been applied.

WING STRUTS. Spruce is suggested for the wing struts. It planes to airfoil section smoothly and offers all the strength you could hope for. A music-wire hook can be set into the struts to fit tubing anchored to the longeron/landing gear fairing, and a bolt can secure the strut to the wing at each position. Nylon shear bolts are recommended for wing-to-fuselage connections.

FUSELAGE. Construction of the fuselage is relatively straightforward. Two sides are built over the plan, joined with crossmembers and formers and stringers added in turn. Nothing hard about it, but do start with good wood. We recommend 1/4" sq spruce; it has the strength, tends to be straight-grained, resists bowing between stations and helps balance the aircraft. Balsa or spruce may be used for the uprights and diagonals. Whatever your choice, make good glue joints.

You may wish to build one fuselage side over the other for greater accuracy. Finishing nails and pins may be used to bracket the wood, though they should never pierce or even bruise it. After one side has been laid out, another skin of plastic wrap may be dropped over the pin heads, punctured by them. The second side is now glued together, with the plastic wrap preventing it from adhering to the siding beneath.

Once the sides are apart, they may be jigged over the top view and joined by the appropriate crosspieces. Align everything carefully. The landing gear should now be mounted and the forward formers added to create that circular radial-engined look of the Monocoupe 90-A. Firewall and engine mount follow, spruce stringers and the forward sheeting, all in logical order. Fuel tank installation, engine mount and pushrods will keep you busy for a few hours. Think up a few extra ways to brace the cabin structure, which takes the wing loads, and the landing gear mount, which must spread the landing impacts across enough of the fuselage structure. It is easier to prevent trouble now than to repair a fractured and sprung structure later.

You'll have a better flying aircraft if you fit and align the wing and tail surfaces to the fuselage accurately. A poor job of it can throw the performance envelope out the window. While you're at it, a good engine thrust setting is important as well. An aircraft should track pretty well on its own without your control inputs, so build accurately and then trim out the model until it flies as it should.

This model was covered with Permagloss Coverite, which we highly recommend. It is light in weight and high in the strength department, and also applies easily. A coat of Balsarite over the structure before application of the covering adds almost no weight and helps make an excellent bond between the wood and the covering.

Windows and windshield were made from .04" clear butyrate. Hot Stuff Super-T is an excellent adhesive for this task, but use it sparingly—it does have a tendency to fog the clear plastic if used too liberally.

The aluminum landing gear needs something of a fairing. Some 3/16" balsa sheeting laminated to it does the job. Grain is best in the fore-and-aft direction, as the gear tends to flex on impacts. Again Coverite may be used over the airfoiled gear laminations to hold all as created.

As for the powerplant, a Quadra is simply too much for this Quarter Scale; the Monocoupe was not that large an aircraft. We chose a .60 displacement Fox Eagle II Side-Exhaust. Select a mount to fit the engine of your choice and secure the mounting nuts within.

There is no end of room for your radio equipment. Check the balance of the aircraft and position the radio equipment to your advantage. Add ballast to the nose or aft fuselage if necessary until balance is achieved. Don't fly until you do; it's the reason why a lot of scale types wipe out on test flights.

The cowling and wheelpants are not easy, and while you can form and balloon-mold your own in fiberglass, we have arranged with Fiberglass Master, P.O. Box 134M, Bayshore, NY 11706, to supply them if you prefer to go this route.

FLYING. After a complete pre-flight check, our Monocoupe was fueled and fired up. At an all-up weight of 9 lb, the wing loading of the model borders on that of a typical powered glider, so we were a little reluctant to fly with the 15 mph winds prevailing on the day at hand.

The model was balanced a little on the nose-heavy side for better penetration, and off it went down the runway. The tail lifted almost immediately and the slightest amount of right rudder was fed to it to keep the ship tracking straight. After about 25 feet of runway was consumed, the ship lifted itself off the ground and began its climb-out. A slight amount of up-elevator and the angle steepened. At perhaps 300 feet a gradual turn was initiated. The model responded beautifully to all control inputs and flying it was a really pleasant experience. Loops and rolls were performed with very scale-like appearance, and even inverted flight proved to be within its capability.

An approach was made into the fairly stiff wind and it seemed as if the Monocoupe didn't want to settle down on mother earth. A couple of more passes were made with varying degrees of nose-down trim until airspeed was in the ballpark. Total ground roll that day was about 5 feet.

Several additional flights were made that same day, even though the wind picked up to about 20 mph toward afternoon. All in all, the Monocoupe impressed us with rock-solid stability in all attitudes. If you're interested in a truly scale-like flying machine that is a real pleasure to fly, you'll have a hard time finding one to equal the beautiful Monocoupe 90-A. Maybe its graceful flight characteristics were what attracted so many early aviators to it. ■