By R. JESS KRIESER

AERO COMMANDER 100

AN RCM CONSTRUCTION FEATURE

1966 Aero Commander 100
Product of Aero Commander Albany,
Division of Rockwell-Standard Corp.

For digital, or pulse proportional, this 54" span semi-scale version of the **AC 100** is ideally suited for the sport flier.

In an unofficial sort of way, this article has become part 2 of a 3-part series that began with the Cessna Skyhawk features that appeared in the January, 1968, issue of R/C Modeler Magazine. Part 3 will appear in a future issue, and will feature the Aermacchi-Lockheed AL-60 "Santa Maria." Those of you who read the Skyhawk article will recall how the Skyhawk was developed, and how I reworked the Skyhawk configuration so that it would resemble the Aero Commander 100. The results have been most gratifying, as the Aero Commander 100 has all of the good performance characteristics of the Skyhawk, with a slight advantage thrown in for extra measure.

That advantage is due to the swept-forward "Mooney-like" fin and rudder on the 100. It gives the ship better stalling and spinning characteristics than the Skyhawk, as the rudder is never blanketed by the elevators when at extreme angles of attack, as is the case with the swept-rudder designs. Recovery from spins is faster and more positive, too. Another advantage of this will be evident to those who fly with Galloping Ghost systems, as the swept-rudder will always give a component of up-elevator in turns, which at times can be undesirable. This characteristic is not present at all with the "Mooney-like" fin and rudder. Herb Abrams, the Rand man, was quick to recognize this when looking over the original Aero Commander 100, and pointed out the obvious advantages of this for G-G systems. He liked the 100 so much that he left my workshop with it in his possession, and is now flying the pants off of it. In his comments on the advantages to G-G of the tail configuration, Herb stated that the Aero Commander 100 "has got to be the prototype of all G-G designs."

When Orv Broberg (of Du-Bro Products) and I got together to figure out what we could come up with in the way of a good design to be molded in plastic, for the growing "Almost-Ready-to-Fly" market, we kept Herb's comments firmly in mind. We settled on the Aero Commander 100 as an ideal ship to be the first in Orv's new line of ARF airplanes. However, we decided to scale it down slightly, to make it more ideally suited for .09, .15, and .19 power, and hence, more appealing to the G-G flyer. At 85% of the size of the original model, this gave us around 380 square inches of wing area, small enough to handle G-G systems, yet large enough to take the new compact proportional systems and provide top performance with a .19 in the nose.

The results have been excellent, and Orv is now on the home stretch on the project. By the time this appears in print, the first production run should either be on the shelves in hobby shops, or on the way. So those of you who would rather fly than build can get your AC 100 in the air by simply going to the nearest hobby shop. Those of you who are die-hard "balsa butchers," and still prefer to work with the traditional building materials, and like the smell of butyrate permeating your workshop, can simply put in your order to R/C Modeler for the plans, gather together all materials you will need, and sit back and wait for the postman to arrive.

I became interested in the AC 100 some time back, when it was still the Volaire. It began its life in Alquippa, Pennsylvania, as the Volaire 10, designed by Jack Gilberti, and certified as a 2-place aircraft in November of 1962. It was modified into a 4-place design and certified as the Volaire 10-A in June, 1965, and very shortly thereafter the entire assets of Volaire were acquired by Aero-Commander. Aero-Commander, in turn, became part of the Rockwell-Standard Corporation, and manufacturing of the 100 was moved to Albany, Georgia, where the Aero-Commander Division of Rockwell-Standard established a complete new facility for producing both the 100, and the 200, the latter being the former Meyers low-wing design which bears a slight resemblance to the Navion. Aero-Commander acquired all of the assets of Meyers Aircraft about the same time that it acquired Volaire. Since then, Rockwell-Standard has merged with North American Aviation, and the Albany works is now part of the Aero-Commander Division, North-American Rockwell Corp.

Upon acquiring the design from Volaire, Aero-Commander made a few minor design improvements to the ship, such as redesigning the wheel pants and the instrument panel, changing the wing tips, and adding a more streamlined rear cabin window to the ship. The latter not only improved the appearance considerably, but added an extra 2 mph to the cruising speed.

The Aero Commander 100 probably represents the most airplane for the money in today's private aircraft market. While there are other comparably-sized aircraft that offer higher performance, with more deluxe features and plushier interiors, they also carry a considerably higher price tag. When it comes to buying an honest-to-goodness basic airplane with excellent performance, with a payload of four people with baggage, the 100 can't be beat for sheer dollar value. Of all-metal construction with fibreglass engine cowls, landing gear parts and wheel pants, it is powered by a Lycoming 0-320, rated at 150 hp at 2700 rpm. This gives the ship a full-load cruise of 128 mph at 75% power. Range is 560 miles with 45 minutes of fuel remaining. Take-off run is 750 feet, after which it climbs out at better than 850 feet per minute, with an operational ceiling of 13,000 feet. Landing speed is moderate, with stalling speed in clean configuration at 52 mph, and 48 mph with ¾ flaps. Landing roll is only 650 feet. The wing features the 23012 airfoil, which gives a smooth stall, with fast, clean-break characteristics, and is fitted with flaps that can be set at 10, 20, and 30 degrees.

The 100 has a roomy cabin with big doors, and can accommodate six-footers with ease. Cabin carpeting is in nylon, with a Royalite interior, and the ship comes equipped with hydraulic brakes on each main wheel, and an altimeter, airspeed indicator, magnetic compass, tachometer, stall warning indicator, oil pressure gauge, oil temperature indicator, cylinder head temperature indicator, ammeter, and left and right hand fuel tank gauges, all as standard equipment. All of this for only 8500 bucks! I expect that quite a few 100's will show up at private airports throughout the country during the next few years.

In the meantime, maybe a number of 100's will show up in 54-inch span, radio-controlled versions at R/C flying sites throughout the country. That is, if many of you fellows out there get as much of a kick out of this ship as have those who have built and flown it to date. You don't need to worry about power handling, as it has handled everything up to .40 size engines to date! Construction of the 100 is virtually identical to that of the Skyhawk, with the exception that many of the parts are shaped differently.

Wing construction is very simple, and it can be built in one piece, or in two pieces, joining the halves after completion and adding dihedral braces and gussets. Simply be certain that your center joints are well-glued, and strong; you may use epoxy here, if you wish. I prefer to build wings in one piece. You can do this by making a simple jig for it, or by propping up two flat boards at the correct dihedral angle, joining them at the center. Tabs shown on the ribs help keep things in proper alignment when building on flat boards. All sheeting and capstrips on the top of the wing are glued to place and allowed to dry thoroughly before removing the assembly from the board or jig. The tabs get cut off the ribs after this stage is completed, and the bottom sheeting and capstrips are then installed. Tips are solid blocks of light-weight balsa, carved to proper shape.

The tail assembly is very simple, with the fin and rudder made from sheet balsa. You have two choices on the stab. You can build a framework, and sheet with 1/16 balsa on both sides, as shown on the plans, or, if you want things to go faster, simply use a solid piece of ¼ sheet. Just make sure it's light, and quarter-grained, so that it doesn't add unnecessary weight in the tail, or warp when you dope it. Either method is okay; it's simply a matter of which you prefer.

Use 6-inch wide sheets of 1/8 balsa for the fuselage sides. If you can't get stock this wide, join some narrower pieces to get the proper width. The 1/16 sheet doublers are laminated to the sides with Hobbypoxy No. 2, as are the 3/8 sheet triplers. The plywood plates that locate and retain the top shanks of the main landing gear struts are epoxied to the inside surfaces of the fuse sides in their correct position before assembling the sides. Longerons and uprights are also added before assembly. Install the hardwood motor bearers, too, before assembling the sides. Join the two sides by gluing formers F-1, F-2, and F-3 in place; then add the plywood cross-pieces for the landing gear on the bottom of the fuselage. Sheet the bottom of the cabin area at this time, as this helps keep the entire assembly in squared alignment when you pull the sides together and glue them at the rear.

After adding the cross-pieces to the rear of the cabin, top and bottom, you can sheet the top and bottom all the way to the tail. Then you can return to the nose area, box off the fuel tank compartment, add the nose gear as shown (or your favorite steerable nose gear), and box off the battery compartment. Then sheet the bottom forward of the landing gear cross-pieces, add the nose blocks, cowl blocks, windshield and turtleback blocks, and, when dry, start carving and sanding to shape.

When the fuselage structure has been shaped and sanded, install the stab and fin, with the fairing pieces to close off the fuselage at the stabilizer joint. Carve and sand this to shape, and you're just about finished, ready for covering.

Before covering, make certain that the entire ship is shaped properly, and sanded very smooth. Coat the fuel tank and engine compartment area with fibreglass resin to provide fuel proofing, and then give the entire ship two coats of clear butyrate, sanding with very fine paper between coats. Cover the entire ship with silk.

From here on, how you finish your ship is up to you. You may wish just a simple utility finish, or a mirror-like finish that would win a finish award. For my part, I just want a ship to look good, but with a minimum of work. Since writing the Skyhawk article for January R/C Modeler, I have simplified my finishing technique even further, and it results in a very fine-looking product. After silking, I give the entire ship three coats of clear dope, thinned 50% with thinner. Between the second and third coats, I sand lightly with 400 wet or dry sandpaper, used dry. I let this dry for several days, then sand lightly again, and apply two coats of thinned out clear with talcum powder added. I let this dry for at least three days, then sand thoroughly with 400 paper until smooth and slick. But be careful not to go through the silk where it has pulled over the capstrips on the wing! Top this with one more coat of thinned out clear, sand when dry, and you're ready to add color.

I spray my color finish on, using butyrate dope thinned out to good spraying consistency. Spray on several finish coats until you're satisfied with the coverage and the depth of the color. Mask off trim areas, and apply the trim colors. When completed, and thoroughly dry, spray on two coats of thinned out clear Aero-Gloss. These last two final coats help even out ridges left by the masking tape, and add an over-all sheen and lustre to the ship. They also add to the fuel-proofing qualities of the finish. The main thing to keep in mind is to get as good a finish as is possible with as few coats as possible.

Install your equipment, fuel tank, engine, check for proper location of the O.G., and decalage angles, and you're ready for your first test hop. Make sure all surfaces are true, and warp-free. If any warps have set in, remove them before flying. If you're satisfied that everything is true, and according to specifications, you should have no trouble on your first test hop. If you're a bit shaky about that first flight, get an experienced pilot to hop it for you. You probably won't have any problems, except for normal flight trimming. If the O.G. is as specified, and all settings are according to the plans, trim as necessary to get true, straight flight with just a slight climb when under full power and all controls at neutral. If the ship climbs too much under power, but has a good flat glide, add down thrust as necessary. If it wants to stall slightly in the glide, add a bit of down trim to the elevator. If it doesn't want to climb properly under power without holding a good amount of up elevator, and sinks fast in the glide, add some up trim to the elevator. Make these changes permanent by adjusting the Kwik-Link as necessary at the elevator horn. If the ship turns in either direction under power, but is straight in the glide, adjust side thrust as necessary. If it wants to turn in the glide as well as under power, adjust the rudder to get a straight flight path.

When properly trimmed, you can have a ball with this ship, even though it doesn't have ailerons. One modeler says he even does four-point rolls with it, using a 3 plus 1 propo system. I'm sure you'll have just as much fun out of this ship as with the Cessna Skyhawk. Since that article was published in January, I've received a number of letters commenting favorably on how the ship performs, as well as comments from modelers who have built my "Sky Squire," and are looking forward to the same fun with the Skyhawk.