

Here, the Gee Bee is doing the one thing it does best, fly up a storm.



Another flight view with the light shining through wing and fuselage.



Lightweight structure requires care in selection of wood and assembly.

Hand-carved balsa propeller adds considerably to flight performance.



# GEE BEE SPORTSTER

By WALTER MOONEY

**Long-nose version of famous racing plane of the thirties by the old professor of free flight, rubber-powered scale planes. Indoor or out, it is a fine flying machine.**

► Gee Bee is a name that is familiar to all interested in aviation. It inevitably brings to mind a series of ill-fated, yet successful, racers, sometimes referred to as flying milk bottles for their fat stubby fuselage shapes. These, the Gee Bees, R-1, R-2, and Z, would not make desirable scale rubber-powered free flight models because they would be difficult, if not impossible to make fly well.

However, the less well-known Gee Bee model D Sportster, which was powered with a 90 hp four cylinder inline Cirrus engine, was really the start of the Gee Bee racing efforts, and this aircraft makes an excellent subject for a small indoor scale rubber model. Looked at closely, the fact that it is an ancestor of the famous "Milk Bottles" is apparent. Wing shape, basic structure, landing gear, and empennage shape are similar. The differences: longer wings and fuselage, and larger tails all combine to benefit the model builder and allow him to make a flying model. Color schemes are classic Gee Bee which were evolved on the model D and later applied to the all-out racers. There were model D's with red and white, black and white, blue and white, and brown and tan colors. The one modeled in this article was blue and white but obviously you can take your choice.

Because a flying model was the main aim for this model, several changes from exact scale were made. Dihedral of the wings was increased, the size of the horizontal tail was made larger and the thrust line was angled to the right. For building simplicity and lightness, fewer ribs are used and they are of the flat-bottomed type. Also, the number of fuselage fairing stringers was reduced to only four; one on the bottom centerline, one on the top centerline, and one on each of the sides of the headrest fairing.

None of the above changes alters the appearance of the Model D significantly and when done, the model is a good replica of the Model D Sportster and it will fly well. Best time indoors is 48 seconds. The model in the article will consistently do over 40 seconds duration and even a fairly new model builder should be able to make a model that will do about half a minute and fly nicely.

This model did not fly directly off the designer's drawing board for exactly one reason. It required quite a bit of right thrust adjustment, much more than was expected. The first four flights ended in left spiral dives, which decreased in violence as side thrust was added. The correct amount is shown, built in, in the plans. You may have to adjust the thrust line slightly for your individual model, but you won't need 3/32 inches of shims angling the nose-block sideways as the original did when it was flown.

The model construction technique is standard so I'll not go through it in detail. However, a few points are worth mentioning.

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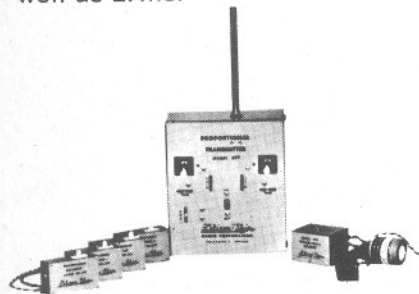
**FULL-SIZE PLANS FOR GEE BEE SPORTSTER ON FOLLOWING TWO PAGES**

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## Gee Bee Sportster

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Lightness in a model of this size is important. That's the reason for laminated outline and vacu-formed pants and wheels. If you don't have a vacu-form toy available, use very light balsa blocks for pants and wheels. Don't use hardwood or rubber wheels, use one or two-pound test, monofilament fishing leader for bracing and you'll get a stiff rigid warp resisting model. Monofilament line looks more like metal wires then thread does and is easier to thread through pin holes in the structure.

One other advantage to making parts on the vacu-form is the fact that you need only make one wheel half mold and only one wheel pant mold in two halves. The way to use the molds need not be explained if you have a vacu-form. One thing I've noticed however, is a tendency for the mold to shift on the platen as the plastic is pushed down over it. If the mold gets too near the edge, a poor part results and the plastic must be reheated for another try. A small piece of sand paper cemented to the bottom of the mold will increase the friction between the mold and the platen and solve this problem.

In only one place can you forget about keeping the weight light. That's in the nose of the model. Use a plastic propeller if you want. It's best to cut down an over-large one in order to get a wider than normal blade with higher than normal pitch. Note also that the engine cowl sides and bottom are simulated with solid balsa blocks cemented to the basic structure and then carved and sanded to shape. All these heavy items will help get the CG where it should be and also make a strong nose which even baby sister can hold while you are winding.

Used a felt pen on the original model for color trim. This is lighter than colored tissue or dope. It must be put on before clear doping the model, but after water shrinking the tissue. Water will surely make the felt pen ink smear. Also be careful with the first coat of dope. If it is put on heavily and brushed too much, it can smear the ink.

Control surface outlines can be either thin strips of black tissue or thin black ink lines. The windshield is thin clear plastic and the cockpit edging is black fuel tubing slit lengthwise and pushed over the balsa edge.

The little triangular gussets shown at the corners of the wing and tail structure are important if you want to keep from getting wrinkles in the covering when the tissue is shrunk. Don't neglect to add them.

A single loop of 5/32 Pirelli flat rubber powers the model exactly right. It should be between ten and twelve inches long. Rubber lube helps as does an occasional drop of three in one oil on the prop shaft.

The model should fly quite well without trim requirements other than to the thrust line provided that the center of gravity is as shown on the plans. Add modeling clay at the nose or tail to obtain this CG before trying to fly the model. Start test flights with a small number of turns in the motor and gradually work up to the maximum winds. Make all your flights R.O.G. especially if you are flying indoors. There is little soft grass growing out of hardwood floors so test glides, if the model is out of adjustment, can be rough on the model. However, if a model is badly out of adjustment, a low powered R.O.G. attempt will show it without the model getting high enough to damage it, (usually). When you have the model adjusted so it is consistently flying well, experiment with motor length to get maximum duration,

## Judge's Eye

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three wheels at the same time. The negative angle then takes over and holds the plane down.

Of course, this same negative arrangement is also effective in producing a decent landing in that the longer main gear is more apt to touch down first if the plane is properly slowed down to below flying speed and the nose held up. However, that negative angle will ruin your take-off.

Looking much like a bloodhound hot on the trail, these tail high, nose down airplanes are all but impossible to lift off smoothly. The negative angle imposes a great deal of downward force and quite naturally it takes a lot of up elevator to overcome it. As a result, when the point of rotation occurs, it happens in a split second . . . now you're on the ground . . . now you're climbing at a 30 degree angle.

The correctly undercarriage airplane demands proper use of controls. With a zero or very slightly positive angle of attack, your plane will leave the ground as soon as it reaches flying speed, smoothly, imperceptibly, and without loss of points.

Of course, now you must slow your plane down to below flying speed in order to land nose high without bouncing, but again, that's worth those extra points. More on that later.

One more thing . . . Hold the take-off in a straight line until you're six feet high before starting a climbing turn for altitude and the first flying maneuver.

**STRAIGHT FLIGHT, PROCEDURE TURN, AND STRAIGHT RETURN FLIGHT** These three maneuvers should provide no less than twenty-one points for any contestant who is the least bit serious about competition. Basically simple, they nevertheless separate the men from the boys, even though some of the "boys" don't believe it. Problem is, they're so deceptively simple that many flyers don't bother practicing them.

The booby trap on straight flight, out or return, is that little phrase "directly over the transmitter." A minor point, you say, but after all, for a maneuver so easy to fly, the placement becomes vital in that man from boy separation. At the Nationals, many flyers placed these maneuvers directly over the judges . . . fine for helping the judge to rate accurately, but t'ain't what it says in the book.

As pointed out by Cliff Weirick during our judges briefing, maintaining the same altitude throughout all three maneuvers is *not* easy and is another prime weak spot. If you keep in mind that the sky meets the earth at the horizon, you'll realize that your plane should appear to be losing altitude as it flies away and appear to be gaining altitude as it returns, in order to hold a constant altitude. This is what the judges are, or should be watching for.

Since, under the new rules for 1968, the Horizontal Eight has been eliminated in two classes (B & C) and moved 100 feet away from the transmitter in the third (Class A), we'll skip over it lightly.

Main sources of point loss occurred in varying circle sizes, changing altitude, and missing the crossover and finish both directly over the transmitter.

### TOUCH AND GO

This maneuver is judged from six feet off the ground on approach to six feet off the ground in the climb out after touch down.

From the six-foot mark on approach until the model makes contact, the judges are watching for a smooth let down without jockeying of elevator, ailerons, and throttle. Lining up should have taken place

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