The Slopemaster about to capture second place in its first contest. Note stabilizer on top of boom — before modification. Note pot on Chief Sunday Flier. This picture also taken before he got streamlined!

SLOPEMASTER

By KEN WILLARD

Sailplanes, in the world of aviation, are to power planes as sailboats are to power cruisers in the marine world. The true sailplane enthusiast intensely dislikes having to put an auxiliary motor on his ship - it stinks up the air and dirties up the plane. Sailboat enthusiasts are just the same.

The big difference, of course, is that sailplanes, although great sport, do not have a high degree of practical utility, whereas sailboats can cruise in seas that power cruisers would not dare to challenge. Also, sailboats can "ride the wind" around the world - their cruising range is limited mainly by the provisions that can be stored aboard.

But the basic similarity, in the sporting world, is the skill required to make maximum use of natural forces - the wind, thermal currents, and gravity - without having to rely on man made power sources. And that's why sailplane enthusiasts have such a great kindred feeling for sailboaters.

A little over a year ago I was introduced to the silent world of R/C sailplane flying, after many years of participation in R/C power plane activities. Since that first introduction, I've become a dedicated enthusiast for sailplanes, although I've never lost my original interest in power planes. I find both fields have their own problems and, correspondingly, their own rewards.

The Slopemaster was my first sailplane design - and like all 'first' designs, by the time I finished modifying it, it still looks like the first version but is considerably different in aerodynamic details. Here's the way the changes came about.

First, as always, I wanted a comparatively small model. But the very nature of sailplanes is such that even a small model has a pretty good wingspread compared to power models. With a seven inch chord, a power plane would have an aspect ratio of about five - maybe six, and the span would be 35 to 40 inches. A sailplane should have at least an aspect ratio of eight - and preferably higher - so I compromised at nine - and that gave me a span of 63 inches - a whopper, for me.

I wanted a nice appearing model,

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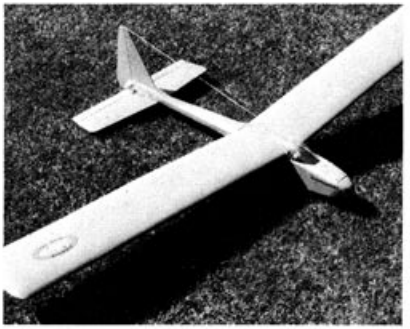
and like the pod and boom design, but that created some construction problems. So I figured out a way to give the pod and boom appearance, and still use the old "slab sided" construction technique. Just shape the side to look like a pod and boom, then add 3/16" square longerons which can be rounded off after the top and bottom sheeting has been added. Looks very authentic from ten feet away.

Since I didn't have a lot of experience in glider designs for R/C, I sought some expert advice. Whitey Pritchard had built and flown several, so I asked him what wing section to use, bearing in mind that all I wanted was a good all around model that could handle both light and moderately strong winds. I wasn't looking for something that would fly in a gale - I'm a Sunday flier, not a storm trooper!

"Flat bottom sections are always good when it comes to general purpose gliders," Whitey opined. That satisfied me - particularly since they are so easy to build right on the bench.



Final version of the Slopemaster.

So, I zip-zipped a modified Clark Y section, and built a conventional type wing - no taper (some time later, my aerodynamicist friend Bob Andris informed me that at the Reynolds number I was operating at, the constant chord wing is just as efficient as a taper wing) and with about 4° dihedral. I was figuring that by keeping the dihedral down the effective lift would be improved. As later events proved, this was a mistake.

Drawing upon some limited experience with a soaring version of the "Double Feature" twin pusher which I "honked up" to fly as a glider, only to find out that the rudder area was insufficient, I made a pretty big rudder for the Slopemaster - or so I thought. Once again, later events showed that there's nothing like a flight test to prove the adequacy of a design.

Finally, for simplicity, I put the sheet stab right on top of the "boom" where it was in line with the wing. I had seen so many gliders that seemed to follow that design layout that I figured it would work all right. Once again - it worked, but not to my satisfaction as I gained experience with the model.

The first flight of the original version of the Slopemaster was pretty disappointing. I drove the 55 miles to Sunset Beach, and on arriving found a group of fellows flying in almost ideal conditions - wind right against the slope at about 12 miles per hour. Three soarers were majestically swooping along the hill, and a fourth was riding the updraft several hundred feet up, and doing all sorts of maneuvers. It was beautiful. I could hardly wait to toss the Slopemaster into the wind.

After checking everything and finding it in good order, I launched the model. It rose immediately, gaining about seventy feet, at which point I gave it right rudder to start riding along the hill. Very slowly it turned and started along, then as it picked up speed it started to drift back over the hill, so I gave it left rudder to turn it into the wind. Nothing. Then gradually a skidding turn. As I held full rudder, it came around and headed back in the other direction, but the wind had gotten under the right wing. The left turn continued, even though I gave full right. The model went over to the back side of the hill, lost the lift, and dumped unceremoniously.

It was apparent that I didn't have enough directional control. There were two ways to improve it; increase the size of the rudder, and increase the dihedral. As it turned out, I did both, increasing the maximum width of the rudder to that shown on the plans, and increasing the dihedral to 7½° as shown.

For a while I thought that took care of the design layout. But the more I flew it, the less I liked the sharp way it fell off the 'step' when an updraft hit it. The stab was critical. So, back to the old favorite trick - lower it from the wing wake. That meant putting it on the bottom of the 'boom' so I added a little sub-fin to help protect the stab on landings.

Finally I experimented with the decalage, and wound up using the incidence setting shown on the plans as the best all around combination.

There are no tricks in the construction of the Slopemaster. It qualifies as an 'old fashioned' model when viewed as a construction project. The fuselage is slab-sided sheet balsa, with longerons for strength. Rounding the corners of the fuselage gives it an appearance of roundness, especially in the tail 'boom' section. The wing is standard spar and rib, with sheeted leading edge on top. The prototype only has the center spar, and although it is strong enough, it was pretty flexible before the covering was applied, and this made it necessary to use considerable care when shrinking the MonoKote tight to be sure that no warp got into the wing except for a slight amount of washout in each tip. The plans show two extra spars which should have enough stiffness to take away the critical element in covering. The additional strength is a bonus factor.

The sheet balsa stab, fin, and control surfaces are cut from medium grade balsa, and have plenty of strength for everyday flying.

The canopy is purely for appearance. With a little Williams Bros. pilot in there, it lends a touch of realism. It's a little tricky to cut the canopy to fit, but worth it. The canopy is held on with a rubber band to the wing dowel.

For access to the battery and receiver compartment, the top of the fuselage forward of the wing is covered by a 1/32" piece of plywood which is held in place with wood screws through the corner braces.

The receiver, servo, and battery compartments are ample for today's equipment. I've shown a typical installation of the Kraft unit; however, during the year of testing and flying, the Slopemaster has carried Bonner receiver and servos, and the combination of Bonner receiver and Wintronix servos, which give a little more control movement. Also, the latest equipment to be tested in the Slopemaster is CitizenShip's DP-2 two channel system. Although it is slightly heavier than the Kraft, you can't tell the difference in performance of the Slopemaster. In my own case, it took a few minutes to change over from single stick to two stick control - I kept trying to pull the rudder stick back at first. Otherwise the DP-2 works great!

If you use the DP-2 system, be sure to modify the left stick so that it centers. The instructions tell you how to change from the rudder and motor control setup, which is the way it comes, to the spring centered rudder and elevator combo.

I have not tried the Slopemaster with single pulse galloping ghost, but I doubt if it would be very satisfactory, since you only have half the effective throw for the rudder, and if you set up the linkage to get more throw, it probably would make the model fishtail through the air. However, dual pulse should work fine, although be sure your battery life is up for the game.

The placement of the tow-hook gives the Slopemaster a good solid climb either on winch or hi-start. There's plenty of clearance from the landing wheel, but if you won't be in an area where the wheel is useful, then you can leave it off. Again, I like it for the realism of appearance.

Slopemaster and "Skinnysocks" after both had completed modifications.

Flying the Slopemaster is one of the biggest kicks I get out of R/C modeling. Although it was not designed for contest work, I've entered it in four contests where the final standing depended upon both duration and spot landing. The duration of the Slopemaster is not as good as some of the big jobs, but it's deadly on spot landings, and unless there's a really gusty wind you can always land within a few feet of the spot. In the four contests the Slopemaster entered, it won two, placed second in two.

Not bad for a Sunday glider.