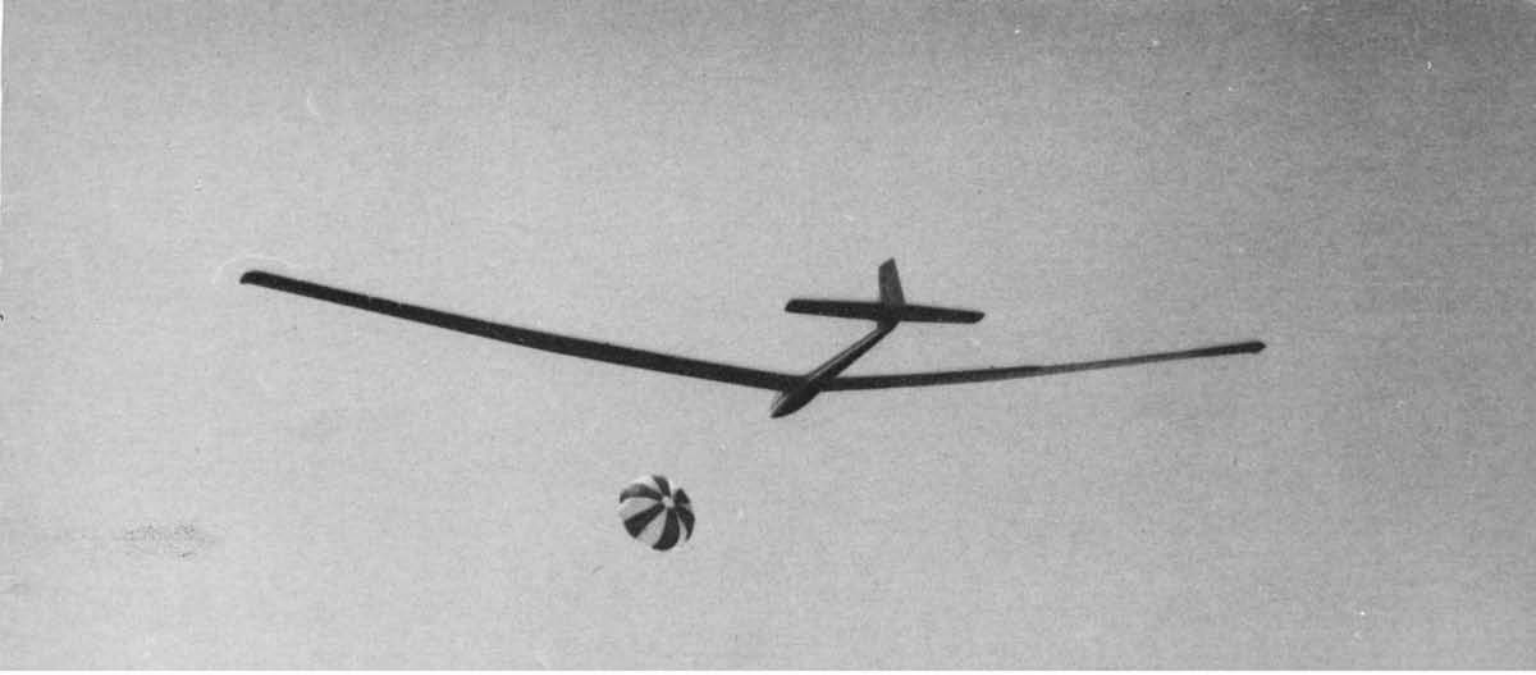


The "Yankee Soar" rises on the line, drag chute billowing. The tremendous wing is for soaring, requires delicate touch on the winch, moderation with your airborne maneuvers. A high aspect ratio.

16 foot "Yankee Soar"

Thermals eat MonoKote and balsa, so the Great Vacuum Cleaner in the Sky will love you for building this. It just doesn't ever want to come down. An easy thing to build.

Photos by Dan Pruss

by Neil Liptak

No, the *"Yankee Soar"* is not the Green Giant's hand-launch glider. It's just a ship designed to solve the problem of locating lift. You see, by taking a 16 foot swatch out of the sky instead of the standard 8 to 10 foot patch, your chances of finding a thermal increase from 60% to 100%. To give you an idea of how the *"Yankee Soar"* appears when viewed from the ground, simply take two flat toothpicks holding them at arm's-length using thumb and index finger as a dihedral brace with the two large ends of the toothpicks butted together. If you hold them about six inches away from your nose and then quickly move them to arm's length, this will give you the illusion of being in a super boomer without the expense of a glider.

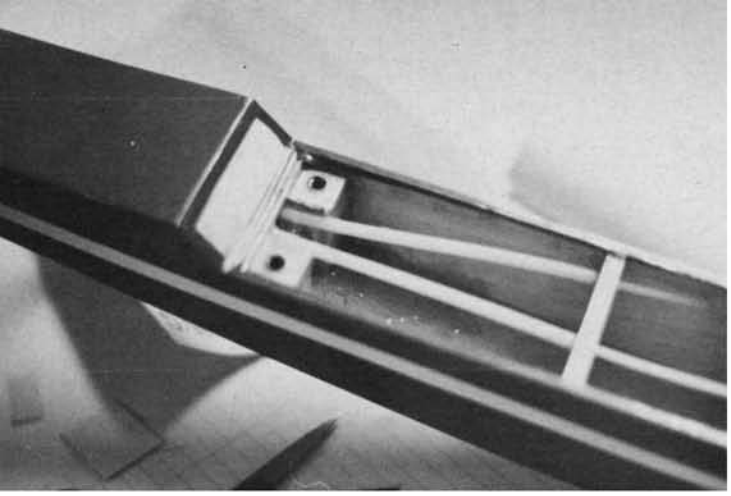
Now that you've amazed your friends with the thrill of soaring, let's simulate a day in the life of a *"Yankee Soar"* owner. Ah-h-h, you've just tuned in the weather on your TV set and the weatherman predicts 60 mph winds, thunderstorms and damaging hail. So, you hotfoot it down to the shop where you throw the monster on charge, to be ready in the morning. Now, you bid goodnight to your pride and joy and trot off to dream of what tomorrow may bring. It's morning—the sun is out, beautiful blue sky, and a balmy 4 mph breeze stirs the leaves on the trees. Just as the weatherman predicted! You cram a piece of toast down your throat and head for the shop. There you go through the sacred ritual of unplugging your charging cords. One final systems check and you're now ready to load the car. Let's see, the center-section first, then the fuselage. Now the wing tips and stabs. The wing wires are also handy to bring along. Transmitter and masking tape play a major role in flying the big bird too. Don't forget the fuel can, remember the lawn has to be mowed when you get home and it won't run on thermals.

As you buzz down the highway to the field, you notice a cumulus cloud forming off to your right. The old adrenalin starts to flow and you can just see your *"Yankee Soar"* making majestic 360's at cloud base as you relax on the hood of your car. Enough of this daydreaming business. You've got to get to the field first. As you reach the soaring site, you notice a fellow glider glider's ship come screaming down and splatter on the deck. Later, you find out that he added onto his flying surfaces with masking tape for better response. It seemed that the tape streamlined itself to the down position going up the towline, oh well.

Now the fun begins. The guys will huddle around your car to see the monster moose they heard you were building. Naturally everybody wants to help assemble it so they can see it ding in sooner. Well, what a miracle—the ship is all assembled and not a single puncture anywhere. A barrage of "wows" and "boy is that big" come from the guys. Now comes the part where you have to test glide it. So, you ask for a volunteer to heave it for you. As luck would have it, Sammy ShortLegs is the first one to grab the ship. He runs across the field gripping the big beast in a nose high attitude, then stops and flings it sidearm into the ground.

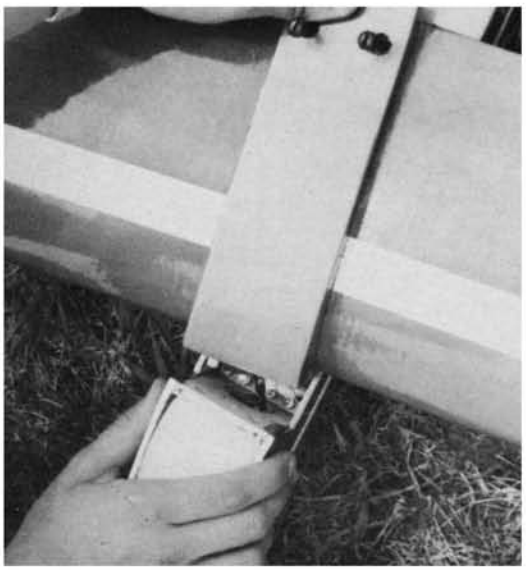
After a couple of aspirin to calm your nerves you decide you're ready for the winch. The tow ring is secured on the hook and you give the signal to start the winch.

For all its great span, the ship is a mild and easy ship to build. It will float on lightest trace of lift, a glider to match your dreams.

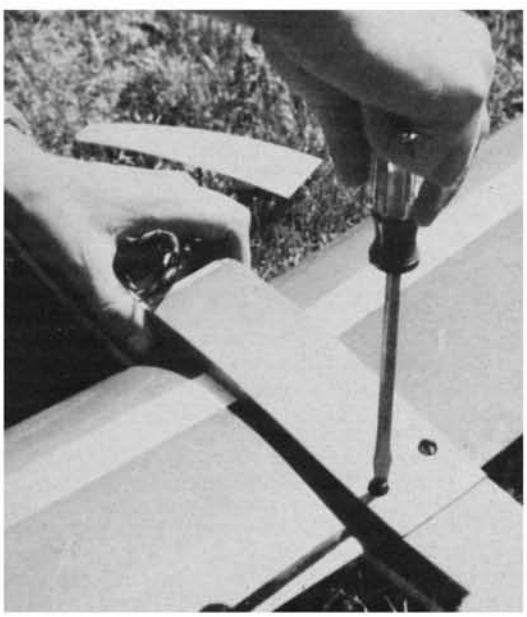


Nyrods go hand-in-hand with big aircraft, snake through a narrow fuselage, actuate control surfaces as the servos command. Tough, light and practical.

With hatch removed, the servos, Nyrod pushrods, foam-wrapped receiver and battery pack are easily accessible. Radio installation in "Yankee" is easy.



Fumble the wing into position. Wing hatch cover fairs it in smoothly. Nylon bolts lock it down.



Neil drives down the nylon bolts and all will soon be ready. No grimy rubber bands in sight.

You feel the line tighten and then as you release your ship, just as another soarer makes a landing approach over the winch area. You hear the nylon line shear through his left wing panel and shouts of concentrated excitement emerge from behind you. As you mutter to the winch operator something to the effect that he'll get over it, you see the flag gently float off the *"Yankee Soar."* After getting everything all squared away you decide to get down to some serious soaring. Light lift seems to be everywhere, so you concentrate on one little patch, working every last ounce of lift out of it until you've reached about 2,000 feet.

Ah-h-h, you've done it, now what to do. Should you cruise around in search of another thermal or let that poor model builder standing on your left have a go at it. Why not, you say you're up so high now that nobody could goof this flight up. You hand this guy the box and turn your head away. A panic scream comes from the guy flying your machine. He shoves the TX in your stomach and sighs with relief. As you pull it out of the reverse spin, inches above the ground and barely get back to the field, the 16 foot span skims over the grass and gently comes to rest. You walk over and dismantle it and leave the field while the leaving is good.

Now to the construction part. First of all, don't let the size or all the lines on the plans stop you. The *"Yankee Soar"* is a simple wing, fuselage, and tail airplane, and it's quite an economical glider to build. The prototype costs approximately $25.00 to scratch build, less covering of course.

Wing Construction

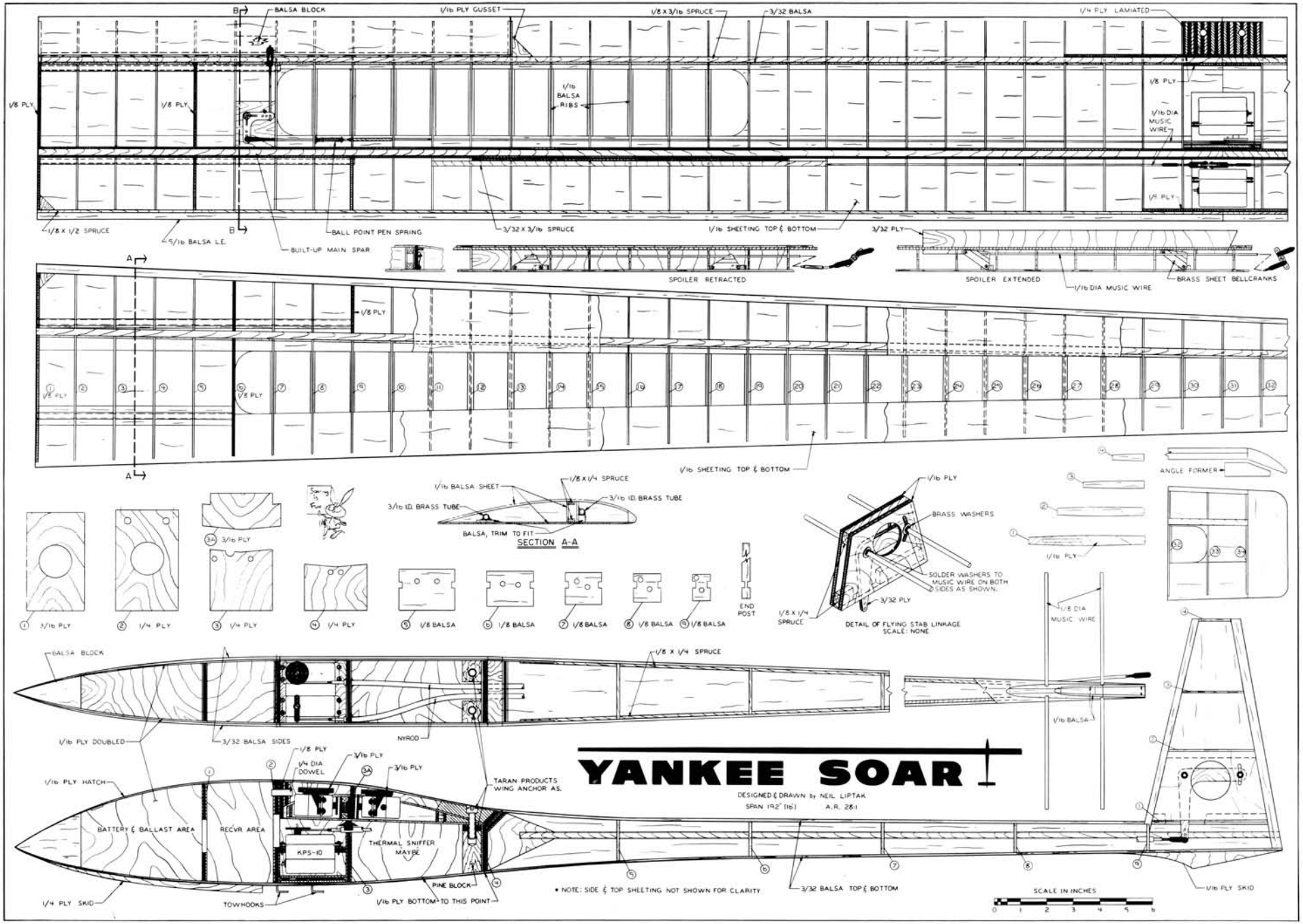
I think the plans are pretty much self-explanatory, so what I'll try to do is give a few hints and reasons for some of the things that were done. Since the wing was the kick-off point for the original I guess we might as well start there.

First assemble the main built-up spar in the center-section. Make sure the spar is straight all over. A warp in the spar could cause a twist to occur in the wing and when you're dealing with something this size, it could reach huge proportions at the tips. Now, locate the spar on the bottom leading edge sheeting and lay the ribs in. You will note that the spar is full depth, so you have to cut a gap out of all the center-section ribs and locate both parts of the rib. The wing wire tube holes for all four end face ribs should be drilled in one operation for accuracy. The pushrod clearance holes for the spoilers and ailerons should be made before ribs are installed. This saves a lot of crunched ribs and swearing later on. The spoilers will have to be played with to get them bind-free but, once they are set up, they need no further attention. Also, I'd like to point out that you should use a non-water soluble glue around the spoiler slot. It so happens that rain will loosen up the glue joint in that area. Also seal the spoiler with clear dope, if you make them of plywood as shown on the plans, because the wood spoiler has a tendency to swell up when rained on. Both of these little problems were discovered at the same time, in a spring shower.

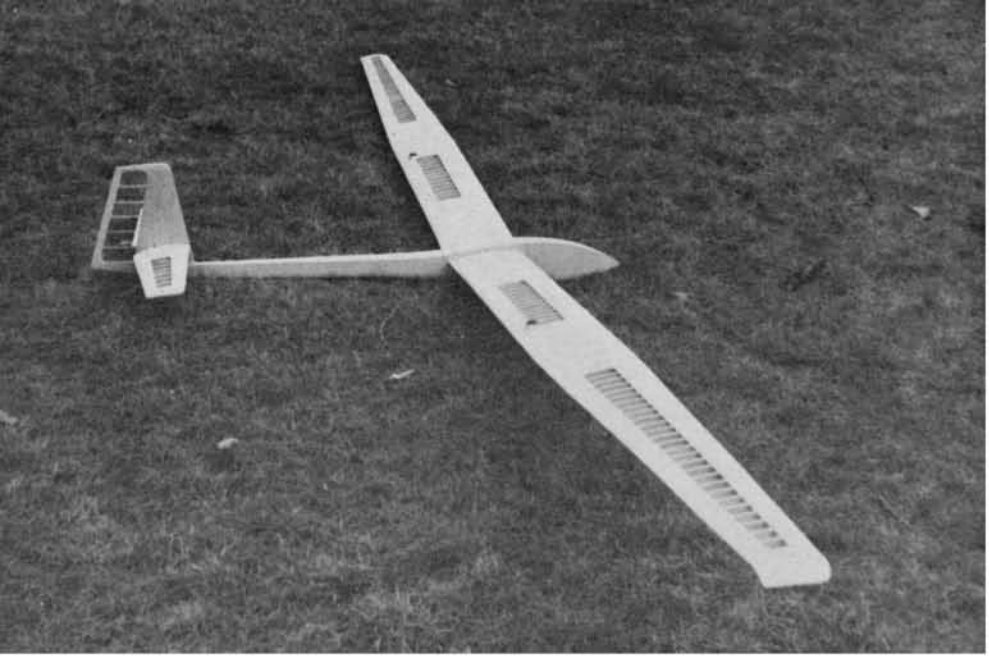
Now to the ailerons. I found it much easier and more accurate to build the aileron as part of the wing, then taking an X-Acto knife and cutting it out. This makes a matched seam and a lot less sanding to shape. The one-way aileron system is pretty clear in the plans, so if you follow the concept detailed, you should be OK. The springs in the system are just a couple of old ball point pen springs. The tension in the springs can be adjusted by just compressing them a little and resoldering them. Make sure that you don't compress them so far in that you stall your servo by completely compressing it.

To hinge the aileron, simply cut two pieces of MonoKote about 1/2" wide and the length of the aileron. Leaving the aileron in the plane of the wing, iron it over the hinge line so as to leave 1/4" on each side of the line. Now, rotate the aileron up as far as it will go and do the same with the other piece to the back side of the aileron. Then the turtle deck on the center-section should be built after the fuselage is built, using the pieces you cut from the sides to make the wing saddle.

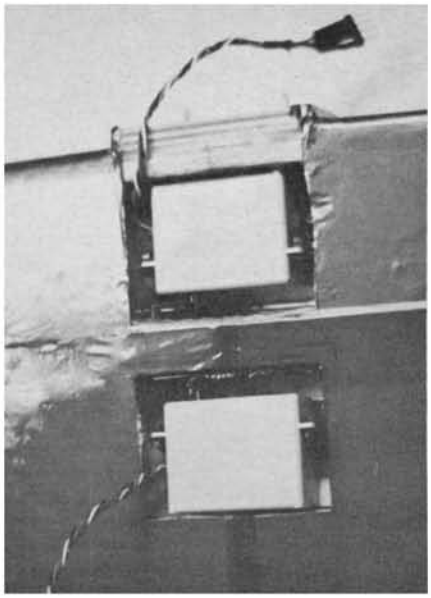
The wing bolt-on system was used to clean up the design. I just couldn't see creating drag by using rubber bands. If you have any doubts that the bolts won't be strong enough, just go to a Pattern or Pylon meet and watch some of those high "G" maneuvers our powered brothers put their aircraft through. That should ease your mind! Drilling the bolt hole will come later on. Also, I did want to mention that the tubes are to be glued in the Hobbypoxy,



FULL SIZE PLANS AVAILABLE THROUGH CARSTENS' FLYING PLANS



The skeleton reveals balsa bonework. A simple sheet fuselage, a well stressed airframe. It is not hard to build, but a ship for experienced glider guiders. Too much at stake on towline for novice.



Two servos buried into the bottom of the wing, operate individual ailerons, practical method.

after you roughen them up with sand paper. All the dihedral braces and the laminated plywood in the trailing edge and turtle deck should be epoxied.

The fibreglass in the center-section was just to give the servo area a little more strength and to give a good solid place to pick up the ship.

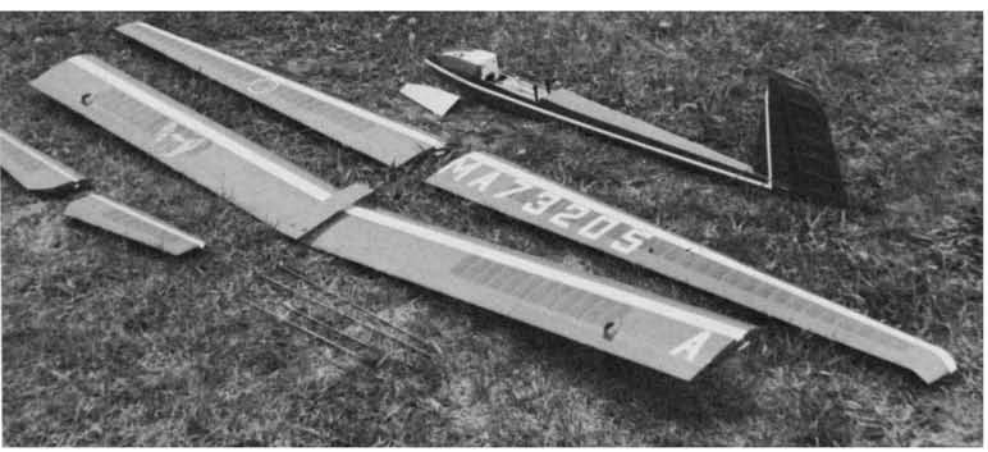
Now to the wing tips. Super-great care must be taken to get the tip plug-in tube in the same plane as the center-sections. A goof here could really foul up the flying characteristics. So make sure this comes out right by actually building the tip panels onto the center-section. If you do this, you should have no problems. Examine the tip rib construction and compare it to the center-section, you will find that the tip panels seem to be built a lot lighter. The reason for this was in the event of landing too hard on a wing tip. The tip panel would collapse and absorb the shock, rather than transfer the stress to the harder to build and fix, center-section, with all the linkage in it. The kicked-down tips are there to reduce tip drag. The idea behind this is to get the air to roll off the wing tip rather than turbulate over it. The kicked-down wing tips seem to give a nice, definite tip ending for the wing also. The wing tip must be washed out about 3/8" from about the last 24 inches of the tip. Since the original was covered with MonoKote, I simply twisted the trailing edge 1/2" or so higher than the leading edge and heated the tip with the iron. This process was repeated until the washout was maintained. Well, I guess that covers the wing. Now over to the body.

The Fuselage

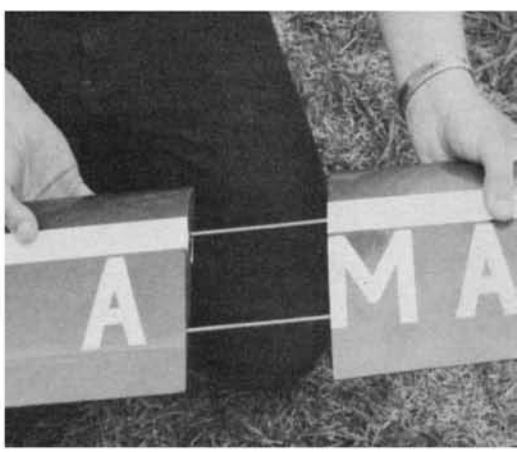
The fuselage is just a simple box structure. The front is 1/16" ply, doubled for extra strength of course. A plywood bottom and hatch also worked out quite well. Build up both sides and when they have dried, cut out wing saddle area. Don't throw those parts away. You need them to make the turtle deck sides. Insert the three mid-section bulkheads, #2, #3 and #4. After they have completely dried, glue the tail bulkheads in. Install the Nyrod now if you wish, but don't wait until you've sheeted the back to do it. Pull the nose into position and glue it up. The nose section can now be sheeted. Also, you can sheet the top of the fuselage. Build up the flying stab horn housing and locate it as shown. The flying stab horn housing worked out great on the prototype. There was no Mickey Mouse fussing around trying to find the horn through sheeting and such. After you hook up the Nyrod to the horn, make sure it won't come off and sheet the bottom. Build up the vertical stab and that about does it. The hatch is made of 1/16" ply with the grain running parallel with the wings. This way it can be contoured over the top of the fuselage.

As a final touch on the fuselage, take strips of fibreglass tape and epoxy them over all the front joints from the nose block to the wing hold-down blocks. Glass cloth was used double strength around the wing hold-down columns and over the plywood nut hold-down plates. Nothing like a little reassurance... Now that the body is complete, take the center-section and plumb it up on the fuselage. Construct the turtle deck using the actual fuselage for locators. Complete everything on the turtle deck except the top sheeting. You'll need to position and glue in your servo mounting plates and also hook up the pushrods. After you've done that, sheet the top. To locate the holes through the center-section for

All loose parts. When it comes time to pack off on vacation, only the most compact of ships can squeeze into a car. The bird assembles up in minutes, soars superbly. It could be hand-towed too.



The panels slide in place on the piano wire. An easy, reliable method. Align tubing carefully.



the wing bolt simply take a felt tip pen and color the tops of the blind mounting nuts. Quickly take the center-section and locate it in the proper position on the fuse. Now gently press the trailing edge area down so that the ink will make a mark on the bottom of the center-section. This will give you an accurate hole pattern to drill. That should do it for the fuselage.

Stab and Rudder

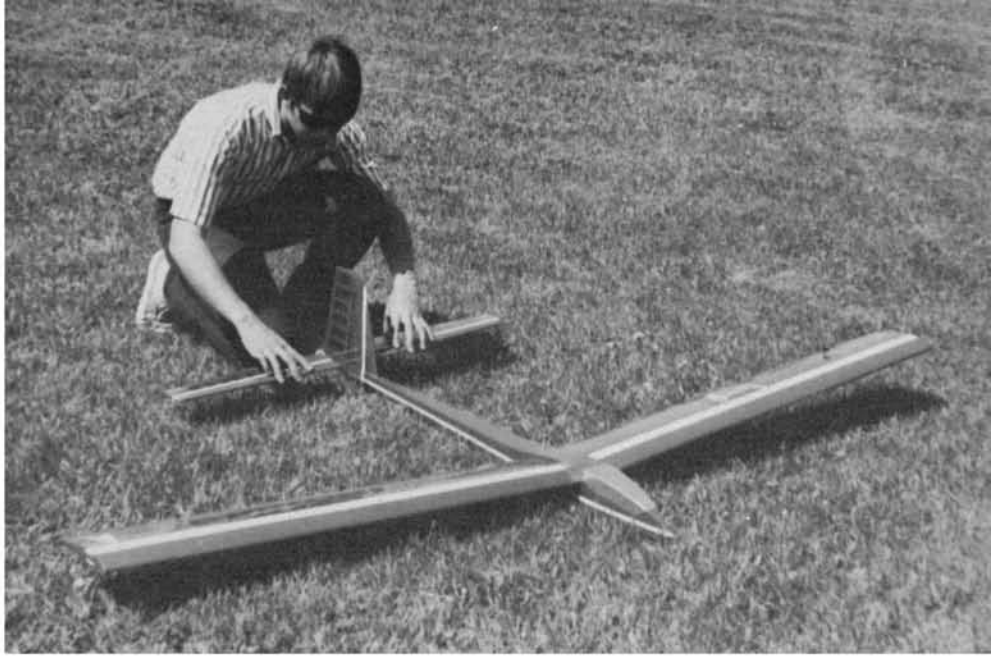
The stab and rudder hardly need any elaborating on, so I'll keep it short. To make the stab ribs, use the root rib, tip rib, and stacked balsa method as shown. This will give you an accurate set of ribs. This method was also used to make the wing tip panel ribs. Use two separate stacks, one for each half. The egg crate structure works well. It jigs up quickly and accurately and is really strong.

The rudder is about a 45 minute project. Just take the basic rib configuration shown on the plans. Note that the rudder ribs are not all one size, so you'll have to measure each one individually. To build the rudder, lay the construction rib under the leading edge and trailing edge sheeting under the corresponding rib. By doing this you get the proper taper on the rudder. Enough said...

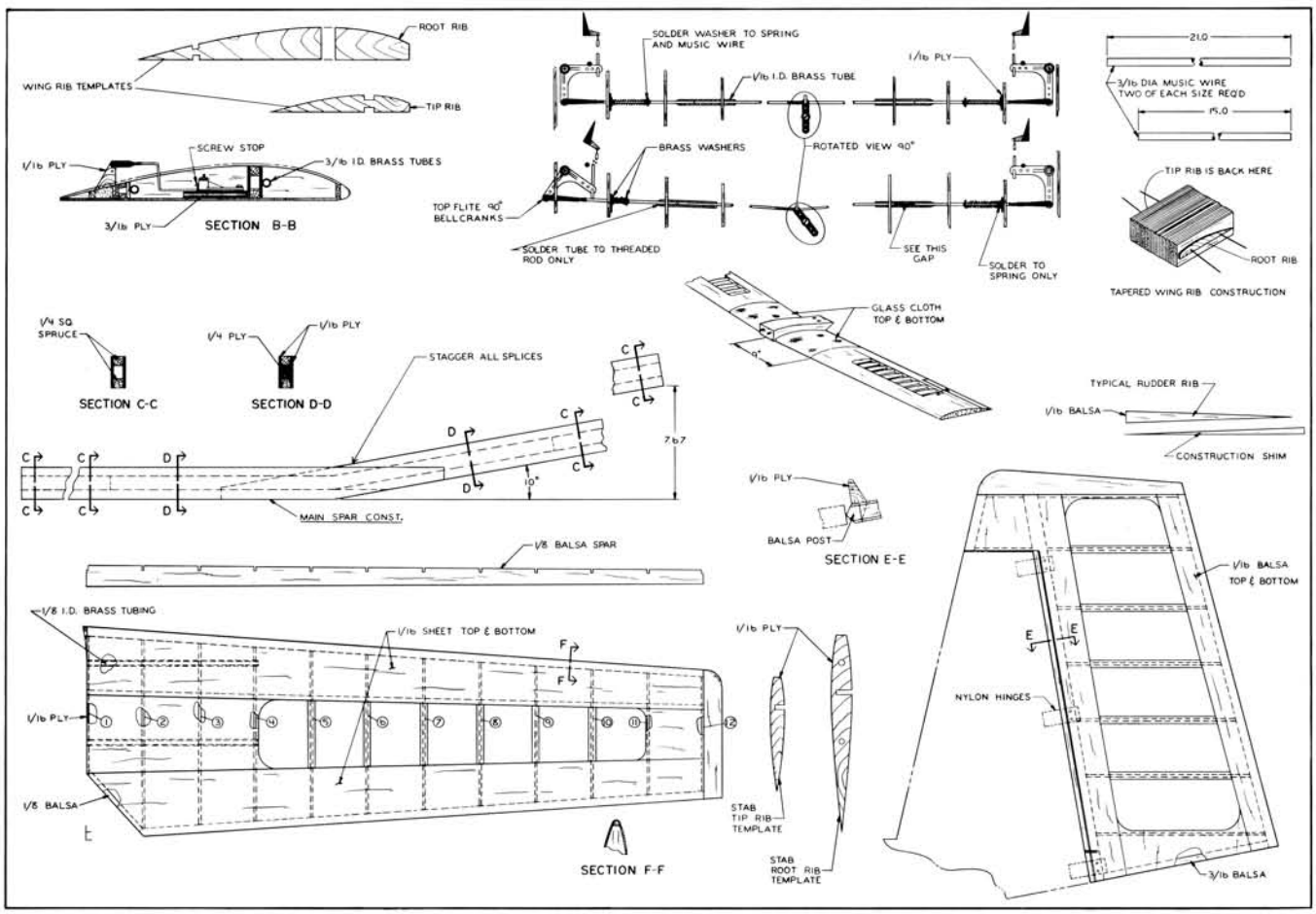
Flying

Balance the *"Yankee Soar"* on the C.G. as shown on the plans. Don't be afraid to add lead to the nose. Remember the design has a short nose moment, so you're going to need a lot. The prototype had about 1-1/2 pounds of lead in the nose alone. The complete glider weighed eight pounds. Take the ship out and give it a few good hard hand glides. When you think it's about right, get out the towline. The original was hand towed since we didn't have a winch. We ended up by holding the hand tow reel out of a car window by the driver and car towing it up. This way, the driver can feel the glider pull on the line so he can monitor the speed of the car. The *"Yankee Soar"* goes up the towline as if it were on a rail. Just monitor the elevator by the flex in the wings. Once off the line you'll find that the ship really eats up the sky for a glider. However, it doesn't seem to lose the altitude as a smaller model would at the same speed.

The ailerons work great when used in conjuntion with the rudder. However, rudder used alone is more than sufficient to crank the ship around.



The panels slide home on wire in tubing, standard fare for the giant gliders. Ship ends up compact enough for transport, rugged enough for a winch launch. Wing assumes polyhedral under air load.



NEIL LIPTAK'S 16 FT. R/C