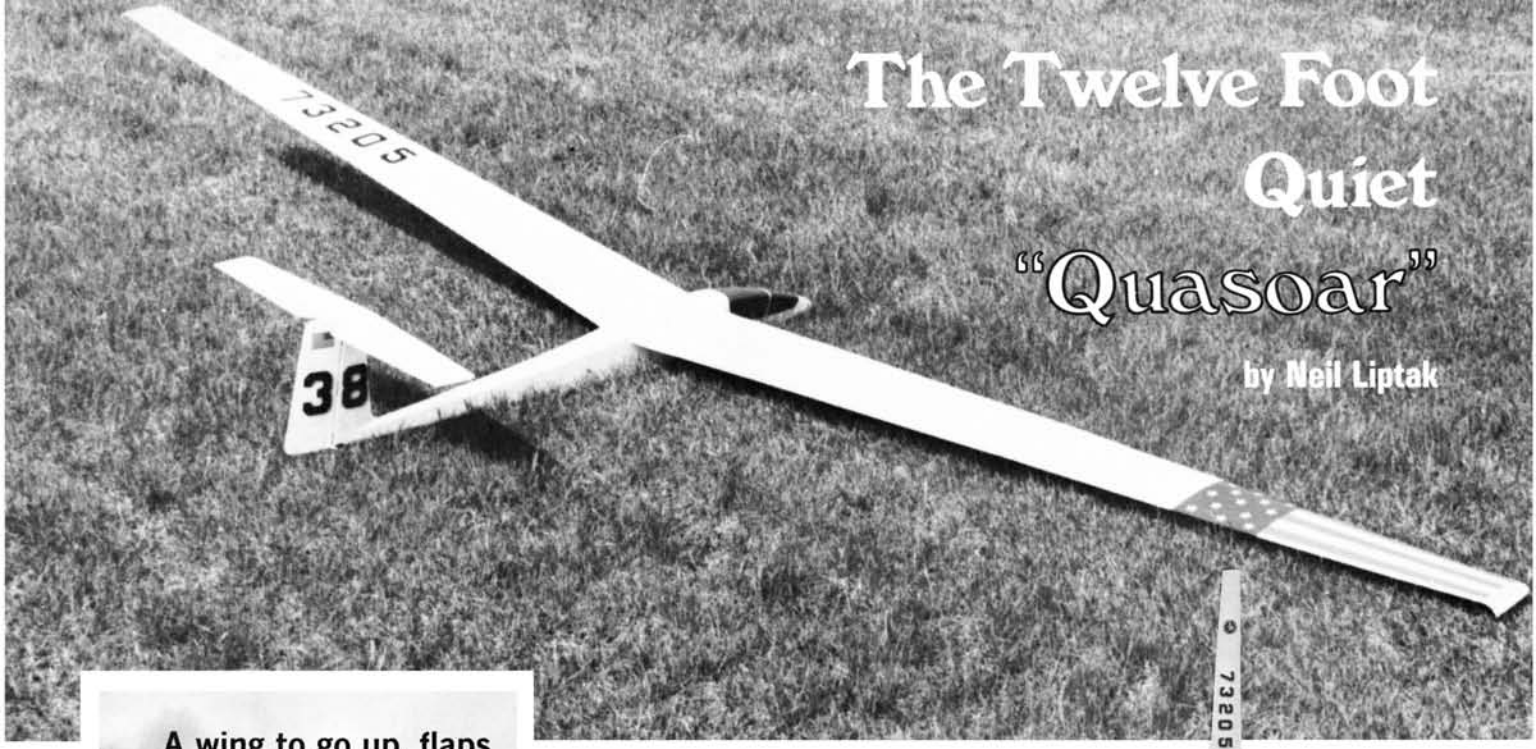
The Twelve Foot Quiet "Quasoar"

by Neil Liptak



A wing to go up, flaps to come down, spoilers to be sure. Goldberg's Retract disappears with the wheel. Five Kraft servos handle all. It's a gentle kind of giant, tuned in to the warm and spiraling air.

Photos by the Author

The *"Quasoar"* is a distinctively different sailplane design, in that aside from having the necessary functions of rudder and stabilator, it also sports flaps, spoilers, and of course a retractable wheel. Well, you say, spoilers are nice and flaps maybe, but a retractable wheel? Ahh, now come on—just close your eyes for a moment and instill the image of your *"Quasoar"* lining up on its final approach, then silently and mysteriously a wheel shows its circumference, just like the big guys do it. Neat, don't you think? Quick, enough enlightenment for now, open your eyes before you plow into that bench mark and ruin the whole trip to fantasyland.

Now let's assume that you've built your very own *Quasoar* and are ready to explore the joys that you'll encounter once the ship has escaped the relentless bounds of earth. You just can't wait to drop those flaps, and the thought of the spoilers intrigues your mind to no end, but the goal that will make your life complete is the result of the gentle pressure on the retract switch.

Oh, boy, the ship looks as though it's five or six feet lower than it was ten minutes ago. Okay, give in, extend the spoilers and start your descent. Here it comes. Your down wind leg seems like an eternity and the cross wind leg was a max, but there you are on your final approach. A little left rudder, now some spoiler action, that's it. You start to go for the retract switch, your spine tingles, crowds begin to form on all sides of the landing circle. Traffic is starting to back up on the field entrance road, TV cameramen line up on the *Quasoar's* landing path. Then, "click". There it is—the wheel is down and locked. The band begins to play, crowds cheer, streamers fill the air and the President of the United States is waiting on the phone. You gently set your machine on the landing spot, but the police can no longer hold the crowds back. The (towline) crazed people lunge from every direction to try to touch the model sailplane that dared to be different.

Now, down to more serious business of building the bird. I will try not to bore you with a "glue part A to part B" type construction article, but rather try to point out some of the areas where a word or two might help.

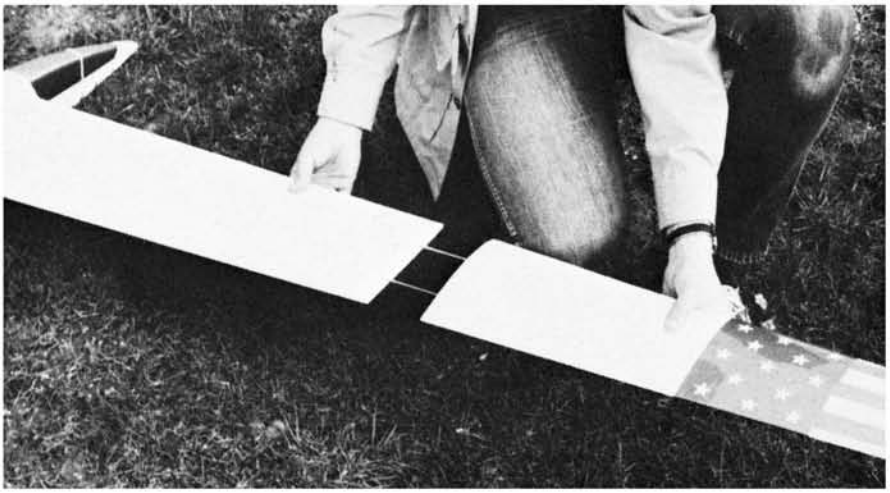
The Wing Assembly

The wing was the starting point on the prototype, so I guess I'll begin there. The ribs were constructed by the method shown on the plans. Make a complete set of ribs for half the wing at a time; this means you'll have to go through the rib making process twice. To build the wing is twice as much fun as making the ribs. The most accurate way I've found to assemble the three-piece wing is to actually construct the entire wing half in one piece. Install the brass wing joining tubes in one piece and after you've glued all the ribs onto the wing bottom sheeting for the entire half, take your razor saw and cut the tubes between the two plywood end ribs. By using this method of construction you can count on having the tip panel in the same plane with the center-section. I don't need to tell you how critical it is to have those tip panels in the same plane as the rest of your wing. If they're not lined properly you'll have one heck of a time getting your glider to fly true at various speeds.

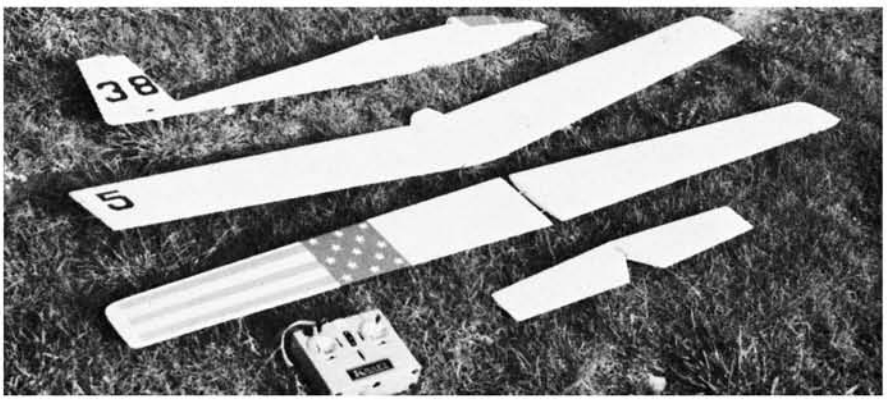
The easiest way to make the flaps is to build them as part of the wing and cut them out later. The hinge is merely a narrow strip of MonoKote which spans the entire length of the flap. Aside from making a great hinge, it also seals up the hinge line between the wing and flap.

The spoilers are pretty much self-explanatory from the details on the plan. The only bit of info I can give you here is to make sure that the spoilers work freely. Don't try to drive a binding spoiler with your servo. After the spoiler has been permanently installed and the top sheeting has been glued down, secure the spoiler capstrip. This capstrip forms a seal for the retracted spoiler. Also, it should be noted that a coat of clear dope should be applied to the spoiler surface. This will insure against the possibility of having the spoiler swell in damp weather which causes binding.

The curled down wing tips are to reduce



6 and 6 is 12. Figuring that if you don't live on the flying field with the gophers, you'll have to transport it. Simple "plug-in" outer panels. Adds up to a fine, efficient thermal bird. Below: The fuselage, center wing, tip panels, the flying tail and a Kraft. It absorbs bounces.

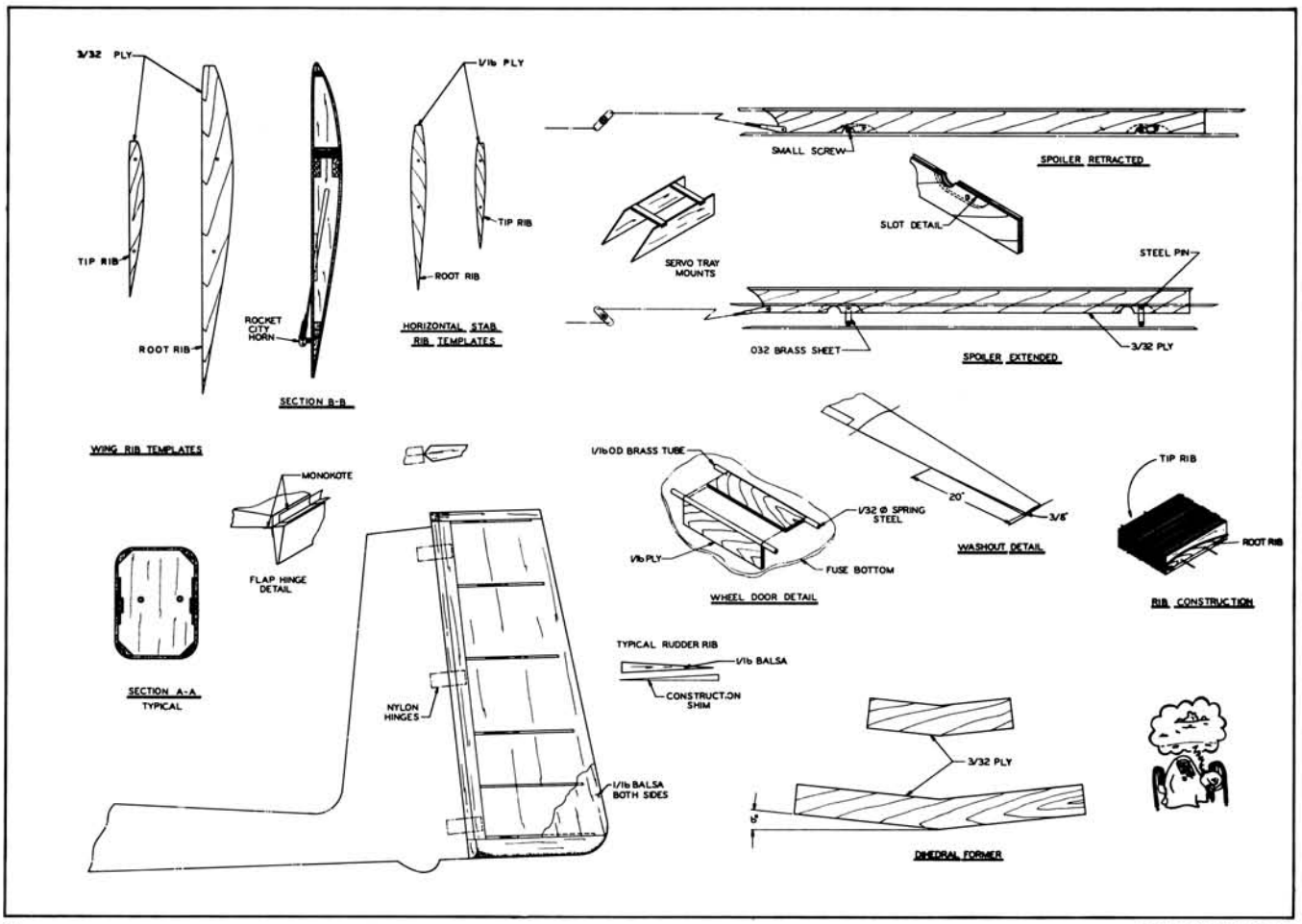


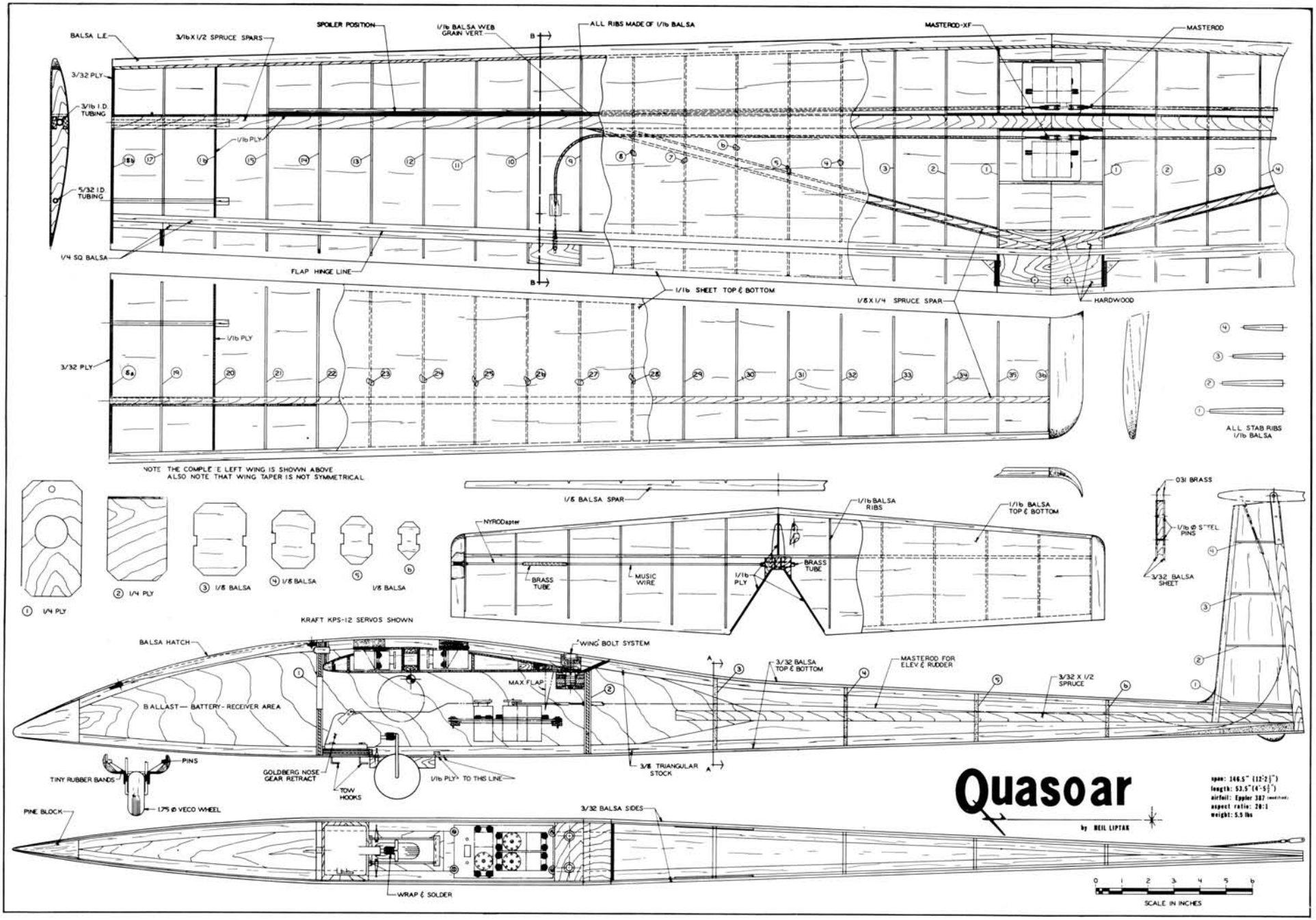
drag, or so the theory says. Really I like to use them because they look good and give the wing a definite ending. One final mention on the wing. You might be wondering about the airfoil and its modification. Well, the basic airfoil is the E-387 and the modification is that it has a flat bottom. This modification was employed for two reasons. Number one—was to simplify the building. And number two—since the design incorporated a variable flap, it was felt that this would compensate for the slight undercamber, which the E-387 has. The turtle deck was fitted over the top of the wing and the bolts were located here. A note here might help to remember to cut the bolts down so that they don't interfere with the pushrods on the bottom side of the mounting block in the fuselage.

Fuselage

The fuselage is just a simple box construction. I've found that this type of construction enables one to build a good strong fuselage in a very short time. The triangular stock on the corners provides for the rounding of the edges that gives the *Quasoar* a more full scale look.

The transition from the plywood doubler to the spruce spar gives a gradual reduction in strength instead of setting up a stress concentration as would be the case if the doubler ended sharply. All the internal front joints up to the wing bolt area were glass taped. This was done to prevent a joint from giving way in the event of a rough field landing. Also, glass tape wouldn't be a half bad idea around the bolt





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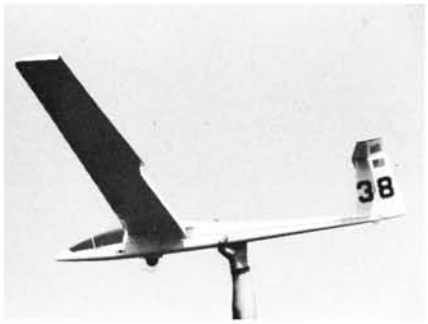

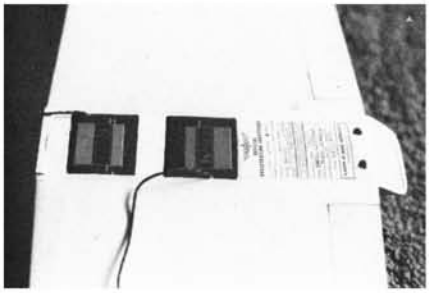

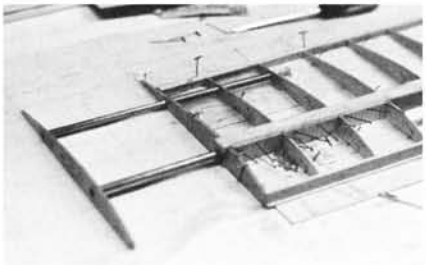

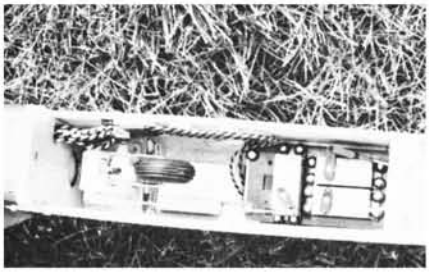

Top left: Neil nails the flying stab to top of fin. It's secure here, seldom snagged by bush. Above: Flaps down. You pick the angle, but this full position brings it down like a lead sled. Top right: Servos in wing for spoilers, flaps, when you need it. Graceful channeled wing tips. At left: Panels assemble. Tubing going in here, alignment must be right. Free-up the spoilers. At right: The Goldberg Retract cleans up last of the dirty drag, it's a Soarer for a purist. Pride is an inner thing, so retract flat tires.

mount. When you get to the flying stab pivot mount, be sure to make the trailing edge post out of a piece of hard spruce. Also, be sure to insert those pins as this will reduce the load on the glue joint. The hole in the pivot mount should be drilled after the mounts are secured to insure that the stab will be mounted straight. I guess a note on the hatch might be useful. The hatch was cut out after the sheeting was glued and shaped, then a piece of 3/8" balsa was fit into the hatch opening and sanded to shape. I think that should do it.

Stabilator

The flying stab is really handy with flaps. Since the flying stab allows you to change your incidence, you can efficiently react to the position of the flaps. The pivot pin extension is the only thing that must be installed before completing the stab. I might make mention that it was necessary to solder the keeper-nut to a small piece of brass. This clever move gave more support area for the keeper-nut. By being able to detach the "T" tail really helps in transportation and storage. It would probably end up detached anyway with a stab's penchant for getting shoved into door jambs and things.

Flying the Quasoar

The first thing to do is to tape your flaps up in the plane of the wing. If you're anything like me, you'll be wanting to use them on your first hand glide, and the main thing is to get the ship completely trimmed out first. Balance the *Quasoar* at the position shown on the plans. You may want to move the C.G. around, depending on how you like to fly your sailplanes. Some guys like to have it fly in a near-stall attitude, while others enjoy racing around the sky. However, with the flaps you can slow quite a bit, so you may want to trim the aircraft faster than usual.

The *Quasoar* was the first attempt I've made with a flap equipped sailplane. Some of you may be interested in what was noted. First of all, take your time with them, don't try to use them the first few flights. Get the glider trimmed out and put some flights in so you know what you've got. After that part is complete, start to add a little flap movement. You will note when you drop your flaps, even just a little, the nose will come up. Compensate this with some down trim. The main point I want to make is don't get disgusted. Take your time and work with it. I believe it'll pay off for you.

Flaps? Yes indeed. A Soarer has no engine, uses speed as a throttle, but this forward motion will cause you to overshoot. Spoilers kill excessive lift, flaps as a brake. Nice insurance!

The 90 degree max travel is for drag. The idea behind the max flap position is to create additional drag which would enable the *Quasoar* to descend at a much steeper angle without picking up a lot of speed. This was tried a few times and looks to be very promising. One thing that was noticed is that when you start to get low to the ground with flaps down and spoilers extended, you really have to concentrate on what you're doing. It's no time to be discussing the price of the towline.

The spoilers are really worth the effort. With some practice, one can really sharpen up the old landings. A word of caution here could help in as far as knowing what to expect when spoilers are employed. First of all you will notice the glider start to dive slightly. You should respond with a slight back pressure on elevator until the nose is back in a flying attitude. The result will be an increased sink rate, because really what you're doing is increasing the wing loading by spoiling the lift over part of the wing. When you are ready to retract the spoilers, be prepared to insert a little down elevator. This will compensate for the zoom effect you will encounter. Anyway, with a little practice you should have no problems. The retractable wheel was just to satisfy my own personal visions of how great it would be to have a wheel drop down on a landing approach. I am sure that the *Quasoar* will fly just as well without it.

The actual flying is very enjoyable. The response to the rudder and stabilator is smooth and positive at all speeds. Loops can be accomplished with hardly a bend in the wings at the bottom.

When in tow, just watch the wings and use your judgement. The prototype has been winched on 12 volt systems in all types of conditions and appears quite adequate in the strength department.

I invite you to send any comments you may have on the *Quasoar*, care of this magazine. Better yet, if you decide to build one, send a photo—it would be greatly appreciated.

Here's hoping that the unending quest to find columns of warm rising air is an enjoyable one.