Sparrow Hawk

Ready for something different? Here's an out-of-the-rut R/C glider designed primarily for slope soaring, but which can hold its own in a thermal as well. Three different wing configurations are detailed on the plan.

By ERNIE HEYWORTH

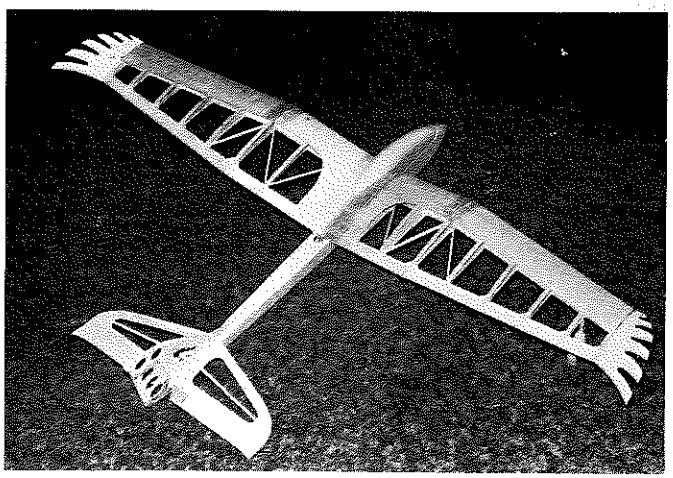
• During this long winter of 1988-89 I made my decision. I would design and build a sport-slope flyer to better fit our local situation. My reasoning for designing something new while the shelves have many kits available went like this: in upstate New York in the Fingerlakes region, we have fair ridge-soaring all year long and some thermal flying when the sun shines. Our ridge will not fly the three- and four-pound California stratographic rocks but it will eat up a "Flatlanders" fluffy thermal machine.

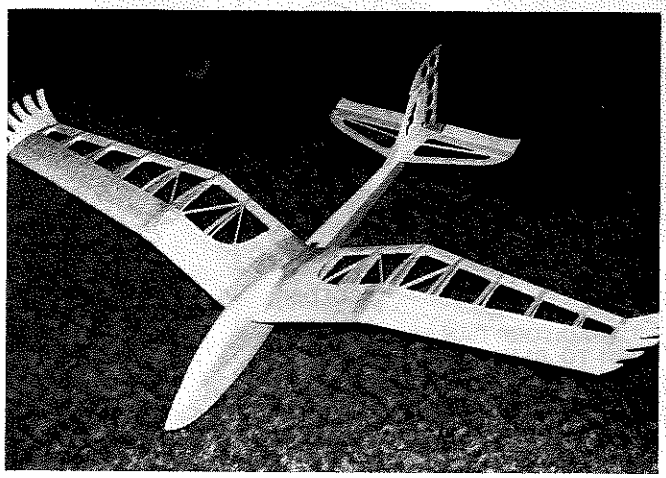
So the demand and challenge was apparent: to design a rugged seven- to nine-ounce per sq. ft. sloper; one that was quick and maneuverable; something not big and awkward that would not be rolled up in turbulence. At the same time we wanted it to be large enough so that we could go out into a thermal and still see and enjoy the plane.

The mix of slope designs available have been developed empirically and all look somewhat alike. They are successful when compared to each other. To break away

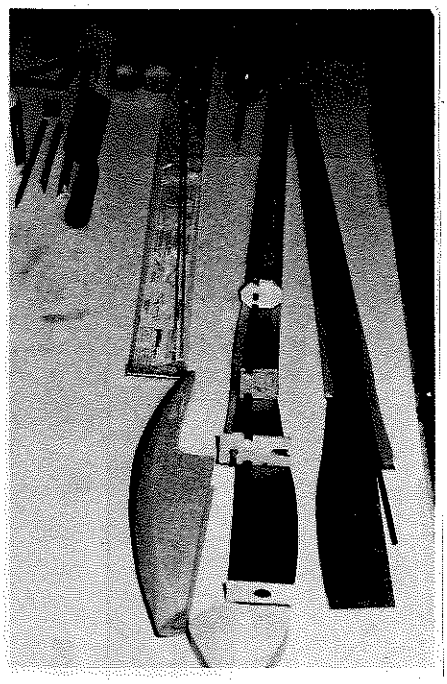
Right: Designer Heyworth with the No. 1 Sparrow Hawk prototype. It's a well-proven design; several others have been built by our author's flying buddies in the Fingerlakes area of New York state.

Below: Two views of the Sparrow Hawk sans covering. The "pinion feathers" at the wing tips are cut from 1/8-inch Lite-Ply.





2901 1 of 2



from this is heresy but I had a theory for change and this project was a good test bed.

Most planes today have very little fuselage area in front of the wing. I felt that more fuselage in this area would give me forerudder to turn against. Yes, it works but it also took away some of the features of weather-vaning. That's good and bad news together; it turns on command beautifully into the wind where we fly the most, but is slow to turn back on the downwind leg.

The other challenge in this design was that I wanted to please my flying buddies' individualistic ideas of what they thought was "good stuff." I polled nine guys and got nine different ideas of what a good design looked like. Some, "the brave builders," wanted gull wings and canopy—shaped fuses; others, "busy people," wanted an easy-to-build, easy-to-fly box. I wanted all of them to have a design class somewhat similar in size and performance so we could compare planes talent and design features.

This has been a fun project in that on the prints I was able to offer both width fuselages and different front profiles. The hatch version is more like the standard slope flyer of today as developed by time, trial, and error. The canopy version is my contribution to empirical data or heresy.

What was accomplished by the group was that we settled on 4-foot wing spars and a fuse big enough to hold standard servos. We left flexibility of wing configuration, gull, poly, or straight to the individual. Also, the airfoil could be similar to a 214 or a flatbottom. Fuse length, tail moments and volumes weren't cast in stone but it is strongly suggested that you not turn the print around and make a canard.

The plans with the article show some of the simple variations that you can do to get your own ideas or features put into your own sport slope soarer. This gets you away from assembling other people's designs to the letter of the instructions.

You must be careful to keep some of the basic principles of aerodynamics as found on these drawings such as tail, stab and wing volumes and the angles in which they join the fuselage. Be prepared to meet the challenges or mess that you get into when you go beyond following the instructions. If all else fails and you're in an impossible mess call up a flying buddy and ask for advice; "He's full of it!"

WINGS

Set the wing plans down on a flat surface covered with wax paper. Get all the parts cut, sanded and organized. Without gluing, pin and set the basic wing on the plans. Shim under the trailing edge and ribs to help the undercamber shape, using 1/16 x 5/16 cap material. Tack glue this together with CA. At this point determine your wing configuration. If it's gull or poly cut the sections apart at the breakpoint. Then make up the dihedral braces, sand and fit them into the space between the spars. Sand the wing sections to fit each other, then tack the TE, LE and spar together.

With the wing formed add the leading edge sheeting, webbing, braces and center sheeting. Round the leading edge; it was made out of spruce so we could trim trees and bushes. Note, the wing tips look best in transparent covering films. The tips are slanted up on the gull and straight wings. On the poly or straight center poly wings you need the tips slanted down to prevent "dutch roll." Put the cap strip on top of the trailing edge, top and bottom. Soak caps in water to get a good bend, especially the bottom leading edge. Fiberglass the center section with one and one-half ounce glass 2" wide, top and bottom. On the aileron version use flexible Du-Bro Engine control cable with soldered ends for stiffness.

FUSELAGE

Glue 1/64 doubler ply to the 3/32 balsa sides. Glue the 3/0 triangular stock onto the fuse sides along with the pushrods. Bring pushrods out through the back and cut off flush to the outside of the fuselage. Clamp the halves, back to back and sand. Make up the wing; hold down formers with the dowel glued in. Glue all formers to one side of the fuse half. Shim under the nose and tail. Then glue on the other fuse half on top of this setup. Cover the top and bottom fuse halves with 3/32-length grain. Under the nose section use 3/16 cross—grain balsa. The length grain on the fuse sides will give you flexibility instead of brittleness. Rough in the nose block and glue it to the fuse. I hollowed mine and used the recess for possible nose weight. Now cut out finger launch hole and put in the tow hook plate with 6/32 blindnut.

STABS

Build these conventionally out of soft 3/16 balsa, lightening them if possible. Reinforce the horn areas with 1/64 ply. Join the elevators with 1/4 x 1/4 spruce in the center. I used the Robart 1/2 A hinges and Goldberg 1/2 A horns.

RADIO INSTALLATION

I used my trusty old Airtronics Championship radio with 401 servos, standard receiver and a 500 mAH battery pack. On my first Sparrow Hawk I built the wide version and could use a square battery pack forward. On the second and narrower bird I used a flat pack. If you need the weight add it in heavier battery packs. The extra mAH helps on longer flights. On the wider fuse I mounted the 401 servos side by side and under the wing. On the narrow fuse I mounted them tandem in front of the wing. Standard sized servos will fit in this plane. On the aileron version, mount the servo in the wing using flexible cable to 1/2 A horns.

COVERING

Transparent covering looks best, especially when you do the bird-like pinion-feather wing tips. I used Black Baron transparent for the first time and liked it. If you have a favorite symbol cut it into the vertical tail. The transparent film will show it off nicely. Add an eye to the front or the canopy for an extra bird-like feature.

FLYING

When reading most building articles I usually read "How it flew" and then go back to the boring stuff. I haven't read an article that didn't overrate the plane with BS that wasn't fabulous or incredible! So, I'll minimize the BS and try to give you a feeling for a 4-foot sport sloper.

First, it was designed for these purposes; 1) to fly in turbulent air; 2) to be simple to build, but to allow each builder to add his ideas; 3) to take standard servos; 4) to be hand-chucked; 5) to be big enough to be seen when thermalling; 6) to be exciting and provoke comment from the gallery.

If you're new to slope soaring and have some R/C flying experience this plane will be easy but you must remember to keep the plane moving. There is no prop blast to keep air going over the control surfaces. This slope soarer does not like long downwind moves; so plan landings with plenty of altitude and lots of down trim. With this in mind anyone can handle a Sparrow Hawk.

For flying arrangement on the planes' control surfaces, start with plenty of rudder, 1" each way and normal to small elevator throw of 1/4" each way. I didn't have to add nose weight to either of my versions.

CONCLUSION

The Sparrow Hawk is able to answer the wind as quick and fiercely as its namesake.

The aileron version is just slightly more maneuverable but it's all in what you want to do. In the Fingerlakes of New York, we are not yet smashing into each other for amusement. We're too busy trying to survive the cold and turbulent air to do that. At the Hill we picked up lots of comments on the wingtips and gull configuration; mostly Auduboners that wanted to identify a new species.

But seriously, the thrill of flying a bird-like creature runs deep in our blood and you just have to build one to experience it! •

2901 2 of 2