

ELECTRAGLIDE II

By Jim Zarembski

The Electraglide 62 was the first model aircraft article and plans that I had published in RCM in 1975. This model was built for the then new Astro 05 when it was first introduced in 1974. At that time all of us in the electric powered arena felt that we needed high lift airfoils because of the excessive weight of the flight batteries. I, therefore, chose the N.A.C.A. 4412 airfoil for the original Electraglide. With a Cox Grey 6/3 prop, those old blue backed Astro 05s turned about 14,000 rpm with 8 cells rated at 550 mAh. The Electraglide would climb very nicely on this power which lasted about 4 minutes and ultimately had a flight time of 6 to 8 minutes.

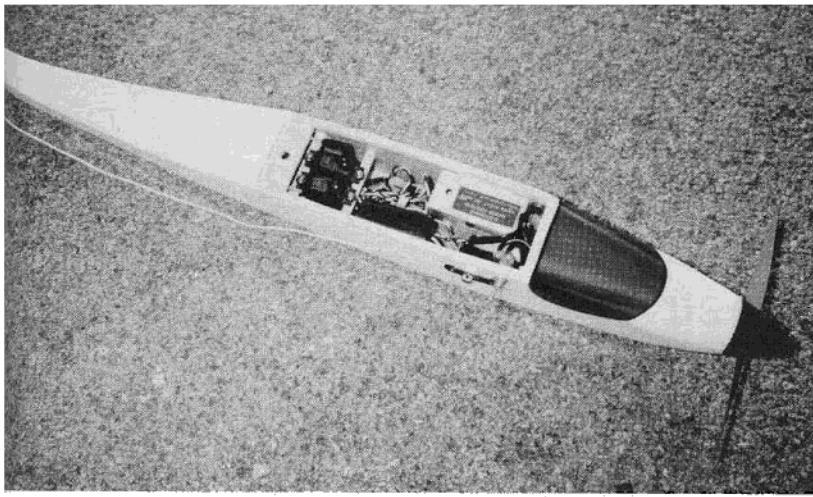
Over the past 10 years there have been significant improvements in the design of electric power systems. The Astro or Leisure 05s available today turn larger props at higher rpms for a far longer duration of power. In early 1984 the new Sanyo 800 mAh batteries began to appear on the dealers shelves. A 7 cell pack of 800s weighs in at a mere 8.6 oz. compared to 13.0 oz. for the 1,200 mAh cells that have been in great use in the past few years.



Jim Zarembski with Electraglide II — designed for the sport sailplane flier, expert or beginner.

Editor's Note: The original Electraglide 62 we flew in 1975 was one of the nicest powered sailplanes we had seen up to that time. The modernized Electraglide II far surpasses the original in all categories. It is easy to build, very easy to fly, and has a majestic glide that is hard to believe. And, best of all, you don't need expensive flight systems to fly it. Any of the 05 systems work very well. The RCM Electraglide II is a fun to fly sport sailplane that'll do 15-20 minutes in still air and thermal with the best of them. The Electraglide II is destined to be a classic!





Streamlined fuselage with plenty of room for your R/C gear.



Jim's sons with the ill-fated straight wing version.

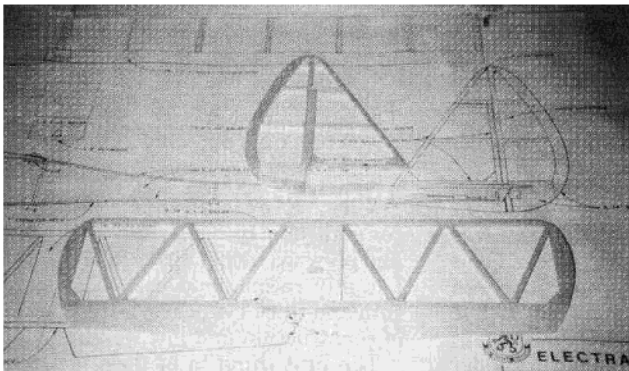
We've also learned which airfoils work well in conjunction with Silent Power. Therefore, I wanted to take the old Electraglide 62 and redesign it as an electric powered sailplane for the mid-nineteen eighties. It would be designed for all of the 05 motors available today with either 7 cells of 800s or 6 cells of 1,200s. It would be designed for the sport sailplane enthusiast, not the contest oriented flier.

The original idea in early 1984 was to use the same wing and stab as the original model with an Eppler 205 airfoil instead of the 4412. Because of reductions in the size of radios the

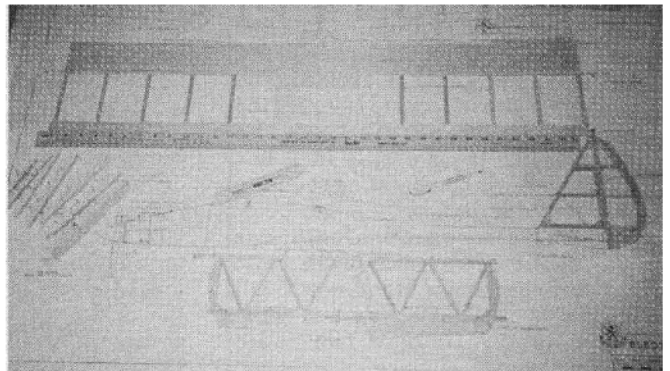
fuselage could be reduced in size. Hence, the first versions of a new Electraglide sported a straight dihedral wing with a small streamlined fuselage and was very similar to the original Electraglide 62.

The first model was flown in June 1984 using an Astro Cobalt 05 for power. It was immediately apparent that there was more than enough power to climb this ship at fantastic rates of climb. In fact, almost full down elevator was required to keep the model from ballooning. The glide was not really what I expected. It simply was not up to the caliber of

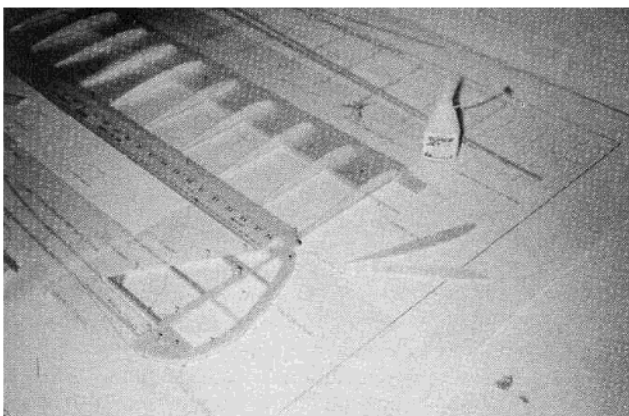
performance for models like the Electricus that I had been flying for the past two years. Another major problem was that this model did not respond well to rudder, especially when flying with the wind. I also broke the wing of the second prototype trying to dive out of a thermal. This version had spruce spars top and bottom with 1/16" balsa sheeting from the leading edge to the spar. Shear webs were used but there was no bottom sheeting in an attempt to save weight. The result was wing flutter and a basket case. I'll always use the old D spar technique in the future on sailplanes.



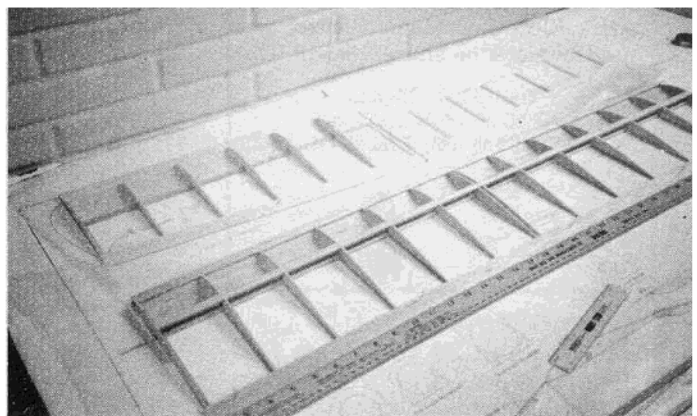
Stabilizer and rudder assemblies. Constructed out of 3/16" balsa, very light yet quite strong.



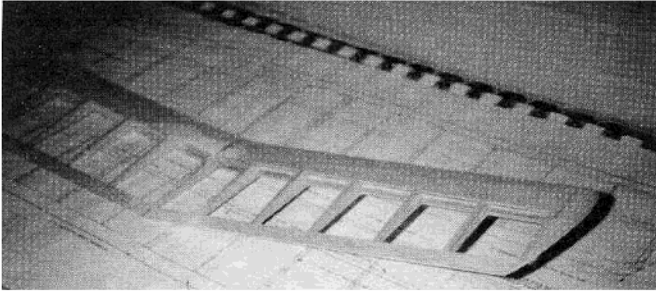
Bottom sheeting and spars in place ready to accept the wing ribs.



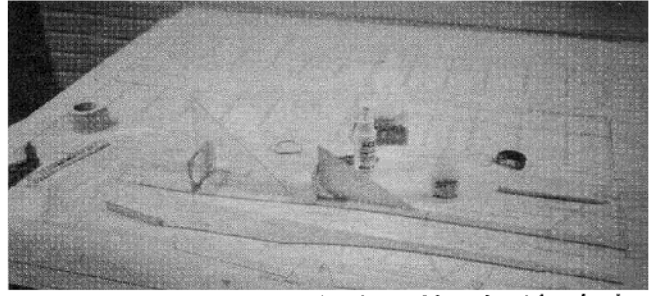
Wing ribs glued in place with Super Jet. Note the trailing edge strip used to curve the bottom sheeting up to the ribs.



Semi-completed wing panels.



Finished wing tip: Sanded flat to match the airfoil on the top and tapered on the bottom.



Formers epoxied to the right fuselage side using triangles to hold at 90 degrees.

Back to the drawing board. The model would be redesigned with a larger wing (72" instead of 62"). The rudder would be enlarged and additional downthrust would be added so that a modeler could climb and glide with the same elevator trim. Additional design features include a lifting fuselage which is designed to be as drag free and lightweight as possible. This was accomplished by designing hatches out of the model. The motor, for example, would be able to be inserted from the rear radio compartment through a large hole in the fuselage former at the leading edge of the wing. From the first two prototypes it was determined that no other equipment had to be placed in the forward compartment to achieve balance.

The wing would be redesigned to use tip dihedral with a flat center section. This would be easier to build and lighter and stronger because additional dihedral braces and strengthening would be avoided. The wing tips were tapered to beautify the ship. A new version of the Electraglide II was built in a few weekend marathon building sessions. How would it perform?

A trusty Astro Cobalt 05 was inserted from the inside of the radio compartment and a brand new 7 cell pack of 800 mAh Sanyo's was servo taped to the floor of the radio compartment.

I installed a new Futaba FP-4L radio with two of the new S-33 servos for rudder and elevator control. An Astro Electronic Motor Control was used for motor on and off control. This

unit was selected because it has a motor short feature that stops the prop when the motor is turned off. A free wheeling prop is like gliding with a paper plate nailed to the front of your ship. To keep the weight down, a 225 mAh pack was used. With all of this gear neatly tucked in place, the Electraglide II tipped the scales at 35 oz. for a wing loading of 10 oz./sq. ft. I was all ready for the test flight, the day of judgment.

An old Cox Grey 7/3½ propeller was bolted to the motor inside a Goldberg 1½" spinner and all of those completed model photographs were taken and quickly developed in a one hour processing center. (It's best not to take any chances.) The radio and flight systems were all charged up and a small group of youngsters traveled with me to a large park in my native Perrysburg, Ohio. I knew the model would climb but would it turn properly? I'd take no chances, I'd first test glide the model over long grass. Remember that instruction from the old days?

I ran into a light breeze and tossed the Electraglide on the test glide. It drifted to the left so I corrected with right rudder and it didn't respond. In fact, it spiraled into the turf and was tossed from wing tip to wing tip. I was mad! About ready to give up. I checked the model out and found no visible damage. The radio worked fine but . . . I couldn't believe it! I had the rudder hooked up backwards. The new Futaba FP-4L has servo reversing micro switches built into the transmitter. I had used it on another model and forgot to recheck at the

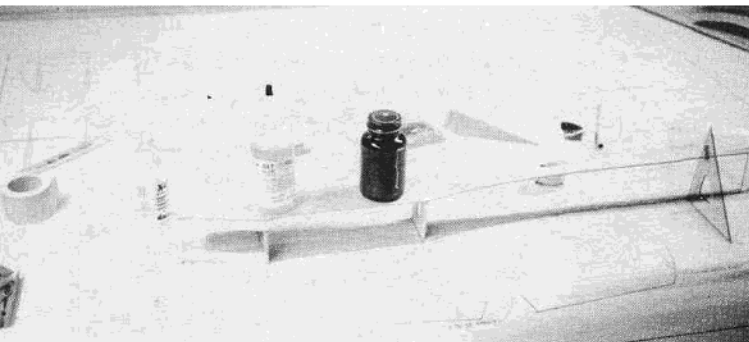
field. A flick of the switch and another test glide was attempted. This time the Electraglide II flew flawlessly. I launched with the Cobalt 05 screaming and climbed for about a minute. I had a total of four motor runs of over a minute and a total flight duration of 14 minutes and 17 seconds. The glide was spectacular and this model responded very well to rudder commands. The elevator was set at dead neutral trim for both the climb and the glide. From mad to ecstatic in a 20 minute period. This is what model aviation is all about.

Over the past few months I've flown the Electraglide II with Leisure and Astro ferrite motors with either seven small or six large cells. Flight duration in still air is about 17 minutes with the small cells and 22-24 minutes with the 1,200 mAh cells. The Electraglide II is easy to fly and easy to thermal. With the streamlined fuselage and the Eppler 205 it also handles the wind very nicely despite its light wing loading. I hope you're interested enough by this time to consider building this model. It's also very easy to build!

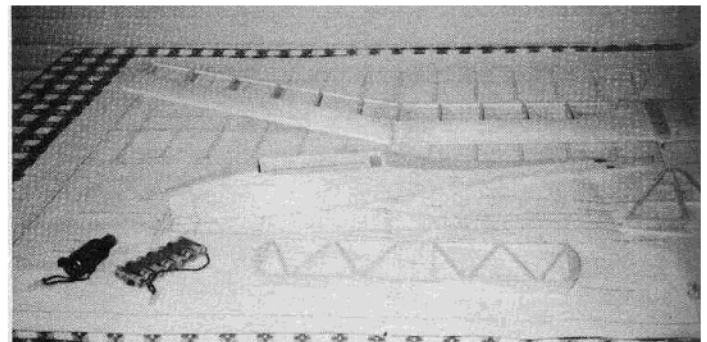
CONSTRUCTION

The Electraglide II is a conventionally built balsa, spruce, and plywood model aircraft. However, I highly recommend the use of both thin and thick cyanoacrylates for ease of construction and low weight.

The first thing to be done is to cut out all of those parts on the plan. Stack cut the wing ribs on your Dremel saw along with the fuselage sides, formers and tail feather components. If you don't have a jig saw, rib and former



Fuselage sides joined, make sure they are even.



Completed components of the Electraglide II ready to cover.

partial kits will be made available on a limited time basis.

Fin and Rudder:

Let's start with the fin and rudder framing. Pin the curved rear of the rudder to the plan over a piece of waxpaper. Cement and pin the rudder bottom in place followed by the 3/16" sq. balsa uprights and front as well as the horizontal braces. Add the four corner braces cut from 3/16" sheet balsa and lightly tack the moving rudder to the fixed fin and sub fin prior to sanding. After sanding to a streamlined section cut the rudder away ready for covering.

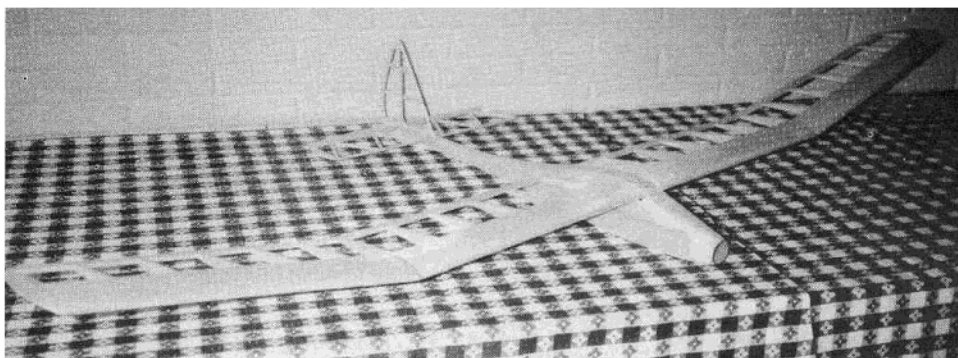
Stab and Elevator:

Pin the rear 3/16" x 1/4" member to the plan and glue the center section and the stab tips in place. Glue the leading edge in place and carefully cut each of the diagonals to size with a single edge razor. Glue these in place one by one and add the 3/16" balsa corner reinforcements in place. Epoxy the 3/16" sq. spruce torque rod to the two elevator halves. Tack the elevator to the stab and sand to a streamlined section ready to cover.

Fuselage:

It's very important to build a straight fuselage. Start by making sure that both fuselage sides are identical. If not, sand them to match exactly while they are pinned together. Use a felt tip pen and mark the location of all of the formers on the inside of the two fuselage sides. Cement the 1/2" triangular balsa to the top front of each fuselage side. Formers F-2, F-3, and F-5 are all the same width, so pin down the right fuselage side over the plan and epoxy these three formers in place. Make sure they are vertical by using triangles. When this subassembly cures, remove it from the plan and pin the left side to the building board with the inside up. Place a bead of epoxy on all three formers and carefully position them over the left side using the lines you drew as a guide. Place some light weight on the assembly and check all around with a triangle to make sure that the sides are perfectly aligned. When this dries, glue the rear fuselage halves together and cement formers F-6 and F-7 in place. Use a thin bead of cyanoacrylate to cement the 3/32" balsa bottom in place, cross grained. At this point install your favorite brand of control rods for the rudder and elevator and add the top fuselage sheeting both at the front and rear of the fuselage. Cement the nose block, F-1, in place and epoxy F-4 to F-5 and the fuselage sides.

I use an X-Acto #26 blade to carve the nose to roughly match the spinner. I then progressively use 100, 220, and 400 grit sandpaper to finish the fuselage. With some of the scrap



Assembled model ready for the MonoKote.

you've generated, fabricate an air intake and cut an opening on the bottom of the fuselage for cooling air entrance. A 1" diameter hole is cut in the bottom at the rear of the fuselage for cooling air exit.

The center wing panel is very similar to the wing tips with a few minor exceptions. Begin by pinning down the trailing edge and bottom 1/16" balsa sheeting. Cut the bottom capstrips at each rib location and glue them in place. Cement the center 1/16" balsa sheet in place and then carefully position the two tip panels in place with 4" of dihedral under each tip. Next cut the bottom spruce spar to size and glue it in place making sure that it lines up with the spar on the tip panels. Follow the same construction as in the tips and add the top spar, the shear webs and the leading edge in place.

Remove the center panel from the plan and cut or drill a hole in the bottom of the wing between the middle #1 ribs and insert the 3/16" diameter dowel and place the sub-assembly on the fuselage. Make sure the dowel is inserted into F-3. Rubber band the wing to the top of the fuselage and apply a generous amount of 5-minute epoxy around the dowel between the #1 ribs and wait until it sets up.

Remove from the fuselage and add the wing leading edge and top sheeting. Next add the capstrips and epoxy the tip panels to the center panel. Apply a patch of fiberglass on the bottom of the wing at the dowel and glue the 1/16" plywood wing hold-down reinforcement in place. You are now ready to carve the wing tips and sand the wing for covering.

Covering:

Once the entire model is sanded to a smooth surface with 400 grit sandpaper, vacuum the entire model. Then wipe off any balsa residue with a tack rag.

I chose transparent red MonoKote for the open structure in the wing and tail. This is very easy to see at high altitude and is a very handsome looking finish. I chose to use white MonoKote on the wing leading edge and fuselage so that when I fly the model in dusk conditions I can see what it's doing near the ground.

ELECTRAGLIDE II

Designed By:

Jim Zarembski

TYPE AIRCRAFT

Electric Powered

Sport Sailplane

WINGSPAN

72 1/2 Inches

WING CHORD

7 1/4" Center Panel tapering to 6" at Tip

TOTAL WING AREA

500 Sq. In.

WING LOCATION

Top of Fuselage

AIRFOIL

Eppler 205

WING PLANFORM

Constant Chord

Tapered Wing Tips

DIHEDRAL EACH TIP

4 Inches

O.A. FUSELAGE LENGTH

34 Inches

RADIO COMPARTMENT SIZE

(L) 7 1/2" x (W) 2 1/8" x (H) 2 1/2"

STABILIZER SPAN

17 1/4 Inches

STABILIZER AREA

80 Sq. In.

STAB. AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top Of Fuselage

VERTICAL FIN HEIGHT

7 3/8 Inches

VERTICAL FIN WIDTH (inc. rud.)

6 1/2 Inches

REC. ENGINE SIZE

05-075 w/6/4-7/6 prop

REC. CELLS

7

CAPACITY

800 mAh

LANDING GEAR

Skid

REC. NO. OF CHANNELS

3

CONTROL FUNCTIONS

Rud., Elev., Motor On-Off/Short

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa & Ply
Wing	Balsa, Ply & Spruce
Empennage	Balsa & Spruce
Wt. Ready To Fly	35 Oz.
Wing Loading	10 Oz./Sq. Ft.

The rudder and elevator hinges used are sold by RC South and are mylar covered with a paper covering for cyanoacrylate adhesion. A slot is simply cut in the rudder and elevator

at the hinge line and the hinge is inserted. When everything is the way you want it, a drop of Jet cements it permanently in place.

With the wing in place on the top of the fuselage, drill and tap the wing and F-4, making sure the wing is straight. Next epoxy the fin to the stabilizer and, in turn, glue this to the fuselage. I generally apply epoxy to the fuselage and then turn the whole assembly upside down between chairs while its setting so as to flow the epoxy to the stab. Be sure to line up the wing with the stab so that everything is straight.

Equipment Installation:

Friction fit the motor in the nose with masking tape around the O.D. if required. Next, servo tape the flight battery in place along with the receiver, and radio battery. Install the servos and hook up the controls. By all means make sure right is right and up is up.

Complete the installation by installing a motor off/on control and the recharging switch harness. Add the skid and spinner and you're ready to fly.

I think you'll enjoy it. For ease of construction, a partial kit of wing ribs, fuselage formers, and stab and elevator components will be available on a limited basis from Jim Zarembski, 156 Mark Lane, Perrysburg, Ohio 43551, for \$17.50 postpaid in the USA. Outside USA, write for prices.

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