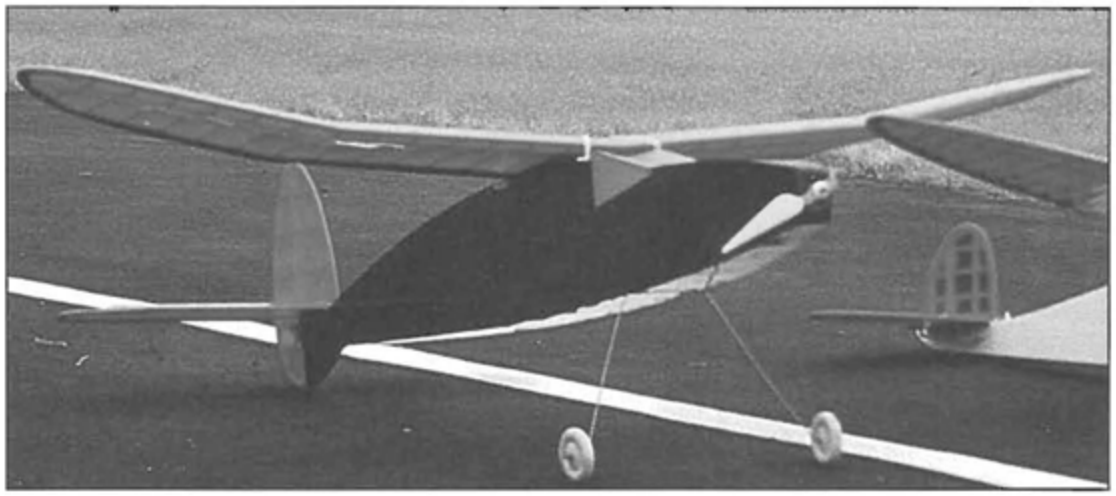


KORDA

A Scale model of a model, enlarged by a factor of 1.7 for 7-12 cell electric power

By Bill Baker

I look upon old-timer models as scale models, in the sense that the degree of perfection achieved is related to the fidelity to the original model. Most of us are willing to make some compromises for the sake of practicality, but each deviation is carefully considered, so as not to seriously detract from the illusion we seek. In this article I will refer to an occasional departure from "scale," or to some feature that is a "scale detail" not absolutely necessary for performance.

Sir Charles Wakefield donated a perpetual trophy in 1927 for an annual International event for rubber powered models, which is to this day actively competed for, and is the oldest International Championship event for model aviation. In 1938, the winner was James Cahill of the United States, which meant the 1939 event would be held in the USA. The event was held at a New York City golf course August 6, 1939, and was won by Dick Korda of Cleveland, Ohio. The model was published in the November 1939 issue of Air Trails magazine, and shortly after was kitted by Megow. It was extremely popular, and the numerous copies made displayed the same affinity for thermals as the original. You may be surprised to know that a kit is still being produced by the P&W Model Service, and a 3/4 size version is kitted by RN Models. Both of these kits should be available from FAI Model Supply, P.O. Box 3957, Torrance, California 90510, (310) 830-8939, catalog $2.00. I might point out that the 3/4 size RN version is a model of a model, just like this one is!

Why build it? Well, it flies very well, but then a lot of models fly well. It comes down to nostalgia: Those of us who started our modeling careers before, during, or shortly after WWII have a special admiration for the modeling champions of the 1937-41 era, I think in part because the magazines again and again from 1941 to 1945 reminded us of their exploits and designs, they were not

1939 KORDA (X1.7)

Designed By:
William Baker
TYPE AIRCRAFT
Vintage, Sport Electric
WINGSPAN
75⅛ Inches
WING CHORD
8⅜ Inches
TOTAL WING AREA
596 Sq. In.
WING LOCATION
Shoulder
AIRFOIL
Undercambered
WING PLANFORM
Constant Chord/Elliptical Tips
POLYHEDRAL, EACH TIP
7⅛ Inches
OVERALL FUSELAGE LENGTH
60¾ Inches
RADIO COMPARTMENT SIZE
(L) 9" x (W) 4⅜" x (H) 3"
STABILIZER SPAN
35½ Inches
STABILIZER CHORD (incl. elev.)
6¼ Inches
STABILIZER AREA
205 Sq. In.
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
14-13/16 Inches
VERTICAL FIN WIDTH (incl. rud.)
8½ Inches
REC. MOTOR SIZE
Geared 05-15
BATTERY SIZE
7 x 1400 mA — 12 x 600 mA
12 x 1000 mA
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
3
CONTROL FUNCTIONS
Rud., Elev., Motor Control
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa, Ply, Hardwood
Wing	Balsa, Ply & Spruce
Empennage	Balsa
Wt. Ready To Fly	60 Ozs. (3 Lbs. 12 Ozs.)
Wing Loading	10.8 Oz./Sq. Ft.

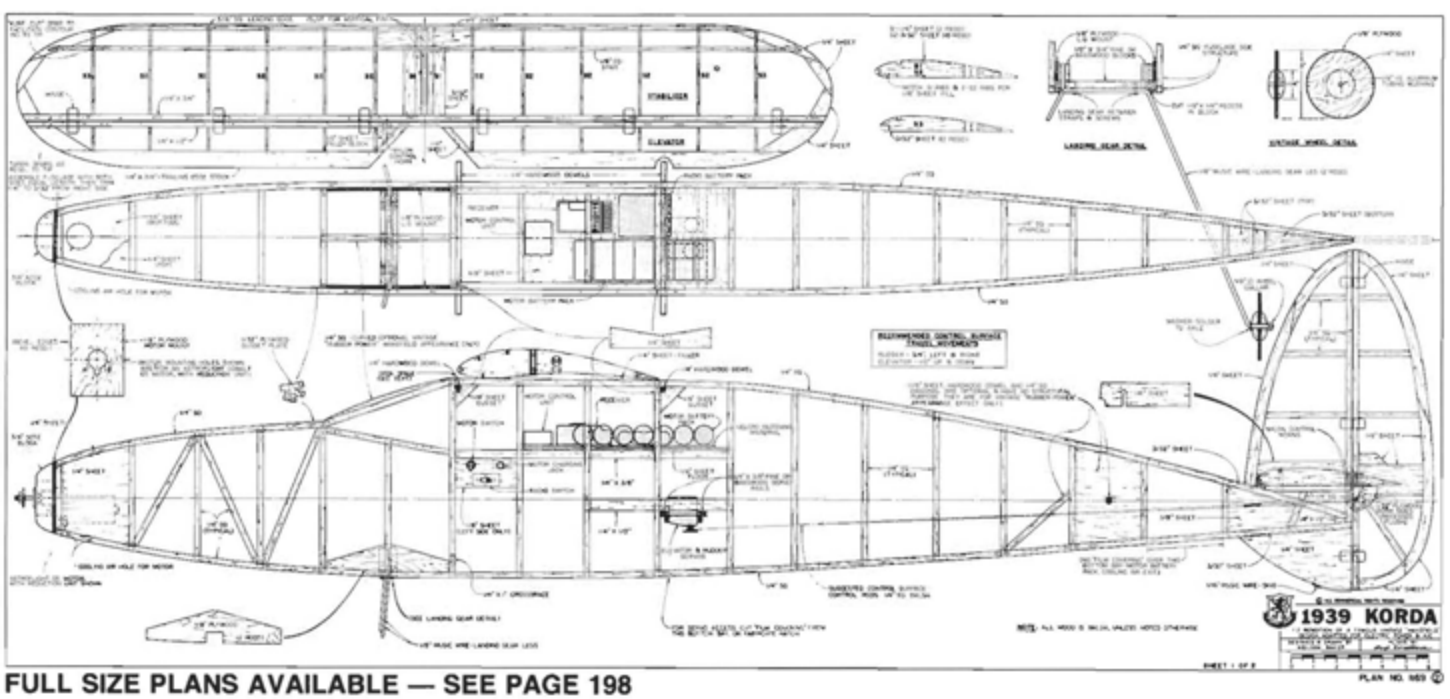
ABOUT THE AUTHOR

Bill Baker started building models about 53 years ago. He has been flying R/C for about 30 years, starting with escapements. His first transmitter was a tube type, 135 volt job. He flew control line off and on for fun, and flew free flight competively until 1988. He won several firsts in AMA Nats and Sam Champs (mainly in rubber events), and won Mulvihill trophy in 1979. He graduated from Oklahoma State University in 1956, University of Oklahoma School of Medicine in 1960, and completed residency in Psychiatry in 1964. In partial retirement, Bill works part time at Veteran's Hospital in Oklahoma City, and does some teaching in Psychiatry to students and residents, with faculty appointment at the University of Oklahoma, School of Medicine, Dept of Psychiatry. Bill has had several free flight oriented articles and designs published in various model publications, with this being the first R/C construction article.

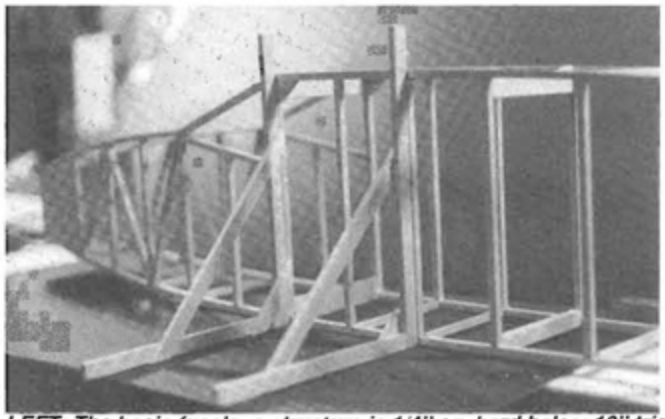
pushed into oblivion each year by the newest winner like current World and National Champions are. So for people of about my age, names like Korda, Lanzo, Struck, Taibi, Goldberg, and many others are really meaningful, and for an old rubber flier like me, the Korda is really special for the dramatic way it won in 1939 with a 43-minute 29 second flight!

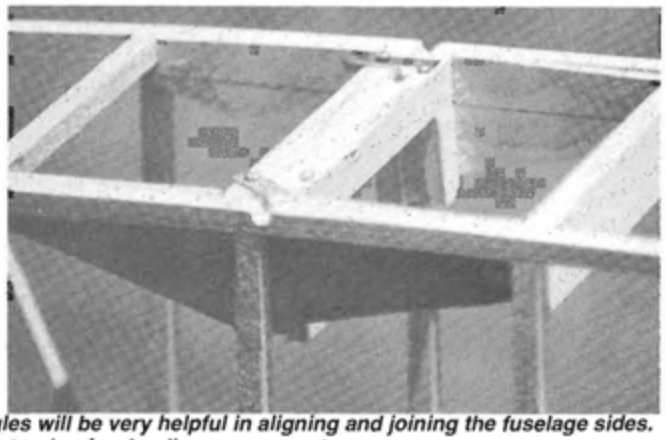
In recent years, I have put down my rubber winder and picked up a transmitter, and have been flying electric power mostly, as the most practical way for me to get a soaring model up to thermal altitude. I like soaring models of all sorts, including modern and Old-Timer designs. I built the Comet Clipper from RCM plans and converted it to electric power, and I also have one of the popular electric Playboys. I've seen model magazine construction articles on electric R/C versions of the Sparky, the Jabberwock, and the Pacific Ace, all Old-Timer rubber models and I thought, "Why not the greatest classic of them all?" I scaled the plans up by a factor of 1.7, which gives a span of about 74" and a wing area of 600 sq. in. From experience, I felt this would be a flyable size for a geared Astro Flight Cobalt "05" on 7-cells. The "15" size motor is the same size and weight, so the only difference in weight would be the added cells (up to 12) and the 15 with 12-cells is recommended for those who want a fast climb. I really like the leisurely, dignified way mine climbs on 7-cells.

A further word on flying: Mine is very easy to fly, very stable; flying very slow and

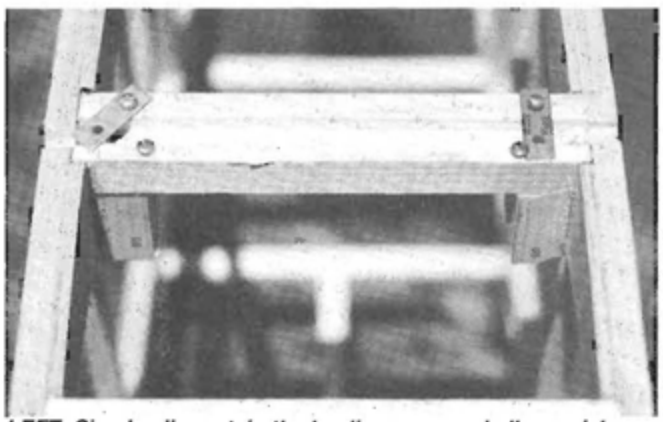


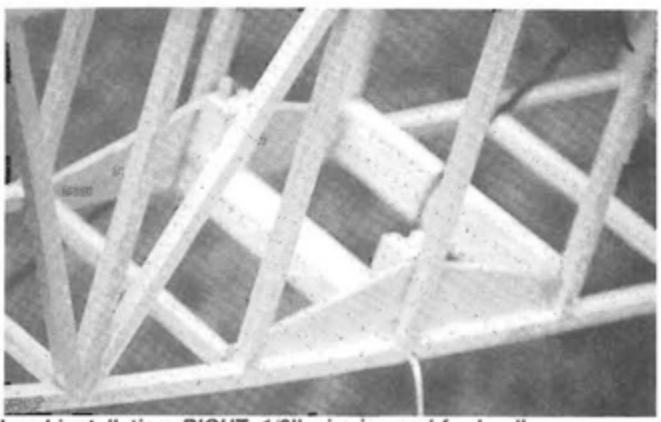
FULL SIZE PLANS AVAILABLE — SEE PAGE 198





LEFT: The basic fuselage structure is 1/4" sq. hard balsa; 10" triangles will be very helpful in aligning and joining the fuselage sides. RIGHT: Grooved pine blocks with plywood side plates make up the torsion bar landing gear mount.

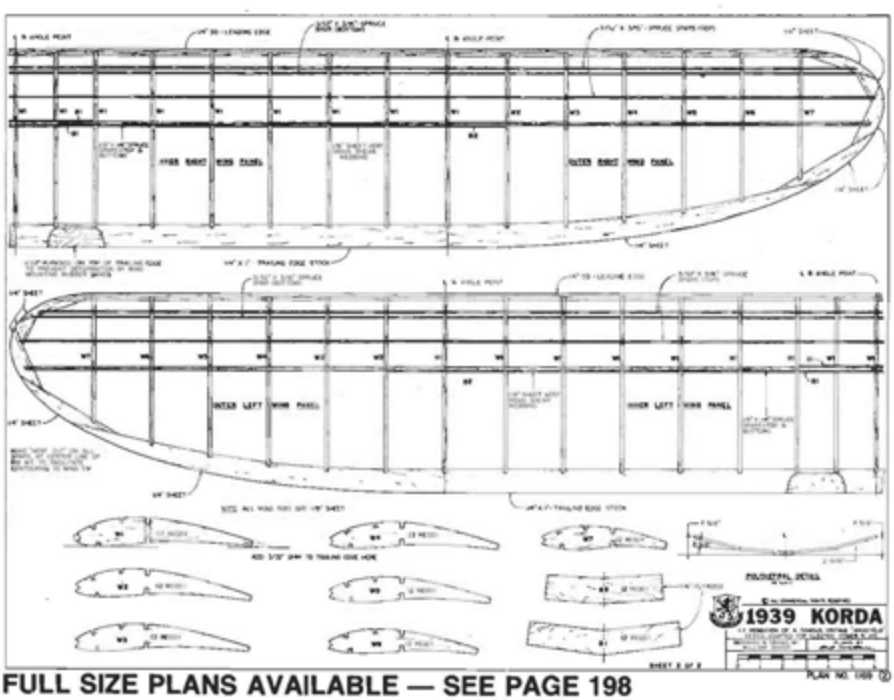




LEFT: Simple clips retain the landing gear, and allow quick removal and installation. RIGHT: 1/8" wire is used for landing gear.

floats on the wing. It is a delight to take off and let climb in wide spirals, and then shut the power down and watch the floating glide. There is very little trim change at this power level, between power off and power on. It does neat touch and go's and low slow fly-bys and will, of course, thermal; I am seriously thinking of adding spoilers. It is not intended to be aerobatic and it's **slow**; not a windy weather ship. Mine weighs in at 60 ozs. I could have built it lighter, but I wanted a practical model that could be used a lot.

A couple of questions younger folks may ask before going into the construction: Why is it so "fat," and why is the landing gear so long? This is a scale model remember, and to shorten the landing gear would, in my opinion, be too great a change in appearance. The original, or "real" Korda is a rubber powered model and rubber models use very large diameter propellers since the 1939 rules required an unassisted take-off from the ground (in practice usually a sheet of plywood or two). The large fuselage cross section is also a result of the 1939 rules that related fuselage length to cross section: The greater the length, the greater the cross section required; a compromise decision being required of the designer.

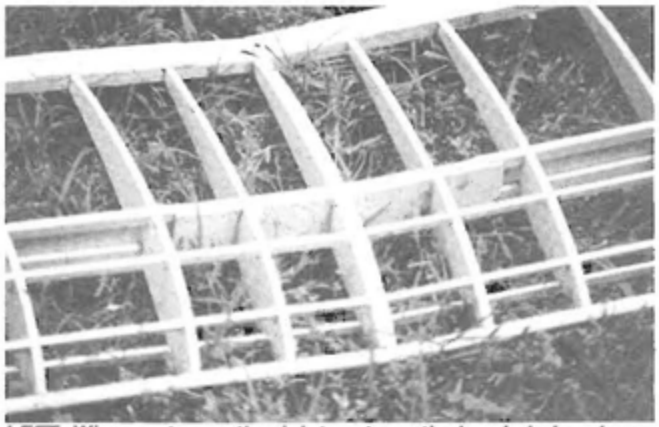


FULL SIZE PLANS AVAILABLE — SEE PAGE 198

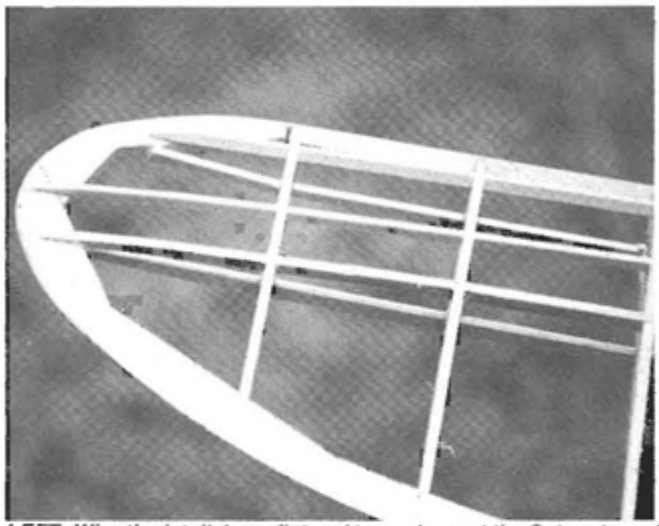
CONSTRUCTION

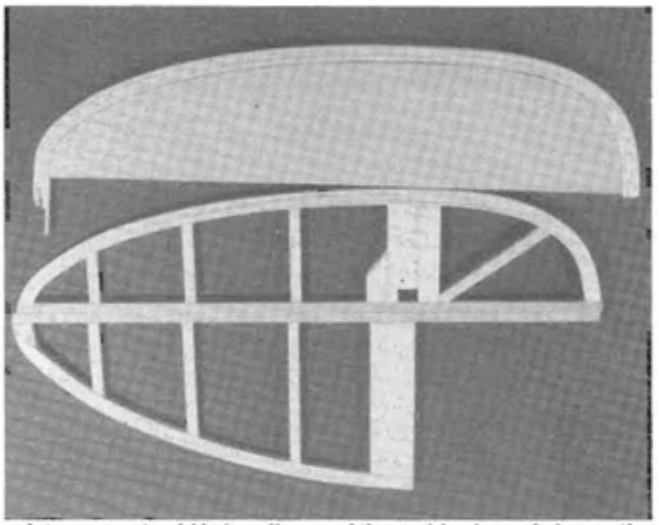
Fuselage:

Hard 1/4" balsa longerons, medium to soft for upright and crossbraces. The sheet fill at the nose and at the back are "scale." The nose fill is functional, the aft sheet fill is a "scale detail" since I assume the rear rubber hold-down dowel is not really going to be used. It might startle some of the free-flight folk, however, if you ask them to hold while you wind. The rails to support equipment are not part of the basic side framework and are added later. Make the sides identical, add the small 1/32" ply "sort of star shaped" brace at the junction of the upper nose longeron and the cabin, and glue to the inside of the frames (which then become one right and one left). Make the plywood landing gear block supports, notch for the crosspiece and add to the inside of the two sides. To join the sides, it will be helpful if you make some large triangles of wood, such as 1/4" x 1/2" balsa to pin down to the board and then pin the sides to the triangle. This "jig" is most useful to get the cabin area square. Get the crosspieces in at the leading and trailing



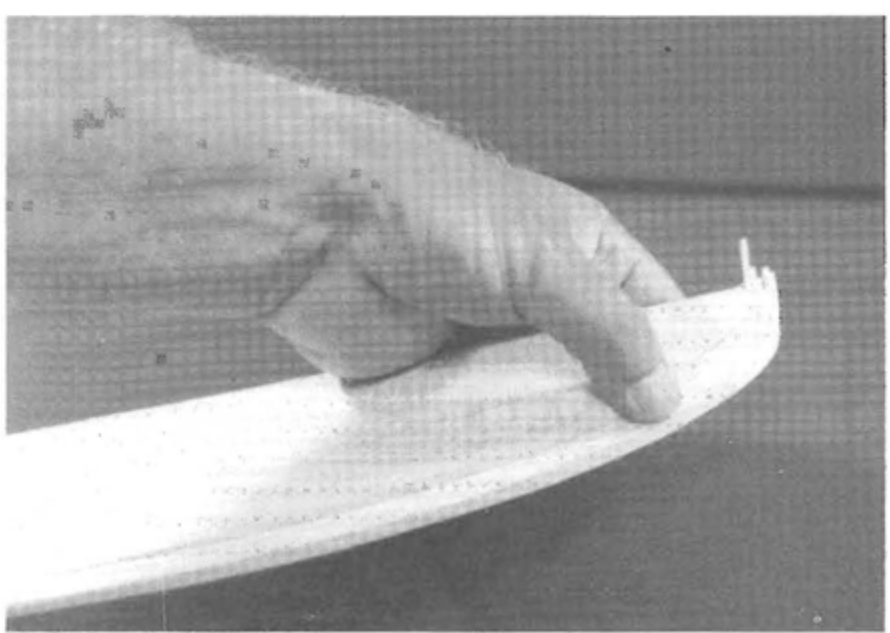
LEFT: Wing center section joint; note vertical grain balsa shear webs and plywood dihedral brace. Thin plywood also used to protect trailing edge from rubber bands. RIGHT: Tip panel joint with plywood dihedral brace.



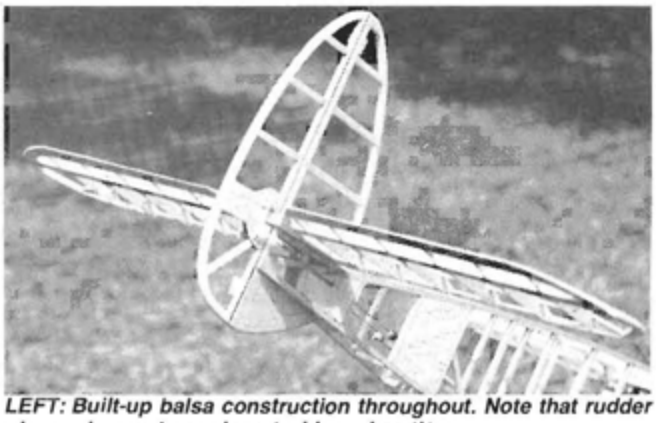


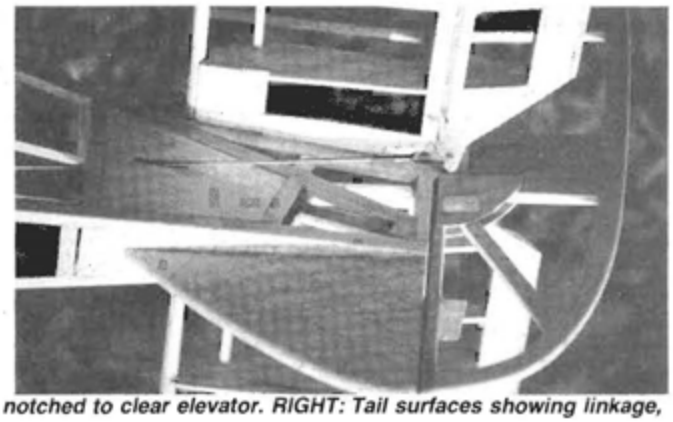
LEFT: Wingtip detail; keep flat and taper down at tip. Cut part way through top spars to aid in bending, and then add a drop of glue on the cut. RIGHT: Details of rudder structure showing laminated style outline.

edge areas of the cabin first and only when this part is square and glued together do you start with the tapered section. Bring the aft end together, using the top view to get it straight. Once you get the aft end and a couple of intermediate crosspieces in, it is best to cut the remaining crosspieces to fit the fuselage, rather than to force them to be the precise sizes shown in the plan since your sides may flex a bit differently. After the crosspieces are added, remove 1/16" from the first upright on the right side for right thrust before adding the motor mount. Taper the top and bottom first crosspieces to make a nice fit to the 1/8" plywood motor mount. Install the blind nuts in place before the motor mount is glued in, or before the first station's top and bottom sheet fill is added, otherwise it will be hard to reach them. Add the 3/4" frame around the outside edges of the motor mount, notching for bolt clearance, then round to "nose block shape." Add a 1/4" sq. doubler to the upper cabin longeron, and the curved piece to fill the space between the bottom of the wing and the upper longeron. This later bit is not on the original plans, but it does cut drag a bit, gives some support to the spar, and helps distribute the pressure the wing puts on the upper longeron evenly. Add the gussets and rails to carry the internal equipment. On my model, I found I needed to put the motor battery aft of the trailing edge (well, four of the seven are aft of the trailing edge), to get the Center of Gravity at 50% of the chord. For that reason I decided to put the servos below the motor battery. I did not make a hatch; if I need to get at the servos I will cut away the MonoKote and iron on a patch when through. If doing it all over again, I would seriously consider placing miniservos further aft, perhaps where the rear sheet fill is. Then the motor battery and other gear could be further forward. At this time add some sheet fill for the pushrod exits.



Laminations are pushed from form, never pulled.





LEFT: Built-up balsa construction throughout. Note that rudder is notched to clear elevator. RIGHT: Tail surfaces showing linkage, plywood mounts, and control horn locations.

Landing Gear:

If the original construction were used, there would be rebending needed after every landing. By going to a torsion bar gear as shown, take-offs are no problem, for if the gear flexes back, as it will, the wheel points straight ahead, but without the torsion bar construction, a gear flexing back results in the wheel pointing outward, dragging the model into a ground loop, bending the gear. I made my cross brace from a piece of 1" x 4" pine (really 3/4" thick) and used a table saw to make a 1/8" x 1/4" groove on the 3/4" edge, then cut off a 1/2" strip with the grooved edge on the 3/4" edge. You could modify a commercial L.G. block with a Zona saw (razor saw) and chisel if you want, or just build it up of plywood strips laminated together. About 1" long pieces of the same material are glued to the plywood fuselage doublers and to the crosspiece. When dry, drill for the upright parts of the wire landing gear. I used 1/8" diameter wire, but 5/32" would be less springy and heavier, your choice. The 1/8" steel wire is adequate, but does look sort of comical landing in grass.

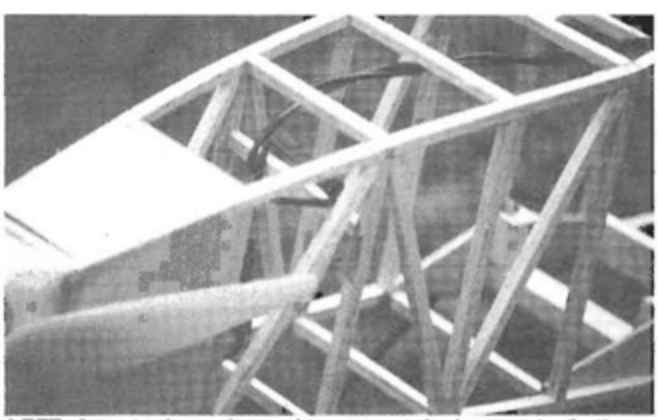
In the lower nose fill sheet, cut a hole about the size of a quarter ($0.25) for cooling air for the motor and batteries. There will be a gap between the leading edge of the wing and the upper fuselage, which will also serve to get air flow over the batteries. I removed the MonoKote from the last bay before the sub rudder on the bottom, for an air exit.

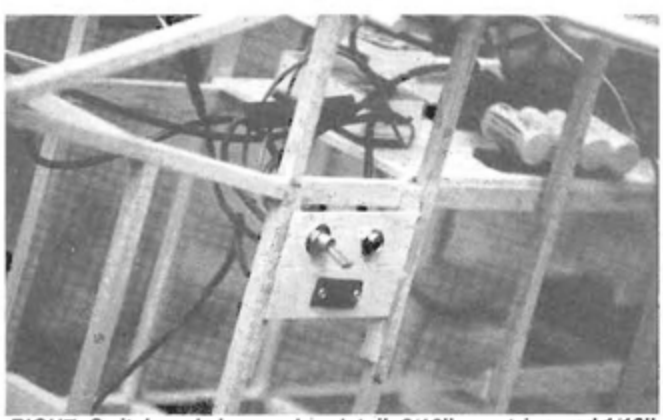
Wheels, by the way, should be light, because they are in front of the C.G. and this thing tends to be nose heavy. (A well designed rubber model had the heavy rubber motor about centered over the C.G., that's why the nose is so long.) You can make "scale" wheels as noted on the plans using disks of plywood, or what I used, since I had them, were 3" "Jimmie Allen Bluebird" wheels of turned balsa from Old-Timer Model Supply, P.O. Box 7334, Van Nuys, California 91409, catalog $2.00. The wheels were drilled for 5/32" o.d. aluminum tubing which was CA'ed into place and then given a coat of clear dope, so all could see and admire the turned balsa wheels. The Old-Timer Model Supply catalog is a source of Old-Timer rubber model plans, including the Korda Wakefield, and scratch-builder's supplies for such models.

"Why is it so 'fat,' and why is the landing gear so long?"

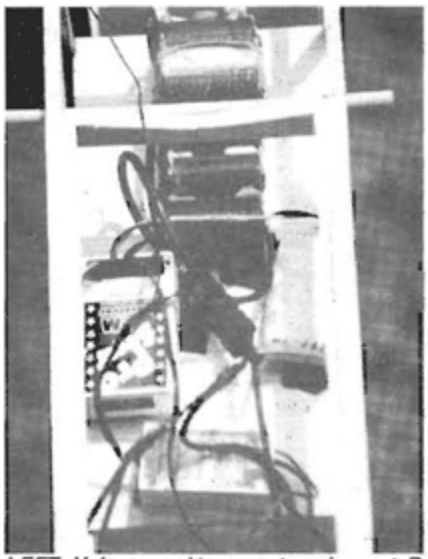
Wing:

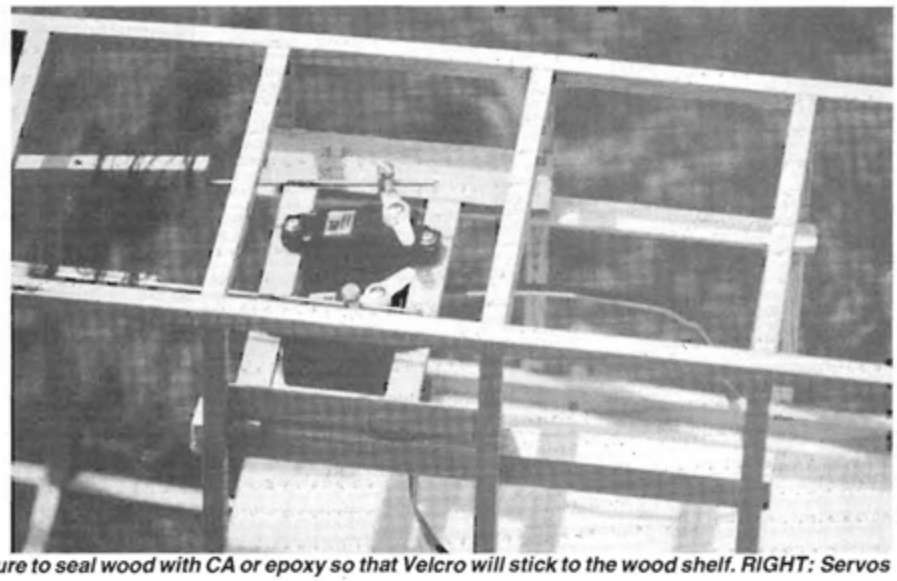
The wing is really very conventional. Departures from scale placement of spars is subtle, and the main idea was to get an I-beam effect. Firm balsa would likely be okay, but I am very partial to spruce for spars. The 3/32" x 3/16" accessory spars will be much less of a problem with breakage from handling if you use spruce, but balsa will deal with the flight loads should you want to sacrifice strength for performance. The shear webs are important, and the dihedral braces act as shear webs in their part of the wing. I used 1/8" balsa for the ribs, 3/32" might do fine if you must use harder wood, but I had some nice six to eight pound 1/8" so I used that. One advantage to using 1/8" is more surface to stick the covering down to. I should now tell you the easy way to make a multispar wing. In the first place, I would cut all the spar slots only in the W-1 ribs, put the ribs together with short spar stock bits, then sand and shape this "block of ribs," including the spar slots so they are straight. For the tapered tip ribs, cut only the main spar slots, add the little spar slots with a straightedge after the ribs are part of the wing. That is the secret of straight stringers and spars. Okay, now for the big thing to make a multispar wing easily. Make the tips, then block one tip up to its dihedral angle, and build a main panel right on to it. You will have to cut a W-1 and add it after the plywood spar joiner is in place. Now block that main panel up for dihedral, and the other tip panel, and connect them by building the final main panel. If you will do it this way the possibility of building in warps is minimized. Okay, you now have a wing with a main spar, now add the assistant spars, webbing, ply doublers to prevent wing rubber damage, etc. It is really easier to add the main upper spar alone, then when dry, remove each panel to add the lower main spar, laying flat again for the glue to dry. I find this easier than trying to block the lower spars up.





LEFT: An extra brace is used to support the long motor/battery wire. RIGHT: Switch and charge plug detail; 3/16" sq. strips and 1/16" plywood mounting plate allows flush mounting surface.





LEFT: Velcro used to mount equipment. Be sure to seal wood with CA or epoxy so that Velcro will stick to the wood shelf. RIGHT: Servos mount inverted, below the equipment shelf.

Speaking of blocking up, you do need to block the front of the trailing edge up 3/32". Just cut a 3/32" x 1/4" strip from scrap and place so the rear edge of the strip just catches the front of the trailing edge.

Tips on Tips:

The wing and stab tips on Korda's original were shaped of bent bamboo. I prefer here to use short pieces of 1/4" sheet joined as shown, or they could be laminated of 1/16" x 1/4" balsa strips. I did laminate the rudder outline because I liked the looks of that, but on the original, Korda used sheet strips sort of like I show for the wing and stab tips. With a strip of 1/4" x 1/2" or 3/4" you will find you can improvise these parts rapidly using a razor saw.

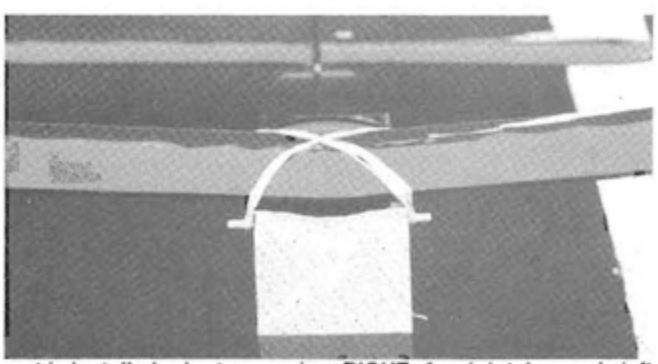
When covering the undercamber, iron each rib down well. Start by touching each rib at about the center with your hot iron, "tacking" the covering in place, then each corner at leading and trailing edges, then each rib from middle out and then leading and trailing edges, then shrink.

Tail surfaces require little explanation. The stabilizer main spar is the hinge line, and I suggest using two pieces of 1/4" sq. glued together to make this and the elevator spar. Taper at the tips, only the top of the spars. When you go to slot for the hinges the glue line will give you a guide for bind free hinge lines. The sheet fill on the bottom of the stab is just for more stuff to stick to the fuselage, and more area to stick MonoKote to. The 1/4" sheet center ribs are thick for the same reason. I would consider making the whole stab and rudder assembly removable, but I decided I did not have such a severe storage and transportation problem as to need to do that, but you might. One nice feature of the torsion bar landing gear as shown is its easy removal, which could help with storage and transportation.

I strongly urge that all equipment installation and wiring be done before the fuselage is covered. It would be hard to do otherwise. Do it the easy way. I used Ace R/C "310 Import Special" servos, and balsa pushrods. I also used a three capacitor noise supression set up on the motor; one across the leads, and one from each lead to motor ground. With this set-up I have not had any radio problem from motor electrical noise. I added a cross brace or two to support the long wires to the motor, so they would not be acting like jump ropes in there. Use a large enough wire, like 12-14 gauge since, with the long lengths involved, small wire would be a lot of resistance. I used a High-Sky on/off switch, which is my favorite and sure beats using a servo to operate a switch. I used 7 x 1400 mAh Sanyo SCR cells. Obviously, less capacity would be less weight and if performance is important use 12 x 600 or 1200 Sanyo SCR and a geared 15. I like the long runs I get from 1400-cells and a 7-cell "5", giving slow leisurely climbs at least three times from touch and go. I am using a 12 x 6 Graupner plastic propeller, and have also had good flights with a Sonic-Tronics 13" folder. My control surface throws are elevator 1/2" up and down and rudder 3/4" each way, which I find comfortable yet responsive.

Now for the all important Center of Gravity placement. It is not enough to cut Carl Goldberg's initials from the plan and glue them to the indicated place. The model must balance at 50% of the root wing chord. Half way! The chord is 9", 4½" from either the leading or trailing edge will get it. Do not balance at the spar, or 30% of chord like most normal models. This is not a normal model because of the large lifting section stabilizer. If you put the Center of Gravity at the usual position it will fly only with a lot of "up elevator" needed, which will hugely increase drag and the trim change from power on to power off will be uncomfortably large. Trust me, 50% of chord is where mine balances, and it flies perfectly with very little trim change from power variations. Add power, it climbs, cut power, it floats like a cork.

This has been a fun project. It is in some ways easier for these old "fangers" to build with 1/4" sticks than the 1/8" of the original, and the sight of the ship in the air is



LEFT: Completed framework, ready for covering. Note that all equipment is installed prior to covering. RIGHT: An air intake gap is left between the leading edge and the fuselage, providing additional cooling air for batteries.

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to me a beautiful thing. Beauty being more in the eye of the beholder than in the object beheld, this model will appeal to many to the puzzlement of others. Mr. Korda, by the way, still lives, and remains a hero to several generations of those who, like myself, love free flight and the history of our hobby. □

The **MARAUDER R/C HOVERCRAFT** flies on all surfaces. Pavement, Grass, Sand, Snow, Ice and Water (It's unsinkable, solid foam core). It is very maneuverable. While flying in a straight line, it will do a 360-degree spin and keep going straight. It can fly sideways, around corners, and slide backwards to a stop, using thrust from the prop to brake itself. To power the MARAUDER, you need to purchase a two-channel radio and .50 or .61 engine. The MARAUDER is constructed entirely of aircraft aluminum. Allen head bolts with nylock nuts are used to assemble the MARAUDER (10 hours assembly time). All the aluminum has a powdercoat paint finish that has been baked on, in an oven at 400 degrees. The MARAUDER can be ROLLED, CRASHED, AND THRASHED and still keep going all day long. It is extremely durable. A HOVERCRAFT is completely amphibious. It can travel over all surfaces and easily transition from one surface to another. It is truly a multi-terrain vehicle, that can be used all year round! LENGTH: 37" • WIDTH: 17" • WEIGHT: 11.5 lbs. (with radio & .61) • SKIRT: 8 oz. black neoprene, pre-sewn. Kit comes complete, including: Fuel Tank – Adjustable Motor Mount – All Linkage – Hardware – Two-tone paint (Blue and Red).

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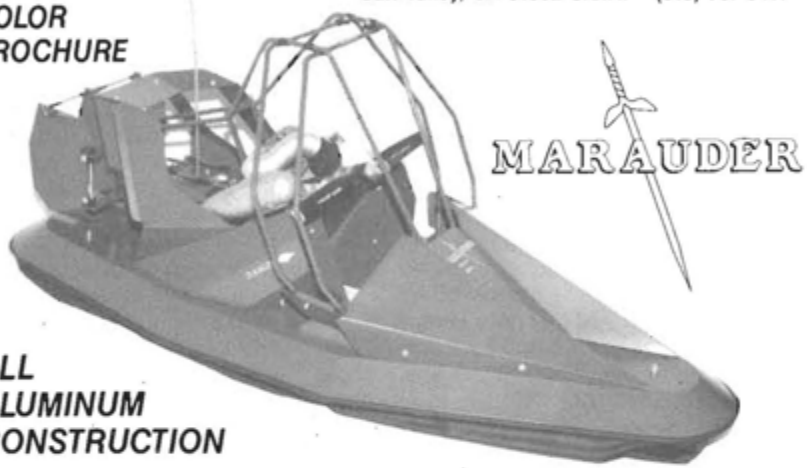

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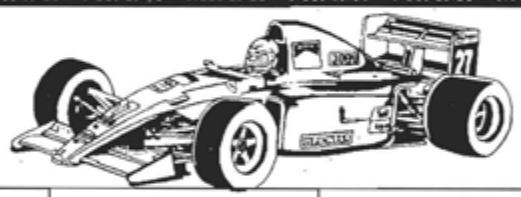

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