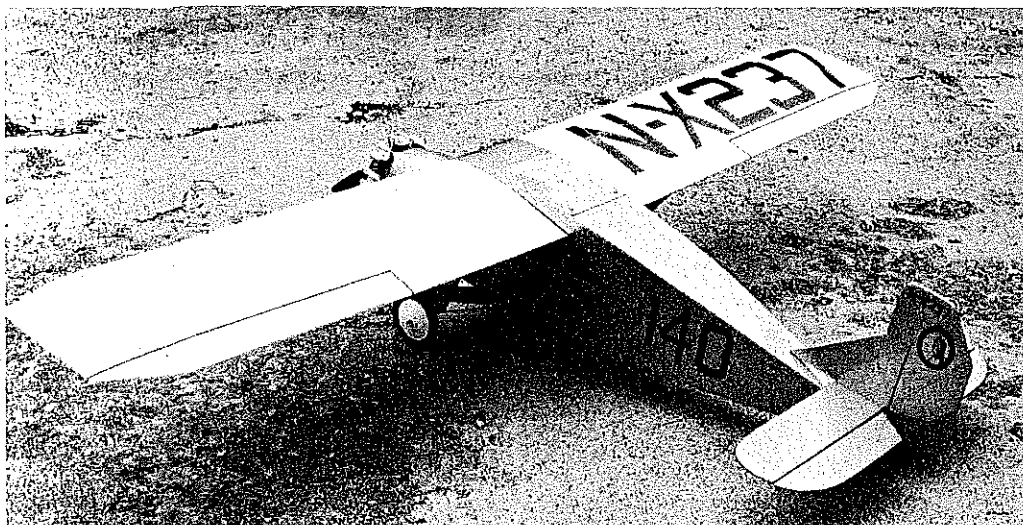




■ Dave Haught

Bellanca Columbia

Back in 1927 if Chamberlin and his copilot, Acosta, had gotten away just a few days earlier in their Bellanca Columbia, it might have been Lindbergh and the Spirit of St. Louis that nobody remembers today. The Columbia went on to set records of its own, though, in those heady days after Lindbergh pointed the way. This model makes an unusual, easy-to-build, great-flying RC Schoolyard Scale project that's perfect for a Black Widow .049 engine. 649



Top: The Bellanca is shown finished and ready to fly. The color scheme duplicates the original Columbia. The fuselage is done with MonoKote dull silver; the wings are white with black Geo-Type lettering (available at your local art supply store). With all the struts and fairings, patience is the order of the day in covering this model. Above: Another view of this unusual ship. It has a 40-in. wingspan and enough scale detail to make any craftsman happy. Build it light (about 11 oz.) for best performance—it's basically a Free Flight designed to fly itself. Modern RC gear adds only 3 or 4 oz. of weight, sacrificing very little of its fine Free Flight characteristics and performance. It has two-channel control and can be hand-launched or ROG.

GETTING INTO Radio Control is one of those things I'd managed to put off for years. In the first place, it was just too expensive at the time. My next best excuse was that the equipment was too heavy—a Free Flight hates to add weight to a model. These and assorted other excuses kept RC at bay for a good 20 years.

In the fall of 1988 that all came to an end. When our local club put on a model display at the mall, one of the members showed a beautiful version of Don Srull's Cessna C-37 that immediately took my fancy. Right away I knew I had to build one of these RC Cessnas!

After finding and reading through Don Srull's article on his C-37 in the November 1986 *Model Aviation*, I began investigating the small RC sets on the market. When Futaba's 1991 4NBL came out priced just over a hundred bucks, I was sold. It was time to get building!

The problem is, I've never been able to build someone else's designs. No matter how great they are, I still spend so much time changing things that I might as well

have started from scratch. So the lure of the Cessna waned.

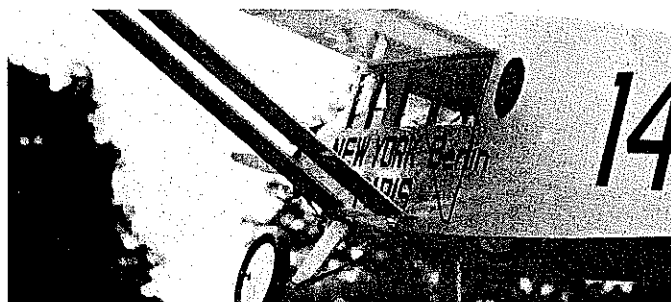
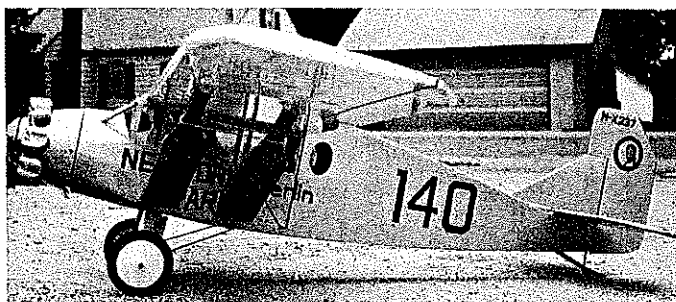
Not so the lure of RC, however. The question was, which full-size airplane to model? Since it would be my first Scale RC (the radio was getting a good workout in a Glider), the model would have to be a high-wing monoplane.

Searching through piles of prospective designs, the first candidate that caught my eye was the Spirit of St. Louis. But there was the problem of the nose moment and the size of the tail—old Free Flight Scale habits are hard to break. Then the light came on!

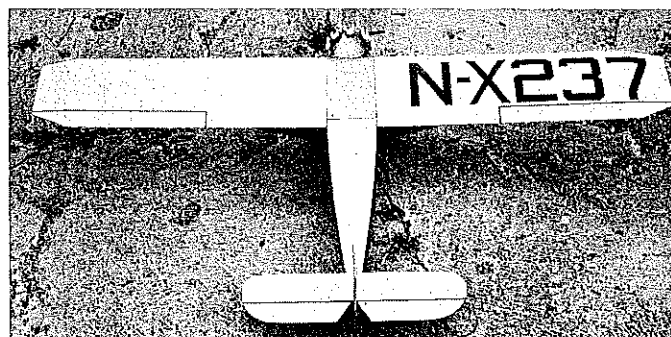
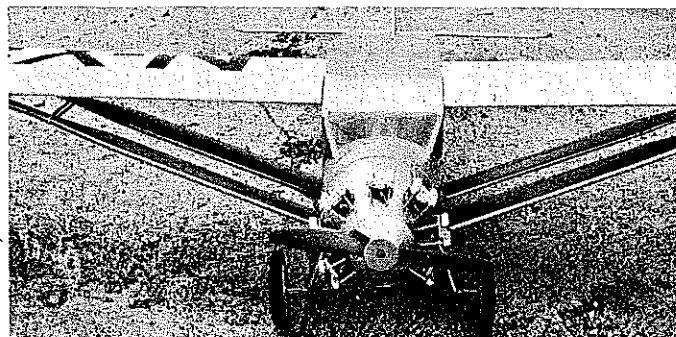
Late one Friday night I'd stayed up to videotape "The Spirit of St. Louis," being shown on television. Watching the story unfold, I was caught up in the scene in which Jimmy Stewart was trying to buy a Bellanca. There it was in his hands, a beautiful silver-and-white model!



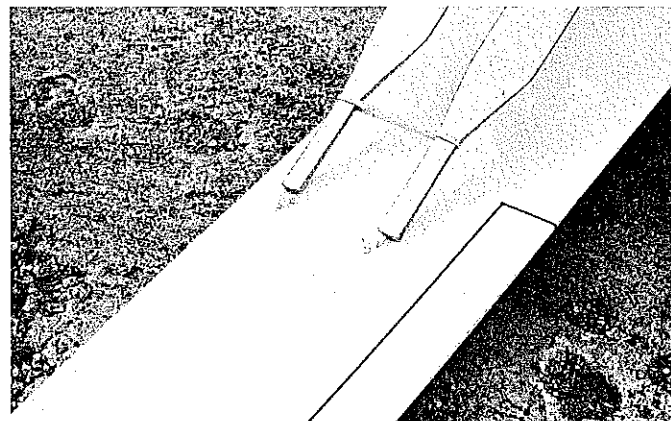
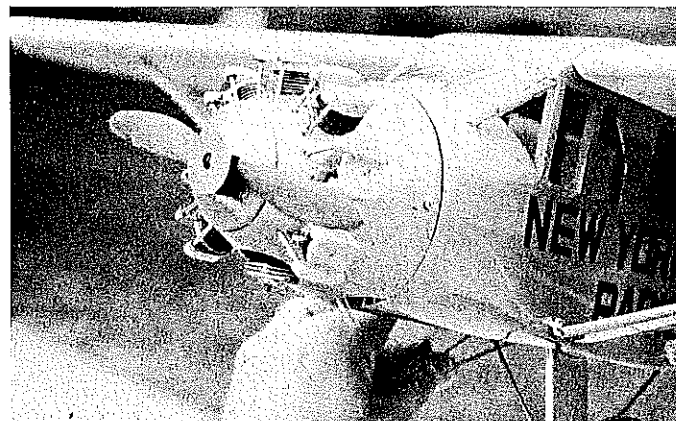
Just a few days after being beaten out by Lindbergh's historic flight, Clarence Chamberlin had to make a hasty change in destination. Deciding on Berlin, he and Bert Acosta lifted off in his Columbia on June 4, 1927. Just 108 miles short of their goal, they ran out of fuel and landed in a field near Eisleben, Germany. The Columbia went on to set many aviation records before finally being destroyed in a hangar fire in 1935. Building historical Golden Age models is an excellent way to relive aviation history and renew our understanding of the past.



Left: Most radial-engined airplanes don't offer this long a nose moment, a feature which has a great deal to do with the model's good balance. The large and unique rudder shape, designed just for the Columbia, adds to the singular charm of this airplane. Right: Chamberlin got his mileage out of advertising. The extensive lettering on the original was simplified for the model and cut out of MonoKote Trim Sheet. There are many precut varieties of vinyl lettering on the market if you don't care to cut your own. Notice the quick-release wing struts to facilitate wing removal.



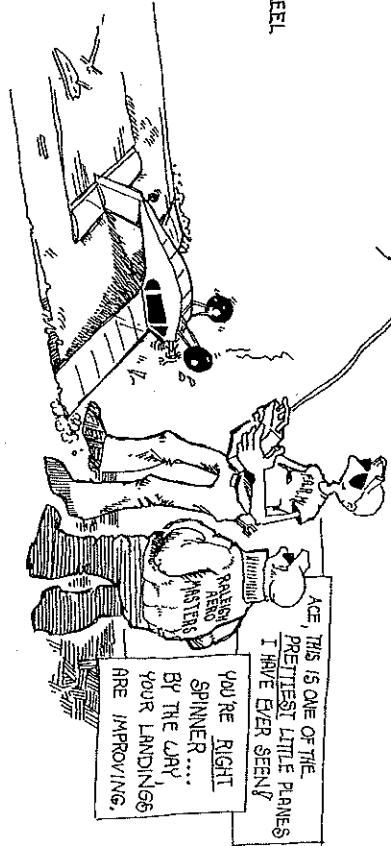
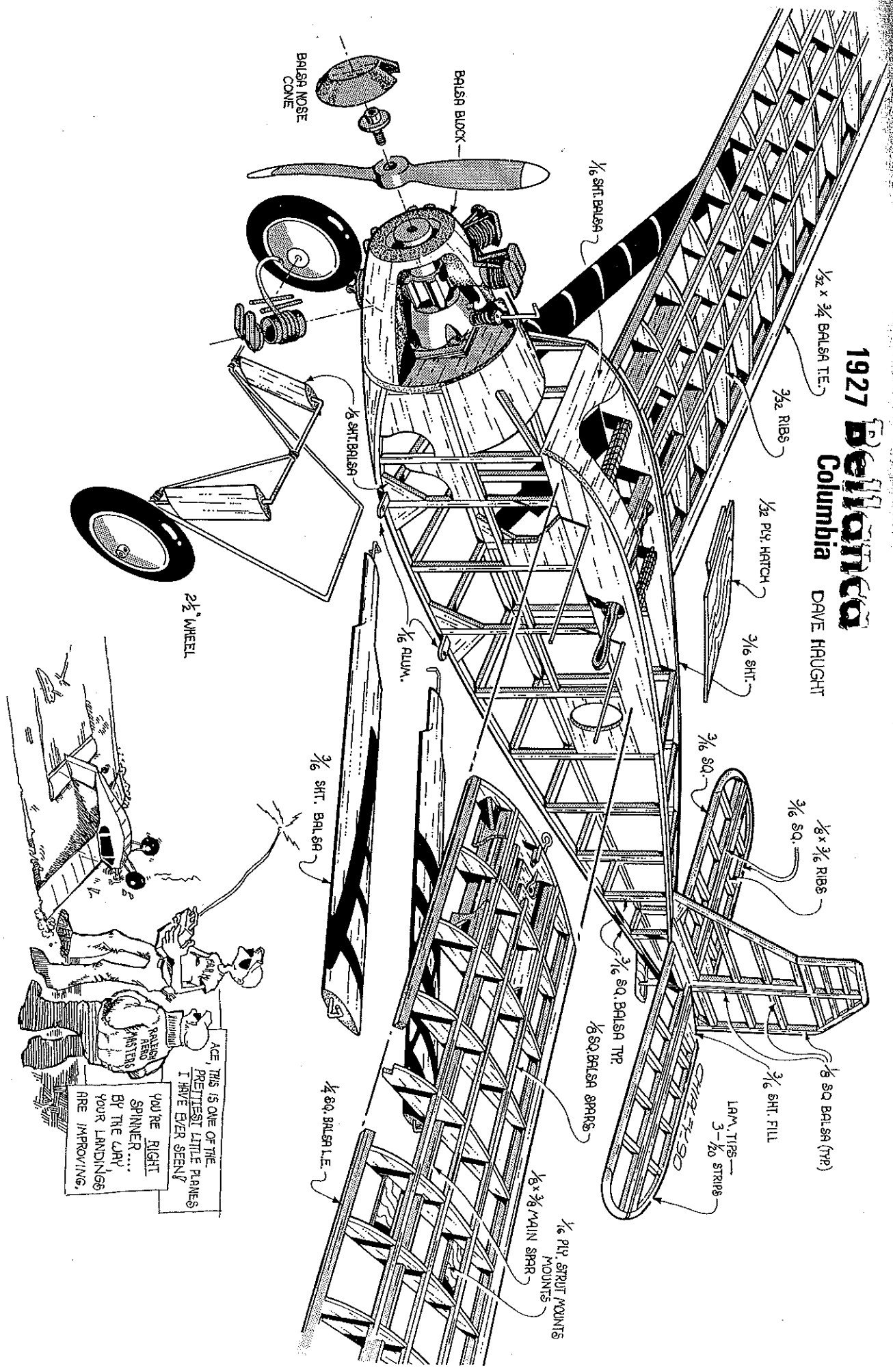
Left: The Columbia's roots in the Pacemaker line are quite evident, especially from the front. The lifting fuselage, distinctive windshields, and lifting struts make for a clean, efficient aircraft. Right: From above and behind the Bellanca shows just how clean she is. The areas and outlines are scale, with only the structure modified for lightness. Without ailerons, a small amount of washout helps to keep the wings level.



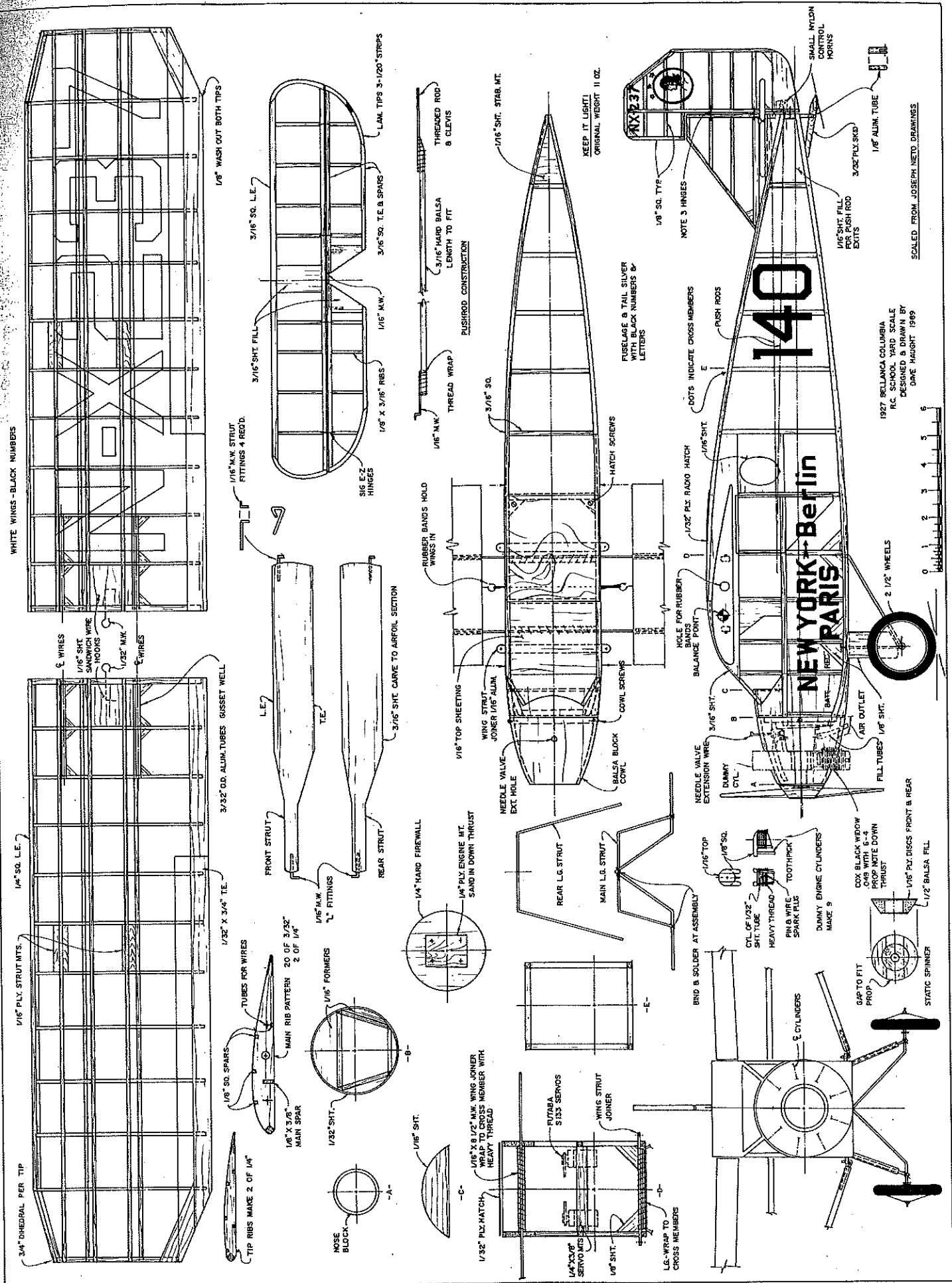
Left: The dummy radial engine cylinders add authentic detail to the model. The spinner is scale but only for show, as it blocks the cooling air intake. Note the modified Z-bends at the base of the wing struts. Right: Small nylon landing gear clips are enlisted to anchor the wing struts to the wing. The rubberband on the struts pulls them together and locks them into the clips mounted on the wing. Since the wing dihedral is established by the length of the struts, the builder must exercise great care in cutting and trimming the struts as precisely as possible.

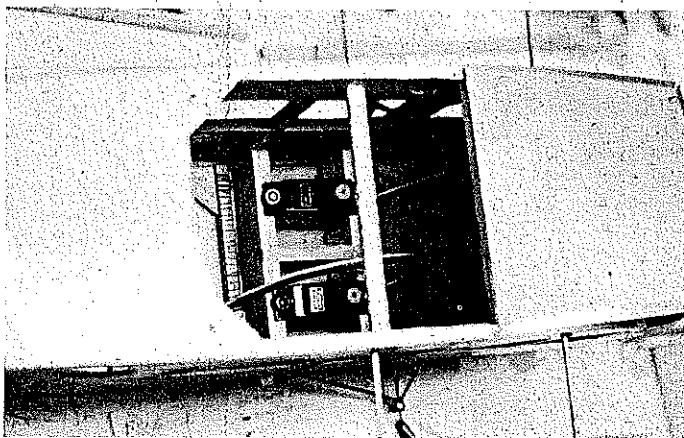
1927 Bellanca

Columbia DAVE HAUGHT



YOU'RE RIGHT
SPINNER...
BY THE WAY,
YOUR LANDINGS
ARE IMPROVING.





Left: The Futaba microservos are almost lost inside the cavernous cabin area. Note the thread wrapping on the landing gear wires and aft wing wire brace. Also note the ample gusseting in the structure. Right: Small and lightweight control horns link the elevator and rudder pushrods with a simple S-bend. Both exit on the same side to keep the other side clean. Clevis pins are shown on the plans to make adjustment easier.



As the VCR continued in my absence I was found digging through the unpacked box of three-views that had been holding up a pile of junk in my shop. However, a quick glance through the "Bs" in my file didn't produce the airplane I was looking for. I knew it was there somewhere! Where could it be? What was it called? Bobby Haight's Free Flight Scale model flashed through my mind—what was its name?

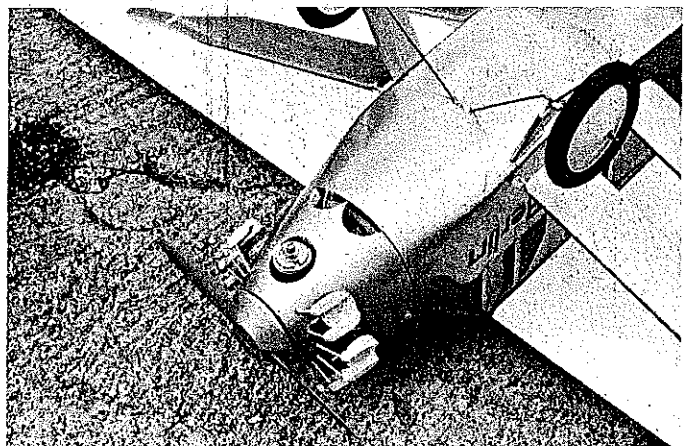
Finally it came to me: the Columbia!

Sure enough, filed under the "Cs" was a set of sun-aged blueprints I had ordered years ago from Joseph Nieto. They were great drawings—internal and external details, all the color info, and nicely done in 3/4-in./1-ft. scale.

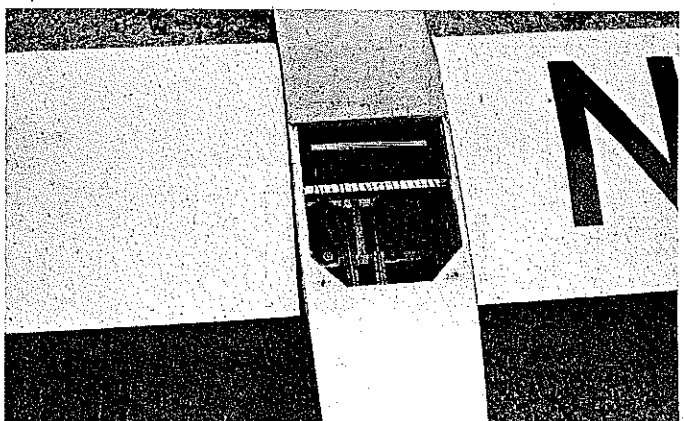
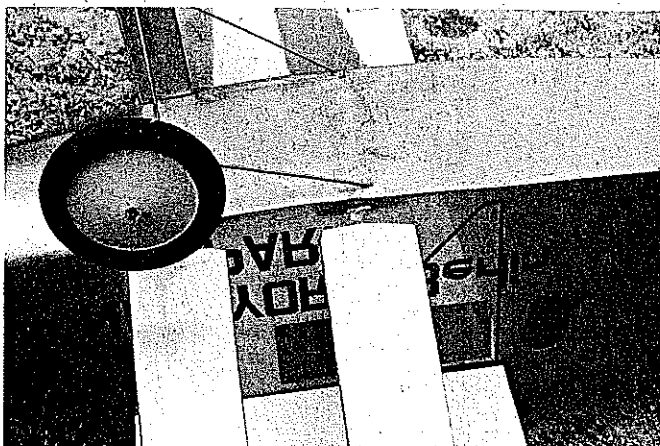
The Columbia was a specially built Bellanca with a huge fuel capacity, designed to set duration and distance records. In fact, owners Charles Levine and Clarence Chamberlin planned to make aviation history in

their new airplane by flying nonstop from New York to Paris, but were beaten out by Lindbergh by just a few days. Undaunted, the aviators decided to modify their route by flying from New York to Berlin.

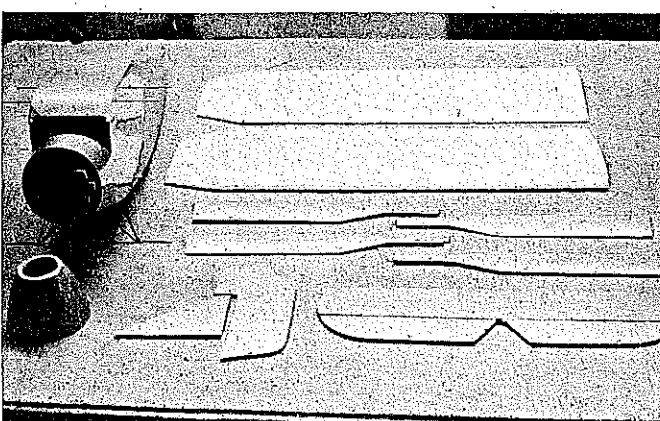
With fellow pilot Bert Acosta, Chamberlin crossed the Atlantic on June 4, 1927. Four thousand four hundred miles later, the Columbia ran out of fuel and made a forced landing in a village called Helfta, just outside of Eisleben, Germany. The aviators



Left: The Cox Black Widow gives a lot of power for its small weight. Just protruding from the left air cooling hole is the fuel tank overflow tube. The engine is well concealed, yet the cowl is shaped so that it's easy to slip the glow connector on and off. Right: Very wide wing struts were a trademark of the Bellanca company in its heyday. The strut attachment is designed to absorb enough shock to keep the model from breaking in rough landings. Spring wheel retainers work great and add very little weight. Williams Brothers manufactures 2 1/2-in. Golden Age wheels.



Left: The large upper hatch allows easy access to the servos and the wing-retaining rubberbands. You can see the servos with pushrods attached under the aft thread-wrapped wing wire brace. Note the rubberbands and hooks—an old Free Flight trick. Right: The main components, covered and ready for final assembly. Check all the surfaces—including the struts—for warps, and iron out any you might find. Make sure the wing washout is correct. Note that there are two sets of struts—right, left, and front, back. In the Bellanca no two struts are the same.





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BIRCH PLYWOOD

BALSAL WOOD STICKS*		1/8-INCH		36"	48"	3/8-INCH		36"	48"
1/16 x 1/16	.06	1/8 x 1/8	.08	.11	3/8 x 3/8	.27	.37		
1/16 x 3/32	.07	1/8 x 3/16	.11	.15	3/8 x 1/2	.30	.41		
1/16 x 1/8	.08	1/8 x 1/4	.13	.17	3/8 x 3/4	.44	.60		
1/16 x 3/16	.09	1/8 x 3/8	.16	.21	1/2-INCH	36"	48"		
1/16 x 1/4	.10	1/8 x 1/2	.17	.24	1/2 x 1/2	.37	.49		
1/16 x 3/8	.13	1/8 x 3/4	.25	.33	1/2 x 3/4	.52	.70		
1/16 x 1/2	.16	3/16-INCH	36"	48"					
1/16 x 3/4	.21	3/16 x 3/16	.13	.17					
		3/16 x 1/4	.14	.19					
		3/16 x 3/8	.16	.21					
		3/16 x 1/2	.18	.25					
		3/16 x 3/4	.28	.38					
		1/4-INCH	36"	48"					
		1/4 x 1/4	.16	.21					
		1/4 x 3/8	.18	.25					
		1/4 x 1/2	.21	.29					
		1/4 x 3/4	.31	.42					
		5/16-INCH	36"	48"					
		5/16 x 5/16	.20	.27					
		5/16 x 3/8	.22	.30					
		5/16 x 1/2	.27	.36					
		5/16 x 3/4	.39	.52					

BALSAL SHEETS			3-INCH			36"	48"
1-INCH	36"	48"	1/32 x 3	.40	.53		
			1/16 x 3	.43	.58		
			3/32 x 3	.62	.70		
			1/8 x 3	.60	.80		
			3/16 x 3	.72	.95		
			1/4 x 3	.84	1.12		
			5/16 x 3	1.03	1.34		
			3/8 x 3	1.20	1.60		
			1/2 x 3	1.50	2.00		
			36"	48"			
2-INCH	36"	48"	4-INCH	36"	48"		
1/32 x 2	.30	.40	1/32 x 4	.65	.87		
1/16 x 2	.38	.48	1/16 x 4	.73	1.01		
3/32 x 2	.41	.54	3/32 x 4	.82	1.09		
1/8 x 2	.46	.60	1/8 x 4	.95	1.26		
3/16 x 2	.54	.72	3/16 x 4	1.14	1.51		
1/4 x 2	.63	.84	1/4 x 4	1.31	1.93		
3/8 x 2	.77	1.03	3/8 x 4	1.82	2.71		
1/2 x 2	1.13	1.50	1/2 x 4	2.19	3.25		

1/84 x 12 x 12	1.82	1/4 x 8 x 12	.74
1/64 x 12 x 24	3.64	1/4 x 12 x 12	1.46
1/84 x 12 x 48	7.28	1/4 x 12 x 24	2.93
1/64 x 48 x 48	29.12	1/4 x 12 x 48	5.85

1/32 x 6 x 12	.60	3/8 x 12 x 12	1.80
1/32 x 12 x 12	1.19	3/8 x 12 x 24	3.60
1/32 x 12 x 24	2.37	3/8 x 12 x 48	7.20
1/32 x 12 x 48	4.73		

1/16 x 6 x 12	.59	1/2 x 12 x 12	2.02
1/16 x 12 x 12	1.17	1/2 x 12 x 24	4.05
1/16 x 12 x 24	2.34	1/2 x 12 x 48	8.08
1/16 x 12 x 48	4.68		

LITE PLYWOOD			
3/32 x 6 x 12	.91	1/8 x 12 x 12	.56
3/32 x 12 x 12	1.81	1/8 x 12 x 24	1.12
3/32 x 12 x 24	3.62	1/8 x 12 x 48	2.24
3/32 x 12 x 48	7.23		

TAPERED TRAILING EDGE			
1/8 x 6 x 12	1.00	36"	48"
1/8 x 12 x 12	1.99		
1/8 x 12 x 24	3.97		
1/8 x 12 x 48	7.94		

3/16 x 6 x 12	.74	1/8 x 1/2	.22	.30
3/16 x 12 x 12	1.46	3/16 x 3/4	.29	.40
3/16 x 12 x 24	2.93	1/4 x 1	.42	.55
3/16 x 12 x 48	5.85	5/16 x 1/4	.44	.61
		3/8 x 1/2	.52	.72

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flew on to Berlin after refueling.

During those exciting years after the Lindbergh feat and its own promising beginning, the Columbia went on to log many more flights and set additional records. After changing owners several times, the airplane came to an untimely end when she burned in a 1935 hangar fire in New Castle, PA. But the grace and beauty of the design fly on in the aviation history books—and now, even at your local field.

After studying my old blueprints, I decided to build the Columbia to Schoolyard Scale proportions. Using the size and area of the Cessna C-37 as a starting point, with the help of a calculator I worked out the numbers for the scale presented in this article. The wealth of markings and details guaranteed a good-looking and somewhat unusual model. And with any luck, it would fly RC. If not, at least I'd have an attractive new Free Flight ship for the flying field.

Construction. As with all building projects, time is well spent studying the accompanying plans and pictures. The Columbia is a very simple model with only a few new twists.

The fuselage is basically of old-fashioned stick-and-tissue construction, with the addition of a few formers at the nose to produce the rounded cowl section. Begin by cutting out the cabin top sides from medium-to-hard 3/16 balsa sheet. Match up the sides, and carefully locate and drill the holes for the wing wires and rubberbands.

Pin the sides to the plans, and pin down the upper and lower longerons. Pin down the short strip under the cabin windows, and then the remaining uprights. If you did a good job of fitting these pieces, glue them in with CyA (cyanoacrylate) and allow to cure.

Once the first side is finished, cover it with a sheet of wax paper and build the second side over it. Make sure the wing wire holes line up before you start gluing; the sides must match up to ensure proper alignment later.

After the glue has set, lift the sides from the plans and join them with the crossmembers. Begin by beveling and applying CyA to the tail posts. Draw the sides together, CyA the crossmember at station D, then pull the nose together and add all the remaining crossmembers. Check as you proceed to

make sure that the fuselage is square and evenly tapering when viewed from the top.

Cut out and install the firewall. Bend the landing gear wires, and sew them to the proper crossmembers. Gather these units at the axle, bind them with fine copper wire, and solder them together. Don't forget to sew in the wing strut joiners with the landing gear struts.

Cut a pile of gussets, and install them wherever you think they'll help. Plank the nose, extending the 1/2 sheet from the firewall to the front landing gear strut and then to the top, sides, and bottom. I found that soaking the outside of the sheeting with hot water in a spray bottle helped curve the sheet around the corners.

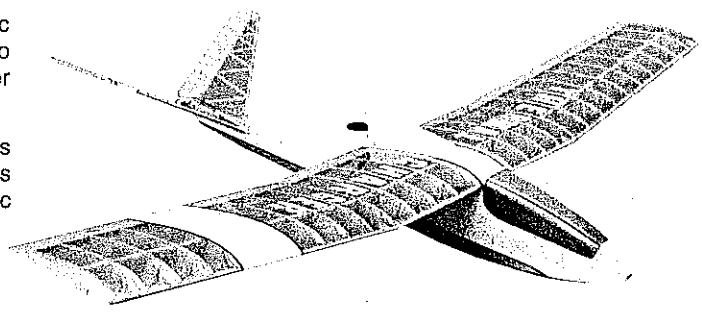
Add the 1/6 sheet for the rear windows, pushrods, and stabilizer mounts. The cowl may be formed either from four trapezoid-shaped sheets of 1/2-in. balsa with triangle blocks in the corners, or from a single block of balsa. Carve and fit the cowl: Tack glue it to the firewall with model cement, and have at it. When the shape is approximately right, pop the cowl off and hollow it to clear the engine.

Continued on page 38

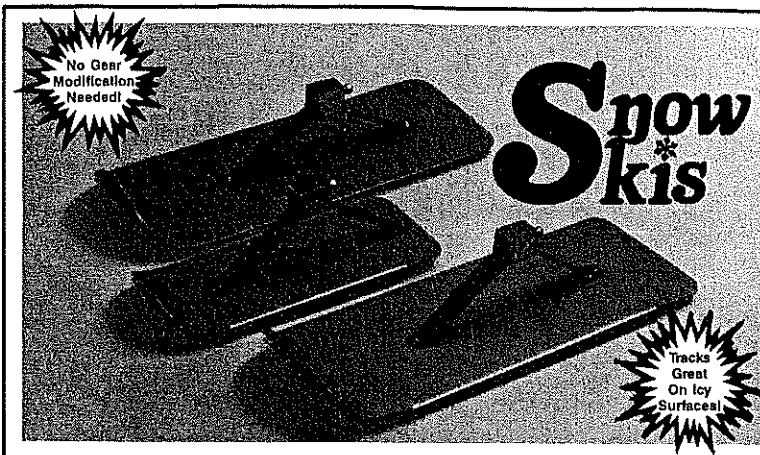
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Mount the engine, then cut openings in the cowl so that it can be slipped on in one piece over the engine. Drill two holes for the cowl retaining screws. Soak the holes with CyA, and install the cowl when the glue is dry. Finish sand the fuselage.

Install the landing gear fairings, and sand to shape. Install and sand the hatch cover. I hinged the cover to the top of the fuselage with the MonoKote covering. Two small sheet metal screws keep it closed at the rear, as shown in the photos.

Tail surfaces. Begin by cutting a form for the stabilizer tip. I cut three strips $\frac{1}{20} \times \frac{1}{2} \times 6$ in. long, and soaked them in hot water for a few minutes. Wax the form edges with a white crayon. Run the strips between your fingers as you take them out of the water. This rids them of excess water and also gives them a little prebend. Apply a light coat of white glue to one side of each strip before stacking on the next one. Repeat until all three strips are a soaking mess in your fingers, and then begin the forming process.

Holding one end of the strips against the trailing edge of the form, pull the strips around the form. Use enough tension to force some excess water and glue out of the strips, but not so much as to break them. After the strips are wrapped around the form, secure them with pins and tape until they're dry. Since the formed tip is $\frac{1}{2}$ in. wide, you have room to sand both the top and bottom smooth before carefully slicing it into two

$\frac{1}{4}$ -in.-wide tips. Sand each tip down to $\frac{3}{16}$, and pin them to the plans.

Cut out the $\frac{3}{16}$ sheet parts, and start pinning those for the stabilizer to the plan. CyA all the joints, and allow them to cure. Repeat the same procedure with the rudder and fin, except use $\frac{1}{8}$ -in. balsa. Make sure to use hard balsa for the sheet parts where the control horns attach, or give the balsa in the attachment area a light coat of CyA for strengthening. Sand the edges well, and prepare them for covering. Join the elevators with the wire connector, and set the assembly aside for covering.

Wing. Select medium-firm, straight-grained balsa strips for the spars and leading edges. The trailing edge strip will need to be stripped to $\frac{3}{8}$ in. for the top and bottom of the wing.

Since all the ribs except the tip ribs are the same shape (but different thicknesses), stack cutting them on a band saw ensures uniformity. Set four of the $\frac{1}{32}$ ribs and the two $\frac{1}{4}$ -in. ones together, lining them up carefully, then drill the holes for the wing tubes all at once.

Pin the main bottom spar, the rear spar, and the bottom trailing edge to the plans. Accurately position all of the upper ribs over the spars, and glue each joint. Add the leading and trailing edges and the top spars. Lift the wing from the plan, and install the wing tubes and gussets.

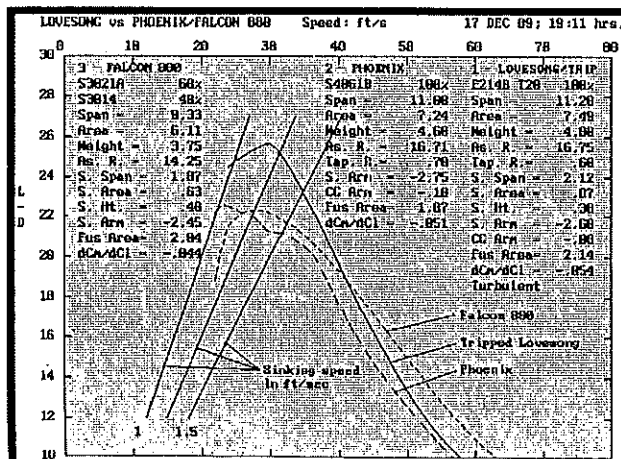
Add the plywood strut mounts along with

the wire hooks and the sheeting that they sandwich between. Try the fit of the wing wires, fuselage, and wings. Adjust the alignment carefully if necessary. Since this alignment sets the incidence, wing twist, etc., it's important to make sure that everything squares up when viewed from the top, front, both sides, and rear. When you're satisfied with the fit, bind and install the wires into the fuselage. Remove the wings, and prepare them for covering.

Now we're down to the details. Make the dummy engine either from scrap wood or from a Williams Bros. kit. Cut out the wing struts, sand them, and prepare them for finishing.

It's best to mount the servos and fit in the pushrods *before* covering the model, while you can still reach through the sides. I waited until after covering, and ended up doing a lot of the building with tweezers. Use your favorite method (everyone seems to have one) for mounting the servos. I screwed the servos into two beams that I positioned across the fuselage. The battery pack can be fitted to the rear of the firewall, with the receiver positioned just behind it.

Make up the pushrods as shown on the plans. Adjust the length of the stick and the wires to your liking. Pin together the elevator and stabilizer and the rudder and fin, then pin them in place on the fuselage. Attach the control horns, and fit the pushrods



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