

A 93" wing, 14" chord, .40 to .71 power. It's big, easy and historic, and can carry a gallon of fuel for shore to shore hops/

Don McGovern and Tony Lombardo

PHOTOGRAPHY: DON MCGOVERN

Spirit of St. Louis



If ever a PR effort reaped full measure it was the naming of the Spirit of St. Louis. The bankers who backed the obscure aircraft are still receiving publicity for their fair city. Lindberg's flight spanned an ocean and shrunk the world to a new dimension.

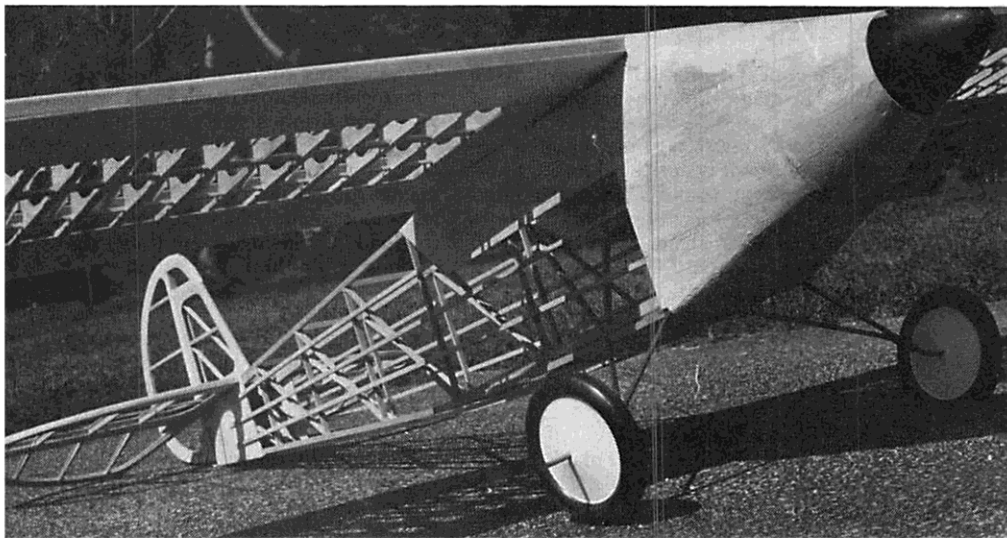
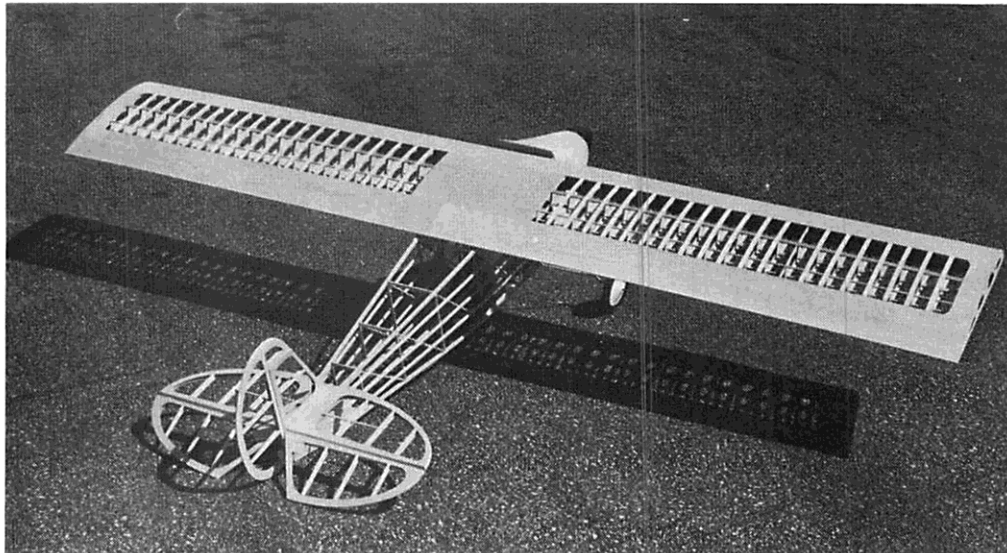
The year that followed sparked all kinds of interest in aviation and this very magazine first took root in 1928 as "Flying Aces". 50 years ago, which kind of inspired me to epoxy up a giant 2" scale replica. Now Long Island is of floating loose from the rest of the country, so I got to thinking about a ship big enough to take a full standard gallon fuel can square on the center of gravity. Enough suds to feed the terrible thirst of a glow-plugged .60, Long Island to Connecticut. About 20 miles of water. The plane might do it in half an hour, a couple of quarts would do, but the big problem is the chase boat. A boat has a hard time making it in an hour and an hour and twenty minutes is a better estimate. There is usually some very rough water to contend with.

Well, so far we haven't gotten that far. I started construction of this ship in 1977. I roughed out the basic framework, wings, fuselage, stab, fin, elevators etc., but a compelling family problem brought things to a complete halt and it became obvious it would be a year before I could get back to it. Tony Lombardo happened by and his eyes lit up. "Don, let me finish it up." It seemed like a wonderful idea. We decided to forego any thoughts of a nautical flight at this time as much would have to be done in waterproofing the radio, bringing our boat to the Sound side of the island (a 13 hour run and \$100 in fuel) and installing the fuel pumping system. Another season perhaps, the leaves are falling and the first snow flakes have already descended.

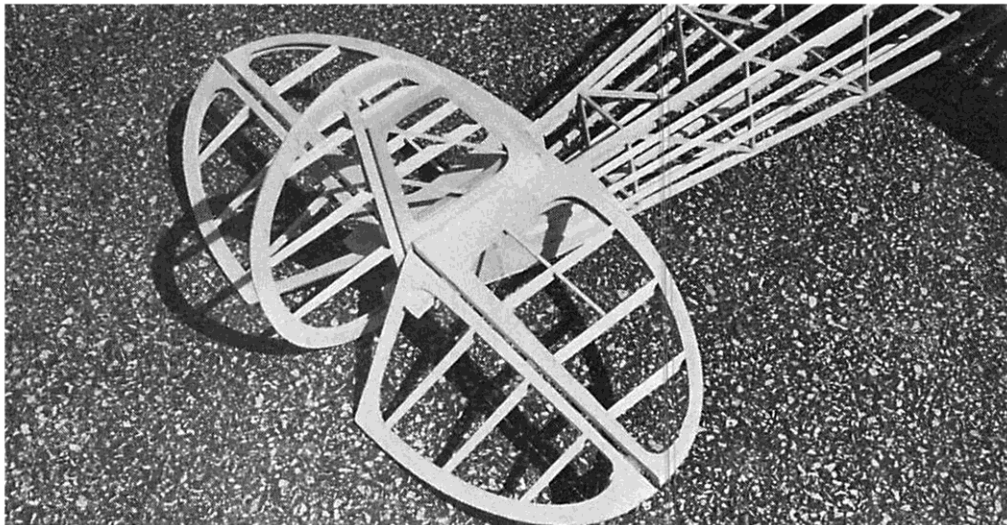
Tony has a thing for big aircraft, his DC-3 appeared in a recent issue of FLYING MODELS and he dug right in where I had left off.

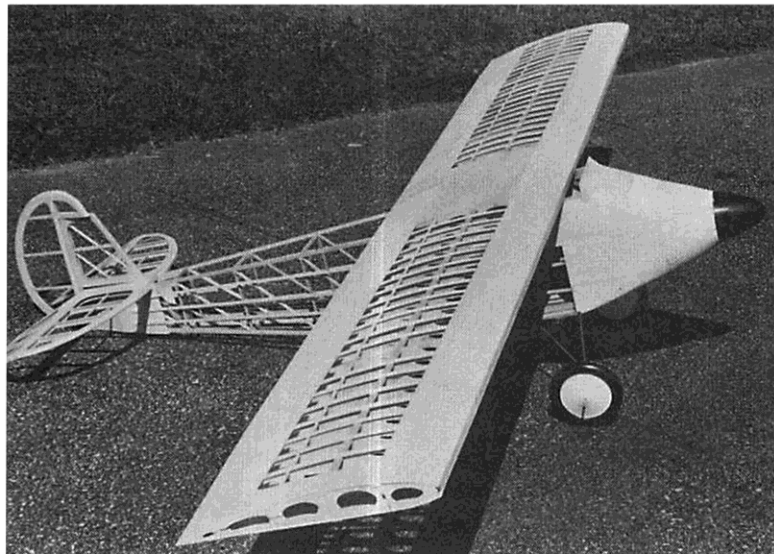
The Spirit of St. Louis was a great big flying gas tank. It had a Clark Y airfoil section capable of lifting the load. There was no forward windshield whatever, only a periscope and a view somewhat forward through the side window. An aircraft can be landed without such forward vision. Fly a crazed plexiglass windshield into a setting sun and you will use the side window too. Charles Lindberg's problems however don't bother the model much, we're not in it to look anyway. The model's tail surfaces have been enlarged somewhat to offer better stability and you can live with the absence of dihedral. Our ailerons have been increased in span one rib bay inward, but this is optional. The model seems to fly easily, comfortably, and I think it is almost a pussycat. The Clark Y section offers high lift and slow flight performance and the massive size gives you a good look and the time response to really fly the aircraft. Assuming you are moderately experienced in R/C, this aircraft is for you. While it is large, there is nothing difficult in the structure.

Williams Bros. offers 2" scale cylinder heads, exactly the right scale size. Also the wheels seen on this aircraft. They are of the correct diameter and closely approximate the type wheels used. We chose Flat Silver MonoKote for the covering, 5 rolls will do. It does a beautiful job, though you can silk it



A sturdy $\frac{5}{32}$ " double wire landing gear, 5" Williams Bros. wheels. The shot at the top gives you a look at the massive wing. Spruce spars and scale rib spacing. The longerons and main fuselage structure is of spruce, simulates the prototype's structure. **Below:** The empennage yet to be capped with sheet around perimeter, capstripped. It's light, sturdy, durable. **Facing page:** The 93' Spirit slides in on the first final approach. It performed very nicely from the first test, no nervous moments. **Lower shot:** Tony and Don grab a last photo before the testing. Tony finished up the basic framework just to see it airborne.





Eight feet of wing in a wind. "Hold it steady Tony, while I change film." If ever you wanted a big bird here's a good place to start. Always recognized. **Left:** Hollow ribs, light spars. Securely mounted wing struts carry the load.

and silver dope the aircraft if you wish. Wing spars and fuselage longerons are of spruce. It offers greater strength, it is almost warp free and longerons resist sagging between uprights. The aircraft is easily balanced, there is room for anything, and if you do not envision a gallon of fuel within, then there is room for a camera instead. This can be a real fun ship for you, a Stand-Off Scale that is just a big, easy box to build. You will find no plywood wing gussets as the wing is all in one piece. And there are no wing panels to join. The wing ribs were hollowed (optional) to allow for a few more drops of fuel weight, and the wing will appear during construction to be extremely flimsy. It is, but it starts to firm up with the final sheet planking and relies on the functional double wing struts for support rather than on massive wing spars within. As the struts are part of the scale appearance of the aircraft there is no need to incorporate great spar strength into the wing as well, it would be dead weight and cost you more bucks for nothing. Do tie

the mounting tubes at the fuselage longerons together across the fuselage with music wire, and firmly screw mount the struts to wing blocks so that the struts prevent the wing from folding. If ever at gross weight, maybe 7 lbs. of aircraft, plus a pound of tank and 7 more of fuel, the struts are holding a 15 lb. load. Given a 4-G pullout, that's 60 pounds, so do think about that!

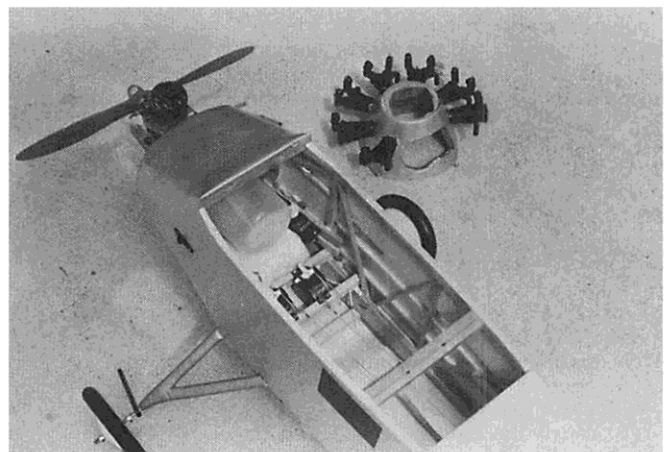
The Fuselage

Clear the bench again, cast everything to the floor. Lay the plan over a smooth area, tape the plan down, and Saran Wrap over it, taped to stay put. Epoxy splice $\frac{1}{4}$ " sq. spruce longerons to length. Drive a few finishing nails straight down along the longeron edges. Never pin or nail through the wood, always next to it. $\frac{1}{4}$ " sq. or $\frac{1}{8}$ " x $\frac{1}{4}$ " spruce is used for the uprights and diagonals, it may be epoxied or installed with a (waterproof) glue of your choice. With one side completed, lay Saran Wrap over it again, pressing the wrap down over the pins and finish-

ing nails. The second side is now built over the first for accuracy. The Saran Wrap will shield it from the epoxy so the two can be separated later on.

The two sides are joined in standard fashion. A temporary pair of sheet formers can be cut to hold the alignment. Sides are parallel through the cabin area, coming together easily as you move aft. The forward nose is harder, too sharp to bend. Zona saw it off, bevel for the toe-in angle and re-epoxy with the firewall in place. You will need some triangular bracing to strengthen the area. Secondary structure will be self obvious as you firm the structure up with stringers, cowlng blocks and the like.

The landing gear patterns are shown. Bend one each from $\frac{5}{32}$ " dia. music wire, easily bent. Bolt them securely into the structure and bind and silver solder the legs together. $\frac{1}{4}$ " brass tubing oleos pivot on the axle inboard of the wheels. These tie into the wing strut legs and simulate the real landing gear of the full scale ship.



The R/C is all but lost within the cavernous interior, Cables to the rudder and elevator work well. Radio should be full forward if a large tank is ever contemplated. **Left:** Nancy McGovern shows how a standard gallon tank fits.



First take-off. A short run and that Clark Y lifting section does the rest. Tail surfaces are enlarged enough to make it mild of manner. **Lower photo:** Balance it at 25%. More new ships are wiped out because of lead-like tails than fingers can count. No ballast in nose was required, just shift the radio about.

If you would like the option of a gallon tank of fuel on the C.G., your radio must go full forward into the most compact area possible, pushrods passing aft right against the fuselage sides. At the moment the original is rigged with cable controls and the radio would have to be re-mounted further forward.

As the fuselage nears completion, the wing is test fitted in place. Two 1/4" dowels peg the leading edge in and a pair of 1/4" nylon bolts lock the trailing edge down. The cowling area should be shaped out and sanded down prior to mounting the Williams Bros. cylinders. These eventually glue into position, but they are a little vulnerable if the tail is raised high as the lower cylinders then scrape the ground. Do look for any loose ones if you do touch them accidentally.

Wing Construction

It is assumed you are a moderately experienced builder for this size project, though

there is nothing hard about it. Start with a big flat bench. Tape the plan down, trace off the opposite wing panel flopping it for the image. Lay Saran Wrap over everything, taped to the board. Splice up four foot lengths of 1/8" x 3/8" spruce for the wing spars. 5-minute epoxy will suffice for this, it's all I used.

That's a lot of wing ribs, scale rib spacing, so blame Ryan. Try it my way and it will only take two hours and you won't need a sanding block. Take eight sheets of 1/16" x 3" x 36" balsa. Run a line of Ambroid across each, every 2". Place one upon the other for eight sheets lightly tack-glued together. Top sheet gets a coat of rubber cement. Next trace the master rib pattern very, very accurately seven times, within a 3" x 36" area. (You'll need a second such sheet stack.) This seven rib paper pattern is now coated with rubber cement on the underside also, pressed onto the stack of eight sheets. It will look like a homemade die layout. You now feed it into a Dremel Motorsaw, starting by cutting into

workable sized blocks of ribs to be. First trim to leading edge end, then from the leading edge cut the top camber. Next, from the leading edge cut the bottom camber. Do not vary this. If the saw blade is not perfectly aligned to the table, returning from the trailing edge end would double the degree of error. Notches are next, easily cut. The pattern shows how ribs can be hollowed (optional) without removing, reinserting, removing saw blade countless times. Glue drops later bind up the blade line. Once a stack of eight ribs are cut, peel off the paper pattern, discard it, then rub off the rubber cement with your fingertip. You can then slip a razor between the sheets to pop off a perfect rib. Two hours start to finish for all those ribs. It's a fast way to go, done neatly there is nothing to trim. You should end up with a couple of spare ribs. The same technique will cut your stab, elevator, fin outlines, formers, firewall, countless other modeling parts. I can't understand why more builders don't use this technique.

I think most of the rest of the wing assembly is pure routine. It will seem very weak as you start to assemble it, as mentioned before, but don't let this discourage you. It ends up stiff as a plank when covered and screwed to the struts. The plan drawing will reveal just about all you need to know and there is no exact order of sequence, just do it, it flies rotten without the wing.

The Tail Surfaces

The stabilizer has a central core of 1/4" balsa, cut to the curvature seen. Later it is capped with 1/16" sheet, and capstrips to create a 3/8" thick surface. The fin is similar. Hinges are epoxied between two laminations of 1/8" x 1/4", each razor shaved to accept the thickness of the Klett hinges. This makes it easy to install the hinges and almost guarantees their alignment. Elevators and rudder follow the same idea, but taper toward the trailing edge, requiring just a bevelled edge on the sheeting as it meets. Do pre-slice a slot wide enough for the hinge to be inserted (with epoxy, after covering). You'll need hinges too for the ailerons. Neatly install all control horn mounts, the elevator crossbar and the like. Screw them on after covering and doping. The aircraft shown was rigged with cable controls, but pushrods may be used if you prefer.

Flying Notes

By the time you get it all together you may be a little up tight for the first test flight. If so, the local expert may be your man. Ours checked out perfectly in the balance department, 25% back from the leading edge. If a ship is tail heavy it is an accident about to happen, so add ballast or do something. Tail heavy ships just don't get up and fly, they respond poorly, and too late to radio commands.

Start up your engine, test out the idle, fuel feed, throttle advance and general smoothness of the power. Take it off in a straight manner and hold it to gentle climbing turns. Throttle back to whatever seems reasonable. The final approach can be made power on with a modest rate of sink. It's an easy bird to fly. Do fly it carefully and try to keep it clear of the pit area. Hope you reach the far shore one day, and send us a photo.

