This photo of the designer/builder with the Thermix '13 provides a feel for the model's size.

Dick Sarpolus'

Thermix '13

Build your own thermal hunter

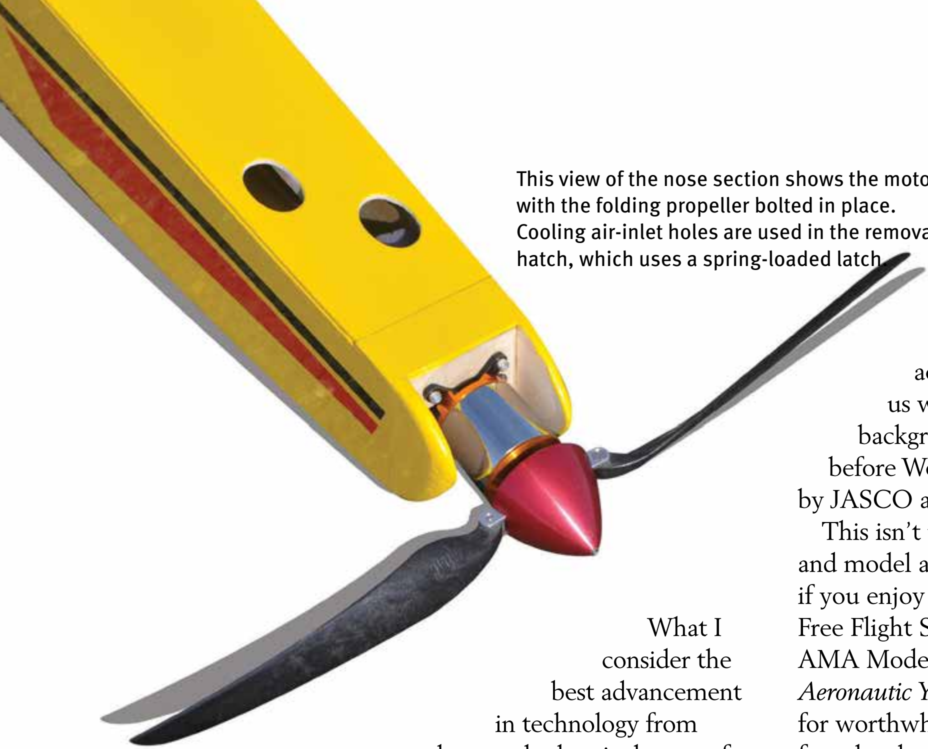
RC sailplanes have changed during the past 45 years. Now there is carbon fiber, vacuum-bagged fiberglass wings, ailerons, spoilers, flaps, crow settings, and highly efficient airframe designs.

My first RC sailplane was built with the wing and stabilizer from a large-class FF model, with a fuselage made to hold the radio gear. Launching was done by hand towing—similar to FF towline gliders. Although running across a field towing an airplane was good exercise, I sure didn't like it.

Next I tried hi-starts, with shock cord or surgical tubing for the slingshot power. This again was a lot of work and not much fun.

The first winches were gas-lawn-mower-engine powered, with a chain drive and clutch setup turning a large drum to wind in the line. Turnaround pulleys were another item to figure out. The gas-engine winches were noisy, messy, and there were plenty of broken lines and broken wings.

Electric winches were next, and somebody finally figured out that the old Ford starter motors with the long shafts would work. Today the winches use small, efficient, powerful modern electric motors.



This view of the nose section shows the motor with the folding propeller bolted in place. Cooling air-inlet holes are used in the removable hatch, which uses a spring-loaded latch.

What I consider the best advancement in technology from those early days is the use of a powerful electric motor and folding propeller in the nose of today's RC sailplanes.

I'm not referring to any sort of contest flying—simply a sunny summer day, soaring for fun, looking for the thermals, and enjoying flying and easy launching without a winch or hi-start.

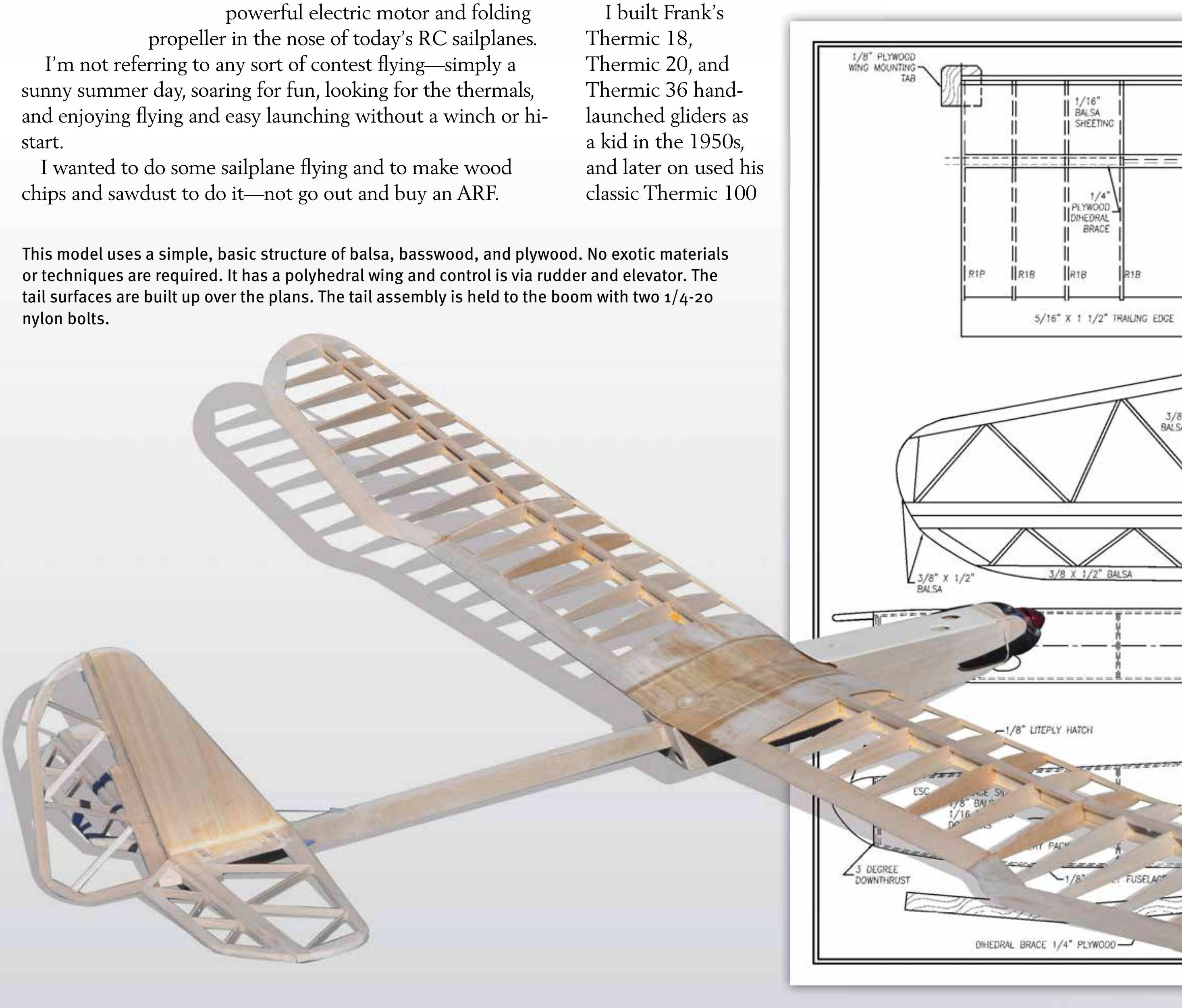
I wanted to do some sailplane flying and to make wood chips and sawdust to do it—not go out and buy an ARF.

I wished to do this retro style, for nostalgia's sake. When looking back at early model sailplane activity, no name comes to mind faster than Frank Zaic and his Thermic series of glider and sailplane designs. Frank and his designs are a part of our aeromodeling history and well known to those of us who appreciate and have a nostalgic interest in the background of our activity. Frank designed sailplanes before World War II, and many were produced in kit form by JASCO and later Jetco Models.

This isn't the place for a review of Frank's interesting life and model aviation activities, but he is worth researching if you enjoy that type of reading. Frank is in the National Free Flight Society, and Society of Antique Modelers, and AMA Model Aviation halls of fame, and his series of *Model Aeronautic Year Books* from the 1930s into the 1960s make for worthwhile reading. Most of his publications can still be found today.

I built Frank's Thermic 18, Thermic 20, and Thermic 36 hand-launched gliders as a kid in the 1950s, and later on used his classic Thermic 100

This model uses a simple, basic structure of balsa, basswood, and plywood. No exotic materials or techniques are required. It has a polyhedral wing and control is via rudder and elevator. The tail surfaces are built up over the plans. The tail assembly is held to the boom with two 1/4-20 nylon bolts.

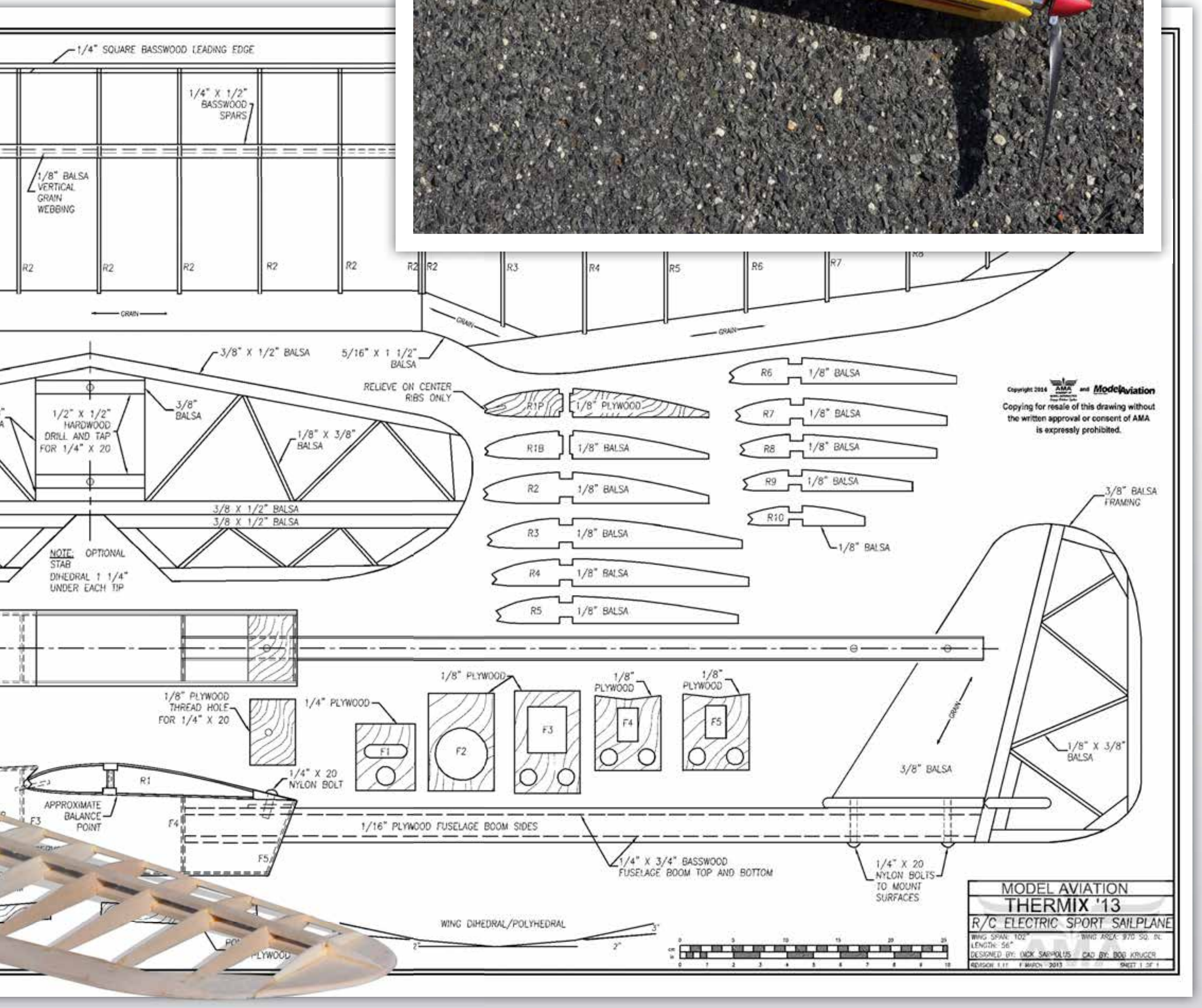


wing as the basis for a few RC sailplanes.

The instantly recognizable, widened and tapered wingtip shape on many of his larger sailplanes came from a full-scale German sailplane of the 1930s, the Minimoa, designed by Wolf Hirth. That wing shape is occasionally still seen today, likely for its nostalgic value rather than for any performance benefit. Some enthusiasts have built replica Thermic 100 sailplanes. Plans and reproduction kits are available for true nostalgia flying.

I decided to use Frank's general Thermic 100 wing shape and pod-and-boom styling, coupled with some building techniques for an old-style sailplane, but have an electric motor in the nose. This project is intended to be an easy-flying model for some fun on a nice summer day—floating around and looking for that thermal lift, knowing the motor in the nose is there to help out if needed. It's built with balsa, basswood or spruce, and plywood.

There is plenty of room inside the fuselage for the battery and radio gear.



When I found I could buy the basswood wing spar material in 24-inch lengths, I laid out the Thermix '13's wing with four 24-inch panels and 3-inch wingtips, for an overall wingspan of 102 inches and roughly 900 square inches of wing area. I built the wing in one piece, and I knew it would fit in my minivan. If the wing size is a concern, you could make it with a one-piece, 48-inch center section and have plug-in tip panels, attaching music-wire joiners to brass or composite tubes.

I like the looks of a pod-and-boom fuselage and you can get a fiberglass tube to use as a boom. I used $^{1}/_{4}$-inch-thick basswood top and bottom pieces with $^{1}/_{16}$ plywood sides


The Thermix '13 is designed to be easy to build and fly, while paying respect to the sailplanes that influenced its design.

Order plans for this thermal hunter at *www.ModelAviation.com/Thermix13*.

Specifications

Type: Electric sailplane
Wingspan: 103 inches
Length: 55 inches
Wing area: 970 square inches
Weight: 64 ounces
Wing loading: 10 ounces per square foot
Power system: 700-plus-watt brushless motor; 60-amp ESC
Propeller: 14 x 8 folding propeller
Battery: Four-cell 2,500 to 4,000 mAh LiPo
Radio: Four-channel; two servos
Construction: Built-up balsa, plywood, and basswood

for an easily built, all-wood boom. Using balsa sides and plywood doublers for the fuselage section to hold the radio gear, the electric motor, and the battery pack, provides an overall structure and is more rugged than lightweight.

The motor I used—a BP Hobbies' A2826-4 with a 14 x 8 folding propeller and a four-cell LiPo battery pack—is more than is needed for relaxed flying. A smaller power setup could be used, but I occasionally enjoy the straight-up climb capability.

Photos by the author

A 2,500 mAh battery is plenty for climbing high, cutting the power, and looking for thermal lift. A pack of up to 4,000 mAh can be used if you want to count on longer flights without worrying about finding the elusive thermals.

Construction

To build the Thermix '13, you'll have to round up the necessary materials and cut up a copy of the plans for paper templates so you can trace and cut out the parts. I've been getting my balsa, basswood, and plywood from National Balsa.

I took my time, cut out all of the needed parts, and made a complete kit before I started construction. Then I made a number of changes while building the airplane, throwing some parts away. Hey it was the prototype! You won't have that problem because the plans now reflect the final version and I'm happy with it.

Because you'll be building your own Thermix '13, if you want to make changes and have some different ideas to try, go ahead and make it the way you want. This is another advantage of scratch-building instead of buying an ARF. And if you ever need to make airframe repairs, you'll be able to make the spare parts you need.

I cut the plans sheet into pieces, and built the wing panels on a flat building surface. I put wax paper over the plans to protect them. I laid the lower spar and the lower center section sheeting pieces down on the plans, and positioned the ribs over their locations on the plans. The opposite-side wing panels were built over the same plans to get the correct rib spacing, but with the ribs heading in the opposite direction.

I used vertical-grain balsa spar webbing in the center panels only, and with the top spars, LEs, and TEs glued in place, I removed the wing panels from the building surface. The panels were put together with the plywood dihedral and polyhedral joiners. I wrapped the center section joint with a strip of 6-inch fiberglass cloth and epoxy.

The tail surfaces were built up over the plans, and I added a little dihedral in the horizontal stabilizer so its tips wouldn't catch on the ground during a landing. That was probably unnecessary, and the stabilizer would have been easier to build flat.

I drilled and tapped the hardwood pieces in the stabilizer 1/4-20 for two nylon bolts to hold the tail assembly to the fuselage boom. The fuselage pod-and-boom sections are easily built up, and the boom is glued into the holes in the pod formers. I put several cooling air inlet holes in the removable plywood hatch, which is held in place with a spring-loaded latch mechanism. Strong magnets could also be used.

Nylon tubing-style pushrods to the elevators and rudder are inside the boom. The wing is held to the fuselage with the plywood tab at the LE and one 1/4-20 nylon bolt at the TE.

The motor is bolted to the plywood firewall, with plenty of room for the ESC and any reasonably sized battery pack. The servos are installed under the wing position. You don't need a towhook on the bottom of the fuselage unless you want a "pure" sailplane. Nylon pinned hinges are used on the elevators and rudder, and your favorite type of iron-on covering will do. I used a 60-amp ESC with built-in BEC circuitry to power the receiver and servos.

I didn't even think about any hand-launched test glides before the first flight. I simply powered up the Thermix '13 and hand launched it. The airplane headed up steeply. I put some downthrust in the motor mounting before the next flight.

My first flights were made in the late fall in cool, and even cold, weather so I haven't done much thermal soaring yet. I like the easy way the airplane flies, and will probably do my piloting from a comfortable lean-back chair in the summer when enjoying that sunny-day thermal activity.

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SOURCES:

Frank Zaic autobiography
www.modelaircraft.org/files/ZaicFrank.pdf

BP Hobbies
www.bphobbies.com