

Sky Bench Aerotech

Olympic III

Sailplane

By Dave Garwood

From the time it was first published in 1976, this all-wood sailplane has been a classic. Now it's reborn with a few tweaks.

Sky Bench Aerotech has updated and improved a classic of R/C soaring, the *Olympic II*. I find the performance of this sailplane so pleasing that I've built and flown three of them, each kit better than the last.

Designed by Lee Renaud and first published in June 1976, a high quality *Olympic II* kit was made by Airtronics for many years, then discontinued. In the 1990s, Ed Whyte at Whyte Wings, produced the kit, upgrading the wing rod from 1/4-inch to 5/16-inch diameter as winches got stronger. Now, in the new century, Ray Hayes at Sky Bench Aerotech holds the rights to produce the design, and he has further upgraded the kit with improved materials and laser-cut parts. We now have a modern version of a respected sailplane design.

Why three *Oly II*s? I built my first version as a step up from 2-meter gliders; and it

gave me my first half-hour flight, my first aerial photos, and my first contest win. When Jim Harrigan decided to try R/C soaring and needed a plane, I sold him my *Oly II* because I had "graduated" to six-servo sailplanes and would no longer need a simple polyhedral glider.

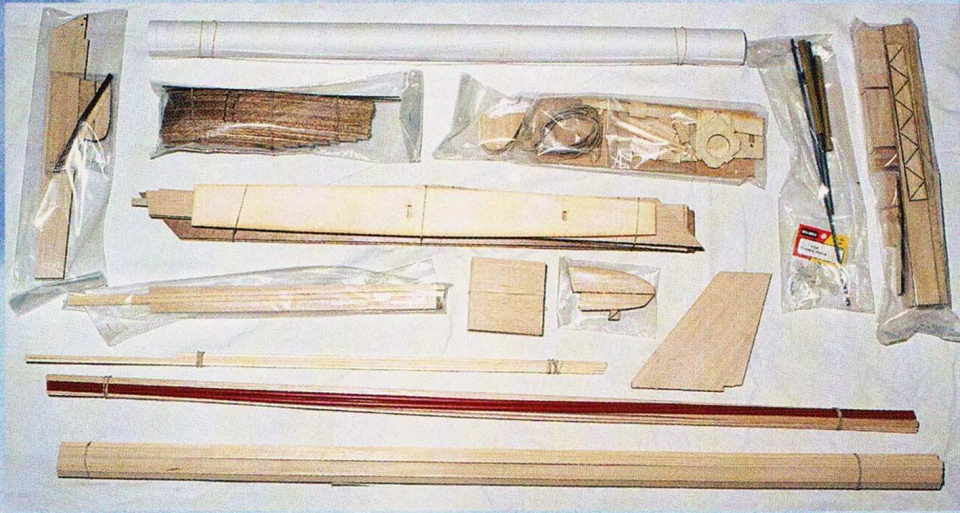
I'd outsmarted myself, because I soon missed the relaxed flying that a 100-inch polyhedral ship so easily delivers. I built my second kit *Oly II*, this time from the Whyte Wings kit and it flew as well as the first. Then, new glider guy, Wayne Rigby, had worn out his starter polyhedral 2-meter glider and needed a contest-capable glider, so I sold him my second *Oly II* because I, of course, was getting so good with my full-house sailplanes I was confident that I would never need a polyhedral ship again.

In August 2003, Wayne and I flew in the Charles River RC Club's annual RES (rud-

der/elevator/spoiler) contest; Wayne flew well with the *Oly II* and I was less happy with my "newer" RES ARF sailplane. A week after the contest I ordered my third *Oly II* kit, this one from Sky Bench Aerotech, and I'm real happy that I did, because this plane flies so well and thermals so spectacularly that I now consider it a "must have" glider, regardless of how many other thermal sailplanes I have or how "sophisticated" they are.

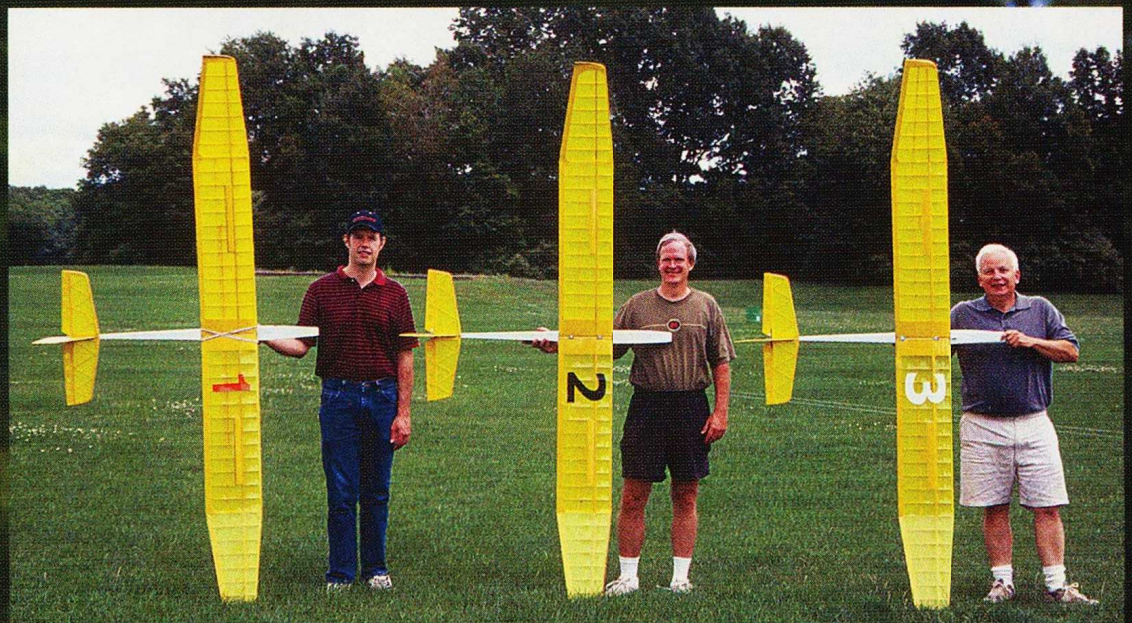
As an example, one recent weekend we had a classic thermal day—cool night, warm day, clear sky, light wind, cumulus clouds starting to form when we got to the field. Four launches were all I needed for a full day of flying. The first launch turned out to be a trim flight, the next three launches delivered a 20-minute flight, and two flights over half an hour each. You can't ask for more than that from a stick-built glider.

There are scores of laser-cut parts, plus all the needed hardware and additional wood in this very complete kit. Adhesives, radio gear, and covering are the additional items needed to finish the *Olympic II*.



AT A GLANCE

Type:	R/C sport sailplane trainer and intermediate thermal
Construction:	balsa/ply
Wing span:	100 inches
Airfoil:	flat bottom, 10% thickness
Length:	49 inches
Weight:	49.4 ounces (as built)
Wing loading (avg.):	7.7 oz./sq.ft.
Wing area:	928 sq. in.
Radio:	3-channel three mini or standard servos
Manufacturer:	Sky Bench Aerotech 9218 Thunder Hill Place Fort Wayne, IN 46804 Phone: 260-434-1322 www.skybench.com



Jim Harrigan, Wayne Rigby, and Dave Garwood display *Oly IIs* that Dave built over the last 15 years. The former two wouldn't part with theirs so Dave built a third.

Olympic II

The plane

The *Olympic II* is a proven design, constructed of traditional materials, and traditional adhesives can be used throughout. Building methods will be familiar to anyone who has built balsa planes before, and you'll need a building bench surface that will hold pins, or a 12-inch by 48-inch balsa building board.

A slow and stable plane, large enough to see at a distance, it qualifies as a trainer because it will right itself from odd flight attitudes in case the pilot loses orientation or makes a dumb-thumbs move. If you get in trouble, just release the sticks and the plane will recover and fly itself.

A simple four-channel radio easily controls the plane; two or three standard size servos and a standard 650 mAh, square shape battery pack fit inside the fuselage. A two-channel radio can be used if you decide not to build the spoiler option.

The *Olympic II* is designed with a two-piece wing, and includes instructions for optional removable tail parts to make covering, storage and transportation more convenient. It launches easily, flies splendidly, and cores thermals effortlessly.

Kit contents and construction

The Sky Bench Aerotech *Olympic II* introduces several upgrades and enhancements to the original design. First there's a new instruction booklet with plenty of photos. Second, many parts are now laser-cut, making them fit more accurately than with

the former die-cut method. Third, the wing joiner rod diameter has been increased from $\frac{1}{4}$ inch to $\frac{3}{16}$ inch, and fourth, the plywood braces between the spars have been extended in length from about three inches to 11 inches. These upgrades help the airframe handle the launch loads of today's more muscular 12-volt winches.

This is an exceptionally complete kit, including all balsa, spruce, and plywood needed to build the airframe, plus control cables, tow hook and small hardware for both the two-channel version as well as the three-channel (spoilers) version. Another Sky Bench kit upgrade is to include the wood parts needed for the spoiler option. The builder must supply adhesives, cables for the spoilers, covering material and a radio set.

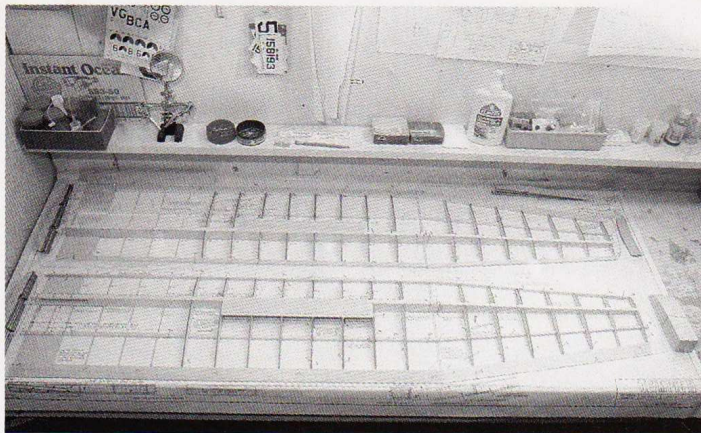
Construction of the *Olympic II* is well within the capabilities of any modeler who has built one or two balsa-rib aircraft of any type, including control line kits or rubber-powered freeflight kits. The steps are clearly and logically presented in the 15-page construction manual which contains 26 photographs and seven drawings.

Basically, you glue the parts together over the plans, which are covered with waxed paper to protect them from glue. A 24x48-inch sheet of Homasote™ insulating material, or soft ceiling tile makes this work go more easily because these materials take T-pins well. You could also use a 12x48 portable balsa building board if your bench top material doesn't accept pins.

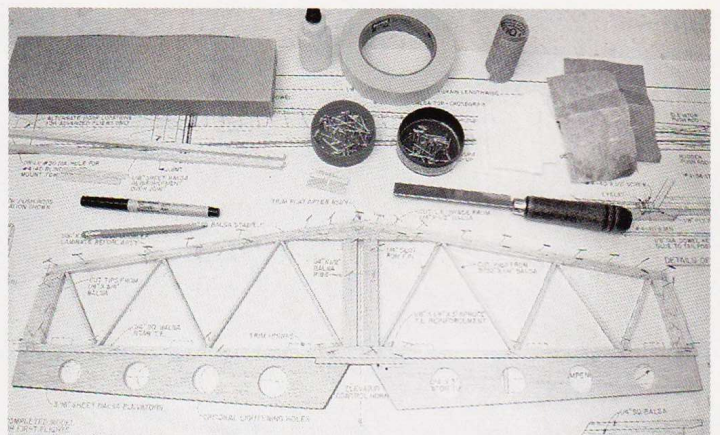
I used a combination of aliphatic resin (yellow carpenter's) glue on larger, time-consuming assembly work, epoxy in a few places where extra strength is important, and CyA (cyanoacrylate) glue on smaller assemblies where quick curing was useful. Sanding is safer and more efficient if you use long sanding blocks. My preference is to finish the fuselage with sanding sealer and paint, as it takes the wear of landings and handling better than a film-covered fuselage, and on this plane I finished the fuselage with polyurethane sanding sealer and Krylon spray paint.

I had only one construction problem: the pre-cut plywood fuselage bottom was not wide enough for my servo installation. While that part matches the plans, it is a tiny bit too narrow to accommodate standard size servos (including Hitec 300s, Futaba 148s, Airtronics 141s, or JR 507s) mounted crossways as shown on the plans. My solution was to widen the plywood fuselage floor by gluing $\frac{1}{8}$ -inch strips of spruce along the sides and sanding them smoothly to shape. Another solution is to use three smaller servos, but this increases the cost of the completed plane. If you mount only two servos this will not be a problem.

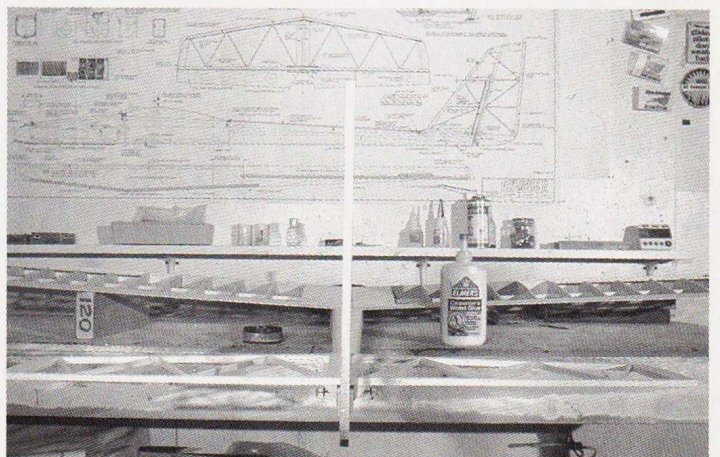
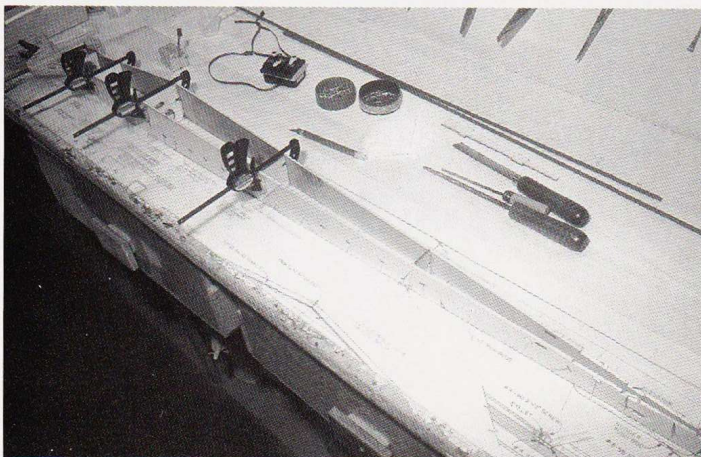
Yes, go ahead and build the optional spoilers. As you gain experience with the plane, spoilers will dramatically increase your landing accuracy. They will steepen the descent path without adding air speed, giving you an extra dimension of control for precise landing as well as a method of escaping

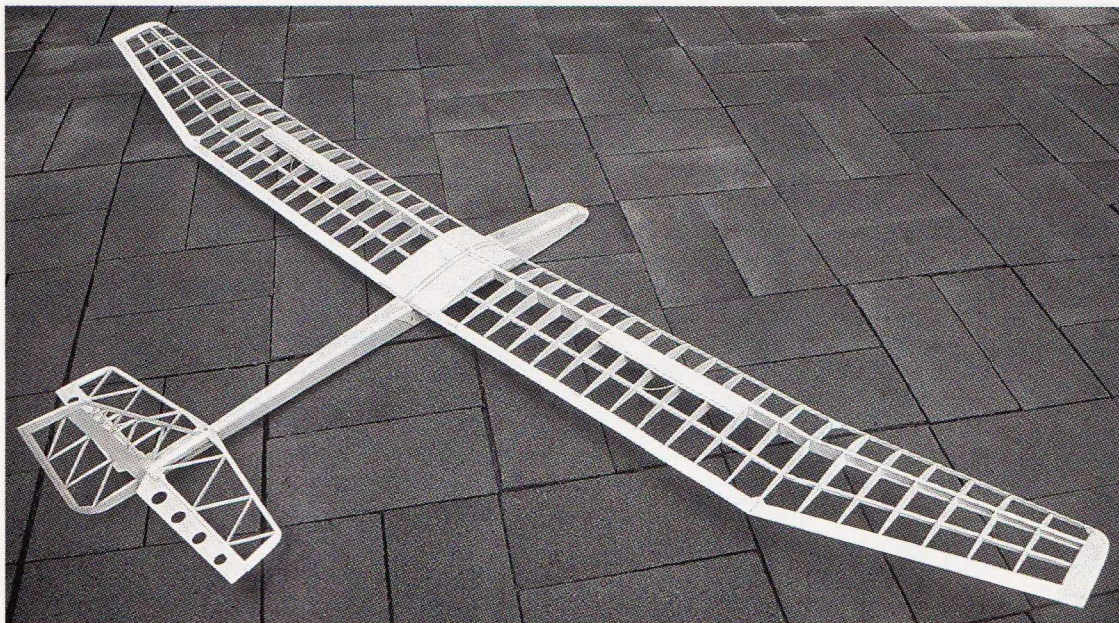


Most of the wing frame construction (above left) is done with the parts pinned to the bench over the plans. The same is true of the tail pieces (above right). Dave prefers wood glue, instead of cyano, because it's lighter, as strong and gives



longer working time. The fuselage is built over the plans as well (below left), and clamps help in the construction. For any model construction, parallel flying surfaces are a must (below right). Triangular stock helps maintain that alignment.





The *Oly II* airframe complete and ready to cover. Even though this is a 100-inch span model, it can be built on a small workbench.

added a small strip of carbon fiber to the joint between the elevator halves because my first *Olympic II* broke there a couple of times when landing.

A word on radio selection. Almost any two-, three-, or four-channel radio set with standard size servos will work in this plane. I used Airtronics 94322 ball bearing servos for rudder and elevator, an Airtronics 94102 servo for spoilers, an Airtronics 92777 receiver, an Airtronics 97002 switch, and an Airtronics 95009 4-cell 700 mAh square battery pack. I used an Airtronics VG6000

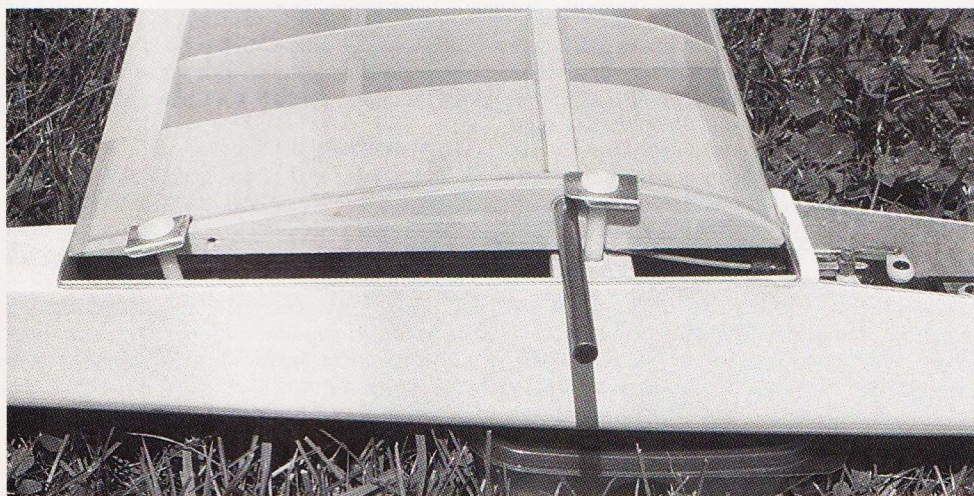
transmitter, not that a computer transmitter is necessary with this plane, but I like the VG6000, and it does allow automatic elevator compensation when the spoilers are deployed.

those killer thermals before the plane becomes too small to see.

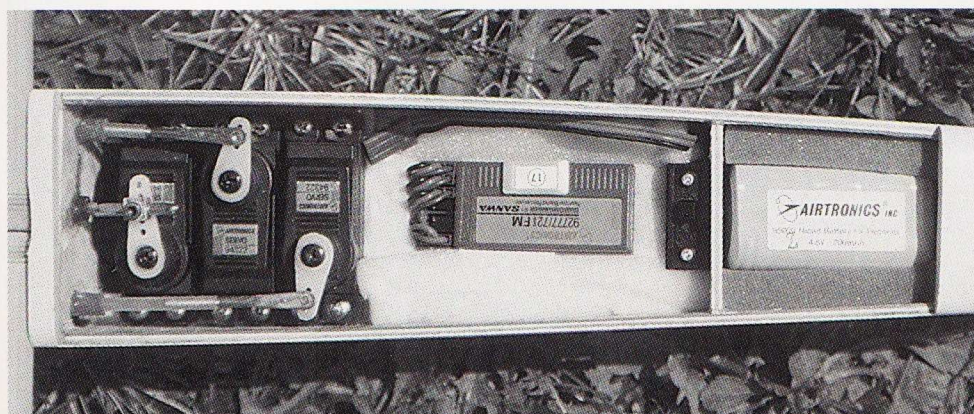
Instructions for spoilers in this and many wooden kits call for a cord in a tube to open the spoilers, which works fine, but closing them with springs, rubber bands, or magnets has been troublesome for me. The way I did it on my last two *Oly IIs* was to connect the spoiler control horns to their servo in the fuselage with Sullivan #507 Very Flexible metal cable. With this rig, the servo both opens *and* closes the spoiler blades. At the servo end, the cables terminate in fine brass tubes soldered to the cable, ground to half-

round, and attach to the servo arm with a Great Planes #GPMQ3870 Screw-Lock Pushrod Connector.

The materials supplied and adhesives specified are well-suited to their intended application, strong where strength is needed and light where structures need to be light. I did strengthen the polyhedral break adding a bit of fiberglass cloth and epoxy underneath because this area seemed vulnerable to handling damage. I applied a layer of 2-ounce fiberglass cloth to the inside of the fuselage from the nose block to the wing trailing edge, but this may be overkill. I also



Though the Skybench kit features the original rubber band wing retention method, Dave chose to modify it with a bolt retention system (above) for a cleaner setup. To fit the standard size Airtronics servos in the *Oly II* fuselage (below), Dave slightly "fattened" the width of the radio bay from the original plan.



Suppliers

Olympic II glider kit

Sky Bench Aerotech

9218 Thunder Hill Place
Ft. Wayne, Indiana 46804
Phone/Fax: 260-434-1322
E-mail: skybench.aerotech@GTE.net
Website: www.skybench.com

radio equipment

Airtronics, Inc.

1185 Stanford Court
Anaheim, CA 92805
Phone: 714-978-1895
Fax: 714-978-1540
E-Mail: info@airtronics.net
Website: www.airtronics.net

covering material

Top Flite MonoKote

Great Planes Model Distributors
PO Box 9021
Champaign, IL 61826
Phone: 800-637-7660 or 217-398-6300
E-mail: aircsupport@top-flite.com
Website: http://www.top-flite.com/

spoiler control cables

Sullivan Products

PO Box 5166
Baltimore, MD 21224
Phone: 410-732-3500
FAX: 410-337-7443
E-Mail: sales@sullivanproducts.com
Website: www.sullivanproducts.com

hatch hold-down hardware

Carl Goldberg Products Ltd.

PO Box 818,
Oakwood, GA 30566
Phone: 678-450-0085
Fax: 770-532-2163
E-Mail: info@carlgoldbergproducts.com
Website: www.carlgoldbergproducts.com

Olympic II

Construction took me 43.25 hours over 20 building sessions; covering and final radio installation and setup took another 9.75 hours. You could reduce the building time substantially if you built the kit as instructed and omitted the modifications mentioned in the sidebar. It is important to use a stiff, high-strength covering film on any large open-bay model to give proper wing stiffness. Top Flite MonoKote is a tried-and-true example that meets this specification. MonoKote comes in transparent colors, which are just as stiff as the opaque covering and slightly lighter, and the clear stuff lets the sun shine through the covered surfaces.

One important flight preparation step on any polyhedral sailplane which is not mentioned in the instructions is making sure the inner wing panels and the horizontal stabilizer are flat, and that the outer wing panels are slightly and correctly twisted to give washout. It's common for wing panels to be warped after completing the covering step.

Check the flatness of the inner wing panels by laying them on a flat surface and make sure all four "corners" touch the bench evenly. We want the outer panels to be about ¼ inch higher at the trailing edge out at the wing tip than the leading edge at the tip. The lower angle of attack imparted by this geometry insures that the inner panels will stall before the outer panels, giving more predictable, straight-ahead stall characteristics, rather than falling off to one side, which happens when one wing stalls before the other.

Set the alignment of your wing panels by twisting them to the position that they need to be in, or a little further, and re-shrink the covering with your covering iron or a heat gun. Re-check alignment, and re-shrink as necessary to get it right. This process goes more quickly with a helper. Take your time, get it right, and you'll be rewarded with a sweet-flying sailplane that tracks straight.

The tow hook on my plane is mounted under the front of the spar, and my plane is balanced at the rear of the spar, and I'm quite happy with the way it launches and flies with this setup and the factory-recommended control throws. If you're new to sailplanes, start with both the tow hook and the balance point (also called center of gravity) more forward to give a less aggressive launch angle and more stable, more self-correcting flight characteristics.

Flight performance

With c.g. and tow hook locator as mentioned, the *Olympic II* launches on winch or high-start straight and high, generally requiring no control input until well into the launch, and then only a little rudder. Note that it's possible to overspeed the plane on launch. I fluttered one wing on a contest winch launch, and fluttered both wings on a large hi-start. No damage ensued in either case, but it's best to avoid wing flutter. On winch tow, go easy on the pedal. On hi-start, pull up elevator to steepen the flight path and slow the plane's forward speed. In

You'll see that Dave installed the spoiler option on the *Olympic*. He also advises that the inner wing panels be flat, and that the outer panels have the proper and equal amounts of wing washout.

Optional Performance Modifications

1. Install a receiver antenna tube, using an outer plastic pushrod tube, or a plastic tube sold for this purpose. This makes receiver installation easier, protects the antenna from wear and damage, and allows the antenna to easily extend its full length for maximum radio range.
2. Move the receiver switch to inside. I've even seen external switches turned off by mistake. Not many things in model flight stop your heart faster than a launch with the receiver off. It's safer to have the airborne switch on the inside of the plane. My switch attached to the first bulkhead with double-stick thin servo mounting foam. A Carl Goldberg Models #464 Angle Hold Down can be used to secure the hatch, making opening it to get to the switch more convenient than the screw provided in the kit.
3. Bolt on wing mount. I replaced the rubber band wing mount with nylon bolts to reduce drag and clean up the appearance. The bolts go through small clips fabricated from thin aluminum stock. The clips grab specially-installed 3/16-inch plywood root ribs. Two ¼ × 20 nylon bolts go through the clips and into threaded plywood plates mounted in the fuselage.
4. Eliminate the balance horn and build the rudder with a straight hinge line. I think this design was originally intended to reduce the load on the rudder servo, which is not needed for modern servos in this plane. Many believe the overhang is aerodynamically inferior to a straight hinge line. I added one inch to the chord (width) of the rudder to compensate for the lost area, and I'm happy with its appearance and performance.
5. Eliminate the wing-tip wires to save weight, and simplify wing tip block carving to save time. Lighter tips allow the sailplane to roll quicker and signal lift more easily. The specially shaped tips look interesting, but in practice do not seem to work better than plain tips.

There are more building tips and performance modifications on the Sky Bench Aerotech website, including a suggestion to reduce decalage to improve penetration into the wind.

case of a pop-off, recover with a loop. If you're not yet comfortable with these maneuvers, stick with a lower-powered winch or smaller hi-start.

In the air, the *Oly II* practically flies itself, requiring little stick input to cruise confidently around the sky. Turns are improved with a little up elevator command to keep them flat. This sailplane practically defines effective thermal turning. It holds the turn accurately with little elevator input, and turns tightly when coring a small thermal.

Aerobatics are pretty much limited to inside loops, which are performed easily. Just gather a little speed with a short shallow dive and pull back smoothly on the elevator stick—hard for tight loops, and easy for big loops. It tracks perfectly through the loop without the need for rudder correction. Inverted flight is possible if your thumbs are up to it, although the descent rate increases

dramatically. It will spin, but it's natural stability fights this maneuver; the spins look more like spiral dives.

The plane lands like a dream: slow, predictable, and completely controllable down to stall speed. Installation of the optional spoilers will add a measure of precision to your landings, but with a large enough flying field, you may find you don't need them.

Conclusion

The *Olympic II* is one of the most satisfying thermal sailplanes I've built and flown—all three of them, each better than the last. With its stable launch, gentle flight, and predictable landing characteristics it makes an excellent trainer and introductory sailplane. If you like high performance thermalling with minimalist equipment you can't go wrong with the *Oly II*, built from the excellent Sky Bench Aerotech kit. 

