

ICARE

## Avia

Classic looks with modern soaring performance

by Thayer Syme

Most of my early RC success came with relatively simple built-up gliders, so open structures and transparent covering will always be a draw for me. Fortunately, advancing design and structural technology have allowed built-up models to keep pace with the times, making it possible to retain that classic visual experience and enjoy modern performance. The Avia from Icare is just such a design. It spans 98.5 inches and weighs about 2.5 pounds all up, giving a very modest wing loading and excellent light air performance. The Avia features a 4-servo wing, with flaps and ailerons offering all the mixing capabilities you might want. Add in a lightweight power system that will loft it vertically and there is little question this model is a recipe for fun.

## TIPS FOR SUCCESS

The manual is profusely illustrated with limited text. This works well though, as the line drawings need much less translation than paragraphs. Anyone who understands the very basics of setting up a complex sailplane should be fine.

I spent a couple hours on the Avia my first evening, beginning by going over the manual to set the assembly procedure in my mind. Next I cut open the servo pockets and hinged the aileron and elevator surfaces with tape as recommended. I cut out the covering in wedge-shaped pieces, leaving a little film left in the hole to seal the edges. I then used my Coverite trim sealing iron to work the remaining film into the cutouts and anchor it up under the sheeting.

The tape hinging sequence shown in the manual seems backward to me. They recommend installing tape across the top of the hinge area first, followed by the piece that ends up inside the bevel. I've always found the thickness of this inner piece can restrict motion slightly, so I install the inner tape first.

Setting up the controls means cutting slots in the surfaces and gluing the G-10 horns into place. Pacer's 30-minute Z-Poxy is my favorite adhesive for applications like this. It gives a great combination of strength and enough working time to get everything properly aligned.

The V-tail is designed for the panels to be glued together into a single assembly that then bolts to the fuselage saddle. A length of brass tubing glued into the assembly prevents the screw from crushing the balsa. The Avia is the type of model I can see tucking into the car for a family weekend away, so I invested a little more time to make the tail surfaces more portable. Instead of gluing the panels together I decided to join them with a length of music wire as a spar joiner. The carbon tube spar had a center bore of approximately .073 inches, determined with a few numbered drills. I ground a sharp end on a length of .078 music wire and used that to ream the tube slightly larger. I then bent a length of wire to match the 120-degree angle. Sleeving that wire into the carbon fiber spars provides a very solid joint. I also taped the halves together on the underside and then inserted the brass tube between the panels.

I wrapped each panel with plastic film and molded a fiberglass cap using Z-Poxy and several layers of 1.5 ounce fiberglass cloth. Once the epoxy cured I drilled through the cap using the brass tube as a guide and then shaped the cap with sandpaper. Tightening the screw brings the cap down and spreads the load across the surfaces. As originally intended, the tube prevented crushing the balsa.

The pre-painted and molded canopy cover was trimmed slightly oversized and didn't quite match the molded step in the fuselage. A little work with a sanding block allowed me to bring it to a perfect fit. I used Z-Poxy and fiberglass again when installing the canopy retaining rod, shimming it with the plywood tabs included in the kit.

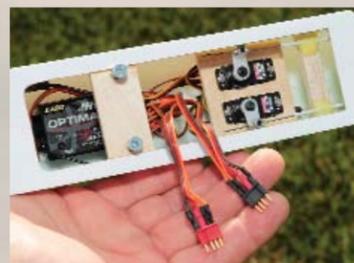
There are several pieces that need to be bonded

into the fiberglass fuselage; the plywood wing and servo mounting plates, the G-10 motor mount, V-tail anchor plate and the pushrods all need to be installed. I took my time and used Z-Poxy for each of these, with a separate mix and cure cycle for each one. In a few places I wanted to keep the epoxy from running, so I mixed it with some cotton fiber to strengthen and stiffen it. In all cases I roughened up the fiberglass with some coarse sandpaper to give the epoxy a good "bite." I also secured the pushrods about half way through the tail boom using a piece of music wire to insert a couple daubs of epoxy and cotton fiber. These are the only bonding locations that were not pre-sanded.



## WIRING THE WINGS

The first order when installing the wing servos was extending the leads. The wing ribs have cutouts for the wiring, but they are not big enough for simply adding a prefab extension. Instead, you will need to clip off the connectors and then solder in a length of servo wire. The manual recommends adding 33.5 inches for the aileron servos and almost 8 inches to the flap



Hitec Optima receiver under the wing mounting plate. Note the custom harnesses to facilitate connecting the wing.



The forward hatch has plenty of room for installing the flight batteries. I am using the Thunder Power G-4 Pro Lite 3S 2600mAh pack and it seems a perfect combination of light-weight efficient power. Left: There's plenty of room for the

## SPECS

PLANE: Avia

MANUFACTURER: Top Model CZ

DISTRIBUTOR: Icare

TYPE: Electric sailplane

FOR: Intermediate pilots

WINGSPAN: 98.5 in.

WING AREA: 713 sq. in.

FLYING WEIGHT: 40.5 oz.

WING LOADING: 8.2 oz./sq. ft.

WING CUBE LOADING: 3.68

LENGTH: 51.5 in.

RADIO: 7 channels required; flown with a Hitec Aurora 9 transmitter, Hitec Optima 9 receiver, 4 Hitec HS 65MG servos (ailerons, rudder, elevator) 2 Hitec HS82MG servos (flaps)

POWER SYSTEM: PJS 1400 Hotline brushless motor, CAM 10x6 folding prop, Castle Creations Phoenix 80 speed control, Thunder Power 2S 3300mAh Pro Power 30C and 3S 2600mAh Pro Lite 20C LiPo batteries

FULL THROTTLE POWER, 2S: 43.75 amps, 330.75 watts, 8.17 W/oz., 130.7 W/lb.

TOP RPM: 9,810

RATE OF CLIMB: 1,500-1,800 ft./min.

FULL THROTTLE POWER, 3S: 60.77 amps, 586.4 watts, 14.48 W/oz., 231.7 W/lb.

TOP RPM: 11,580

RATE OF CLIMB: 2,500-3,000 ft./min.

DURATION:

3-5 minutes (full power), actual duration limited by lift

MINIMAL FLYING AREA:

Sports field

PRICE: \$349

COMPONENTS NEEDED TO COMPLETE: Computer radio with sailplane programming, 6 micro servos, receiver, 250-600W power system, 8 feet of servo wire

## SUMMARY

The Avia combines modern composite construction with a traditional-style open framework that really shows off well with the colorful transparent covering. The light wing loading allows it to float on the lightest lift, and when that fails the onboard power will get you back to altitude for another chance in a few seconds. The Avia is perfect for sport flying or your club's next LMR contest.

## ICARE AVIA

### AIRBORNE

Despite the appearance of a lightly built floater, the Avia will surprise you with its "get up and go." Well over 200 watts per pound let you climb vertically until out of sight. My initial launch caused several gasps from the assembled gallery, as it had much more power than its appearance had led them to expect. Within a few seconds I was well into the lift zone, and released the spring-loaded switch assigned to the throttle. I let the Avia settle into its glide, then gave it a few beeps here and there



leads. A quick check showed I didn't need to extend the flap servo leads at all, as the leads of the HS-82MG servos were just long enough to clear the hole in the wing root sheeting. I extended the aileron servo leads to clear the sheeting, and then crimped on a new set of pins using the wire, connectors and crimper from Maxx Products. Each wing has a piece of monofilament threaded through the ribs to pull the servo leads. I also pulled a piece of lightweight nylon cord through the wing just in case I need it at some point in the future.

With four servo leads coming out of the wing, you need to pay a lot of attention when plugging them in. Instead of doing that dance before each flying session, I took a little extra time on the bench and made up custom harnesses using Deans micro 4-pin connectors. A mating pair of harnesses connects to the receiver and allows me to plug in each wing panel with just a single connector. Using color keyed red and black connectors prevents any confusion. Yes, it took a bit of time to solder and crimp everything up, but I feel it is time well invested.

Molded foam blocks slotted for the mounting lugs locate the wing servos. I secured these blocks with Z-Poxy, and then locked the servos in with a little daub of ZAP Goo so I can remove them if needed.

### RADIO SETUP

Setting up a model like the Avia is a place where the Hitec Aurora 9 really shines. It is fully flexible and adaptable, with every function assignable to any switch. I set up separate flight conditions for glide and



**The aileron and flap servos mount in the wing with traditional vacuum formed drag covers. I mounted the servo blocks with 30-min. Z-Poxy and secured the servos with Zap Goo. The kit includes pushrod hardware, but I opted for a direct wire linkage. I used Hitec HS-82MG servos for the flaps to prevent stripping gears when landing.**

land, selectable with a two-position switch on the left side. Since a powered sailplane either has the motor running or not, I programmed the throttle to the spring-loaded switch. Pull for power, release to glide. Incidentally, this same switch activates the launch mode, overriding the other two flight conditions and zeroing out the entire trailing edge, just so I don't end up in some unexpected trim condition when I pull the trigger on the throttle.

I set up the flaps and ailerons for camber adjustments in glide mode to the left slider, giving a touch of reflex to get between thermals and dropping the trailing edge to slow down for minimum sink in a thermal.

The butterfly landing mix is controlled by the throttle stick to give as much control as possible. With the HS-82MG servos on flaps, I am getting nearly 90 degrees of deflection down. Pushing the ailerons up 45-60 degrees at the same time adds even more

drag, giving the ability to get down from high altitude safely, or to land precisely on the target time and spot. If you don't want to push yourself or the power system so hard, the Avia is also a very nice 2-cell model. Flight testing with 2S Thunder Power packs gave nearly 2,000 ft./min. climb rates; 10-15 seconds to match a hi-start launch. Two-cell or three, the Avia is perfect for sport flying, or your club's next LMR contest.

to get what looked like a smooth baseline glide from which I could then watch for any signs of lift.

I didn't need to wait long. Within a few seconds I saw that telltale bobble as the sink rate went to zero and then the Avia started up in its first thermal. I added a little flap to slow down and then made a few turns to check its handling in lift. This was the first flight though, so I quickly cut out of the lift to check its handling in other realms. I toggled the condition switch to landing, pulled the throttle stick back and watched as it seemed to simply stop in the air.

The butterfly mixing is very effective with this model. Hanging out full flaps and aileron reflex starts this bird downhill in a hurry, but it doesn't get going too fast. It remains fully controllable, allowing you to maneuver precisely to the landing spot. By choice that first flight only lasted a few minutes but it showed me a lot. Clearly the Avia was made to fly, so I quickly re-launched and gave it a much longer mission.

The second flight was all about fun and lasted nearly half an hour. I logged sustained climbs between 2,500 and 3,000 feet per minute and also found several thermals. Yeah, I am really going to have fun with this bird over the summer!



**I protected the tail surfaces with plastic film, and then used them as a mold to lay up the clamping plate for the V-tail. 30-minute Z-Poxy and a few layers of 1.5 ounce fiberglass cloth worked wonders. After a bit of trimming, sanding and drilling a hole for the hold down screw, the clamping plate is complete.**

### CONCLUSION

While a lot has changed in RC over the years, I still find the sun glimmering through the flying surfaces of a sailplane high overhead one of the most relaxing and pleasing sights to be had. The Avia offers that pleasure, combined with the easy-launching convenience of an electric sailplane and exceptional performance made possible by today's modern materials and computer radios. If this kind of flying appeals to you, take a good look at the Avia. It is well worth adding to your stable. ☺

### Links

**Castle Creations**, [www.castlecreations.com](http://www.castlecreations.com), (913) 390-6939

**W.S. Deans**, [www.wsdeans.com](http://www.wsdeans.com), (714) 828-6494

**Eagle Tree Systems**, [www.eagletreesystems.com](http://www.eagletreesystems.com), (425) 614-0450

**Hitec USA**, [www.hitecrd.com](http://www.hitecrd.com), (858) 748-6948

**ICARE**, [www.icare-rc.com](http://www.icare-rc.com), (450) 449-9094

**Maxx Products International, Inc.**, [www.maxxprod.com](http://www.maxxprod.com), (847) 438-2233

**Thunder Power Batteries**, [www.thunderpowerrc.com](http://www.thunderpowerrc.com), (702) 228-8883

**ZAP and Z-Poxy** are manufactured by Pacer Technology, [www.zapglue.com](http://www.zapglue.com)

For more information, please see our source guide on page 121.