SOARING

ICARE RC SWIFT S1—TOW OR SLOPE 1/4-SCALE AEROBAT

BY **Wil Byers**

Frank Davis readies to give the Swift S1 a nose-down launch at Eagle Butte. The wind was blowing about 20 mph, so a good throw was needed.

The model comes as a deluxe kit, with most of the glider already built and ready for you to install the radio gear. You'll need about 20 hours to complete the model.

A few years ago I purchased a 1/5-scale Mibo Swift. I wanted a scale model for slope soaring and for flying aerobatics. Unfortunately, the model ended up in the hands of a friend who discovered it was a superb slope machine as well as a good aerobat. I've been wanting a Swift S1 ever since.

Note that the full-scale Swift S1 is the successor to the Kobuz 3 glider. Both aircraft are of Polish design and manufacture. The Swift S1 has won many full-scale aerobatic competitions, including the 1995 World Aerobatic Championships, which were hosted in France.

The model is also a formidable machine, and in the hands of a pilot like Gernot Bruckmann (his competition model is a 40%-scale Bruckmann Swift) it has won many glider aerobatic competitions, including the acclaimed German Acro Cup.

When I learned that Icare RC was selling the 1/4-scale Swift S1 it was pretty much an instant sale. A quick call to Etienne (the owner of Icare RC) got me the details about what it would take to finish the model. It seemed to be just what I was looking for: a quick build project; composite fuselage with retractable landing gear installed; obechi covered foam wings with built-in spoilers Quabeck 1.5/12 airfoil, covered in Oracover®; and a releasable towhook installed in the model's nose. So, about a week later, the model was delivered to my office; and, it arrived without any damage having been rendered during shipping.

I used Hitec servos because they are strong, lightweight, have metal gears, and they deliver excellent resolution. They also come with a metal servo arm, which is nice!

KIT CONTENTS

- White epoxy fiberglass fuselage with reinforcement
- Retractable landing gear installed
- Tail wheel & tow release installed
- Hollow molded rudder
- Rudder pushrod installed
- Clear canopy installed with hinged frame
- Cockpit seat pan,
- Oracovered 2-piece wings with control surfaces hinged
- Servo wires installed with 9-pin connector
- Wing snap locks installed,
- Airbrakes installed
- Foam core obechi wood covered horizontal stabilizer w Oracover finish
- Decals factory applied
- Plastic servo covers

The canopy comes glued to the frame, with an instrument panel, and it is hinged at the front, which is similar to that of the full-scale glider. A pin at the rear holds the canopy in place.

This gives you a good look at how the seat pan is made, as well as how the retract is installed. Notice that the servo wires come pre-installed in the fuselage and wings.

NEEDED TO COMPLETE

- Aurora 9 9-channel transmitter
- Optima 9 9-channel receiver
- Six Hitec HS-5245 MG servos (ailerons, elevator, rudder, retract, release)
- Two Hitec HS-5085MG servos (spoilers)
- 5-cell 3000-mAh flat battery pack
- Lead shot (balance weight)
- Epoxy, CA glue

TOW & SLOPE

TOW

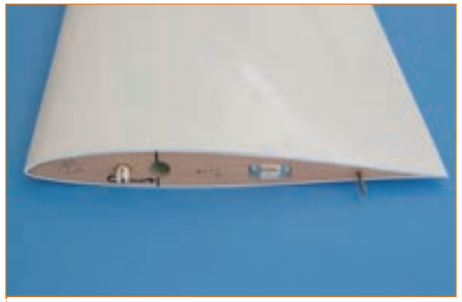
Once I had balanced the Swift S1 using my EZ balancer, it took me about 30 minutes to program the Aurora 9 transmitter. The Swift's center of gravity was set at the most rearward position because it was going to be aerotowed for the first flights. All exponential settings and dual rates were set as well.

The Hitec HS-5245 servos work great in this application. You must cut the pigtail and solder the wires for their installation in the wings.

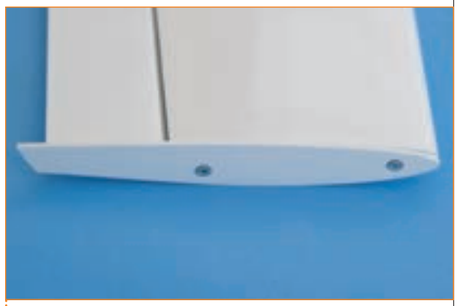
The Swift was towed behind a DA-100-powered tug for its maiden flight. The tow went off without a hitch; albeit, you must keep the models wings level from the moment it starts to roll because there is no dihedral built into the wing's design, so the wingtips run close to the ground. You do not want to catch a wingtip during tow. It could be troublesome!

At about 800 feet above ground level (AGL) the Swift was released. It was nice to discover that it was nearly perfectly in trim. Because it was being towed and I would be searching out thermals with it, I did pull in two beeps of up elevator trim. The model then settled into a cruising flight model as I hunted out a thermal that was rising faster than the glider was sinking.

It did not take long, on this late summer day, to find a pretty strong



The root of the wing has a 9-pin Amphenol connector pre-installed. There is even a plastic wing lock built into the root of the wing as well is in the root rib on the fuselage.



The endplates on the wings are made of aluminum. All you'll need to do to finish the end of the wing is screw the plates in place with two small wood screws that come in the kit.

The wing has a straight leading edge, so it tracks well in loops and rolls, plus the rudder is generously sized which helps for good knife-edge flight.

thermal. You'll want to know that this model thermals well! It must be attributable to the wings' Quabeck HQ1.5/12 airfoil. Quabeck sections work exceedingly well as long as you keep the model's airspeed optimized. If you slow the model too much the glider will just mush and sink. However, in this case I was flying the model at cruise speed and keeping the turns fairly flat. It did not take long for me to climb the model to about 1500 feet. Then I flew it through a roll. It rolls fast on high-rate control. Note that the pilot bailed out because I had not latched the canopy. Even without a parachute he survived and was back in the cockpit for the next flight.

That day, the Swift was towed three more times. Each flight I was able to find a thermal. The model indicates lift well and it climbs quite well too. So, each flight was at least 15 minutes or more.

You need to know that this model lands quite hot! You must keep the airspeed up to keep away from tip stalling, so in ground effect the model will run a good distance. Fortunately, the spoilers are quite effective, providing excellent sink rate control—although I don't think you'll want to spot land this machine.

You'll want to seal the covering down around the edges of the servo wells to prevent it from pulling loose. I used a small Monokote® trim iron to seal my models cover in places like this.

I used Hitec's aluminum arms to drive the ailerons. Notice that I have the arm positioned a bit forward with the servo at center, so that the servo drives more up travel than down.

The spoiler servo is an easy install. It just sits on its side in the bay. I glued it in place with 6-minute epoxy with a bit of flocked cotton mixed in. Once the epoxy cures it provides an excellend bond.

A set of Dynamite scissors were used to cut the plastic servo covers. One pair is straight, the others are curved to cut around corner. These are a handy tools to have in your shop.

SLOPE

For its maiden flight on the slope I added one half ounce of weight to the nose. It is best to have the CG a bit forward for those first few slope launches. You want the model to penetrate, and not get blown back into or over the hill's crest.

My friend, Frank Davis, gave the Swift a very nice, ten-degree, nose-down launch from the hillside at Eagle Butte. The wind was blowing about 20 mph. He walked down over the hill's face until the air was smooth and laminar. Then with a brisk, straight forward motion he threw the glider into the wind. It didn't pitch up or down on launch. It just jumped onto it step and started climb.

Once the model was on step and flying well, I checked its trim. For these wind conditions I added three beeps of down trim. It did not need rudder or aileron trimming.

Then, I stepped on the "gas." The Swift is an outstanding slope soaring machine. It does nice rolls with a need for a very slight amount of down elevator as you transition through inverted—you'll want to use rudder too for point rolls. Inverted the machine needs a very small amount of forward stick pressure to maintain level flight.

Chandelles are absolutely

This photo gives you a good look at the curve of the Dynamite scissors, which aids in cutting round shapes and such. I bought mine from Horizon Hobby, so go to horizonhobby.com.

The elevator's servo install is probably the only hard part of the build. That is because you must fit a screw driver in to tighten the screws. The linkage is straightforward.

As you can see, the elevator is held in place by an aluminum screw. The rudder comes with a brass control horn installed and the pushrod attached, which makes the install a breeze.

I used IC-2000 high-strength CA glue to bond the release mechanism servo tray together. This is a great product and one you should have in your stock of building supplies.

Just after launch the Swift S1 penetrates well into the 20 mph wind. The Quabeck airfoil delivers fantastic performance for this model, even letting it soar well from aerotow.

Just a bit of down elevator control will let this model transition to high speed for either penetration or doing aerobatics!

I like to carry a lot of speed in the landing zone as is the case with this diving turn. Then I just bleed off the speed to set up for a slow, sinking landing.

a blast, but you must carry lots of energy during the climb so that the model will come over the top nicely. It also carries plenty of energy through the turns. Loops can be absolutely huge if you enter them with plenty of airspeed. Note too, that the model did not have a tendency to roll to one wing or another during the loops, so it has good lateral balance. I did one Cuban Eight with the model during this 30-minute slope session, but honestly, I need some practice. The model is up to the task, but I need to straighten the model a bit during the 45 portions of the Eight.

When it came time to land, the wind was blowing at about 25 mph. Consequently, I made about 10 to 15 passes at the landing zone to test out the model's penetration and sink rate in the sink zone of Eagle Butte. The Swift has no problem with penetration. You simply push forward on the down elevator control a bit and this machine will speed up nicely, cutting right through the sink zone. Its maneuverability is awesome too. Using the rudder will push the nose around the turns well, and the roll control is fantastic, if not somewhat unnerving at first if you are not used to this type of machine.

The landing was performed by flying the model back over the lip of the hill's landing zone about 100 yards. I then slowed the glider down to about 10 mph above stall and let the model ride the sink down until the model was about 50 feet above ground. At that point some down elevator was added and the model penetrated over the landing zone lip. At about 30 feet above ground I modulated the spoilers and the Swift SI sank slowly to ground, making a nice, easy, and relatively slow touchdown.

ANALYSIS

At a price of just $899 for the Deluxe kit version, this glider is a bargain basement buy. If you like slope soaring as well as aerotowing, and have a want for a machine that delivers great aerobatics performance this is the model to have in your hangar. After putting about an hour and half of airtime on this glider, I want more, more, more! This is a exceedingly fun machine to fly. It gives my thumbs a workout, and it delivers delightful aerobatics.

The bottom line for me, with respect to the Icare RC 1/4-scale

The landing gear comes installed. You will, however, need to install the servo tray. Be sure to use some fiberglass and epoxy to secure it in position after tacking it with CA.

I built a dam for the lead shot the model uses for nose weight. You'll mix the shot with epoxy and then pour it in the dam. After it cured I mounted the battery on the shot.

Control Throws

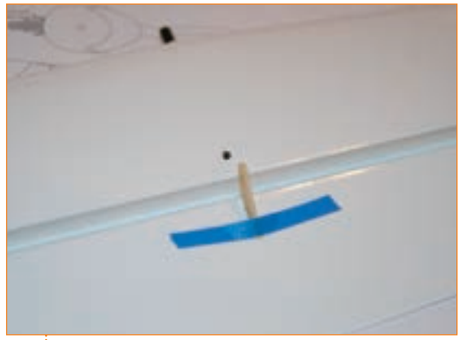
	Up (Expo)	Down (Expo)
Ailerons	.8 in. (20%)	.5 in. (20%)
Elevator	.85 in. (20%)	.85 in. (20%)
Rudder	2.5 in.	2.5 in.
Dual Rates	60%	60%

Center of Gravity

3.75 to 4.1 in back of leading edge at root

My EZ Balancer, a paper cup and the lead shot made setting the balance point easy. You will tape the cup to the nose and then fill it with shot until the model balances.

In the photo, the airplane is small, but you can just see it breaking ground for its maiden on aerotow. I "specked" it out in a thermal!



I glued the elevator's fiberglass control horn in the elevator with finishing resin. I then taped it in position and let the resin cure overnight so that it provide a strong bond.

I did not like the travel that the stock elevator horn provided so I removed it and made a new horn. This one provides plenty of control throw both up and down.

The Swift is slowing down on final approach to the landing zone. I modulated the spoilers to control the rate of sink rather than just open them and leave them that way.

ASSEMBLY

Assembling the Swift S1 is straightforward and relatively easy, especially if you've built a couple of models before. The instructions are simply two sheets of paper with some drawings on them. If you need more information than this to build the Swift, I think it is not the right model for you. Alternately, get a friend to build it for you. You do not want to miss the fun of flying this model.

Let's start with the wings. You'll screw the endplates onto the tips of the wings. That it for the tips.

Next you must cut open the aileron and spoiler servo bays on the bottom of the wings. Be sure to iron the covering down on the openings before gluing the servos in place.

There is nothing to assemble or glue on the wing roots. They are finished, including the 9-pin Amphenol® connector and plastic wing lock being installed, where the roots mate to the fuselage.

The wings come pre-wired, so all you need do is cut the servo pigtail and solder the servos to the appropriate connection. It is easy and fun, but don't get carried away with the solder—a little will do. Be sure to use solder flux to clean the wires as you apply the solder too. That will make for a more low-resistance connection.

Here is how I installed the servos in my model's wings. Before I glued the servos in the servo bays, I used some Great Planes® finishing resin and brushed a thin coat of epoxy resin on the foam in the bottom of the bays. Then I laid in a layer of 1.4-oz fiberglass cloth. I let the resin cure until it was hard—overnight worked well for me. To glue in both the ailerons and the spoiler servos, I first centered the servos as needed per control. In the case of the ailerons, the arms are forward at about ten degrees when the control stick is centered. The spoilers were set for the spoiler (throttle) stick to be at the top of its throw—pull down for spoilers. Then the servos were glued in place with 6-minute epoxy. Note that I mixed a bit of flocked cotton with the epoxy so that it had the consistency of ketchup. You must be careful not to have the epoxy run up and around the servo arm, or you could glue the arm in place, which you must know is not a good thing. Glue in all four servos using epoxy.

My model is fitted with Hitec's metal arms for the ailerons. They drive a 1/16-in. pushrod, which has a Du-Bro solder link on one end and a threaded link on the other. The threaded link connects to the fiberglass control horn on the aileron—a standard install. The fiberglass control horns were glued into the wings with 30-minute epoxy. You'll need to cut an opening in the control surfaces for the control horns to fit in. Be sure to remove enough foam inside the wing to get a strong bond between control horn and the control surface. That is about it for the wings. You'll need to connect the spoilers' pushrod to the servo, but that is easy, just make sure everything is centered per the controls and the servos. The pictures will show you how I did it. After you've programmed the radio transmitter you'll cover the openings with plastic covers and fairings, which are provided in the kit.

The elevator servo is just a drop-in affair. You must make the linkage however. As you'll see in the photos I used a solder link and a swivel link to create a smooth, friction free mechanism for the elevator control. It is a straightforward install. You must glue the fiberglass control horn into the elevator as well. Know that I did not like the elevator's fiberglass horn because it did not give the travel throws I wanted, so I made another one that does.

The rudder comes hinged to the vertical fin. You only need install the servo in the servo tray and use solder on a threaded solder link.

Next you should install the servo tray for the release mechanism. I used Extra Strength IC-2000 cyanoacrylate glue to fasten the side supports on the tray. Then the tray was glued to the side of the fuselage with 6-minute epoxy, again with a little flocked cotton mixed in.

The servo tray comes precut. You will need to glue the side support on the tray before you install it. I installed the servos in the tray before I glued it into the model with IC-2000. I recommend you position the tray so that the retract servo can drive the retract properly. The photos show how I did mine. After you have it glued in place with IC-2000 it is best to use some 30-minute epoxy and 1.4-oz fiberglass to reinforce the bond between the fuselage and the servo tray. If you don't the tray will likely break free of the fuselage during a hard landing. Note that I used Velcro® bonded to the back of the tray as a place to mount the Optima 9 receiver.

To balance the model you'll want to have everything installed in the model, with the battery slid into its final position. Put the pilot in too. Then you'll simply tape a paper cup to the nose of the model, set the model on an EZ Balancer, and pour lead shot in the cup until the model balances at its most rearward position. Then remove enough shot from the cup to compensate for the weight of the epoxy that mixes with the shot as well as the paper cup. You'll want to make a plywood dam in the nose of the fuselage. In front of the dam you will pour the lead shot that has been mixed with epoxy finishing resin. Once it cures it makes for an excellent place to mount the battery pack.

My Swift is outfitted with a 5-cell 3000-mAh NiMH battery pack that was custom made for me by Batteries America. They put a heavy duty lead on it and made it the right length so that I could eliminate the on/off switch. I simply plug the battery into a short servo extension that is hid under the pilot's seat pan. The battery is fastened in place by Velcro which is bonded to lead shot in the model's nose (see the photo). I used a bit of hard foam between the battery and the top of the fuselage to guarantee that battery does not shift during aerobatics too. It is also held in place with a small piece of Velcro.

Program your radio transmitter and the model will be ready to fly.

Specifications

Wingspan	123 in. (3.14 m)
Length	68.5 in. (1.74 m)
Wing Area	1193 in.² (77 dm²)
Stabilizer span	29.5 in. (.75 m)
Wing Airfoil	HQ1.5/12
Wing Loading	19 oz/ft² (65 g/dm²)
RTF Weight	190 oz (5.4 kg)
Transmitter	Hitec® Aurora 9
Receiver	Hitec Optima 9
Servos	Hitec HS-5245MG HS-5085MG
Instructions	Two Sheets
Deluxe Kit	$889

Swift, is that I want to fly the heck out of it. While it is not a huge machine, it easily fits in my van, it goes together easily at the airfield, it launches well, and it flies fantastic. You will not pry the Swift out of my cold dead hands! I'm exceedingly glad I bought the Swift S1 from Etienne. Get one too.

Distributor

Icare/Icarus
890 d'Anjou
Boucherville, QC J4B-5E4
Canada
Phone: 405-449-9094
icare-rc.com