

## Sunbird 60 (1.5 Meter) Instruction Manual



### *Who is that ugly bar-steward?*

Sunbird is a CNC machine moulded, CAD designed slope model aircraft. This plane has had a development period of over 2 years, and three separate models to evolve into the highly agile thoroughbred that you now own. We hope you have a lot of fun with it.

James D. Hammond PhD, DBA – designer  
RCRCM Aeroteam, proud manufacturers.

### **Unpacking**

- Please unpack the plane carefully making sure that you have retrieved all of the small parts.
- Don't throw the box out until you are 100% sure it's empty!

- Check that all the parts are supplied.
- If any are missing please contact your vendor immediately.

Sunbird 60 parts



### **Before construction**

- Start with a clean workbench and cover it with some foam, or a soft thick cloth to protect the finish of the wings and fuselage as you work.
- Be careful not to place the wings or fuselage on any screws or tools etc that can dent or scratch the skin.
- Be very careful using epoxy and CA so that you don't get any on to the surfaces of the model during assembly.
- You can tick off the bullet points on this instruction manual if you want to follow it to the letter.
- Remember - check twice – cut once!

## Wing Construction

I always begin with the wings because it gives that “already half done” feeling.

- First, do a dry assembly to make sure that the entire plane fits together well. If the carbon joiner seems too tight – it probably is not. They tend to loosen a little after a few flights – but adding some floor or car wax can help if it is particularly stiff.
- Check the control surfaces to make sure that they have enough “up” movement.
- If not, then open up the controls surface to expose the wipers, then carefully sand the hinge joint inside a little and try again.
- When you are happy, use an air gun or similar to blow the sanding dust away.
- Install the control rods on each surface using the control horns that are already installed. Check that they don’t bind in any way.



Control rod installed



***Check for enough movement    Sand the hinge inside if not enough***

- Next, make up control rods and clevises using the parts supplied.
- The flap rods should be about 85mm and the ailerons about 65mm including clevis length - but check before you cut!
- Make sure you have adjustment at both clevis ends!



***Control horns for ailerons and flaps***

- Zero the servos by using your R/C unit.
- Remember! Aileron servo arms can be set to 90 degrees, but the flaps need to have about a 20 degree offset towards the leading edge and set at + 35 degrees.
- Make up your own, or use the RCRCM wiring harness and check continuity before installing.

- I use a thin piece of piano wire to thread through the wing plug holes to tape the wiring harness to pull it into position, servo plugs first.
- When the wiring harness is positioned inside the wing and accessible, servos can be installed.
- First, check the position of the plywood servo mounts and check that the servos fit them.
- Install the control rods on to the servos and check that they do not bind, are snug but not too loose or too tight.
- Tape the control surfaces flat with masking tape.
- Assemble the completed set of servos, servo mounts and control rods. Screw the servos to the mounts at this time too.
- When you are satisfied that you have the correct position for the servo mounts – glue them in using a slow set epoxy, or thick Cyano. Don't use 5-minute epoxy because it will probably let go – at just the wrong time! Be careful not to use too much glue otherwise you will permanently set the servos.
- When cured and secure, mount the servos, connect them to the wiring harness and check for zeros, then for free and adequate movement. Adjust using the clevises if needed. (See the control settings section at the back of this manual for control movements)
- Finally, check the fit of the servo hatch covers and sand if not snug.
- Then put some double sided tape on the underside and install all on to the servo hatches.

WINGS DONE! CONGRATULATIONS!

### **Fuselage construction:**

#### **Canopy:**

- Start with the canopy – it's fast and easy!
- First check the canopy fit. Sand it carefully if it's too large. Take time on this because nothing looks worse than a badly fitted canopy.
- If the canopy has distorted and seems too wide – use a hairdryer (carefully) to warm it up and squeeze it back to shape.



***Canopy distorted – use a hairdryer and squeeze it back!***

- When you are completely satisfied with the fit, bend the supplied wire to the shape of the inside of the canopy remembering to leave wire equally at both front and rear ends.
- When you are happy with the wire fit, there are two ways to secure it: Epoxy blobs or glass fibre patches. For speed I used glass fibre set with cyano which works well and is a 1 minute job. Be careful with that cyano!



***Canopy with wire installed.***

- Check that the canopy fits and is secure.

Another job well done!

### **Rudder and elevator controls:**

- The elevator carbon snake or carbon rod should be already connected to the machined elevator bellcrank and bearing assembly. Check that it moves smoothly. If not, some Teflon spray will normally free it up. Be careful with this if you use it. It's quite possible to make it impossible to glue anything to the fuselage!
- Do a trial assembly with the tailplane halves and check for smooth movement.
- OK? Now for the rudder.
- First remove the control rod or snake inner.
- Attach the clevis to the rod with thick cyano, and when cured – test that it is very well secured by pulling on it as hard as you can!
- Next, insert and epoxy the rudder control horn into the rudder.



***Just like this!***

- Thread the control rod or snake back into the fuselage using the rudder fairing hole.

- Connect the rudder control horn to the control rod and check for movement and range.



***Right OK?***

***Left the same?***

- If the right rudder movement is not enough then its back to sanding those damn wipers!
- Adjust until you have enough movement – should be about 30mm each way – more if you can get it.

OK, rudder and elevator done!

### **Installing the ballast tube (if you want to that is):**

- The ballast tube as supplied is too long – but don't cut it!
- First. Check the length of ballast you want to fit, then check the wing root on the fuselage and mark a position at 35% of the chord with a white board marker or soft leaded pencil. Don't use a permanent marker!
- Cut the ballast tube to the length you want remembering two things:
  1. Leave enough length to a 10mm (3/8") plug at one end.
  2. Leave enough length to provide space for a spring or plug to stop the ballast from moving in flight.

- Fit and cyano the plug inside the tube. Whoa! Make sure, sure, sure it is secure. The last thing you want is loose ballast knocking around inside your bird in flight. NOT recommended!
- Next mark the centre point of the ballast tube minus the length you have left for the spring or plug.
- Finally, when you are completely sure it's all OK, epoxy/spooge the ballast tube inside the fuselage, using the mark on the wing root fairing to line up as closely as possible with the centre mark on the ballast tube. Look through the wing joiner hole to make it as close as possible. Check, check, check, and adjust until you are 100% sure you are correct!
- When you are 100% satisfied with the position, wedge the ballast tube in place and leave to cure.

There, that was not hard was it?

### **Servo tray:**

**Note:** The servo tray as supplied is a black plywood plate. The reason for this is that these days there are so many servos available and each flyer has his/her favorites. It is impossible to make a generic servo plate with holes that fit all. So we decided to supply a high quality plywood blank that can be cut to fit any installation.

OK, let's get on with the next bit.

- First sand the edges to a gentle curve to fit snugly inside the fuselage in the position you like, then cut the servo/switch holes remembering

to put the servos where the snakes can easily reach them without sharp bends.

- .Now fit the servos and adjust the height of the tray to best connect the servos to the snakes.
- When you have it right and square, pencil a line where it fits on both sides of the cockpit wall.
- Now sand a chamfer all along the sides, maybe 3mm deep. This will help the epoxy to bond it to the fuselage sides.
- OK, now remove the servos and tack cyano the tray into the fuselage.
- Check it again!
- If it's OK then slow-set epoxy it in.
- After the epoxy has set, you might like to apply a coat of varnish or paint to keep moisture out.

Another bit done!

### **Installing the rudder/elevator pushrods or snakes to the servos**

- Set the rudder and the elevator to zero and tape them that way.
- Install the servos and use your RC unit to set them to zero.
- Then simply cut the snakes to fit, remembering to leave space for the adjustment clevis.
- Check for movement and adjust accordingly.

Done!

### **Installing the wiring harness**

- Use the RCRM wiring harness or make your own.

- Check continuity!
- Check that the wiring harness connectors fit snugly into the fuselage connector holes.
- If not...file the holes out until they do.
- Thread the plugs through into the fuselage and rout the receiver plugs to the receiver area.
- Put in the receiver and battery temporarily and make sure the whole shebang actually works!
- Now cyano the connectors into the holes.



*Done! neat huh?*

## **Battery Installation**

I made a couple of formers to keep the battery with holes in them so that I could use tie wraps to keep it in one place. It gets really boring when you are flying inverted and the battery ejects...

**Nose weight** (Note that the photos are for the Vector III but exactly the same procedure applies.)

This can be custom made or just fishing weights etc

Here we will deal with the custom made version

- First, fill a paper (not plastic!) cup with sand – not too wet, just damp. Alternatively an antique bone china coffee cup will do.



*There, see the impression of the nose?*

- Then push the nose of the plane into the cup about 2 inches (50mm) and take it out to leave an impression or mould.
- Using your wife's best saucepans, melt about a pound (0.5KG) of lead and then – careful! Stand as far away as possible and use eye protection! – pour the lead into the mould.
- When its set (give it at least 5 minutes) bung it into the sink and cool it with water:



*Not too bad! Cool maybe?*

Now for the last part:

- Trial fit the nose weight into the fuselage. Note that you can fettle it with a hammer if it's a bit too big:



*Bit of a banger huh?*

- Now fully assemble the plane and test the CG at **XXXX**
- Add or remove weight until the plane balances correctly.
- When satisfied, epoxy the nose weight in.



*Just like that! Neat or what?*

**Important note:** Whatever you do, never make the nose weight too heavy – its better to have a slightly underweight nose with a bit of lead added than it is to have to drill out lead from a too heavy nose.



*The old heave-ho!*



*Crikey! Flying straight and level*

Now you might need the last bit:

## **Control surface movements and CG settings**

C/G = 60 – 65 mm from Leading Edge to start. Move back slowly in small increments to further improve control responses.

Control surface settings: (All measured from the outboard trailing edges)

### **GENERAL:**

Ailerons + 7 mm, -5 mm

Flaperon +/- 8 mm

Rudder – As much as possible

Elevator +/- 10 mm

### **CROW**

Crow- Flap - 50 mm or more if desired

Crow-Aileron +7 mm

Crow-Elevator compensation -4 mm

### **THERMAL (WHAT?) OR PUSSYCAT**

Thermal or Cruise flap - 2 mm

Thermal or Cruise Aileron - 1mm

### **PACEMAKER SWITCHED ON?**

Ailerons/flaps reflexed up 1-1.5mm



Finally, thanks to **Denis Wittner** whose photographs I have shamelessly stolen for use here!



Pilots notes: