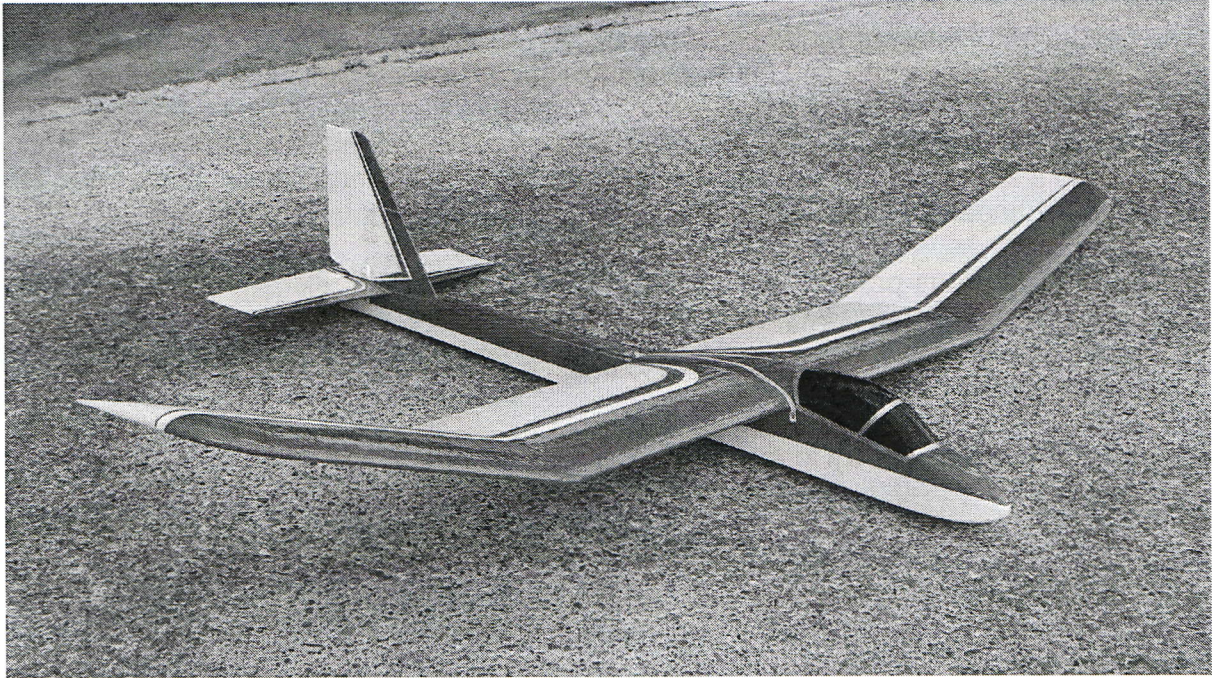


Ranger

Building Guide



Thermal/Slope Soarer

By Canterbury Sailplanes

Congratulations on your purchase.

The Ranger is designed specifically as a thermal soarer, capable of very good performance off the flat, it's also suitable for launching off the slope in light wind conditions.

The Ranger is a stable model, ideally suited for beginners to learn to fly with or as a relaxing Sunday flier.

EPP is a fantastic material for Model Aircraft; it's incredibly resilient and will take almost all the punishment you can give it – which makes it perfect for a first model. The Ranger uses high density EPP for the nose and wing fairing where the extra strength is needed. The wing and fuselage are from regular density EPP and the tail is all coreflute, so it's a very durable model.

Assembly of the Ranger is straightforward and shouldn't be too difficult for a complete beginner to build. If you have any problems please contact Canterbury Sailplanes or the shop you bought the kit from.

Canterbury Sailplanes
www.flycs.com

GENERAL NOTES – Read these before you get started!

- At the back of these instructions there are plans of the Ranger, study these before you start building as they show where the radio gear is located, the wing taping plan and the general layout of the Ranger.
- Throughout the instructions there are a number of **Tips** to help you through each step. Read each instruction fully and the **Notes** and **Tips** before attempting the next step.
- The kit contains nearly everything you need to build your model. To complete the Ranger you'll need a 210ml can of spray adhesive (Ados F2 or 3M Spray 77) and some basic tools to get your Ranger ready to fly (See the list on page three).
- Shipping regulations prohibit sending 3M Spray 77 or Ados F2 contact adhesive. These are great glues for adhering the tape to EPP and we strongly recommend using it. Adhesive spray should be available from your local hobby or hardware shop. A 210ml sized can, should be adequate.
- As you build the Ranger try to avoid using excessive amounts of glue - in particular on the tail section!
- The kit includes Coloured Polypropylene tape and Strapping tape (fiberglass reinforced) make sure you use the correct tape as specified in the instructions. There are 50 meters of Coloured tape but only 24 meters of Strapping tape – *which is just enough so try not to waste any.*
- To decorate your model use different coloured tape, iron on covering film (available from a model shop) or self-adhesive vinyl (available from your local sign writer). Don't over-do it though, as this will increase the weight of the finished model. Where the Assembly instructions specify coloured tape these other products can be used instead. If you use other coloured tape products, they must be of similar spec, i.e. polypropylene or vinyl, but not PVC. Iron on film also looks great; use a low heat and apply onto the strapping tape, (use contact adhesive with iron on films as this also helps the bond). Test a small piece of covering film and heat settings on a scrap piece of EPP, before applying it to your model.
- When applying the contact adhesive to the model; lightly spray it onto the model from about 200 – 250mm away and leave for a minute or two, until the glue is quite tacky, before laying the tape onto the glued surface. Once it's on however, it's difficult to remove - so take care.
- Check that all the parts as per the parts list are packed in the box. Notify Canterbury Sailplanes immediately if any parts are damaged or missing.

LMA

One addition we recommend for your Ranger is a Lost Model Alarm, this is an excellent investment if you ever land/crash in trees, or long grass, your model may be hard or even impossible to find. A lost model alarm will sound for up to 2 days. Ask your model shop or check out our website for details.

If you don't install an LMA, it's always a good idea to put your name, address and contact phone number somewhere on your model – just in case!

Gorilla Glue is included in the kit, this is a great all purpose adhesive. Using it is a little different from most glues however as it foams while curing. Note the following points;

- Read the instructions on the packet.
- Use a minimal amount, as the glue foams and expands when curing; wipe off any excess with a damp cloth.
- To get a better finish, tape over the joints, this will leave a smooth finish to any exposed glue when it's cured.
- When gluing the wings together and the coreflute tail assembly in place, the expanding glue may push the items apart – clamp or tape the parts together to prevent this from happening.
- Any excess can be sanded or cut off after the glue has cured.

Use Gorilla Glue:

- To join the wing sections together.
- Installing the spars into the wing.
- Holding the servo's in place.
- To join the fuselage components together.
- To hold the pushrod outer tubes in place.
- To glue the coreflute parts to EPP.
- To hold the wing dowel and 6mm plywood blocks in place

Tools you need to complete your Ranger include:

1. Small power or hand drill
2. 2mm drill bit (Launching hook)
3. 2.5mm drill bit (Control horn screws)
4. 3.5mm drill bit (Wing dowels)
5. Small ruler or tape measure
6. Sharp knife, scalpel or modeling knife
7. Scissors to cut tape
8. Sandpaper (120 - 240 grit is ideal)
9. Marker (ballpoint pen)
10. Small phillips head screwdriver (for the servo's)
11. Small flat head screwdriver (for the control horn screws)
12. Long nose pliers
13. Soldering iron (for cutting pushrod grooves)
14. 150mm Slide Clamps (for holding parts in position while the glue cures).

Servo installation – Retain the servos in the fuselage by the following methods:

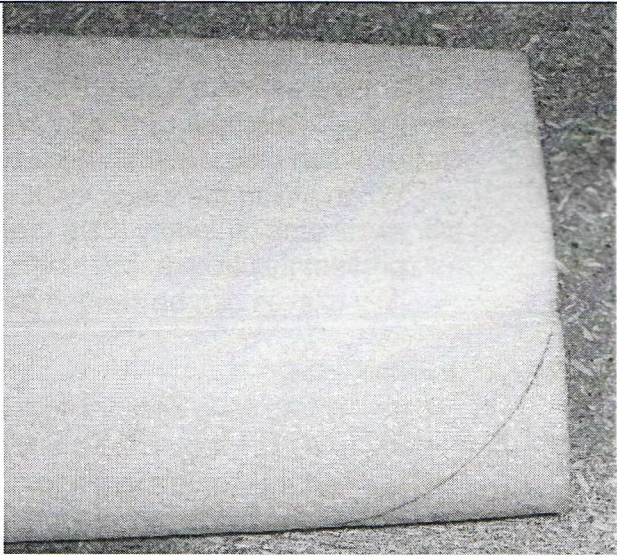
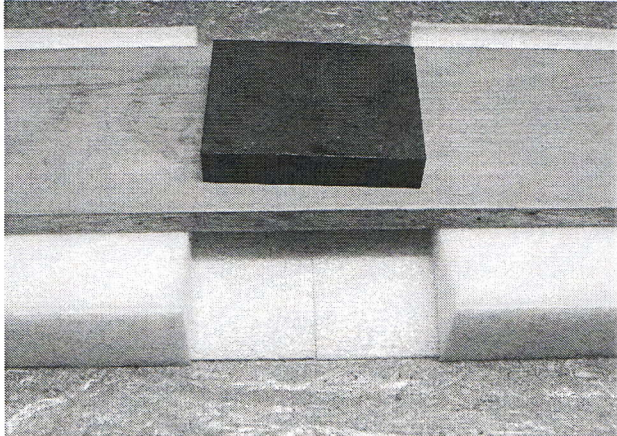
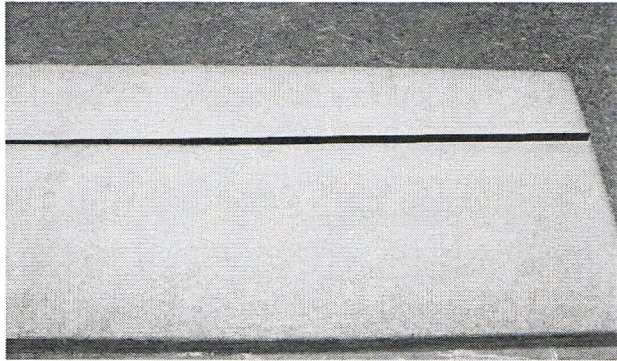
- Neat fit in the recess (no glue required),
- Gorilla glue them in, or
- Put double sided tape on the servo and spray contact adhesive into the recess before inserting the servo.

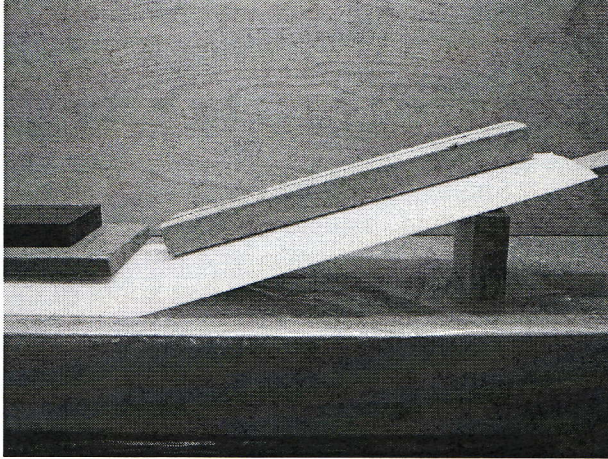
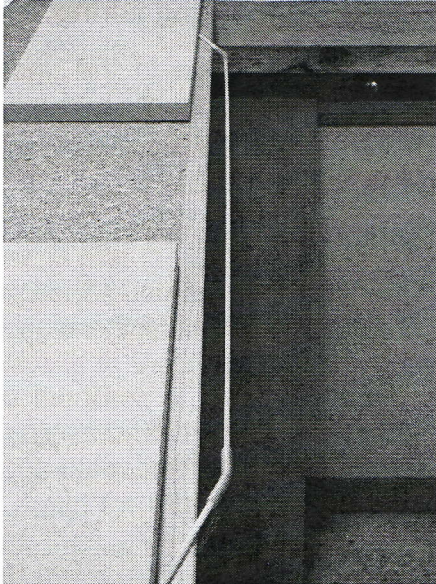
Construction aids – While building your Ranger, you'll find it useful to have the following items:

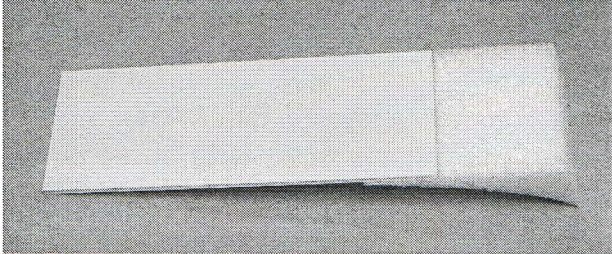
- Plastic sheet – you can use the bag from the kitset, split down the seam.
- Flat surface – a bench, sheet of plywood, old door – so long as it's flat and big enough to build the wing on (ie: About 1800mm long x 400mm wide)
- Weights – I use blocks of timber or steel, but you can also use small containers filled with nuts/bolts/nails or even water.
- Support blocks – a few flat pieces of wood up to 20mm thick come in really useful for supporting the wing outer sections or for putting over the spars when you glue them in.

Building sequence.

The Wing:

1	Shape the wing tips. The one shown here on the right has been marked ready to trim with a sharp knife to shape, leaving just a small amount of sanding to finish off. (Refer to sheet 3 of the plans – Note: R50 means a radius of 50mm) Important Tip: Before you glue any of the wing sections together, lightly sand the top and bottom of the wing with 120grit sand paper to remove the high spots. Get it so the surface appears to be dull and the sand paper doesn't make as much noise!	
2	Joining the wing centre section. Join the two wing centre sections together with a thin smear of Gorilla glue on the joining faces. Ensure the two sections are aligned on the spar groove and on a flat surface. Tip: Use a sheet of plastic underneath and weigh the two halves down with the two outer sections of the wing skins to keep the wing sections aligned. (ie: cut the middle wing skin in half to put a piece either side of the joint)	 Important Note: The centre wing sections are angled at one end – these are the OUTER ends. Join the two centre sections together at the ends that are cut vertically.
3a	Installing the carbon fibre spar. When the glue has cured, turn the two centre sections upside down and make a 12mm deep cut along the line in the underside of the wing. Tip: Test fit the carbon fibre ribbon spar into the cut before you apply the glue, to make sure you've got the depth right. (ie: the ribbon should go completely into the cut freely without having to hold it down)	 Continued on the next page.

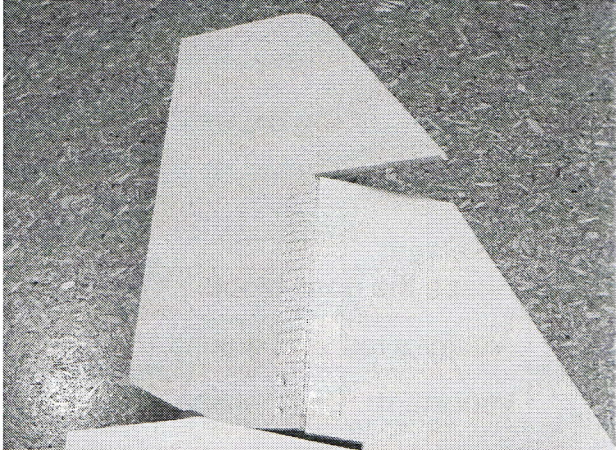
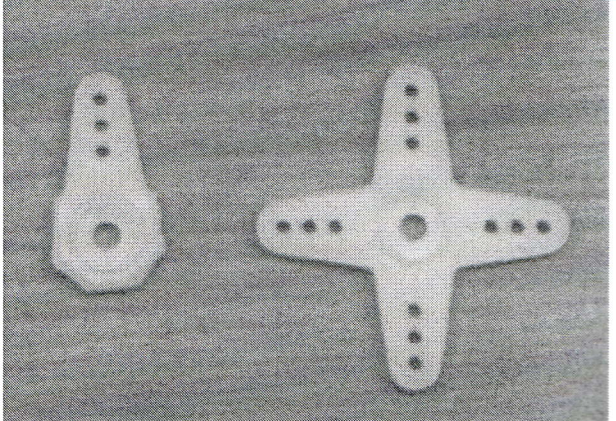
<p>3b</p>	<p>Squeeze a bead of Gorilla glue into the cut along its length, then insert the carbon fibre ribbon spar into the cut. Turn the two centre sections right side up and lay them back on the plastic sheet, put the weights on as you did in Step 2. while the glue cures.</p>	
<p>4</p>	<p>Joining the wing tips to the centre section.</p> <p>When the glue has cured on the carbon fibre ribbon spar you can join the two outer wing sections to the centre sections. Use Gorilla glue again on the two joining faces. Align the centre and outer wing sections along the spar groove. Support the outer wing sections as shown here to ensure a good joint and the correct dihedral angle.</p>	
<p>5</p>	<p>Fibreglass wing spar.</p> <p>First insert each of the two short lengths into separate joiners. Make sure they're pushed in firmly then lightly crimp the joiner onto the spar with pliers.</p> <p>Now take the long fiberglass spar and insert it into the other ends of the two joiners.</p> <p>Lie the two outer spars flat on your bench and weigh them down to keep the spar assembly parallel. Leave the centre spar and the joiners hanging over the edge – as shown here.</p> <p>Make sure the centre spar is firmly into the joiners and lightly crimp the joiner onto the spar with pliers.</p>	<p>Tip: Squirt a <i>small</i> amount of Gorilla glue into the joiner before fitting the spars.</p> 
<p>6a</p>	<p>Installing the fiberglass spar – Part 1.</p> <p>When the glue has cured on the outer wing section joints, lay the fiberglass spar assembly on top of the wing along the spar groove.</p> <p>Mark the wing where the joiners will be located.</p>	<p>Tip: Test fit the spar into the wing to make sure you've removed enough EPP around the joiners for the spar assembly to fit comfortably.</p> <p style="text-align: right;">Continued on the next page.</p>

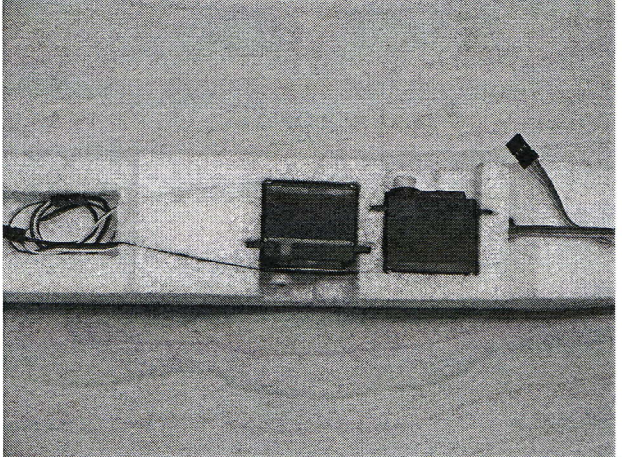
6b	Carefully use a sharp knife or soldering iron to remove the EPP around the spar groove where the joiners will be located.	
7	<p>Installing the fiberglass spar – Part 2.</p> <p>When you're happy with the fit of the fiberglass spar assembly in the wing, you can glue it in place with Gorilla glue.</p>	<p>Tip: Use a strip of tape or your plastic sheet on top of the spar to keep the glue tidy. Put weights along the spar and supports under the wing outer sections while the glue cures. Refer to the photo in step #4.</p>
8	<p>Wing fairing assembly.</p> <p>Shape the top of the fairing forward of the coreflute recess with a (15mm) radius, towards the front where it will sit against the canopy. Refer to the first sheet of the plans for a guide.</p> <p>Trim the coreflute strap to length - keep the offcut for later! (Refer step #14)</p> <p>Glue the coreflute strap onto the wing fairing – making sure it's aligned correctly.</p>	
9	<p>Attaching the wing fairing.</p> <p>Apply Gorilla glue to the underside of the wing fairing assembly and stick it onto the wing. Use strips of tape to hold it until the glue has cured.</p>	<p>Tip: Mark the wing, 30mm either side of the centre joint, at the leading and trailing edges. Align the fairing with your marks when you glue it to the wing.</p>
10	<p>Taping the wing fairing.</p> <p>Lightly spray contact adhesive across the wing fairing and onto the wing (about 20mm either side is fine).</p> <p>Apply short strips of strapping tape across the wing fairing and onto the wing either side.</p>	<p>Taping Tip: Pleat the edges of the tape to go around the curve of the wing top.</p>
11 a	<p>Taping the wing (Strapping tape).</p> <p>Start on the bottom of the wing by lightly spraying contact adhesive on the areas where you will be applying the tape. Leave until tacky or just touch dry.</p> <p>Apply the tape in the order shown on sheet 3 of the plans.</p> <p>Start at the trailing edge and run the first strips of tape right along the trailing edge – without overhanging it.</p>	<p>(Refer to sheet 3 of the plans)</p> <p>Taping Tip #1: Make sure your scissors or knife is really clean before starting. To prevent the gum from the tape building up on the blades while you're cutting the tape, spray a light mist of Silicone onto the blades. Wipe off the excess spray before you start cutting tape and the blades should stay clean and easy to use.</p> <p style="text-align: right;">Continued on the next page.</p>

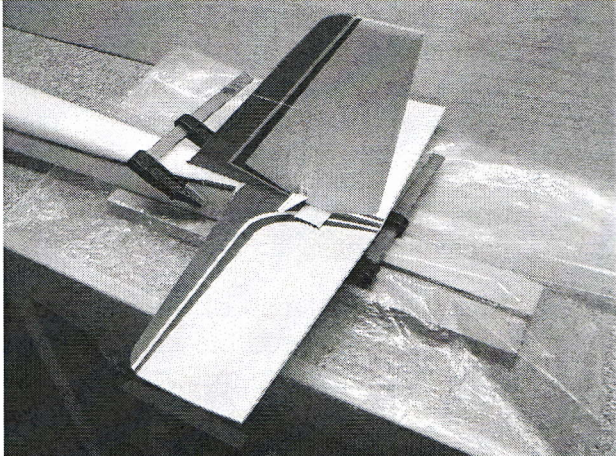
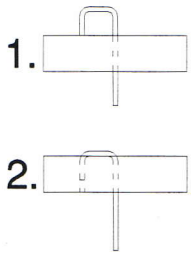
<p>11 b</p>	<p>Note #1: Overlap strips 4, 5, 6 & 7 by 3 - 5mm along the edge.</p> <p>Note #2: Pleat the tape ends where they overlap each other at the dihedral joints.</p> <p>Note #3: Support the wing while applying the tape to avoid building twists into it.</p>	<p>Taping Tip #2: Don't stretch the tape while applying it, stick it down at one end first then lay the strip down by lightly running your hand over it towards the opposite end.</p> <p>Taping Tip #3: Put small marks on the wing as indicated on the taping plan to help align strips 12, 13, 14 & 15 correctly.</p>
<p>12</p>	<p>Coloured tape.</p> <p>When you've finished applying the strapping tape to the wing, lightly spray the uncovered sections with contact adhesive before applying the coloured tape.</p> <p>Start from the trailing edge again and work forwards as you did with the strapping tape, overlapping each strip of tape by 3 – 5mm.</p>	<p>Note: It's not necessary to cover the bottom of the wing with coloured tape, however make sure the very front strips of coloured tape on top of the wing, go right around the leading edge to the underside of the wing.</p>

The Fuselage:

<p>13</p>	<p>Shape the nose block.</p> <p>Aim for a radius of around 15mm.</p> <p>Important: Don't shape any of the back edges!</p>	<p>Tip: Trim the corners off initially with a sharp knife then sand with 120 grit sand paper to finish.</p> <p>Tip: Make a small hole from the back of the nose block into the battery compartment to pass the battery wire through.</p>
<p>14</p>	<p>Glue the nose block to the fuselage.</p> <p>Insert the battery pack into the nose block first, passing the wire through the back of the nose block.</p> <p>Refer to the photo in step #19 below for the battery wire position (as mentioned in the Tip opposite).</p> <p>Trim the coreflute offcut to size to use as a cover for the battery. Use offcuts of EPP from the wing skins as padding if required.</p>	<p>Tip: Check that the battery wire isn't going to hold the nose block and fuselage apart before you apply the Gorilla glue.</p> <p>If the wire is in the way, make a 10mm deep cut into the back of the nose block from the hole you've made to the top of the nose block. Gently push the wire into the cut. Check again for a good fit, deepen the cut if required then glue the nose block onto the fuselage. Hold it in position with strips of tape.</p>
<p>15</p>	<p>Shape the canopy.</p> <p>First cut a shallow groove on the underside of the canopy from front to back, to accommodate the battery wire.</p> <p>Trim the top edges of the canopy only. Use a sharp knife to start then finish with 120grit sandpaper.</p>	<p>Tip: Sit the wing on the fuselage in the correct position by aligning the fairing with the fuselage.</p> <p>Draw a line on the back of the canopy and around the wing fairing.</p> <p>Do the same on the front of the canopy and around the nose block.</p> <p>Use the lines as a guide for shaping the canopy to match both nose and wing fairing.</p>

<p>16</p>	<p>Making the elevator hinge.</p> <p>Mark the elevator 40mm from the trailing edge at both ends.</p> <p>Very carefully, cut one side only of the coreflute along the 40mm line, then trim the coreflute away as shown on the plans.</p>	<p>Refer sheet 2 of the plans.</p> <p>Tip: Fold the elevator right over onto the tailplane when you trim the excess coreflute off, to prevent cutting the hinge side.</p>
<p>17</p>	<p>Making the rudder hinge.</p> <p>First bend up the hinge wire as shown on the plans.</p> <p>Now insert the two short ends of the hinge wire fully into the back of the fin.</p> <p>Cut a single strip of strapping tape 90mm long and split it lengthwise down the centre.</p> <p>Apply one of the 90mm strips of strapping tape onto the fin along the back edge with half of it overhanging past the hinge wire.</p> <p>Position the rudder up against the hinge wire, angled slightly away from the strip of tape.</p> <p>Fold the tape over onto the rudder and gently rub it smooth.</p> <p>Repeat for the opposite side.</p>	<p>Refer sheet 2 of the plans.</p> <p>The secret to making a good hinge is to stick the tape onto the rudder when it's angled away from the fin. See the photo below.</p> 
<p>18</p>	<p>Trim the Servo arms.</p> <p>Before installing the servos into the fuselage – trim the servo arms to look like the one on the left, in the photo shown here.</p>	
<p>19 a</p>	<p>Installing the servos.</p> <p>The servo cut-outs in the Ranger fuselage are for standard size servos – lying on their side.</p> <p>To install a servo into the recess, first position it over the top of the recess, with the bottom of the servo aligned with the closed end of the recess. (ie: with the servo arm at the open end of the recess).</p>	<p>Refer to the photo on the next page and sheet 2 of the plans.</p> <p style="text-align: right;">Continued on next page.</p>

<p>19 b</p>	<p>Mark the position of the servo lugs, then carefully cut slots in the fuselage either side of the recess to accommodate the servo lugs.</p> <p>You also need to make cuts for the servo wires from the servo recess back to the receiver recess.</p> <p>Note the orientation of the servos with the servo arms towards the tail of the fuselage and the battery wire exiting from the back of the nose block.</p>	
<p>20</p>	<p>Cutting the pushrod grooves.</p> <p>Important: Refer to sheet 2 of the plans.</p> <p>Mark the side of the fuselage from the elevator servo arm to the tail – 14mm below the tailplane.</p> <p>Mark the side of the fuselage from the rudder servo arm, under the rear dowel block cut-out and back to 200mm in front of the tailplane cut out. Then draw a line up to the top of the fuselage about 10mm in front of the tailplane cut out.</p>	<p>Tip #1: Using a soldering iron is the quickest way to do this job – but be careful that you don't cut the grooves too deep or too wide! Do some test cuts on the wing skins first.</p> <p>Tip #2: Use a straight edge to guide the soldering iron along the marks you've drawn. Take your time – don't rush it.</p>
<p>21</p>	<p>Control horn location.</p> <p>Lay the fin/rudder flat and sit a control horn on the bottom left hand corner of the rudder. Mark the two screw holes then drill through the rudder with a 2.5mm drill bit.</p> <p>Mark the elevator 205mm in from one end, position the control horn on the mark and mark the two screw holes. Then drill through the elevator with a 2.5mm drill bit.</p> <p>Screw the control horns onto the elevator and rudder as shown in sheet 2 of the plans.</p>	<p>Refer to sheet 2 of the plans for the correct location of the control horns.</p> <p>Note: After marking and drilling holes in the elevator, make sure you put the control horn on the correct side so that it's under the elevator and on the right hand side of the fuselage.</p> <p>Tip: Trim the ends off the screws when the control horns are attached to the fin/elevator. This is especially important for the elevator control horn as the screws may foul the rudder when applying full right rudder.</p>
<p>22 a</p>	<p>Gluing the fin and tailplane onto the fuselage.</p> <p>Before installing the fin and tailplane – you may want to apply coloured tape to the parts as shown here, which is a lot easier to do now than later on. (See the photo on the next page)</p>	<p>Tip #1: Use tape or clamps to hold the tailplane and fin in position and the rear of the fuselage together.</p> <p>Tip #2: Put a 2mm packer under the rudder to ensure it has clearance to move freely when the glue has cured.</p> <p style="text-align: right;">Continued on the next page.</p>

<p>22 b</p>	<p>Fit the fin and tailplane together first then apply a thin smear of Gorilla glue to the fin slot in the fuselage and the tailplane seat.</p> <p>Slide the fin into the slot until it's sitting up against the end of the slot and the tailplane is resting on top of the fuselage and against the small step at the front.</p>	
<p>23</p>	<p>Wooden block preparation.</p> <p>Drill a 3.5mm hole in the centre of the two thin plywood plates and through one of the 6mm thick pieces of ply as shown for the "Rear dowel block".</p> <p>Drill a 2mm hole vertically through the second 6mm thick piece of ply in the position shown for the "Tow hook block".</p>	<p>Refer to sheet 2 of the plans.</p> <p>Tip: Sand the corners off the two thin plywood plates and bevel the edges for streamlining.</p>
<p>24</p>	<p>Tow hook block assembly.</p> <p>1. Insert the longer end of the partially bent tow hook wire into the tow hook block until the short end touches the block.</p> <p>Rotate the wire with the short end against the block to 'scribe' a line on the block. Remove the wire and drill another 2mm hole through the block - <i>on the scribed line</i>.</p> <p>2. Insert the longer end of the wire back into central hole in the block and push the short end firmly into the second hole.</p> <p>Use a pair of long nosed pliers to grip the wire protruding from the bottom of the block - bend the wire 90 degrees towards the back of the block to look like the tow hook on sheet 2 of the plans.</p>	 <p>Refer to sheet 2 of the plans for the finished towhook shape.</p> <p>Tip: It's not essential, but it's a good idea to bend the last 5mm of the tow hook slightly away from the block to help release the tow line after launching.</p>
<p>25</p>	<p>Installing the ply blocks.</p> <p>Insert the 15mm long fiberglass dowel into the "Rear dowel block" with a drop of Gorilla glue on it, push it through until it just reaches the opposite side.</p> <p>Apply Gorilla glue to the "Rear dowel block" and "Tow hook block" cut outs, then insert the blocks into them. Use tape to hold them in position while the glue cures.</p>	<p>Important: Make sure you have the tow hook pointing towards the tail – it's not easy to change it later on if it's back to front!</p> <p>(Mind you, it's probably easier to change the hook later on than figure out how to launch the model backwards!!!)</p>

26	Front wing dowel.	<p>Mark the side of the fuselage for the front wing dowel in the position shown on sheet 2 of the plans.</p> <p>Drill through the fuselage with a 2.5mm drill bit.</p> <p>Squeeze a small amount of Gorilla glue into the hole then insert the 85mm long fibre glass dowel through the fuselage. Apply a small amount of Gorilla glue to the backs of the two thin plywood plates and slide them over each end of the fibre glass dowel and onto the fuselage sides.</p>	<p>Tip: Use a strip of tape with small holes cut in it to hold the ply plates in position while the glue cures.</p>
27	Outer pushrod tubes.	<p>Cut the two outer pushrod tubes to the lengths indicated opposite.</p> <p>Roughen the outer surface of the tubes with sandpaper then glue them into the grooves you cut in the fuselage, starting approximately 45mm back from each servo arm.</p>	<p>Rudder outer tube = 705mm long.</p> <p>Elevator outer tube = 685mm long.</p> <p>Tip: Keep the glue well clear (15 – 20mm) of the ends of the tube when applying it. Use a couple of strips of tape to hold the tubes in position while the glue cures.</p>
28	Fuselage spar.	<p>Apply a bead of Gorilla glue along the groove on the underside of the fuselage and insert the 490mm fibreglass spar into it.</p> <p>Hold the spar in place with tape until the glue cures.</p>	<p>Note: You can build the Ranger without the fuselage spar, which will save a small amount of weight, however for a stiffer rear fuselage, we recommend using the 490mm spar supplied.</p>
29 a	Pushrod assembly.	<p>Follow the instructions in the packet supplied.</p> <p>To find the correct lengths of each pushrod, first ensure the <i>servo arms and control surfaces are centered in the neutral position.</i></p> <p><i>Don't cut the pushrod (inner tube) to length just yet!</i></p> <p>Assemble one end of the pushrod, complete with clevis and feed it through the outer tube from the servo end, then connect the clevis to the outer most hole on the servo arm.</p>	<p>Note: The pushrod wires go into the pushrod (inner tube) blank end first. Only the threaded end of the wire is exposed. Aim to get 5 – 6mm of thread into the pushrod to secure it properly.</p> <p>Tip #1: Screw the clevis' onto the thread until there is an equal amount of thread showing either side of the clevis (should be about 4 - 6mm).</p>

Continued on the next page.

<p>29 b</p>	<p>Where the pushrod passes the control horn, mark it in line with the holes on the control horn.</p> <p>Unclip the clevis and remove the pushrod, then cut it about 25mm back from the mark.</p> <p>Now complete the assembly of the 'tail' end of the pushrod. Insert it into the outer tube, fit the second clevis and connect the pushrod to the servo arm and control horn.</p>	<p>Tip #2: If you apply a small amount of heat to the plastic pushrod just before threading the wire into it, you'll find it a lot easier to screw it in.</p> <p>Tip #3: You may need to bend the pushrod wire to align it with the control horn. Try to do this as close to the clevis as possible.</p>
<p>30</p>	<p>Glue the canopy to the fuselage.</p> <p>Apply a thin smear of Gorilla glue to the fuselage then attach the canopy and hold in place with strips of tape.</p>	<p>Tip: Use an aileron extension wire to allow the battery wire to reach the receiver.</p>
<p>31 a</p>	<p>Fuselage Strapping tape.</p> <p>Ok there should be just enough strapping tape left to do this comfortably... so go carefully!</p> <p>Spray a light mist of contact adhesive on the side, top or bottom of the fuselage before you apply the strapping tape to that side, top or bottom.</p> <p>Apply the first strip of tape along the side of the fuselage – starting at the rear of the fuselage, under the tailplane, continue down the full length of the fuselage with about 10mm overhanging the bottom edge.</p> <p>Pleat the overhanging section of tape and fold around and onto the bottom of the fuselage. Repeat for the other side.</p> <p>Apply the third strip of tape along the bottom of the fuselage with a full length strip right down the middle.</p> <p>Apply strips 4 & 5 along the fuselage sides starting just in front of the tailplane – overlap the strip below it by 5mm.</p> <p>Now apply strips of tape over the canopy and nose from side to side – start at the back of the canopy and work your way towards the front.</p> <p>If you have any tape left, apply a strip down the back of the canopy and along the top of the fuselage to about half way between the wing seat and tailplane.</p>	<p>Important Note: To prevent the tape sticking to the servo arms and pushrods, make thin cardboard (from a Weetbix box or similar) covers to go over the servos. You can also make temporary covers to go over the pushrods at the rear of the fuselage to prevent spraying glue onto them.</p> <p>Tip #1: Where the tape goes over the elevator pushrod – cut a hole in the tape about 55mm in from the end. Slide the tape over the pushrod before applying it to the fuselage.</p> <p>Tip #2: Where the tape goes over the front wing dowels – start the tape at the tail of the fuselage, then without applying the tape all along the side, extend the tape to sit on top of the dowel. Mark the position of the dowel, then fold the tape back on itself and make a small vee cut across the fold, right where the mark is, to produce a square cut-out. You should then be able to slip the dowel through the square hole and continue to apply the strip of tape along the full length of the fuselage.</p> <p>Tip #3: Where the tape has to go over the tow hook – first lay the tape on top of the hook and make a cut about 10mm long in the tape, starting just in front of the hook.</p> <p>Tip #4: Tape right over the rear wing dowel and receiver recesses - cut the covering tape off later to reveal the recess.</p> <p style="text-align: right;">Continued on next page.</p>

<p>31 b</p>		<p>Tip #5: Cut the tape at the front of the fin and at the front and rear of the wing seat before folding the side strips of tape across the top of the rear fuselage. You'll also have to pleat the tape to go around the curves at the canopy and nose.</p> <p>Tip #6: Trim the side strips of tape to overhang the nose by about 15mm, then pleat them to go around the curves.</p>
<p>32</p>	<p>Coloured tape.</p> <p>Just about there... You can apply as much or as little of the coloured tape as you like to the fuselage.</p> <p>Use the same strapping sequence as outlined in step #31.</p>	<p>Note: As the coloured tape tears quite easily, take care applying it around the wing dowels etc.</p>
<p>33</p>	<p>Fit the wing onto the fuselage and use 2 rubber bands to hold it in place.</p> <p>Check the balance of the finished model nose to tail and from wing tip to wing tip.</p> <p>Ideally the model should balance on your finger tips, 77mm back from the wing leading edge – <i>slightly</i> nose down.</p> <p><i>Don't attempt to fly the Ranger until you've got the balance correct!</i></p>	<p>(Refer to sheet 2 of the plans)</p> <p>Tip: Balance the model from side to side by adding weight to the lighter wing. Add weight if required to the nose in the battery compartment to get it balance nose to tail.</p>
<p>34</p>	<p>Setting up.</p> <p>Connect your radio gear up and set the controls:</p> <p>To the correct amount of movement</p> <p>To be in line (ie: fin and rudder aligned)</p> <p>To move in the correct direction (ie: right stick = right rudder)</p> <p>Refer to sheet 1 of the plans for the correct amount of movement.</p> <p>Make a shallow cut from the receiver recess to the side of the fuselage for the aerial to exit from and use small strips of tape to hold it to the rear of the fuselage.</p>	<p>Adjust the <i>amount</i> of control movement by moving the clevis on the control horn. A hole closer to the control surface will increase the movement and a hole further out will reduce the movement.</p> <p>Wind the clevis on or off the pushrod thread to get the control surfaces in line.</p> <p>Use the servo reversing function on your radio to match the transmitter stick movements with the control surface movements.</p> <p>Well done! You've now completed your Ranger - it's time to go flying!!!</p>

Flying tips

Test flights.

Connect the battery lead to the receiver and turn on your Transmitter.

Check the controls are working freely and in the correct direction.

Attach the wing to the fuselage with **four** rubber bands (Never fly the Ranger with just 2 rubber bands!), start by hooking a rubber band over the rear dowel and then stretch it forward to the front wing dowel. Apply the bands to the front wing dowels alternately so you have 2 on the right wing dowel and 2 on the left.

Hold the Ranger at shoulder height and face into wind (if there is any).

Push the Ranger firmly out in front of you – don't throw it up into the sky, just aim to release it going straight ahead. Don't touch the controls!

Watch the flight path carefully. The model should climb just a bit at the start then slow down a little and settle into a flat glide straight ahead.

If the model zooms skyward after you launch it, try again but use less force.

After the model has landed, think about what it did and adjust the trims on your transmitter to correct any turns or dives into the ground.

If the model repeatedly wants to zoom skyward after launching it, you may need to add more weight to the nose.

When you can launch the Ranger and leave it to glide by itself straight ahead, without pitching up or diving down, you've got the trim about right.

Check where the trims are on your transmitter and how the control surfaces are aligned.

Adjust the clevis' on the pushrod threads to position the control surfaces in the same position you had them with the trims, then reset the trims to the centre position again.

Do a couple more test glides to make sure the trim is correct – adjust to suit with the clevis'.

First timers...

If you've never flown a radio controlled model before – seek help from a more experienced pilot (someone you know that flies or perhaps contact the local model club) before attempting to launch your Ranger off a winch, bungee or the slope.

Winch launching the Ranger.

The Ranger is very responsive going up on the tow, so the big thing to remember on the launch is to be very gentle with the rudder – unless things look really desperate! Other than that it's very well mannered and shouldn't present any real problems on either electric winches or bungee launches. Even using a mini bungee the Ranger has achieved flights in excess of 30 minutes, so if there's lift around, you should get a reasonable flight time. Just remember not to fly down wind too far and keep the model over head when you get really high!

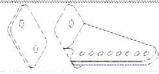

Slope soaring the Ranger.

The Ranger is a very easy model to keep aloft in light to moderate winds on the slope – it's not designed for strong winds however, although it is tough enough for them, the Ranger just doesn't have the energy to penetrate into a strong wind. So long as you keep the model in front of you (until you're ready to land), slope soaring the Ranger shouldn't present any real problems.

Storage and care of your model.

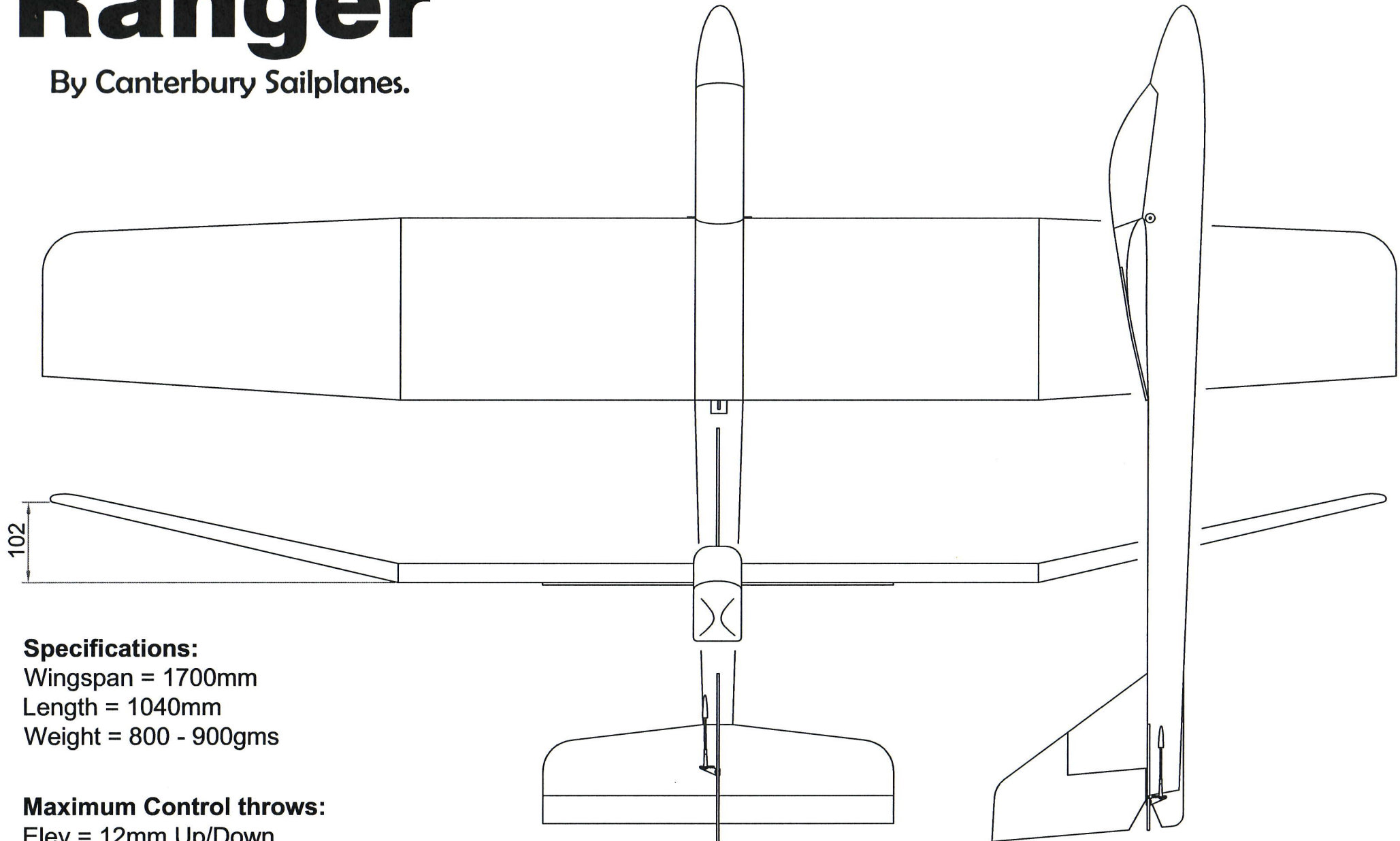
To prevent the fuselage bowing (yes it is possible!), I store mine sitting level on the rear of the fuselage and on a small block of EPP under the nose. This keeps the towhook off the shelf the model lives on when not flying and supports the fuselage where the weight is. Alternatively you can stand the fuselage on it's nose. The wing seems to like sitting flat somewhere out of the way – I don't recommend standing it on a wing tip.

Parts List

EPP Wings	4 pcs	Left & right tip Left & right centre
EPP Fuselage	1	
EPP Nose block	1	
EPP Canopy	1	
EPP Wing fairing	1	
Carbon Fibre Ribbon Spar	1	
Fibreglass Wing Tip Spar	2	398mm Long
Fibreglass Wing Centre Spar	1	800mm Long
Wing Spar joiner tube	2	
Coreflute wing strap	1	
Corflute tailplane	1	
Corflute Fin and Rudder	2 pcs	
Rudder hinge wire	1	1.6mm Diameter x 100mm Long
Elevator and Rudder pushrod assemblies	1 Pkt	914mm Long Plastic inner & Outer tubes Threaded end wires Clevis's
Fibreglass Fuselage Spar	1	490mm Long
Fibreglass Wing Dowels	1 each	85mm and 15mm Long
Front wing dowel ply reinforcements	2	
Wooden block	2	Rear wing dowel Launching hook mount
Tow hook wire	1	2mm diameter x 70mm Long
Gorilla glue Adhesive	1	
Strapping Tape	1	
Coloured tape	1	
Control Horn & Base Plate	2 sets	
Control Horn screws	4	
Rubber bands	6	Minimum of 4 required + 2 spares.
Instruction Manual	1	
Plan	3 sheets	

Ranger

By Canterbury Sailplanes.



Specifications:

Wingspan = 1700mm

Length = 1040mm

Weight = 800 - 900gms

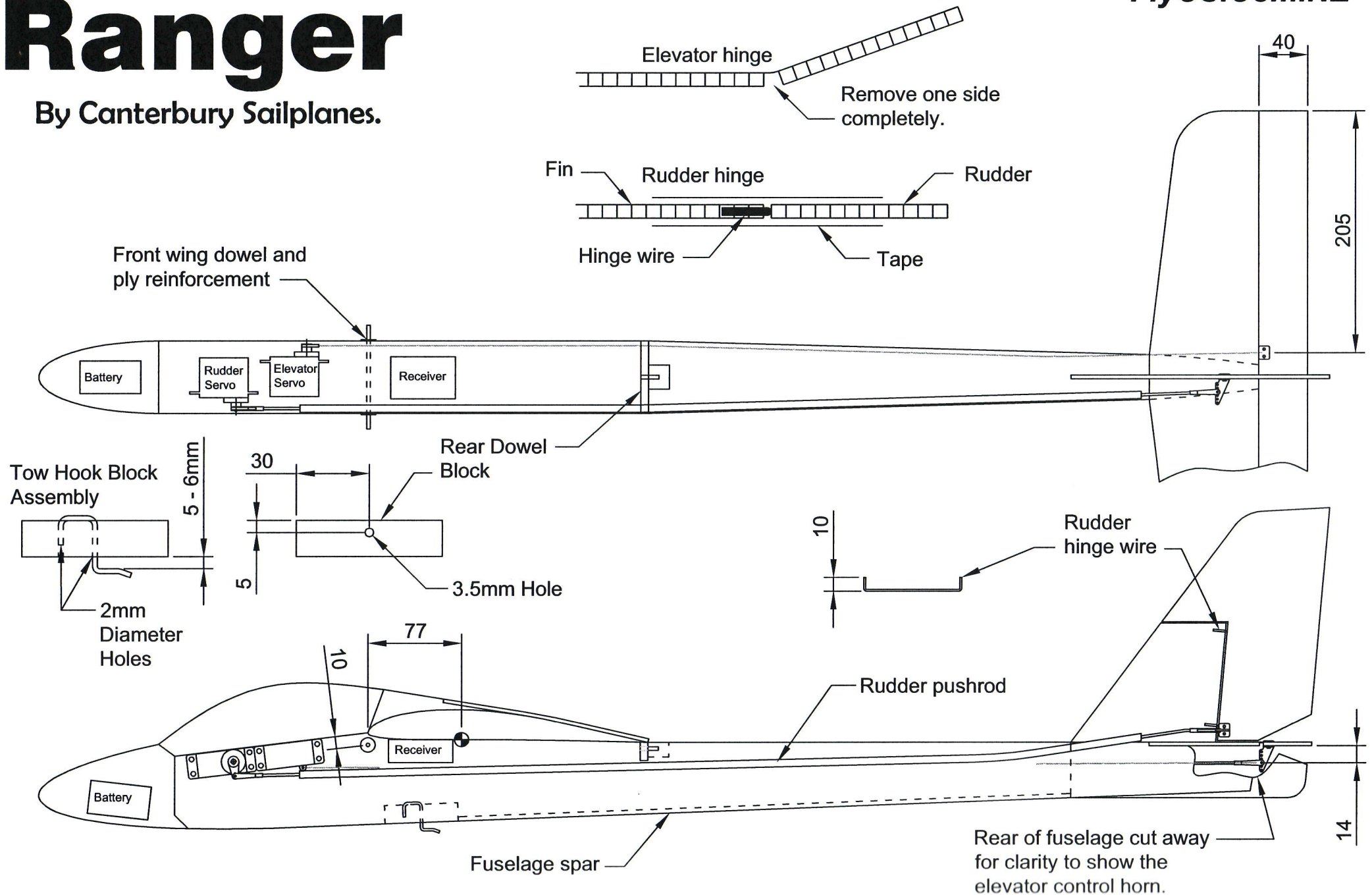
Maximum Control throws:

Elev = 12mm Up/Down

Rudd = 30mm Left/Right

Ranger

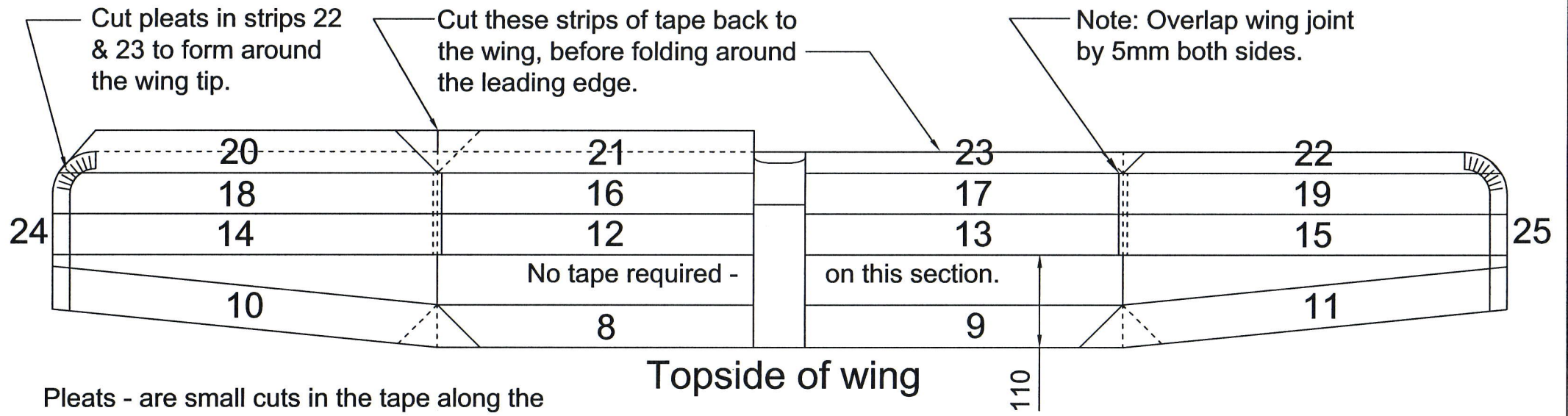
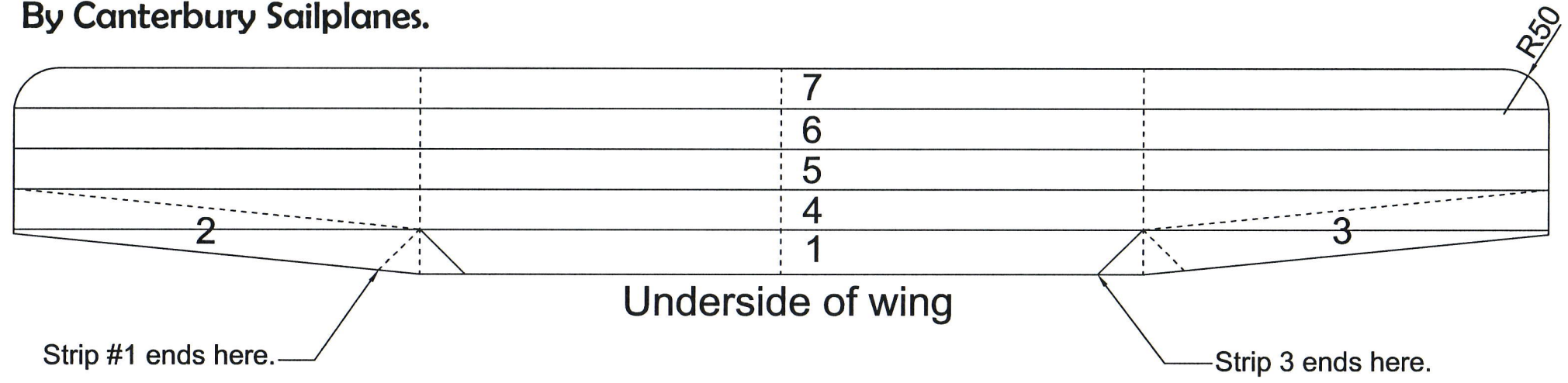
By Canterbury Sailplanes.



Ranger

Wing ~ Taping Plan.

By Canterbury Sailplanes.



Pleats - are small cuts in the tape along the edge. Fold them over one at a time starting at the back and working forwards.