

F-20

TigerShark

EPP Slope Soarer
By Canterbury Sailplanes



Congratulations on your purchase of the F20.

The F20 is a great looking and flying model. It's made from EPP which is a fantastic material for Model Aeroplanes; EPP is incredibly resilient and will take almost all the punishment you can give it.

Assembly is quite straightforward and should not be too difficult for the first time builder. If you have any problems please contact the shop you bought the kit from, or Canterbury Sailplanes.

We hope you really enjoy building the F20.

We guarantee you'll enjoy flying it!

[Canterbury Sailplanes](http://www.flycs.co.nz)

www.flycs.co.nz

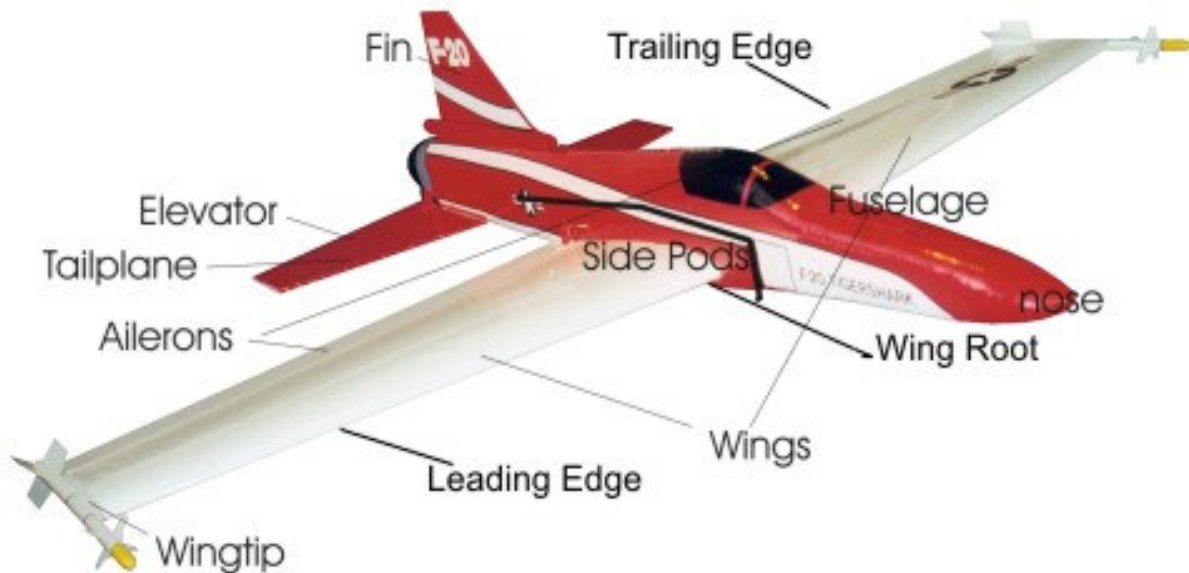
GENERAL NOTES

- This box contains nearly everything you need to build your model; only a 2-channel radio control set, a knife and some basic tools are required to get your model ready to fly.
- Shipping regulations prohibit sending aerosol cans of Contact adhesive. This is a great glue for adhering the tape to EPP and is worth getting. Locate adhesive spray from your local hobby or hardware shop. A 210ml size can, should be adequate.
- Gorilla Glue adhesive is included in the kit, this is a great all purpose adhesive. Using it is a little different from most glues as it foams while curing. Note the following points;
 - Read the instructions on the packet.
 - Spray or wipe the surfaces to be glued with a damp cloth prior to gluing
 - Use a minimal amount, as the glue foams and expands when curing, Wipe off any excess with a damp cloth.
 - You'll get a better finish by taping over the spars after you've installed them, this leaves a smoother finish.
 - When gluing the tail, fin and wings in place the expanding glue may push items apart – clamp or tape the parts together while the glue cures.
 - Any excess glue can be sanded or cut off once it's cured.
 - Gorilla glue works well with tape to tape joins – such as gluing the wings on.
- 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 and 24 metres of Strapping tape.
- You might like to decorate your *F20* using different coloured tapes, iron on covering film (available from a model shop) or self-adhesive vinyl (available from your local sign writer). 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 produces a very good finish; apply it carefully; use low heat. There is no need to use clear or coloured tape first, just apply the iron on film after the strapping tape, use Contact adhesive with iron on films as this will help the film bond to the strapping tape and EPP. Test covering film and heat settings on a scrap piece of EPP.
 - These Assemble instructions only refer to “coloured tape” (and strapping tape) for covering the model.
- It's also worthwhile investing in a Lost Model Alarm, if your model lands or crashes in trees, bushes or long grass, it may be hard or even impossible to find. With a lost model alarm you can walk straight to your model. The alarm will sound for up to 2 days. Ask your model shop or check out our website for more details.
- When applying the contact adhesive to the model; apply by lightly spraying onto the model (from about 200mm away) and leave it a minute or two until the glue on the surface is tacky, before laying the tape onto the glued surface. Once it's on however, it's difficult to remove - so take care.

- If you need help there are several resources available to you; apart from friends with some modeling experience, try the shop from which you bought the model, our website has FAQ pages and online forums where you may find answers or be able to post questions.
- We're keen to make these instructions and our kits as good as they can be – if you have suggestions, comments, or find fault in either, please let us know.
- Some of the pictures in the instructions show missiles on the wingtips, these are an option you might like to add, but the parts are not in the kit.

BEFORE YOU BEGIN ASSEMBLY

- 1) Check that all the parts as per the parts list page are packed in the box. You will note that the parts list page also has pictures of some items to help you identify them. This will help you later when reading the assembly instructions.
- 2) Other tools that you will need include:
 1. Small hand or power drill
 2. 1.5 mm drill bit
 3. 2mm drill bit
 4. Small ruler or tape measure
 5. Sharp knife, scalpel or modeling knife, snap-off type knives are ideal
 6. Scissors (if you'd rather use them) to cut tape
 7. Sandpaper (40 grit is fine)
 8. Marker - a ballpoint pen will do.
 9. Small Phillips head screwdriver (for the servo's)
 10. Small flat head screwdriver (for the control horn screws)
 11. Needle / point nose pliers (or good tweezers)
 12. Soldering iron (not 'needed' but can be helpful)
 13. Either a clothes or modeling iron (for smoothing tape and film-not essential)
 14. Paper masking tape (not essential)
- 3) It's probably also a good idea while you're getting these items ready, to make sure you have enough batteries for both your transmitter and receiver/servos to be mounted in the *F20*. If you have rechargeable batteries, ensure they're charged as you'll need them to be ready prior to fitting the servos into the *F20*.
- 4) It's quite reasonable for a complete beginner to assemble the *F20* to a ready to fly state in 3 nights; the estimated time a "complete beginner" would take for each section has been suggested at each section heading. Decorating the model to a high standard will take a more time.



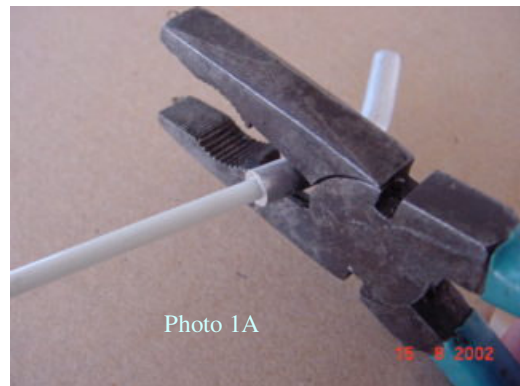
ASSEMBLY INSTRUCTIONS

WINGS (part 1) (estimated time = 1 hour)

- Notes:
- The bottom of the wing is the flatter of the upper and lower surfaces.
 - The spar slots are the grooves cut in the top and bottom surfaces of the wings.
 - The spars are the four 3.5mm fibreglass rods in the kit.

1) Fold open the EPP that surrounds the wing cores and remove the wing cores

2) Join the fibreglass rods to make a top and bottom spar; Insert a fibreglass rod half way into the alloy joiner tube and glue. Repeat the process to complete 2 spars. Use pliers or a crimp tool to put one crimp in each end of the joiner tubes, about 10mm in from each end. This will ensure they do not move. See photo 1A



3) Use the two 'bottom' sections of the wing skins as a bed to place the left and right wing cores into (pack up the lower half so they're both level). Place the two wing roots together, check they line up OK. Glue together with *Contact adhesive* (you could use Gorilla glue but you'd need to leave it overnight, the *Contact adhesive* is quicker). Weigh down the wing with a couple of phone books or a small pile of magazines - this will keep the wings flat.

4) After about 5 minutes, temporarily tape the wing halves together with a 300mm length of coloured tape applied top and bottom - avoid taping over the spar slots.

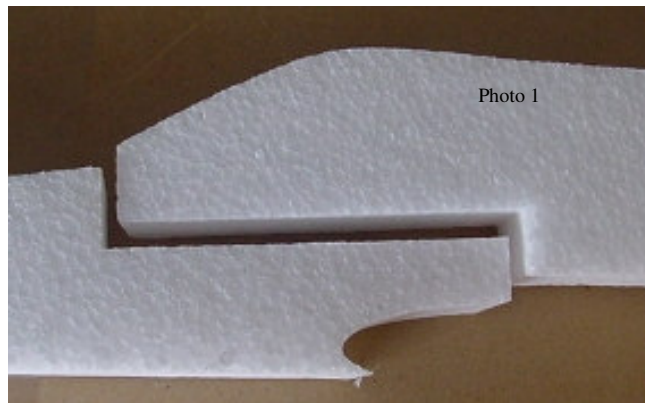
5) Lay one spar on top of the wing, mark the location of the joiner tube in the centre of the wing and cut away a **minimal** amount of foam to allow the spar assembly to sit in the slot in the wing. Repeat for the underside. Test fit the completed spars to ensure a neat fit into the spars slots.

- 6) Apply a strip of coloured tape over the wing bed (outer skins) along the spar line, so that in the next steps, when you place the wings back in the beds, the wing won't stick!
- Squeeze Gorilla glue adhesive into the top and bottom spar slots and spread out thinly
 - Push the spars into place, so they don't protrude above the wing surface.
 - Check the wing is straight and has no twists.
 - Wipe off excess adhesive. Put the wing back onto the lower foam beds, weight down and leave to set. If you need to put weight on the top spar, cover with tape or clear kitchen film.
 - Allow 24 hrs for the glue to set.
 - You can now begin work on the fuselage

THE FUSELAGE, FIN AND TAIL

(Estimated time = 3 hours)

The fuselage comes in four pieces; place the two small EPP side pods to one side for now. The two main fuselage parts have to be joined. See new photo 1.



- Coat the surfaces to be joined with Gorilla glue (not Contact adhesive), spread thinly all over the surface with a spreader such as an old credit card. Align the pieces carefully on a flat surface & push together firmly for 30 secs. The critical point to line up is the wing seat, this should be a smooth surface from the front to the rear.
 - If after joining there is a slight mis-match in width of the front and rear sections, lightly sand the sides to get the two fuselage sections lining up.
- 7) Spray a fine mist of contact adhesive on to the sides of the fuselage only.
- 8) Apply a length of strapping tape along the side of the fuselage, starting 250mm (10") from the nose, to about 70mm (3") from the tail. Repeat on the other side, making sure that the fuselage remains straight.
- 9) Put a piece of tape around the rear end of the fuselage across the slot for the fin to prevent sideways movement whilst rough shaping.

- 10) Use a sharp knife to shape the fuselage around the nose, the top of the fastback, the canopy and tail cone. Aim for a radius of about 1cm. Be careful with the nose. Don't make it too thin and pointy, it should be flat like a ducks bill. See photo 2. DO NOT round the fuselage on the bottom, from in front of the wing cut out, all the way back to the back edge of the tailplane cut out.



- 11) If you intend at any time to launch your F-20 by catapult or bungee topline you will need to add a block of wood to hold the hook. Make a block by laminating four pieces of 3mm (1/8") ply, 25mm (1") wide and 75mm (3") long.
- 12) Using a sharp knife to cut a neat hole just big enough to sink the block in flush with the bottom of the fuselage - just forward of the wing cut-out. Glue the block in place with plenty of Gorilla glue and hold it in place with a couple of pieces of masking tape, then leave to set. More on this later.
- 13) Use your knife and a ruler to cut a hinge on the underside of the Corflute tailplane by making a single cut *along the centreline of the first flute* forward of the two elevator halves. Use only the very tip of the knife blade, taking care not to cut into the other side. Run a screwdriver down the flute to fold in the cut edges, so they won't bind. (See plan).

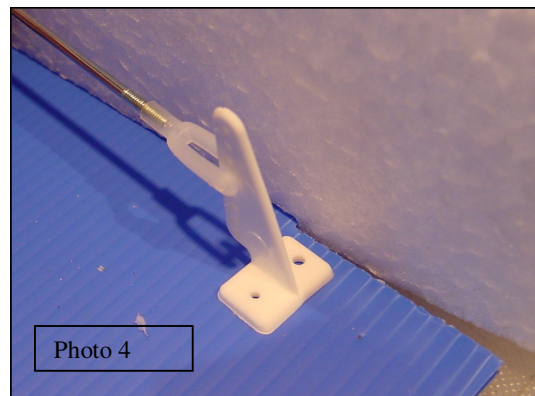
- 14) Fold the elevator halves up over the top surface and place the U shaped elevator hinge wire over the elevators, equally spaced both sides. Mark a spot on the exposed flutes of each elevator half, where the wire is to go in and drill a 1.5mm hole. Push the wire in on both sides, so that the plastic tube sits snugly in the back flute of the tailplane. Centre the tube between the 2 elevator halves and secure the tube with a piece of coloured tape. See photo 3.



- 15) You can now cover the tailplane and fin if you wish. De-grease the surfaces with warm water and dishwashing detergent, rinse and dry well. Cover with coloured tape or self adhesive covering film – but not iron on film, the heat will warp the corflute. We do not recommend painting the Corflute.

DO NOT cover the upper surface of the tailplane or the fin in the area where they will be glued into the fuselage.

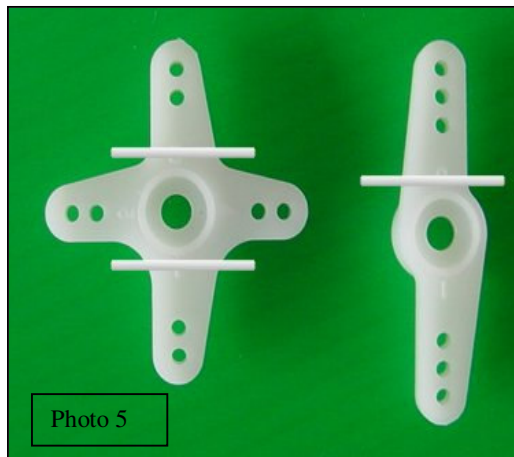
- 16) Place the control horn in position on the elevator on the left top side as viewed from the rear, with the holes for the clevis aligned vertically above the hinge line and about 5mm away from the edge of the fuselage. (see photo 4) Mark the location, remove the tailplane and drill the two 1.5mm holes required for mounting the control horn. Thread the screws provided through the holes and screw into the backing plate, which is placed on the elevator's lower surface, screw until firm, but don't over tighten or compress the corflute. Cut off the excess lengths of screw on the bottom side.



- 17) Temporarily tape the tailplane in position under the fuselage, see instructions cover photo and plan.

18) Plug your radio control set together (including the servos and receiver) and turn them on.

The elevator servo plugs into channel 2 and the aileron servo Channel 1. Centre the trims on the transmitter, this will ensure both servos are in the neutral position. Fit a one-sided servo arm about 15mm long to the elevator servo (the one which operates when the radio control lever is moved up and down), set at right angles to the servo. Fit a straight 2-sided arm about 25mm long to the aileron servo also set at right angles to the servo. If you have more arms than required, cut off the extras with a pair of side cutters (See photo 5). Enlarge the holes in both the outer holes of the aileron servo arms and the outer hole in the Elevator horn with a 2mm drill.

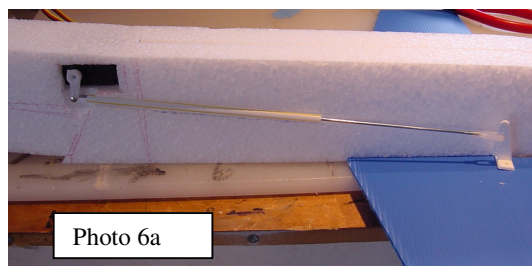
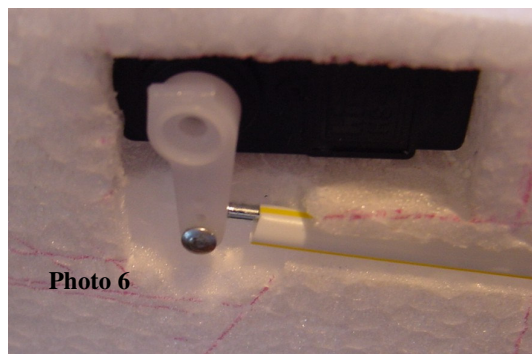


19) The elevator servo, receiver and battery will be fitted into pre-cut recesses in the fuselage that should be just the right size and depth for standard components. If you need to enlarge or make extra cut outs, mark out the hole size then cut the outline with a sharp knife down to the correct depth, remove the foam with pliers. Work slowly and carefully – you don't need an oversize hole!

20) Mount the elevator Servo

Notes: The servo arm must be towards the front of the model (see Photo 6) i.e. The 'body' of the servo will be behind the arm. The servo should go deep enough into the hole so that the top of the elevator servo arm is just below the surface of the fuselage.

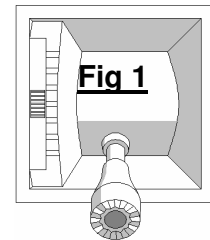
- It may be necessary to cut away any strapping tape covering the hole for the elevator servo
- Cut the mounting lugs off the sides of the elevator servo with side cutters or a very fine saw - be careful not to cut the servo lead! (Don't worry, new servo cases are available!)
- The hole is cut for a standard servo; it may be necessary to make it deeper for your servo. If you wish to make the hole deeper, cut carefully thru the bottom of the hole around the edge, and remove the epp, but not the strapping tape (if any) on the right hand side of the model.
- If you've still got a bottom to the hole, cut a small hole through the bottom to the other side of the fuselage. Thread the servo lead through the bottom of the hole and out the other side.
- Cut away a small amount of EPP on the lower side of the servo so the arm can move.
- Secure the elevator servo in position with a very small smear of Gorilla glue.
- If you cut away extra foam to fit your servo, use this excess to make a block to fill in the hole remaining under the servo.



21) The elevator pushrod runs from the servo arm to the elevator control horn on the tailplane.

- Remove the elevator servo arm from the servo; put the screw in a safe place!
- Slip the steel rod with the knob on one end through the end hole in the arm and slide to the end of the pushrod and around the corner. (See Photo 6a)

- Slide the 100mm piece of plastic tubing over the pushrod and thread the plastic clevis onto the threaded end of the rod.
- Temporarily replace the horn on the servo.
- Attach the elevator clevis to one of the middle elevator horn holes.
- With the servo centred the elevator should be flat in line with the tailplane with no upward or downward trim. If the elevator is up then the rod is too short and the clevis needs to be wound out further on the thread, if the opposite is true then adjust the clevis accordingly.
- Plug the servo and battery into the receiver, turn on the transmitter (always turn the transmitter on first) Check the movement available. The above set up should achieve about 15mm of travel up and down of the elevator, measured at the trailing edge, when the servo operates it. If it doesn't move that much you need to move the clevis down to a hole closer to the elevator. To achieve less movement, move it to a hole further out on the horn.
- Cut a slot in the fuselage for the pushrod assembly about 6mm deep and 4mm wide, and about ½ way to the clevis (approx); check the pushrod moves back and forth without catching. (The tip of a soldering iron is good for this job)
- Test the elevator servo to check free movement, when the elevator stick on the transmitter is moved down (see Fig 1) or towards the base of the transmitter case, the elevator should move up and vice versa. If not, switch the reverse switch on the transmitter to correct.
- Position the plastic tube so it starts to cover the pushrod wire about 12mm from the end of the clevis attached to the servo. Fix the tube in place with two or three drops of gorilla glue.
- Refit the screw into the servo arm.
- Apply a piece of strapping tape from about 50mm forward of the servo, over the servo and about to 50mm back from it, take care not to stick the tape onto the servo arm as this will jam it, if this looks possible, cut a small piece of paper the size of the top of the servo and apply it to the tape first, then place the tape over the hole.



22) Remove the tailplane.

23) Take the side pods and sand the top edges and the bottom edges forward of the wing seat cut out, to a nice round radius. Do not sand the bottom edges in the area the wing will go or rearward of the wing seats. Make sure that you have made a left AND right hand panel.

24) Make a slot in the left side pod for the elevator pushrod to pass through

25) Spray the inside surfaces with contact adhesive and allow go tacky.

26) Set the side panels in place, aligning the wing seat cut outs with those on the fuselage and the rear end of the fuselage. Do this carefully and accurately. You only get one shot at it. Press firmly to bond.

27) Do a final sanding of the whole fuselage with 40-60 grit sandpaper to round and smooth the corners. Use the cross sections shown on the plan and pictures as a guide.

28) Brush, vacuum or blow the fuselage to remove all sanding dust.

- 29) Install a square battery pack in the recess near the nose. Note the receiver and battery pack are not glued in place, just a tight fit. **Tip:** put a band of insulation tape around the battery case, and join the ends of the tape together to make a tab with which to pull the battery pack out.
- 30) Cut a 4mm deep knife slot from the battery and elevator servo to the receiver recess; push the leads into the slot. If using a switch make a small hole just large enough to fit this into. Make a narrow tunnel from the aileron servo recess in the fuselage thru to the receiver cavity, through which you will later thread the aileron servo lead.
- 31) Temporarily install the receiver in its recess with the leads facing inwards; it may be necessary to cut a deeper recess to accommodate the leads where they plug into the receiver.
- 32) As the receiver is central the aerial begins in the middle of the model and should be long enough to go from the receiver, around the tail and back up the other side. Around the rear is also best for damage control. Cut a slot for the aerial along the side of the fuselage and back along the other side. **WATCH OUT FOR THE ELEVATOR SERVO LEAD!** Leave about 20mm slack in the receiver hole and push the rest of the aerial into this slot.
- 33) You can either use a switch set into the fuselage or just plug the battery straight into the receiver, in which case you will need to install the receiver with the leads facing outwards. Note that if you are installing a switch, make sure ON is forward and OFF is backwards, that way when throwing your glider you will not accidentally turn it off. Also if you have a rechargeable battery and will be unplugging the battery and plugging in a charger, try to place the joiner in a place you can easily get to which is also out of the way of where you will hold the model when launching. (Note; Launching grip is between thumb and forefinger, just forward of the wing).
- 34) Lightly spray the fuselage with Contact adhesive.
- Apply a length of strapping tape full length down each side, along the top from in front of the fin to the top of the canopy. Where required, wrap the excess tape around the sides and bottom or top of the fuselage. You will find the compound curves difficult to tape without creasing the tape, take your time, make small cuts along the edges of the tape (about 10mm deep) and apply the segmented edge bit by bit, so it will go around the curves. A warm iron is also very useful for shaping tape around curves.
- 35) Now “Barrel wrap” the nose with strapping tape. Work carefully with the strapping tape around the front of the dummy intakes, it may be necessary to make a few slits in the tape, this is ok, but do not cut right across the tape as this will critically reduce the strength of the tape as a reinforcement of the fuselage sides.
- Starting forward of the dummy jet intakes, wrap pieces of strapping tape over the top of the nose and forward part of the canopy and 2/3rds of the way down the sides.
 - Repeat this going forward, overlapping each piece 5mm (1/4”). As you approach the nose use narrow strips of tape by cutting the 50mm (2”) wide tape down between the fibre strands. As each piece is stuck in place, shrink down wrinkles with your iron set to 150deg C. Try not to cut across the fibres as that destroys the effectiveness of the “Barrel Wrapping”. Don’t scrim here as weight in the nose is beneficial at this stage. Repeat the process on the underside, overlapping up the sides.
 - Finally go over the whole nose carefully with the Iron to get the tape as smooth as possible.

- 36) Now cover the top and sides of the fuselage with the coloured tape provided, or with iron on film. The tape is easiest applied in bands around the fuselage, work from the rear to front - don't tape where the wing will be attached later.
- 37) Cut slots to permit access to the receiver and switch. If you are using dry cell batteries, cut away the tape and secure the battery holder in position with insulation tape – it is much easier to remove and reattach. If you have rechargeable batteries it is possible to leave only the charging socket or the plug between battery and switch outside the tape to enable easy charging.
- 38) Permanently glue the fin and tailplane to the fuselage. Make sure the tailplane is parallel to the bottom of the fuselage bottom as viewed from the side, this will ensure the wing and tailplane are at the same angle to the fuselage. Also check that the fin is at right angles to the tailplane as view from the rear of the model.
- 39) Let the glue set overnight

THE WING - PART 2

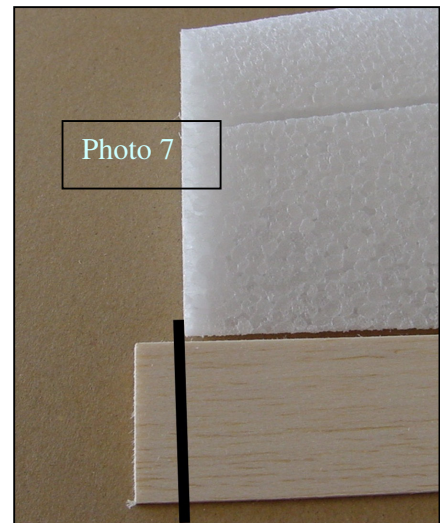
(Estimated time = 3 hrs)

- 40) Now reinforce and cover the wing with tape. It is possible to build in curves and twists during this phase; **TAKE CARE NOT TO APPLY THE TAPE UNDER TENSION**. Lay the wing on a flat tabletop. Try not to get any wrinkles and creases in the tape.
- Remove the tape you put on before gluing the spars in.
 - Lightly spray the wing top with Contact adhesive. Allow to cure for a few minutes.
 - When dry you can add the strapping tape to the top of the wing as shown in the wing taping plan.
 - Now tape the underside of the wing as shown.
 - Apply the strapping tape smoothly, avoiding creases or bubbles. Do not stretch it tight, but lay flat and smooth down with a finger or cloth pad as you lay it down with the other hand.
 - When the wing is all taped up, go over it with a warm iron (100 deg C) to ensure maximum bonding.
 - Increase the irons temp to 150 Deg C and firmly iron down all the edges of the tape to get a smooth surface. Move evenly and keep moving so you don't overheat any one spot. Follow the iron with a damp cloth pad to cool the tape quickly, and feel the edge of the tape with a finger tip. If you can feel it standing proud --iron it again.
 - This way you will get a very smooth surface on the whole wing.
 - Pay particular attention to minimise creases in the wing tips, especially if you are going to add the sidewinder rockets.
 - Draw a line 30mm either side of the wing join line, parallel to the join line, to indicate where NOT to apply coloured tape in the next step. Repeat for the underside. (This makes it easier to bond the wing to the fuselage as the coloured tape does not bond as well directly on to EPP)
 - Lightly sand the strapping tape on the top and bottom of the wing between the two lines you've just drawn, this will improve the bond with the Gorilla glue.
 - Re spray the wing top with contact adhesive; apply lengths of coloured tape to each side of the wing, starting from the marked line out to the wing tips. Start at the trailing edge and work forward, half overlapping the previous layer of tape. Continue until you have reached the leading edge.

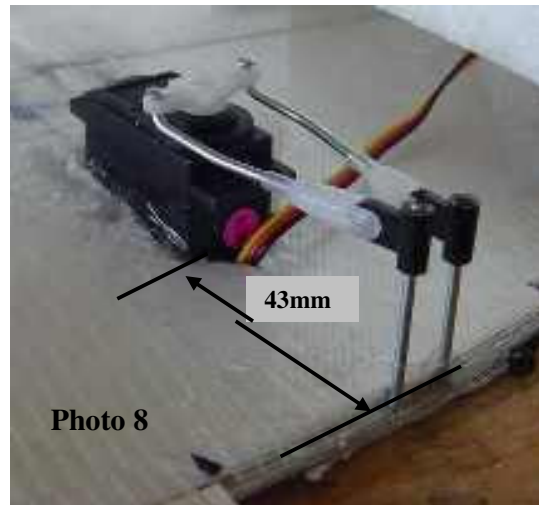
- Apply coloured tape to the bottom of the wing using the same technique described for the top.

AILERONS

- 41) The Balsa ailerons provided are slightly too long, so you need to cut them to the correct length.
- Carefully position the wing in place under the fuselage, place one side pod next to the fuselage.
 - Lay the ailerons in position behind the wing, with a gap of about 3mm between the fuselage side pad and the aileron.
 - Use a ruler and pencil/pen to draw a line on the outer ends of the ailerons. See photo 7
 - Trim the aileron to length with a sharp knife or razor saw.



- 42) Take your aileron servo and remove the arm. If the servo arm still has four arms, cut two off opposite each other, refer to photo 8. Carefully set aside the screw for now. Some aileron differential is provided by the slight rearward bend in the aileron wires (Aileron Differential helps the model roll more axially). If you would like more aileron differential, use a round servo arm rather than a one like in the photo and fit the pushrod wires in the 30deg rearward holes on the servo wheel. (see plan)



- 43) Wrap the body of the servo in masking tape to protect it from the glue.
- 44) Place the servo in position on the wing join line. The rearward edge of the servo should be 43mm from the trailing edge of the wing, measured on the centreline. Mark the outline of the servo. See photo 8
- 45) Cut a rectangular hole down to, but not through, the bottom layer of strapping tape. Make it a snug fit for the servo. Glue the servo in place with a dab of glue; align the servo so its bottom is parallel with the underside to the wing. The servo arm goes toward the rear of wing see photo 8.
- 46) Locate the pre-bent aileron rods. Screw the two nylon flags onto the threaded ends of the aileron rods until the wire is flush with the top of the horn.
- 47) Drill a 2mm hole into the forward edge of each aileron, 30mm from the root of the aileron; make the hole 23mm deep. Take care that the hole is parallel to the bottom surface of the aileron. See Photo 10
- 48) Use your knife to make slot in the leading edge of the aileron, from the hole to the near end of the aileron for the wire to push into. See photo 10
- 49) Glue the ends of the wires into the balsa ailerons.

50) Spray the underside (including the small forward facing edge) of the ailerons with Contact adhesive.

- Cover the undersides of the ailerons with a layer of coloured tape laid lengthways. Work carefully and do not stretch the tape, ensure you do not build in any twists. Stick it on from the 'leading' edge back and allow the extra tape to just 'trail' off the trailing edge (the tape does not wrap around the trailing edge very well, so when doing the upper side of the aileron we will let the tape join together at the trailing edge, then cut with a ruler and knife about 2mm beyond the balsa.

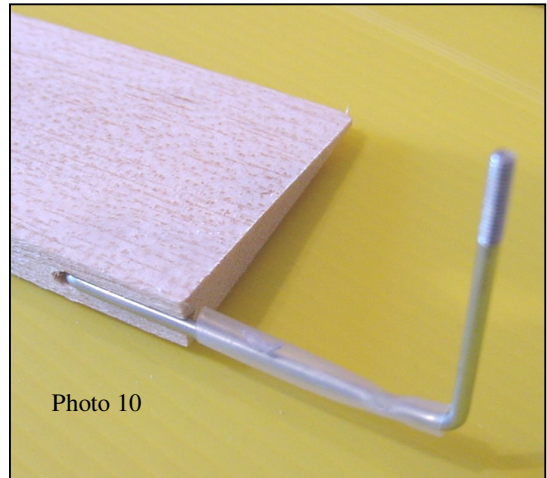


Photo 10

51) Turn the ailerons over and do almost the same (read the points below first) to the upper surface, after spraying with Contact Adhesive;

- Cover the upper surface of the ailerons with a layer of coloured tape laid lengthways. Again work carefully and do not stretch the tape and do not build in any twists. This time however overlap the tape a little (about 20mm) over the 'leading' edge, allowing the extra tape to also just 'trail' off the trailing edge. This tape will meet the tape from the underside and will join together at the trailing edge.
- Cut any excess tape at the trailing edge off using a ruler to get a straight line about 2mm beyond the edge of the balsa.

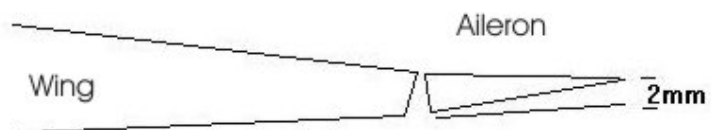
52) Position the ailerons with about a 1mm gap between the wing and ailerons, and about 3mm between the ailerons and fuselage.

- Temporarily hold in position with 2 short pieces of tape on the underside of the wing.
- Apply coloured tape the full length of the hinge line, on the top surface only.

53) Tape the tube on the aileron wires to the rear of the wing. See Photo 8

54) Make the Aileron pushrods

- Slide both of the wire aileron pushrods through the outer holes in the aileron servo arm.
- Thread a clevis onto the end of the pushrod.
- Centre the servo using your RC gear, check that the trim lever (on the transmitter just below the aileron stick) is in the middle and re-install the servo arm making sure it's at a right angles to the centreline of the wing. (If you're using a round servo arm, make sure the holes are aligned with the servo and at right angles across it)
- Clip the clevises into the nylon flags. See photo 11
- **Adjust the length of the pushrods by threading the clevises in or out so that both ailerons are reflexed 2mm (see diagram) this helps to stabilise the model in pitch mode (up and down) as the tailplane is quite small. With the JW wing section and the proper amount of reflex, the F20 performs very well! ☺**



- Check also that both ailerons are lined up with each other, adjust the length of the linkage if required
- When the transmitter aileron stick is moved left, the left aileron goes up and the right aileron goes down. If not, switch the reverse switch on the transmitter to correct.

55) Check all linkage attachments are secure. Check the system for free movement and for proper aileron movement up and down (about 15mm up and 12 down measured at the trailing edge of each aileron)

56) Now before you glue the wing on, Re-check;

- The aileron servo is securely mounted in the wing,
- Put the screw back in the servo arm.
- The clevises are properly clipped into the aileron flags

Make sure the servo lead won't get in the way of the linkage. If you're not sure, make a recess up toward the RX (a soldering iron does this easily) and stuff the excess wire up into it using a wooden stir stick as you offer the wing up to the fuselage.

57) Test fit the wing to the fuselage. You may need to remove a little more foam from the fuselage either side of where the aileron servo will be situated to allow the servo arm to move freely, carefully trim away the foam until there is just enough clearance. The rear of the fuselage cavity may also need a little more space for the aileron pushrods wires to move freely back and forth

58) You can either glue the wing on using plenty of Gorilla glue adhesive in the leading edge and trailing edge notches in the fuselage. Make sure the wing is square across the fuselage and level with the tailplane, and then put aside to set. Alternatively double sided sticky tape does a very good job - particularly if you are sticking tape to tape.

59) When the glue is dry, spray a mist coat of contact adhesive along the entire bottom of the fuselage. Mask off the wing and tailplane so that the adhesive only goes on the centre sections under the fuselage. Lay a piece of strapping tape along the fuselage from 50mm (2in) in front of the wing to 50mm (2ins) behind the wing. Add a single piece running the full length of the fuselage and over the underside of the tailplane and the full length of the tail cone. Smooth the tape down with the iron at 100deg C and the edges at 150deg C as usual.

60) Add 3 x 50mm lengths of strapping tape as reinforcements each side between the wing and fuselage.

61) Now you can complete the covering of the fuselage with coloured tape or covering film and dress up your F-20 Tigershark with insignia etc.

62) If you wish to put "Sidewinder" rockets on the wingtips for display, make them from pieces of 10mm (3/8") balsa dowel. Round one end for the warhead, make 4 large fins and 4 smaller fins from 0.4mm (1/64") ply. Cut slots in the balsa stick where the fins go, then push the ply fins into the slots. Check they're all sticking out at right angles, and then treat each one to a drop of thin CA at the base. Paint the warhead Red, Yellow or Black. The plastic cap over the tailpipe is Red. The body and fins are White.

63) If you want your F-20 Tigershark to fly with rockets on, make them out of rolled paper, with blue foam warheads, and ply fins. Secure the rockets to the wingtips with Velcro so they will knock off easily, but won't come off in the air.

64) It's essential to balance your model so it will fly properly. The design and location of components is optimised so the model should balance close to the Center of Gravity without much adjustment, however individual builders may have added a little more tape or glue here or there so it is important to check and fine tune the balance.

(64) cont'd: The balance point at which to test fly is right under the wing spar in the centre of the wing (i.e. under the fuselage). Balance the model to sit level (nose to tail) or slightly nose down at this point on your fingertips. If necessary add lead or similar weight (coins, nails) to the nose or tail until the model balances. While you're fine tuning the balance just tape the weight on to the top of the nose. When you're happy with the balance, make a small hole under the nose or tail for the weight and then tape it over to secure.

CONGRATULATIONS – Your model is now assembled – LET'S GO FLYING!!!

A few notes on flying for beginners

If you haven't flown before it is well worth getting some help. Ask at the local model shop or go to a local flying slope, most fliers will be very happy to help.

If you are a first time flier, before going to a slope, go to the local park and practice throwing and gliding the plane flat and level into the wind. This will get you used to the controls so that corrections become quick and automatic because on the slope you don't get time to think about which stick to push in which direction. Before flying, check the basic functions, i.e. up is up, down is down (stick forward) and right is right and left is left. Check the radio range by following your radio manufacturers' instructions.

These initial flights will also be a good opportunity to trim your model for straight and level flight.

Once on the slope and you have mastered level flight try some turns. As you turn you will need to add a small amount of up elevator to keep the model level. Be very gentle on the controls, the model won't fly well if you jab the sticks. It's best to **always turn into the wind** as down wind turns can take up a lot of airspace; it can also be tricky to judge the correct airspeed.

Good soaring slopes are a little hard to find, however this makes an interesting challenge for this captivating sport. A good slope is characterised by the wind blowing straight up a slope that is steeper than 45 degrees. Tall sand dunes over about 6 Meters and hills higher than about 30 Meters should provide sufficient lift. You will often see birds soaring in these areas. **It's best to talk with local flyers** or see where others are flying to find the best sites for each wind direction and strength. You can also get first-hand tips on flying and trimming. Most foam planes will fly well in winds from 10 knots to 20 knots. Experts can fly outside this window.

Choose a place to fly that offers a landing site. With EPP models this is less important - just dodge rocks if you can. Long grass, tussock or bushes are fine. **Watch out for spectators!**

Thermals will also assist flying. Thermals are generated by sun the sun heating the land, warming air which then rises as it is lighter than surrounding air. This makes a sunny slope work better than a sheltered one. Before flying, ensure that your transmitter batteries are charged. Follow your radio manufacturer's instructions for proper safe radio operation.

Always make sure that no one is on your frequency before turning your radio transmitter on. Do this by asking any other flyers if they are on your particular radio channel (refer radio manufacturer instructions to determine the channel you are on).

When you choose a slope, have a good look around and imagine where you will fly, pinpoint areas such as trees and cliffs where you don't want to fly and decide where you will land and perform a final range check (refer radio manufacturer instructions).

Always throw off straight into the wind, straight and level and quite hard. Be ready to stop a steep initial climb by pushing the stick forward. Also be ready for a sudden turn to one side. Concentrate on keeping the model in front of you and heading away from the slope. If the model heads down and out from the slope, try pulling up a little. *If the model continues to sink, land it before you loose it!*

If the model climbs nicely but starts to go back over your head, push down to get speed up and hold down until you can fly it some meters in front of you. Once you are comfortable, try some zigzag turns, always turning into the wind. Remember to add up elevator when turning. Don't try fancy moves yet, just concentrating on getting your hours up. Practice, practice, practice.

Note the bad areas are below the horizon and down wind of you. This will put you out of the lift and into turbulence.

It can be quite cold on the slope so be prepared to dress warmly so you can enjoy the day.

WARNING: Model Aircraft, even those made from foam like the Aermacchi can be extremely dangerous if you hit someone, be careful, think about where you are going to fly and the safety of yourself and those around you.

SUMMARY OF SLOPE ETIQUETTE

You will always be welcomed at an established slope flying location by experienced flyers. The majority of flyers will almost always be prepared to stop what they are doing to help out and offer advice if you ask for it, so don't be shy.

Some informal rules have developed over time, that allow everyone to enjoy the slope. Some of these are listed below:-

Always check no other flyers are on the same frequency as you before turning anything on. *You can only establish this by asking around. It's also good practice to turn on the receiver first – if the control surfaces jitter about, there's a good chance someone else is on your frequency! Don't fly until you can identify the other flier.*

Avoid flying or landing where other flyers are standing. Pay particular attention if there are any spectators nearby, foam models still hurt.

Do not engage in combat with a composite or balsa model at any time. These are very expensive models and do not bounce like your new EPP model!


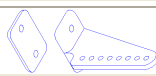




Challenge other EPP flyers before beginning combat so they know what's going on and can decline if they wish.

Avoid at all times any hang gliders or Para gliders. If your intend to share the same slope make sure you talk to these people before launching. You must give way at all times. *A foam model has the potential to damage parts of a hang glider or para glider resulting in serious injury or death.*

Canterbury Sailplanes

www.flycs.com

F20 Parts LIST

EPP Wing	Left & right	
Balsa Ailerons	2	
EPP Fuselage	2 (front and rear)	
EPP Side pods	2 (left and right)	
Corflute tailplane	1	
Corflute Fin	1	
Spars	4	
Drinking straw	1	
Long Steel Rod with knob (elevator pushrods)	1	
Short steel rod with knob (aileron pushrods)	2	
Gorilla glue Adhesive	1	
Strapping Tape roll 15m	1	
Nylon Aileron flag connector	2	
Coloured tape roll (50 metres)	1	
Wing Spar joiner tubes	2	
Control Horn & Base Plate	1 set	
Control Horn screws	2	
Plastic Clevis	3	
Aileron Control wire (pre bent)	2	
Elevator Connector wire	1	
Instruction Manual	1	
Graphics Sheet	1	