



Specifications

Wing Span:	26.0"
Wing Area:	170 sq. in.
Length:	~27.0"
Motor:	Razor 400 or AF010, AXI 2208, PJS 300SF, IPS-D, IPS, or similar.
Propeller:	EP9070-EP1080
Batteries:	2x700 Lipoly - 3x1200 Lipoly, 6x700mah AAA's
Channels:	4
Weight:	- Razor 400: 5.33:1, 3x700 Lipoly , Phoenix 10 ESC, GWS 4P Rx, 3xGWS Pico servo's, Solar Film Covering - 245 grams (8.6 oz)

SIN-NAPS ASSEMBLY INSTRUCTIONS

Version 1.0

(Check web page for updates)

www.cl-i-max.com

Kit Contents:

1 - 1/16" Laser Cut Balsa Parts Sheet #1
1 - 1/16" Laser Cut Balsa Parts Sheet #2
1 - 3/32" Laser Cut Balsa Parts Sheet #3
1 - 3/32" Laser Cut Balsa Parts Sheet #4
1 - 3/32" Laser Cut Balsa Parts Sheet #5
1 - 3/32" Laser Cut Balsa Parts Sheet #6
1 - 3/32" Laser Cut Balsa Parts Sheet #7
1 - 1/16" Laser Cut Plywood Parts Sheet #8
1 - 1/8" Laser Cut Lite-Ply Parts Sheet #9
1 - 2" x .098" Carbon Fiber Rod
1 - 4.5" x 3/8" x 3/8" Basswood Stick
1 - 4.5" x 5/16" x 3/16" Basswood Stick
3 - 21" x 3/32" x 3/32" Basswood Stick
1 - 24" x .063 Piano Wire
2 - 24" x .035 Piano Wire
2 - 4-40 Nylon Screws
1 - 4-40 Blind Nut
1 - Instruction Manual

Suggested Radio Gear:

4 Channel Transmitter
3 - Sub Micro Servos
1 - Micro Receiver
1 - Micro ESC, Rated for your motor

Other Items Required to Complete this Kit:

Motor: Razor 400 or AF010, AXI 2208, PJS 300SF, IPS-D, IPS, or similar.
Propeller: 9 x 7, 10 x 8
Batteries: 2x700 Lipoly - 3x1200 Lipoly, 6x700mah AAA's
2 - Dubro 150MW 1-1/2" Micro Lite Wheels
1 - Roll of Solar Film or So-lite covering material
4 - Dubro Mini E/Z Connectors #845
4 - Dubro Mini E/Z Links #855

Items Required for Building:

Thin Cyanoacrylate adhesive
White Glue
Straight Pins
Building Board
Wax Paper
Razor Blade or X-Acto Knife
Fine and Medium Grit Sand Paper
Small Flat File

Before you begin

- Before you begin construction please read instructions fully.
- Remove only those parts from their carrier sheet that are required at any one-time.
- Remove all remnants of tabs used to secure parts to their carrier sheets from surfaces that are to be glued.
- Always test fit parts before gluing.

Fuselage

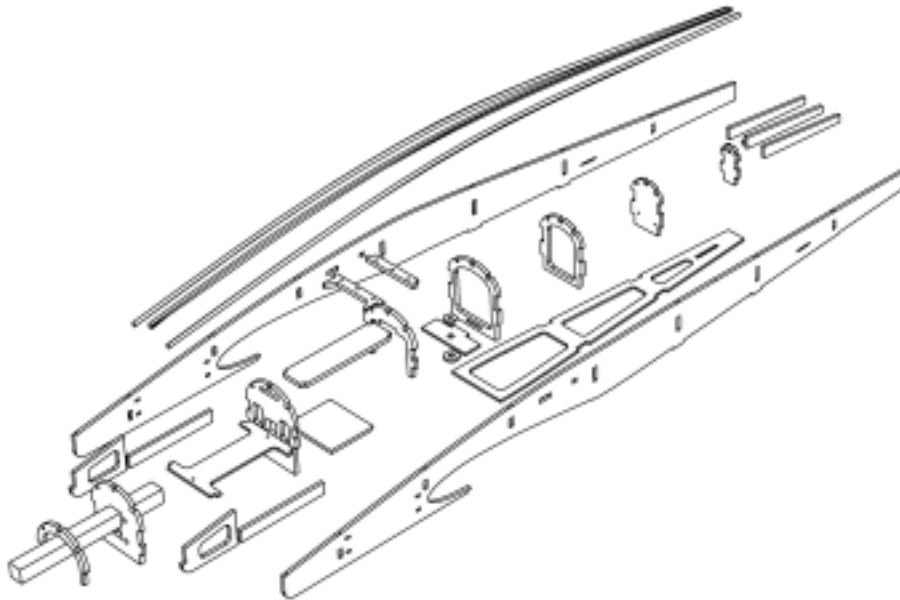


Fig. 1

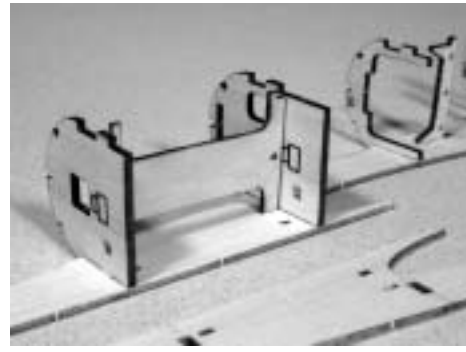
The Sin-Naps kit includes parts for different fuselage configurations depending on what type of motor will be used. **The following instructions are for the default configuration #1, Razor or similar weight motors using the EPS gearbox mounting on a 10 x 10 mm stick and full fuselage nose.** Most construction steps are common to all configurations. For details on setting up the Sin-Naps in one of the other configurations see the “Alternate Configurations” section later in this document.

- Position Fuselage bulkheads B2 through B8, forward battery plate and servo rails into one side of the fuselage.



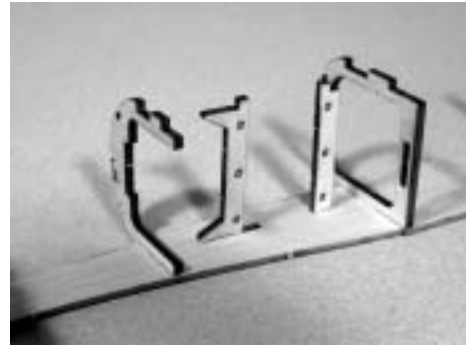
-
- Detailed view – B2, B3 and forward battery plate.

Note: For configuration #1, full fuse and 10 x 10 mm stick mount, the forward battery plate locates in the top holes.

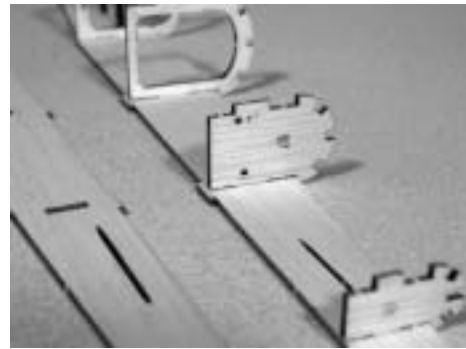


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- Detail view – B4, B5 and servo rails.

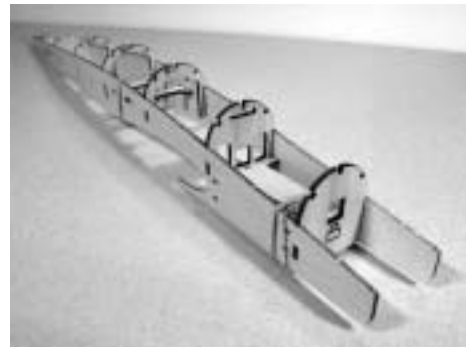
Note: Hole markers face bottom of the fuselage.



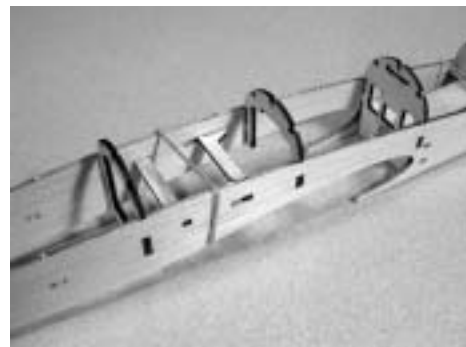
-
- When installing bulkhead B7 make sure the holes for the control rods are located properly. The “L” label indicates the side that mates with the left hand side of the fuselage.



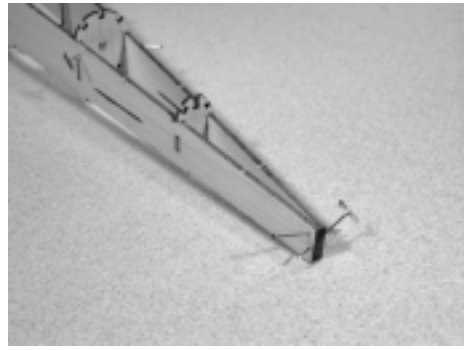
-
- Add the other side of the fuselage. The assembly can be held together with some elastic bands until glued. Do not glue yet



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- Detail view – B3, B4, B5 and servo rails.



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- Align the trailing edges of the fuselage sides and secure them in position.

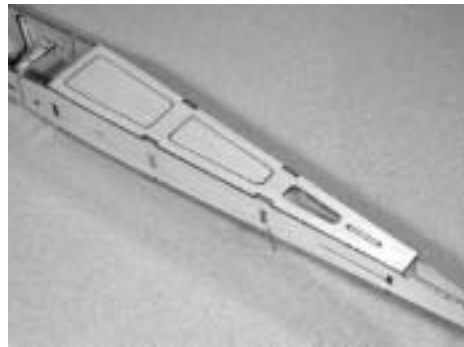


-
- Install the fuselage bottom piece.

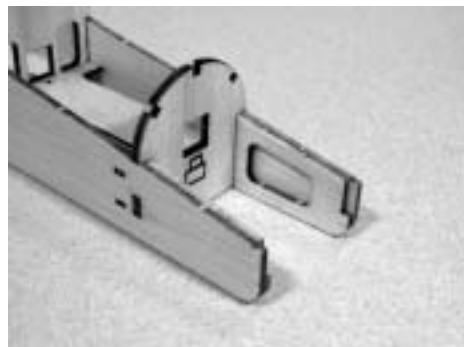
The entire assembly can now be glued with thin Cyanoacrylate.

Do not glue the forward servo rail at this time unless you've determined the spacing required for your servos.

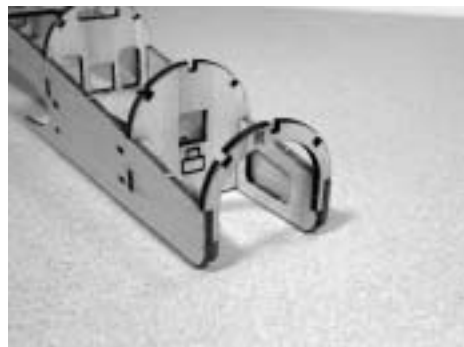
Note: The cutouts in the bottom piece were left in place during assembly. They should be removed before gluing.



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- Glue fuselage doublers to fuselage sides and bulkhead B2.



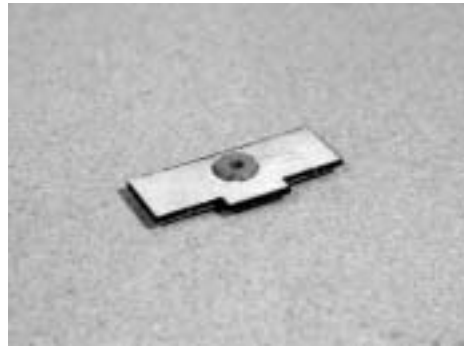
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- Glue fuselage bulkhead B1 to fuselage sides and fuselage doublers.



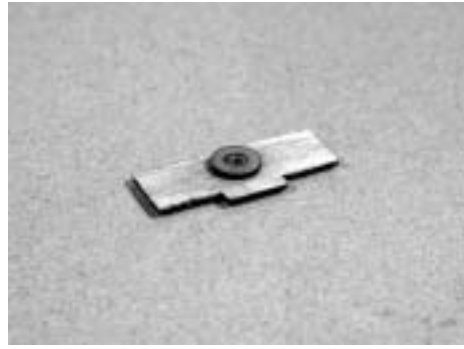
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- Glue rear battery plate to bulkheads B3 and B4.



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- Press blind nut into wing mounting tray.



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- Turn over and glue 1/6" plywood washer over protruding blind nut.



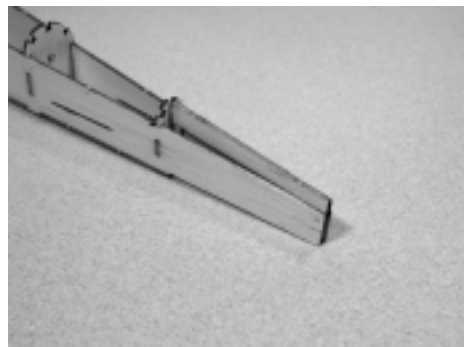
-
- Glue wing mounting tray to fuselage sides and bulkhead B5. The rear tab fits into slot in bulkhead B5. The tray should sit level with the bottom of the fuselage.



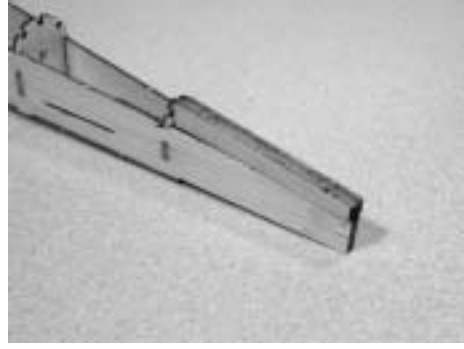
-
- Reinforce the back corners of the wing mounting tray with pieces of 0.5" x 3/32" basswood stick glued to the inside corners between the tray and each of the fuselage sides



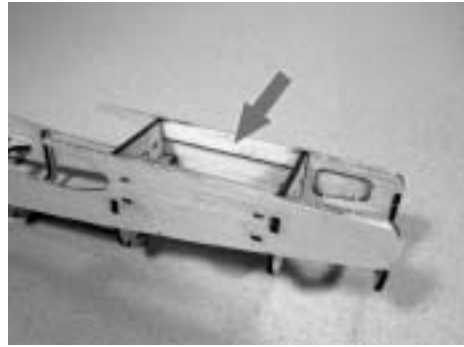
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- Glue tail former #1, the one with the tab in the front. The tab fits into the lower half of the middle slot on bulkhead B8. Center the back with the trailing edges of the fuselage.



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- Glue #2 formers to both sides of former #1.



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- Optional: Add doublers to the inside edges of the fuselage sides in the forward battery compartment. If your configuration requires batteries in the forward compartment, check battery fit before installing these doublers. *Option: These doublers can be used as rails for a hatch over this compartment when the battery plate is in the top position. Glue them up from the fuselage bottom edge a distance equal to the thickness of the hatch. Hatch material not included.*



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- Glue 3/32" basswood stringers to bulkheads B1-B8.



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- If you haven't done so yet, position the forward servo rail to give the required spacing for the aileron servo and glue in place.



Final details of the fuselage assembly will be completed after the wing is assembled.

Wing

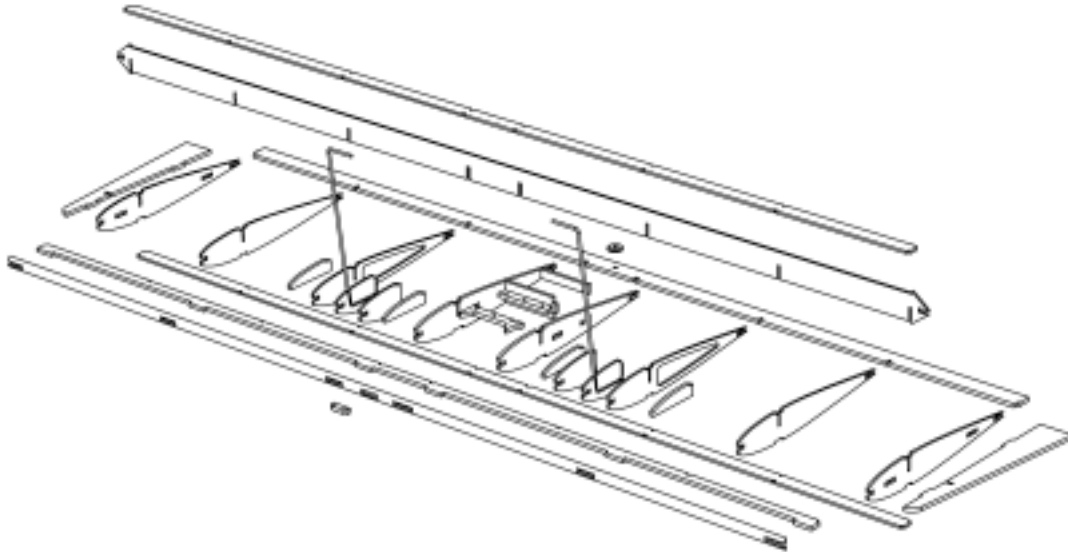


Fig 2 – Bottom View of Wing

Build wing on a clean flat surface. The following assembly procedure is designed for the use of thin Cyanoacrylate glue. If you plan to use a different type of glue you may need to alter this procedure. When removing the wing ribs from the carrier sheets be careful not to remove the jig tabs. If a jig tab should break away from the rib it can be reattached with a small amount of glue until assembly is complete.

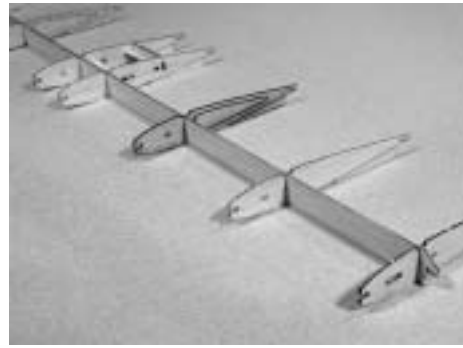
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- Glue leading edge to the leading edge rail. Make sure the assembly is straight when gluing.



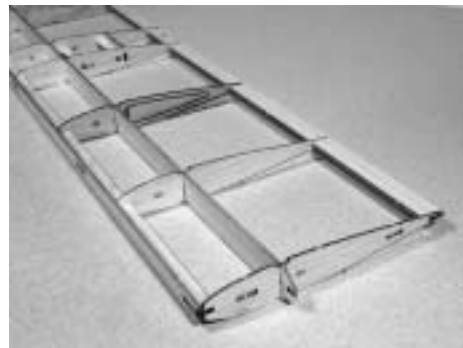
-
- Position servo rails and wing bulkhead #1, between Ribs R1. **Do not glue at this time.** The forward servo rail adjusts for servo lengths between 0.70" and 0.93". If the servos you intend to use are longer or shorter than this you can modify the slot the rail slides in to get the gap between rails you need. The triangular braces on the servo rail will need to be shortened if the dimension required is greater than 0.93". Hole markers should face towards the bottom of the wing.



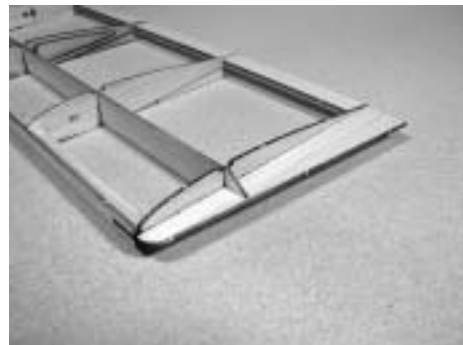
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- Slide the assembly from the previous step onto the wing spar. Position the remaining ribs on the spar ascending in number from the wing center to tips. **Do not glue at this time.**



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- Install the wing leading and trailing edges. A good method is to start at one end of the wing and work your way to the other end. Care should be taken when installing the trailing edge so that none of the rear rib tips are damaged. **Do not glue at this time.**



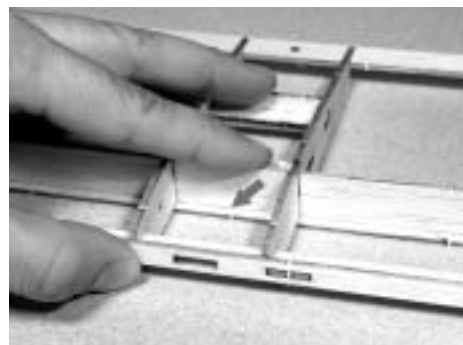
-
- Install both wing tips. **Do not glue at the time.**



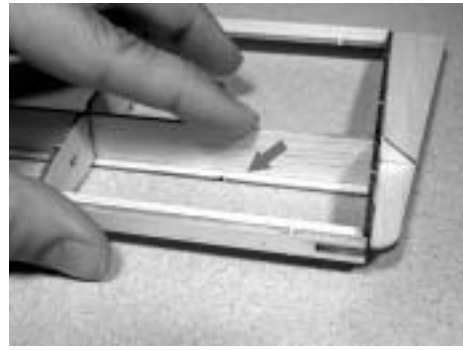
-
- Position wing assembly on the bottom cap strip.



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- After making sure the wing is properly aligned begin gluing the cap strip to the wing spar. Start at the center of the wing pressing them firmly together and then applying thin Cyanoacrylate glue to the seam. Continue Gluing out too each wing tip. The ribs can also be glued to the wing spar at this time as well as the rear servo rail and wing bulkhead #1.



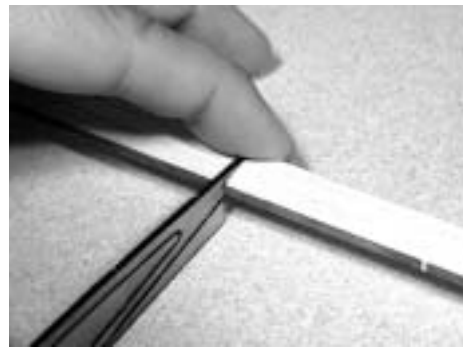
-
- Gluing the wing spar to the cap strip near the wing tip.



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- Glue the leading edge to the ribs. As with the cap strip, start at the middle and work your way to each wing tip.



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- Glue the trailing edge to each rib in a similar manner as the leading edge. Glue the wing tips to rib R4.



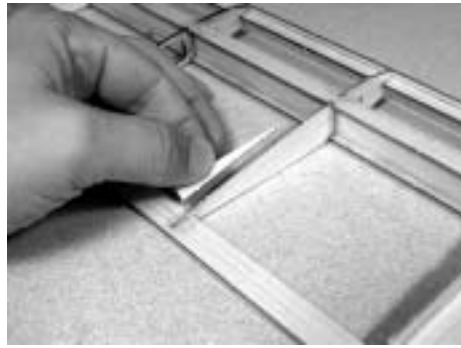
-
- Turn the wing over and position the top cap strip under the wing spar just as you did the bottom one. Glue the top cap strip to the wing starting from the center again and working your way to the wing tip.



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- Gluing top cap strip to the wing near wing tip. Check over the wing and glue any joint that has not been, or requires additional gluing.



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- The jig tabs can now be removed.



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- Sand the leading edge so the wing can fit properly into the fuselage.



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- Once the leading edge has been sanded the wing alignment tab can be installed.



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- Wing alignment tab glued in position.



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- The wing alignment tab shares the hole in B3, which is also used for mounting the 8 x 5 mm stick motor mount. Each of them uses half the thickness of B3.

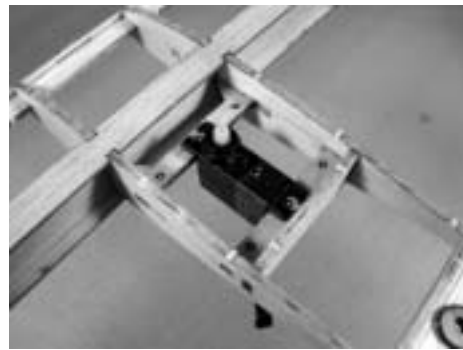


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- With the wing on the fuselage, align and glue the 1/16" plywood washer. The center hole of the washer should be concentric with the tapped hole in the blind nut. Glue wing bulkhead #2 to the back edge of the wing trailing edge and both R1 ribs. It should be centered between the upper and lower surfaces of ribs R1.

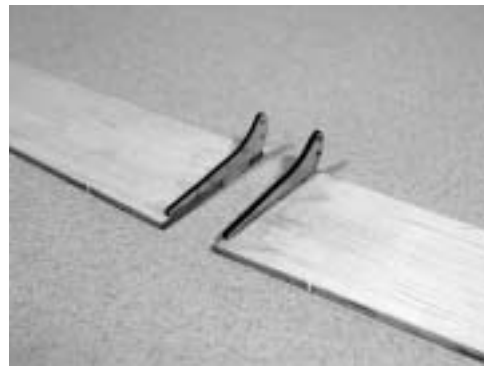


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- If you haven't done so yet, position the forward servo rail to give the required spacing for the aileron servo and glue in place.

Flaperons: The aileron servo bay has room for two servos. One for each aileron.

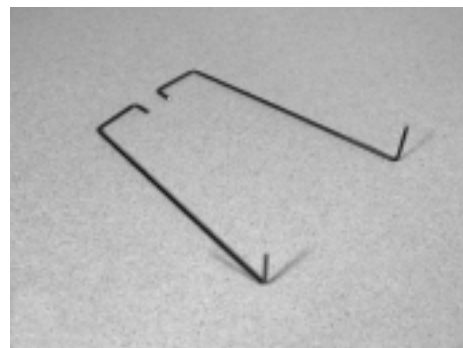


-
- **Ailerons:** Simply glue on control horns. Make sure you have a left and right hand version.



Landing Gear

- Bend 1/16" diameter wire into landing gear shapes. See Appendix A



- Glue ribs R2A and R2B to the inside face of R2 separated by the wire landing gear. *White glue recommended.*



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- Glue Rib R2C to ribs R2A and R2B over top of landing gear. *White glue recommended.*



-
- Glue balsa extensions on either side of the landing gear assembly. They provide more surface area for covering to adhere too.



Final Fuselage Assembly

- Double check fit of wing with fuselage.



- Brace the leading edge of the wing by gluing a small piece of 3/32" basswood to the back face of bulkhead B3.



- Push the basswood piece making it fit snugly against the leading edge and flush with the back face of B3. Glue in place. Be careful not to bond the wing to the fuselage.



- View with wing removed.



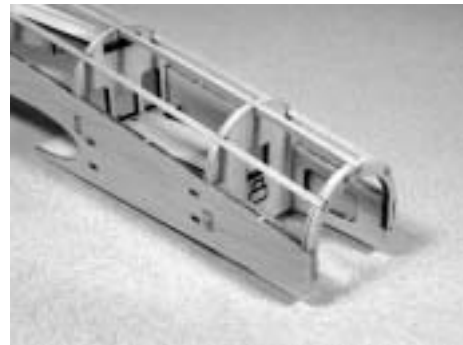
- Now add the 3/32" balsa bottom plate. Note the direction of the wood grain. Bevel back edge of the plate to coincide with the bevels on the fuselage sides.



- The fuselage can now be sanded in preparation for covering and before installing the horizontal and vertical stabilizers. Leave the center former at the tail flat along the top. The vertical stab mounts to this surface.



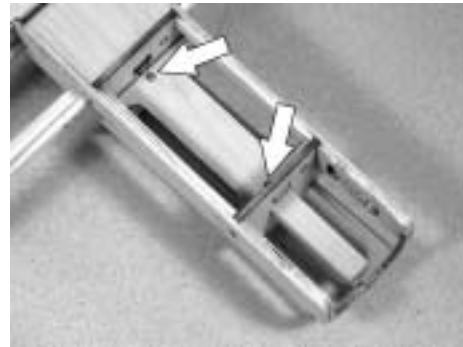
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- Installing the motor mount. Slide the motor mount into position. The back end should be flush with the backside of bulkhead B3. Determine the length required for your motor/gearbox. Remove from fuselage and cut to length. Slide back into the fuselage and fasten to the battery plate with two screws installed through the two precut holes.



Stabilizer Assemblies

- Attach the tailskid to the horizontal stabilizer. Make sure its aligned perpendicular to the horizontal stab.



- Before adding the tailskid/H. stab assembly bolt the wing to the fuselage. The tab on the front of the tailskid inserts into the slot at the rear of the fuselage.



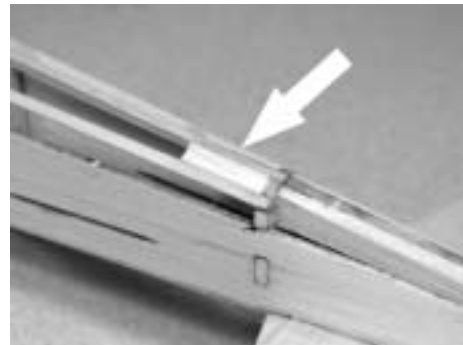
- Before gluing check that the horizontal stab is parallel with the wing and....



- Perpendicular with the fuselage.



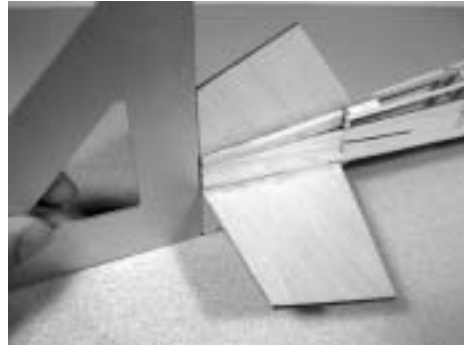
- Add 3/4" long pieces of scrap 3/32" thick balsa between the three stringers in front of bulkhead B8. This provides surface area for the covering to bond too in front of the vertical stabilizer. Sand pieces to conform to the fuselage shape.



- Glue the vertical stabilizer to the fuselage, checking that its perpendicular to the horizontal stabilizer and....

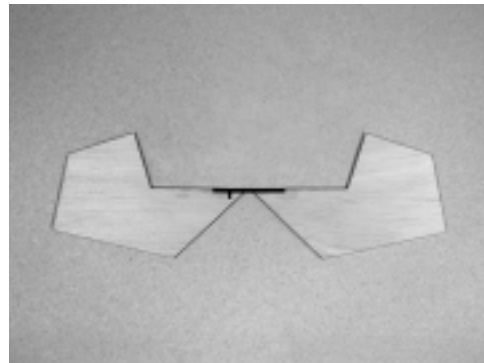


- ... Aligned with the tailskid and rear of fuselage.

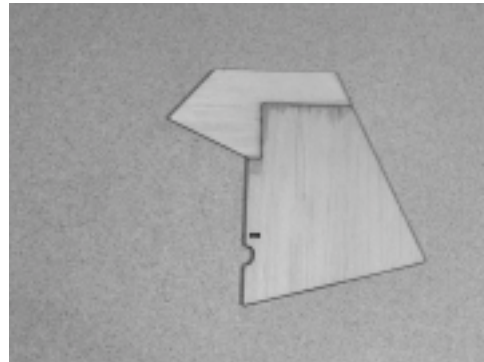


Tail Surfaces

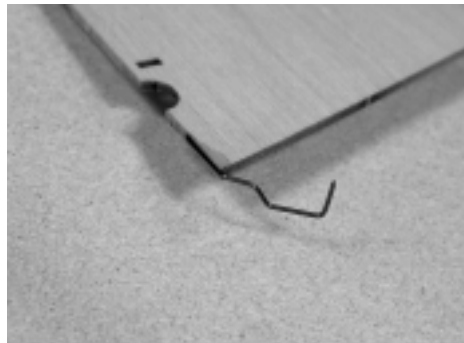
- Glue the 2-inch length of carbon fiber rod between left and right elevator halves. Make sure the hinge lines of both halves are collinear and the rod is two inches long.



- Glue the two pieces of the rudder together.



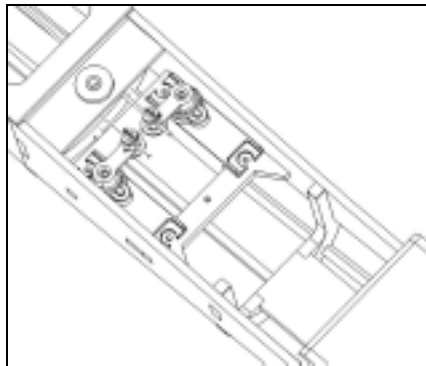
- **Tail wheel:** Bend some .035" wire to form a tail wheel mount, See appendix A. Attach it to the lower front edge of the rudder. A small plywood wheel is provided made from two disks of 1/16" plywood. Glue the two disks together and install on the wire mount.



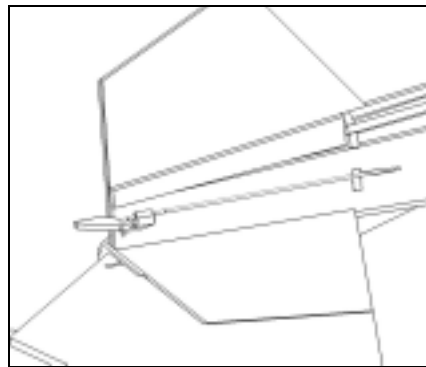
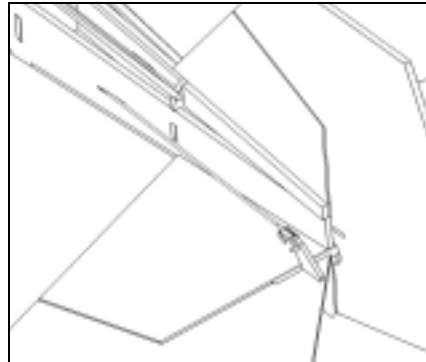
Final Assembly

- Sand entire model in preparation for covering. A smooth balsa surface will yield a smooth finished model.
- **Covering:** Cover the wings first, then the fuselage. The elevator, rudder and ailerons are covered before mounting them to the fuselage and wings.

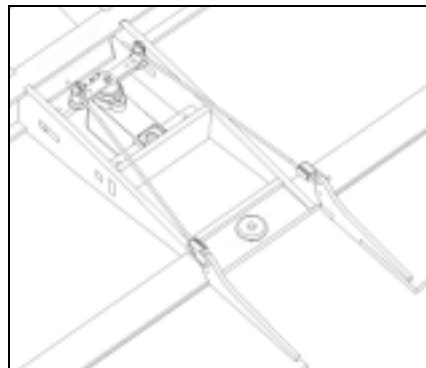
- Install elevator and rudder control horns. Attach elevator to horizontal stabilizer using 4, CA hinges. (CA Hinges are thin plastic hinges fastened with Cyanoacrylate glue). Install the rudder on the vertical stabilizer with 3, CA hinges. Install control rods as shown.



Elevator/Rudder Servos

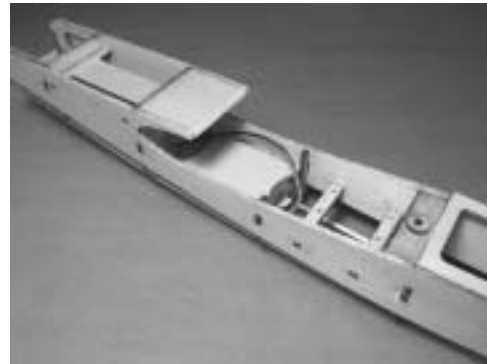


- Attach each aileron to the wing with 3 CA hinges. Alternately you can use a tape or covering hinge. Install control rods as shown.

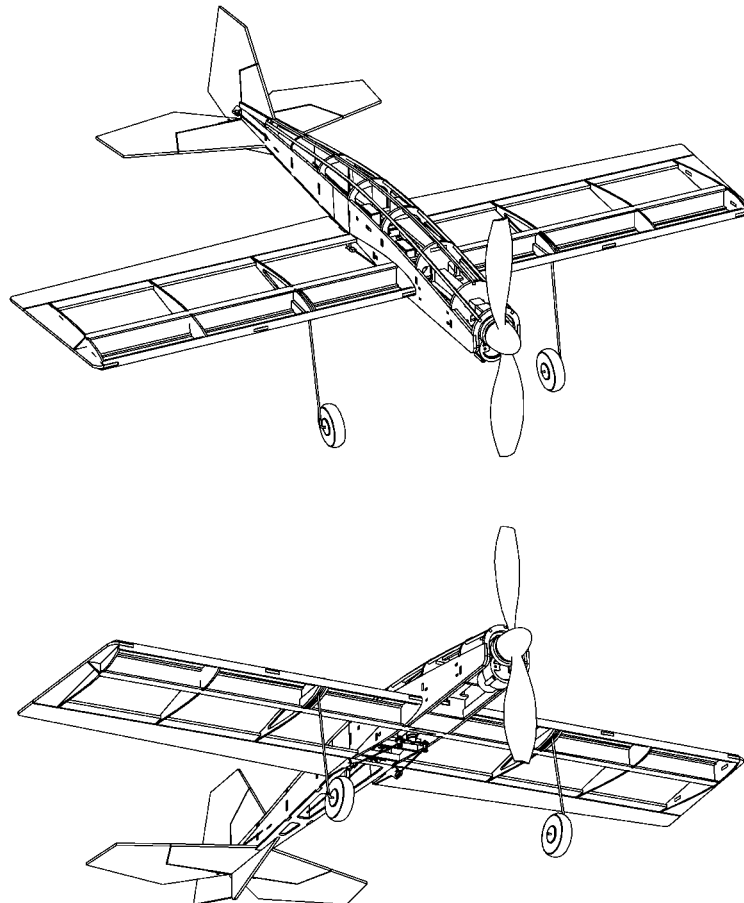


Aileron Servo – wing bottom view

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- **Battery installation:** Place the hook side of the Velcro in the battery compartment and the loop half on your battery. The battery compartment can accept up to a 3x1200 Lipoy pack, or 6 AAA's. If your power configuration requires you to mount the battery in the forward compartment it is recommended that you use an additional belt around the battery plate to secure your battery.



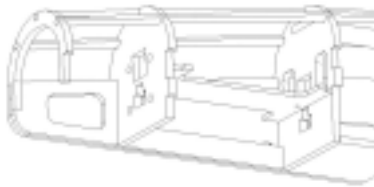
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- **Control Throws:** Trim all control surfaces level. The maximum travel should be set for +/-40 degrees on all surfaces. If you set your controls up for flaperons, you can mix your flaps to move with the elevator but in the reverse direction, i.e. elevator goes up, the flaps go down. The amount of flap movement should be set to a percentage of the elevator travel, 50% is a good place to start.
 - **Center of Gravity Location:** For your first flights the plane should balance between 1.6" and 2.0" behind the wing leading edge. For increased maneuverability you can experiment and move the center of gravity rearward. Be careful not to move the C.G. back too far or else it will become unstable and difficult to control.
 - Happy Flying.



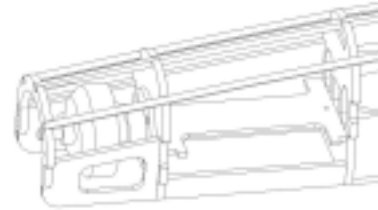
Alternate Configurations

Caution should be used when considering one of the following configurations due to the fact that there are many types of components available with varying weights. The components you use may have a dramatic effect on the center of gravity position. These configurations are to be used as a guide when installing certain types of motors to obtain the desired center of gravity position.

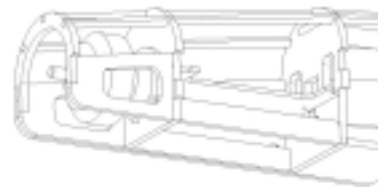
- This is default configuration minus the motor mounting sticks. This set-up is suitable for motors that require mounting to a flat firewall such as the PJS-300SF. Add holes to bulkhead B2 and bolt on motor/motor mount. Batteries can be mounted in either of the two trays depending on how the C.G. position is impacted by the weight of the motor, etc.



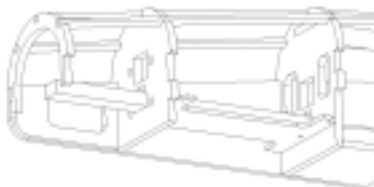
Left fuselage and doublers removed for clarity



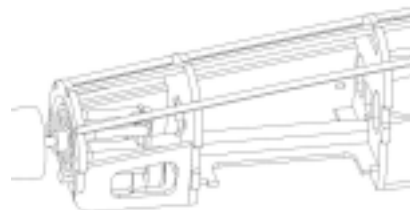
PJS 300SF shown installed
Left fuselage side removed for clarity



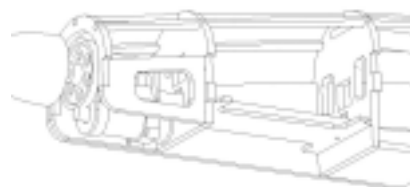
- This configuration is for motors such as the IPS that use an 8 x 5 mm stick in the horizontal position for mounting. Front battery tray is installed in the lower position. The batteries are mounted on the forward tray for lighter motors like the IPS.



Left fuselage and doubler removed for clarity



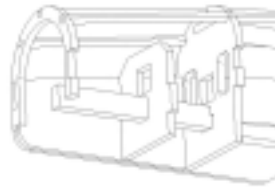
EPS-IPS shown installed
Left fuselage side removed for clarity



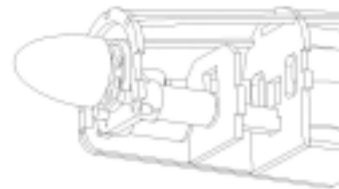
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4. This configuration is for heavier motors that use an 8 x 5 mm stick mounted in the vertical position such as the IPS-D. Because of the extra weight, the IPS-D is mounted farther back. Two new side doublers, bulkhead B1-B and an extra bulkhead, B2-B are installed. The front of the fuselage is shortened from the original B1 to the new B1-B. Batteries are installed in the rear tray. The space between the bottoms of bulkheads B2-B and B3 can be covered with scrap 3/32" balsa.



EPS-IPS-D shown installed
Left fuselage and doubler removed for clarity



Left fuselage and doubler removed for clarity

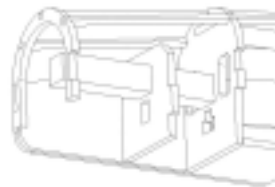


-
5. This configuration is for heavier motors that use a 10 x 10 mm stick such and are heavier than the Razor 400, motor for example. Because of the extra weight, the motor is mounted farther back. Two new side doublers, bulkhead B1-B and an extra bulkhead, B2-B are installed. The front of the fuselage is shortened from the original B1 to the new B1-B. Batteries are installed in the rear tray. The space between the bottoms of bulkheads B2-B and B3 can be covered with scrap 3/32" balsa.

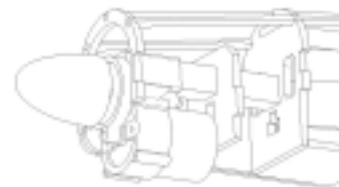


EPS-300C shown installed

Left fuselage and doubler removed for clarity



Left fuselage and doubler removed for clarity

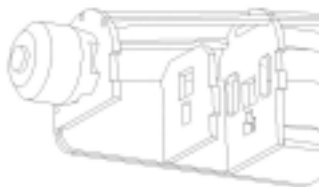


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6. This configuration is for heavier motors that flat mount to a bulkhead such as the AXI 2208. A motor like the AXI 2208 can be either mounted on the back or front of bulkhead B1-C, depending the version of prop adapter is used. Two new side doublers, bulkhead B1-C and an extra bulkhead, B2-B are installed. The front of the fuselage is shortened from the original B1 to the new B1-C. Batteries are installed in the rear tray. The space between the bottoms of bulkheads B2-B and B3 can be covered with scrap 3/32" balsa.

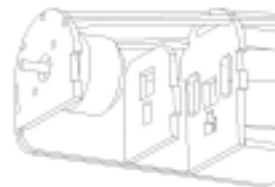
Note: It may be possible to mount a motor like the PJS 300SF in configuration #2, depending on what other equipment is used. Modifications will be needed to bulkhead B2 and spacers required between B2 and the rear motor mount to bring the prop nut out past B1.



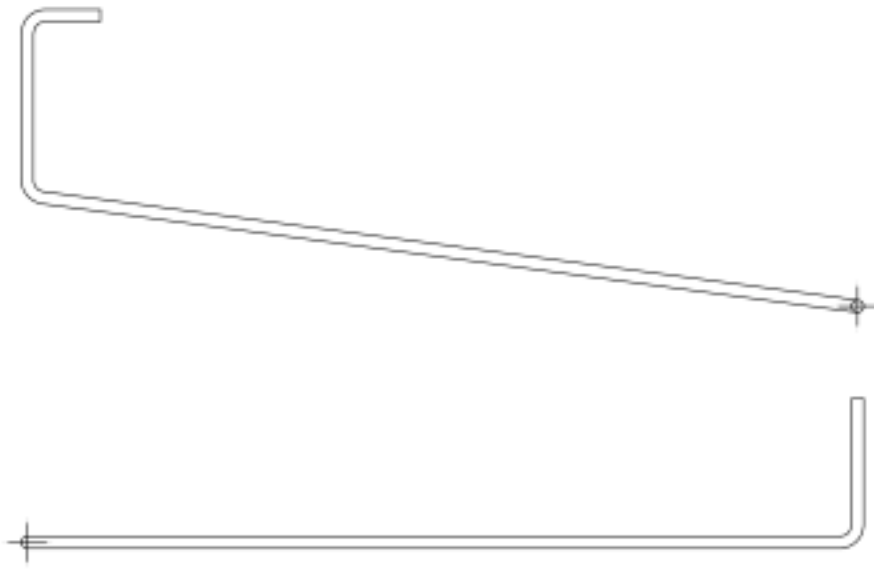
AXI 2208 shown installed
Left fuselage and doubler removed for clarity



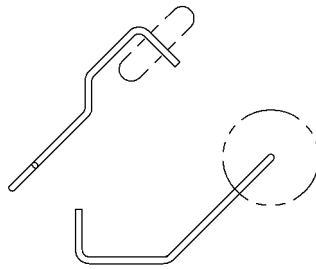
Left fuselage and doubler removed for clarity



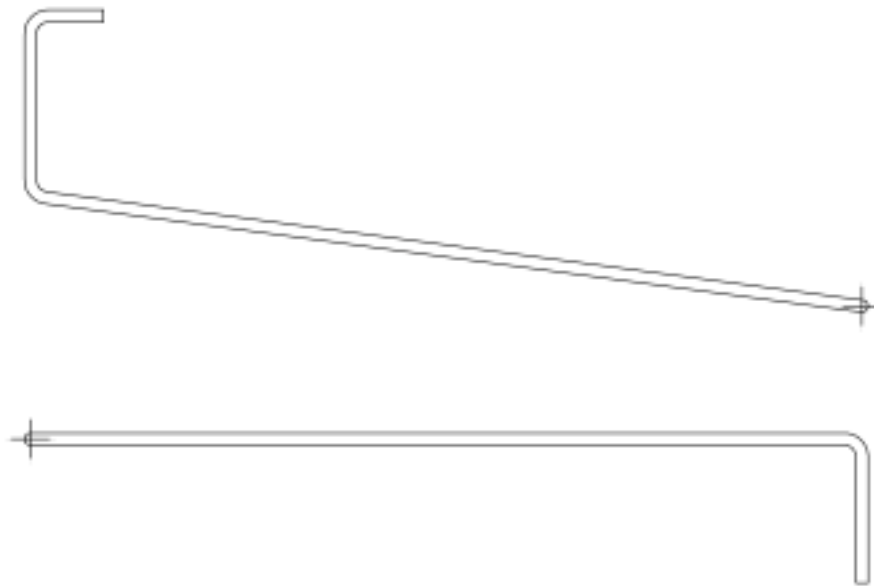
Appendix A



Right Landing Gear Template



Tail Wheel Bracket



Left Landing Gear Template