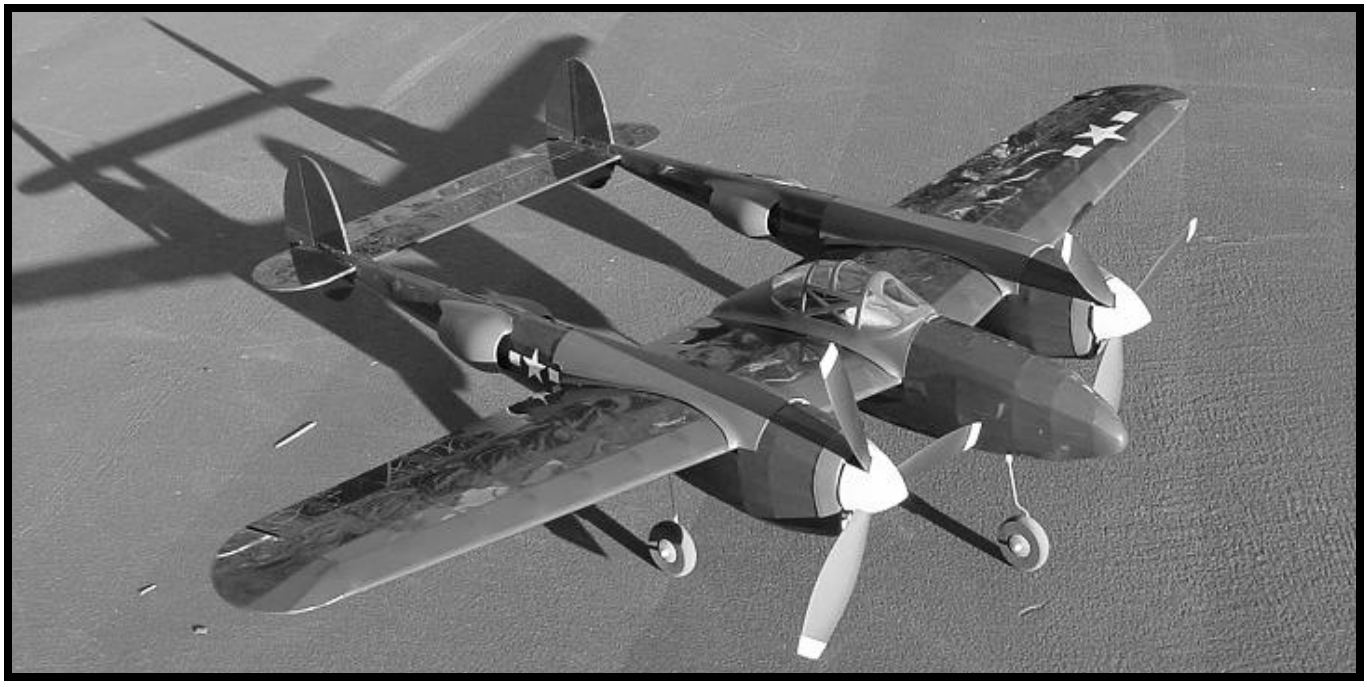
MOLT MODELS

SPECIALIZING IN PARKFLYER WARBIRDS



Parkflyer
P-38 Lightning

Molt Models Background Design Philosophy

When I was first introduced to this hobby eighteen years ago I saw my first WWII warbird and I was hooked. Several years later when I began building radio controlled model airplanes on my own, I learned that along with the intriguing warbird looks came a plane that was usually difficult to fly. After a few disheartening attempts with some larger glow powered warbirds I thought about how great it would be if I could design a spirited yet forgiving warbird that could be flown in a space the size of a soccer field. At that time the level of technology was not advanced enough to make this a reality, but the developments in the last few years have made it possible and economical.

The Molt Models design philosophy is comprised of methods that enhance scale appearance and all around flight performance. The first thing you'll notice about a Molt Models kit is that the majority of wood parts, illustrations and plans are CAD based. These items are derived from the same 3D modeling environment that the plane was designed in. My goal is to cut down on wordy instructions and use a more visual approach that will get you from kit to airborne in as little time as possible.

Molt Models Parkflyer P-38 Lightning

Thank you for purchasing the Molt Models Parkflyer P-38 Lightning. This kit represents a true first in parkflyer warbirds in that it possesses characteristics that make it both enjoyable to build and more importantly, fly. I sincerely hope that you enjoy your new Molt Models kit. Please visit us at www.moltmodels.com for updates and information on future kits.

Manual Revisions

Rev A - Figure 18 (wing tip measurement) 3-5/16" was 2-3/16" in "Wing Halves Joined" section

Molt Models Parkflyer P-38 Lightning Specifications and Kit Requirements

The P-38 Lightning is a fully functional aileron, rudder, elevator, and throttle controlled aircraft (4 channel). You may build the P-38 Lightning to fly with aileron, elevator, and throttle only by gluing the rudders to the vertical stabilizers. If you decide to do this I would recommend that you leave the landing gear off as take off and landing on a hard surface will be difficult without a rudder. I also recommend leaving the landing gear off if you intend to fly on grass only. If you fly on a nice hard surface, the P-38 Lightning with all functions and landing gear is quite impressive. On the other hand I definitely do not recommend you attempt to fly the P-38 Lightning as a rudder, elevator, and throttle only model.

P-38 Lightning Specifications	
Length:	26 in
Wing Span:	38 in
Wing Area:	216 in^2
Flying Weight:	10.0 ~ 12.0 oz
Wing Loading:	6.67 ~ 8.00 oz/ft^2
Power System:	GWS S1 IPS
Functions:	Aileron, Elevator, Rudder, & Throttle
Battery Pack:	7.4V, 1200mAh or larger Lithium Polymer

Parts you will need to complete the P-38 Lightning kit:

- (2) GWS IPS ("S1" gearing) and manufacturer recommend propellers
- (1) 4 channel receiver
- (1) 10A Electronic Speed Control
- (3) Servos (Hitec HS-55 or GWS Pico/Naro) (4 Channel)
- (2) 12" servo extensions
- (2) Female JST connectors
- (1) Male JST connector
- (1) Red wire, 20" long
- (1) Black wire, 20" long
- (1) Roll of Nelson Lite Film AKA Solite covering

Supplies and tools you will need to complete the P-38 Lightning kit:

- Hobby knife and blades
- Stickpins
- Pliers
- 90-degree triangle
- Ruler
- Covering iron
- Fine tip ink pen
- Fine/medium sand paper
- 5-minute epoxy
- Thin CA glue and fine extension tip
- Wood glue
- Wax paper or plan protection plastic
- 3/4" transparent tape
- Masking tape

General Model Building Tips and Orientation

First and foremost, this kit is **NOT** for the first time wood kit builder. Having said that, if you study the plans and instructions and get help from an experienced builder it's quite possible to build a nice flying model from this kit. Lastly, keep in mind that this kit is a reasonably scale model of a real WWII airplane and consists of complex shapes. It **WILL NOT** build as easily as the typical box, slab sided laser cut kits that you may have built.

Please be sure to study the plan sheets and read through the following instructions before attempting to build your P-38 Lightning. Having a good idea of what to expect as you progress will cut down on mistakes and allow you to better organize your project. Checkboxes have been provided in front of each step that allows you to easily keep track of your work.

Begin each building section by taping the corresponding plan sheet to your building surface; masking tape works great for this. Next cover the area of the plans you will be building over with plan protection plastic or wax paper. This will keep your plans from sticking to your model.

It is often necessary to pin parts of the model over the plan sheet as you progress through the build. In conjunction, it will be necessary to have a building surface/board that allow pins to stick into it with ease. I recommend using the smallest diameter "stick pins" you can find as larger diameter pins can split the wood. Appropriate sized pins are available in the craft and sewing section of most major discount stores.

Thin CA glue is suitable for almost all the build sections of this model. If another type of glue is necessary for a certain build section it will be recommended in that segment.

Standing behind the plane orients the left and right side of the model. The plans and building instructions refer to areas of the model in this manner.

Build Section #1 – Boom Construction

The booms of the P-38 are constructed in two halves and then glued together to form a single boom. The boom building section of the plans refer to "**Right Boom Components**" and "**Left Boom Components**". In addition, both the **Right** and **Left Boom Components** consist of an "**Outside Half**" and an "**Inside Half**". If you take care to build only one boom half from each of the four boom halves shown on the plans you will not have to worry about building incorrect boom parts. To avoid making this mistake, mark off each boom half shown on the plans as "**completed**" when you finish them.

Outside Boom Half

- ❑ Pin boom keels **K1**, **K4**, and **K6** over one of the outside boom halves shown on the plans and glue adjacent edges.
- ❑ Glue the boom formers **O1**, **O2**, **O4**, **O7**, **O8**, **O9**, and **O10** to **K1**, **K4**, and **K6** making sure they are perpendicular to the building surface. Be sure to orient each of the boom formers so that the notches that accept **K8** are in a line as you site down the boom.
- ❑ Install, but **DO NOT** glue the boom formers **O3**, **O5**, and **O6**.
- ❑ Glue **K8** into the notches of each of the boom formers **O1**, **O2**, **O3**, **O4**, **O5**, **O6**, and **O7**. Note that **K8** orients **O3**, **O5**, and **O6** at proper angles that interface the wing. Finish by gluing **O3**, **O5**, and **O6** to **K1**, **K4**, and **K6**.

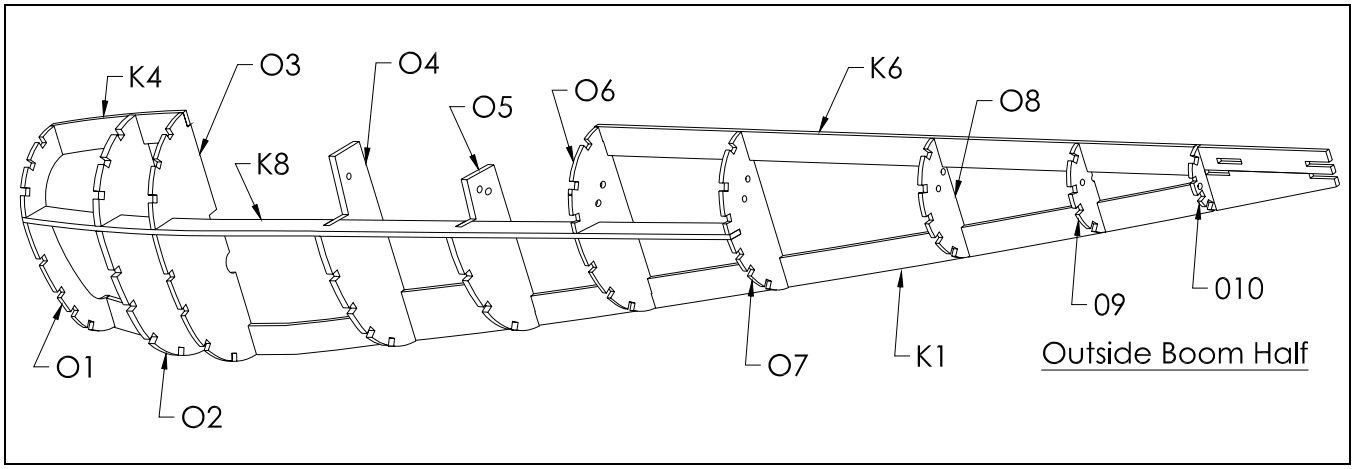


Figure 1

- ❑ Glue **B11** and **B12** into the notches of **K1**, **K6**, and **O10**.

- ❑ Glue pushrod exit **P1** to **B11** and **O10**.

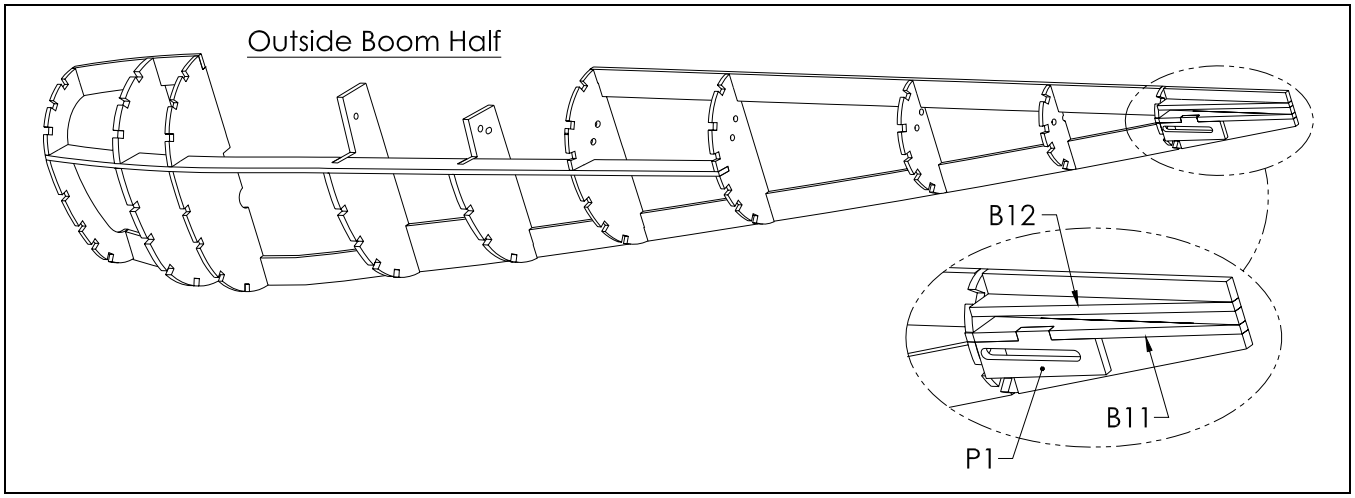


Figure 2

- ❑ Glue **3/32" SQ. Balsa Stringers** to the boom formers as shown in Figure 3 and the plans. Figure 3 illustrates important areas of the boom where stringers end.

- ❑ At this point the Outside Boom Half is complete and can be unpinned from the building board. Do not be concerned if the boom half is a bit warped when it is removed from the building board, this will be corrected when the boom halves are glued together.

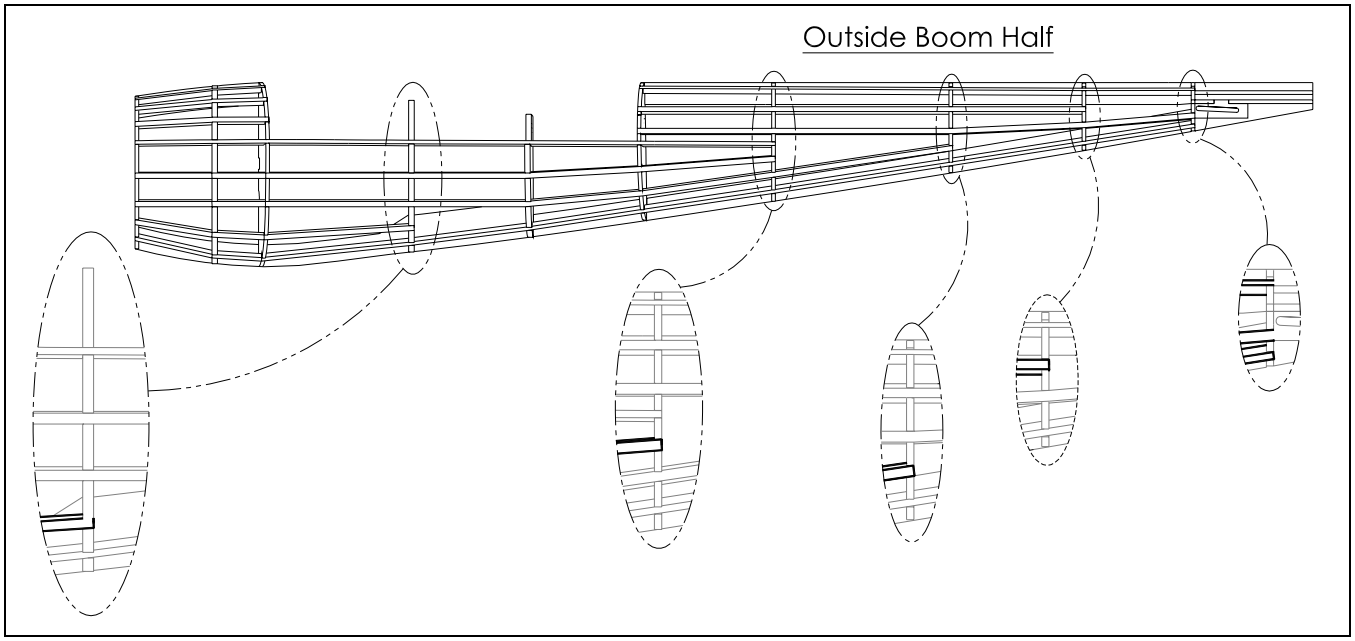


Figure 3

Inside Boom Half

- ❑ Pin boom keels **K2**, **K5**, and **K7** over one of the Inside Boom Halves shown on the plans and glue adjacent edges.
- ❑ Glue the boom formers **I1**, **I2**, **I4**, **I7**, **I8**, **I9**, and **I10** to **K2**, **K5**, and **K7** making sure they are perpendicular to the building surface. Be sure to orient each of the boom formers so that the notches that accept **K9** are in a line as you site down the boom.
- ❑ Install, but **DO NOT** glue the boom formers **I3**, **I5**, and **I6**.
- ❑ Glue **K9** into the notches of each of the boom formers **I1**, **I2**, **I3**, **I4**, **I5**, **I6**, and **I7**. Note that **K9** orients **I3**, **I5**, and **I6** at proper angles that interface the wing. Finish by gluing **I3**, **I5**, and **I6** to **K2**, **K5**, and **K7**.

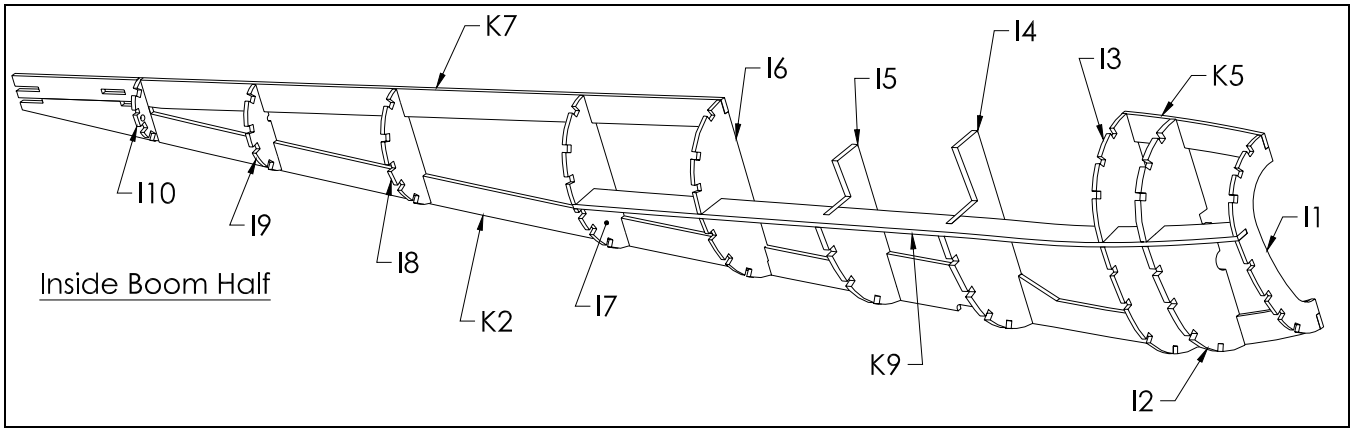


Figure 4

- ❑ Glue **B11** and **B12** into the notches of **K2**, **K7**, and **I10**.
- ❑ Glue pushrod exit **P2** to **B11** and **O10**.
- ❑ Glue **K3** to **K2**, **I4**, and **I5**. **K3** supports the landing gear.

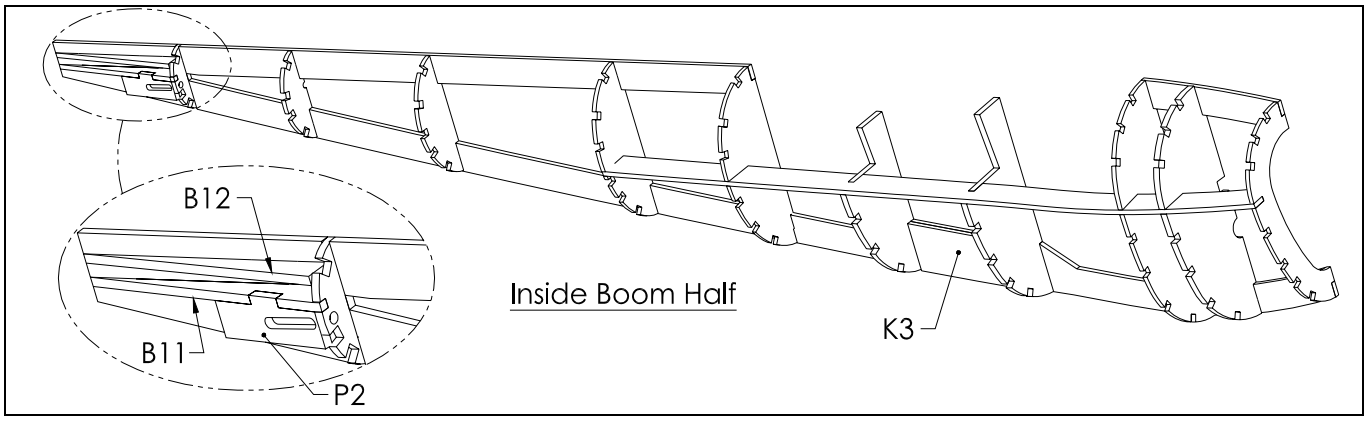


Figure 5

- ❑ Glue **3/32" SQ. Balsa Stringers** to the boom formers as shown in Figure 6 and the plans. Figure 6 illustrates important areas of the boom where stringers end.

- ❑ At this point the Inside Boom Half is complete and can be unpinned from the building board. Do not be concerned if the boom half is a bit warped when it is removed from the building board, this will be corrected when the boom halves are glued together.

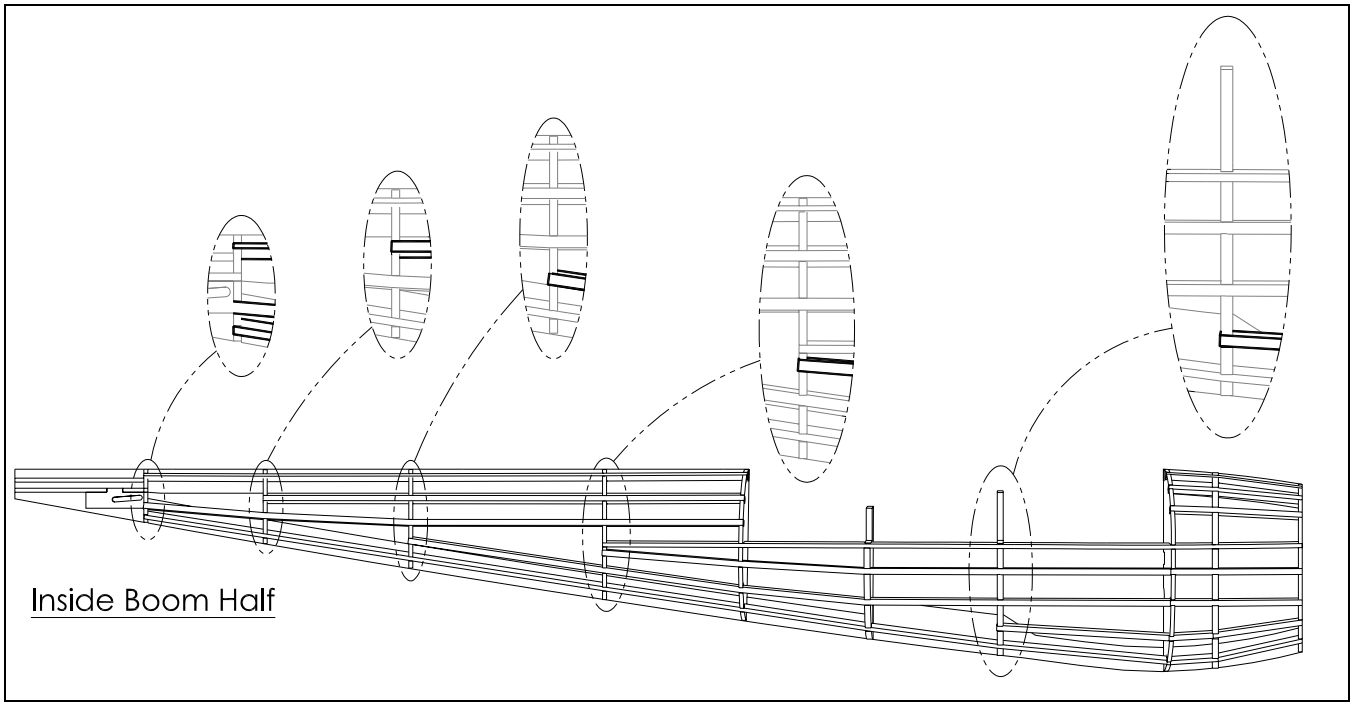


Figure 6

Boom Halves Joined

- ❑ Glue the outside boom and inside boom halves together. Take care to insure the mating formers **I3/O3**, **I4/O4**, **I5/O5**, **I6/O6** are aligned and flush with each other. Be sure to glue each of the mating formers and keels. A longer, more precise tip on your CA glue bottle can help here.

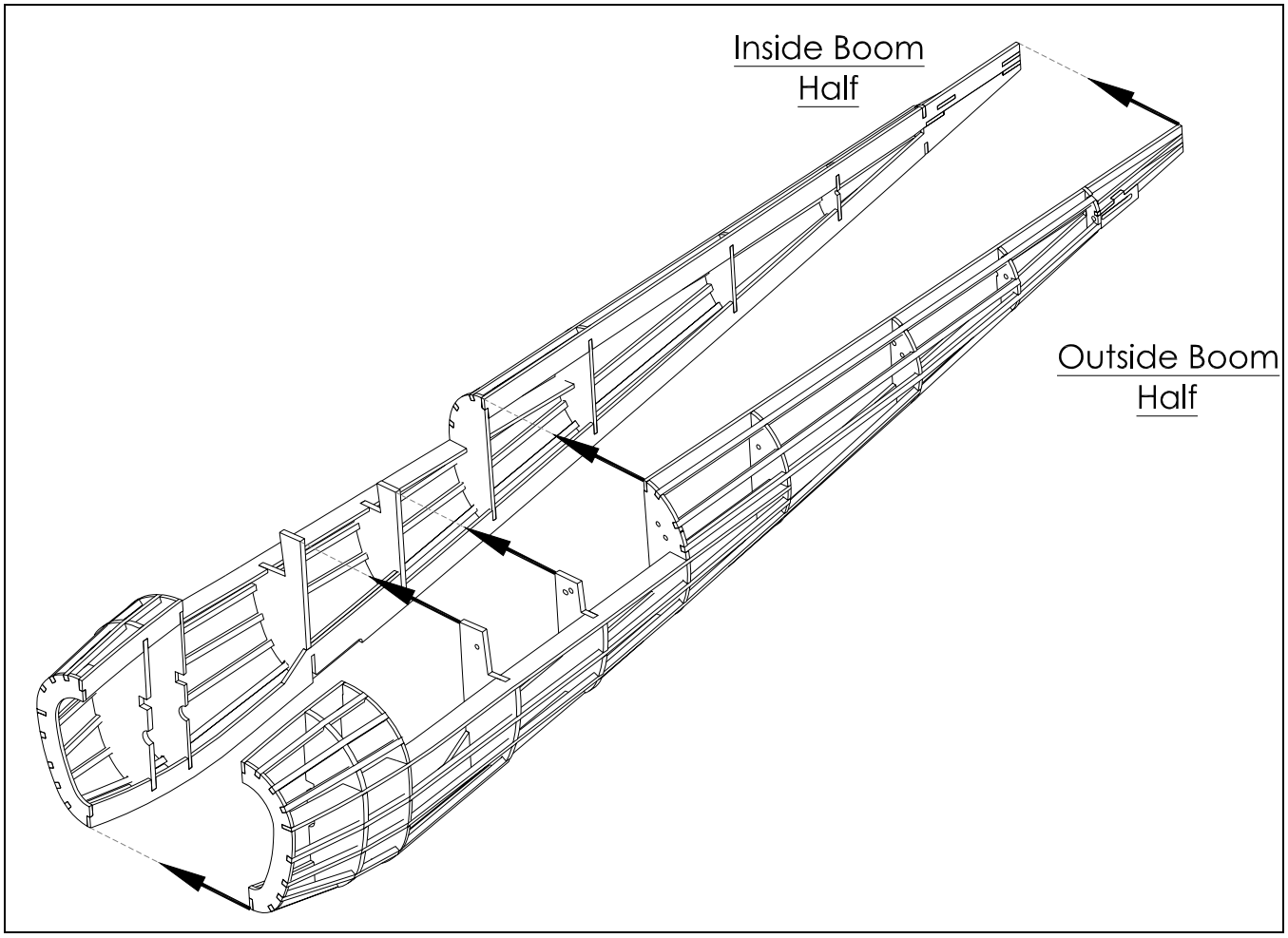


Figure 7

- ❑ Find the **3/16" x 5/16" IPS mounting stick** in the kit and cut it to the length shown in Figure 8.

- ❑ Using a pencil, place marks on the mounting stick as shown in Figure 8. Make sure the GWS IPS gearbox will slide over the mounting stick as far as it will go before gluing it to the boom. The back of the gearbox should end up very close to the line drawn at 15/16".

- ❑ Remove the GWS IPS gearbox from the mounting stick and slide the mounting stick into the rectangular holes in **I2/O2** and **I3/O3**. The mounting stick should slide all the way in until the line drawn at 1-3/8" reaches the front of **I2/O2**. Glue the mounting stick to **I2/O2** and **I3/O3**, be sure to flood the joints with thin CA to assure a good bond.

- ❑ Glue servo mount **M1** to **K8**, **K9**, and **I3/O3** as shown in Figure 8. Sand the boom to eliminate uneven rough wood surfaces and excess dried glue. At this point the boom is complete.

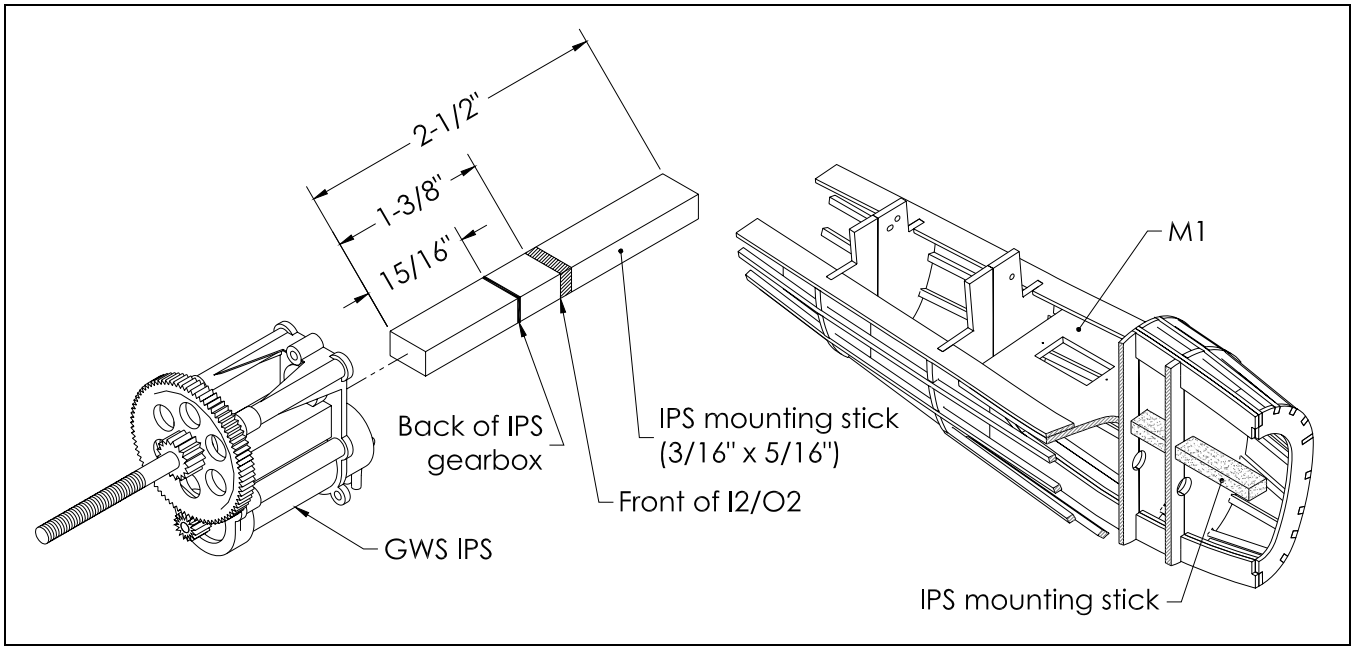


Figure 8

At this point, one of the booms is complete. Build the other boom by starting at the beginning of the **Boom Construction** section of this manual. Note that this boom will be a mirror image of the previously constructed boom.

Boom Covers

- ❑ Pin **C8** and **C9** over the **"Left Boom Cover"** shown on the plans. Make sure **C8** and **C9** are perpendicular to the building surface.
- ❑ Glue **C1**, **C2**, **C3**, **C4**, and **C5** to **C8** and **C9** as illustrated in Figure 9.
- ❑ Glue the top **3/32" SQ. Balsa Stringer**, **C6** and **C7** to **C1** through **C5**. Be sure to dry fit **C6** and **C7** before you begin gluing by pinning them to **C1** through **C5**, starting at **C5** and working your way forward. When you are satisfied with the fit of **C6** and **C7** glue them to **C1** through **C5**. There will be some excess **C6** and **C7** material that protrudes out from **C1**, trim this off flush with **C1** when the glue is dry.
- ❑ Glue the remaining **3/32" SQ. Balsa Stringers** to **C1** through **C5**, **C6** and **C7**. The stringer that interfaces with **C7** will have to be cut at an angle to have a good fit.
- ❑ Unpin the boom cover and finish cutting the small sections of balsa that retain the airfoil shaped bottom of **C8** and **C9**.
- ❑ Build the **"Right Boom Cover"** shown on the plans in the same manner used to construct the **"Left Boom Cover"**. Sand the boom covers to eliminate uneven rough wood surfaces and excess dried glue. At this point the boom covers are complete.

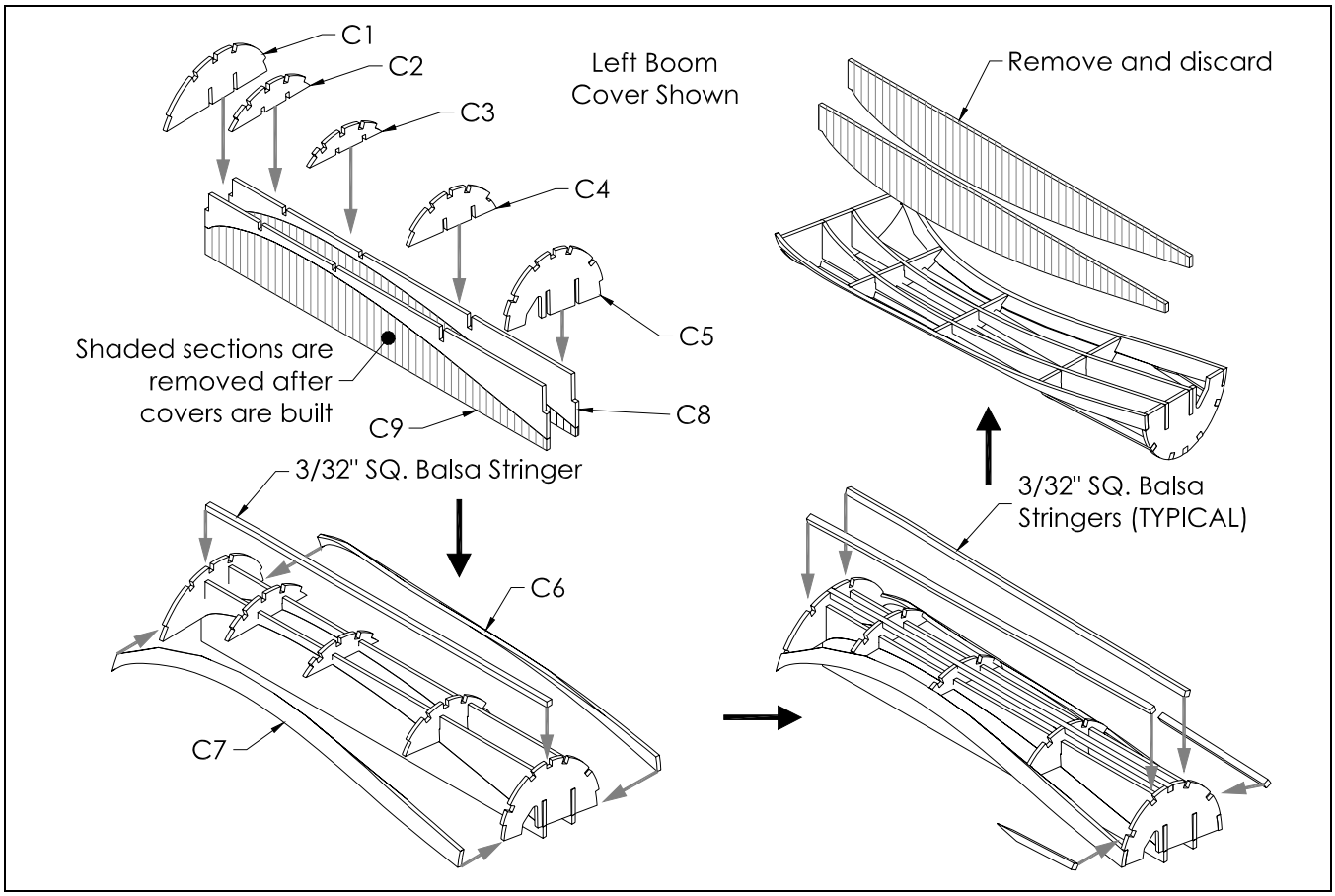


Figure 9

Boom Cowlings

- ❑ Glue **L1**, **L2**, **L3**, and **L4** together as shown in Figure 10 with wood glue.
- ❑ Sand the lamination of **L1**, **L2**, **L3**, and **L4** to the final shape shown in Figure 10. The engraved dashed line on **L4** is a guide to aid in the sanding process.
- ❑ Build an identical boom cowling from the additional set of **L1**, **L2**, **L3**, and **L4** formers. At this point the boom cowlings are complete.

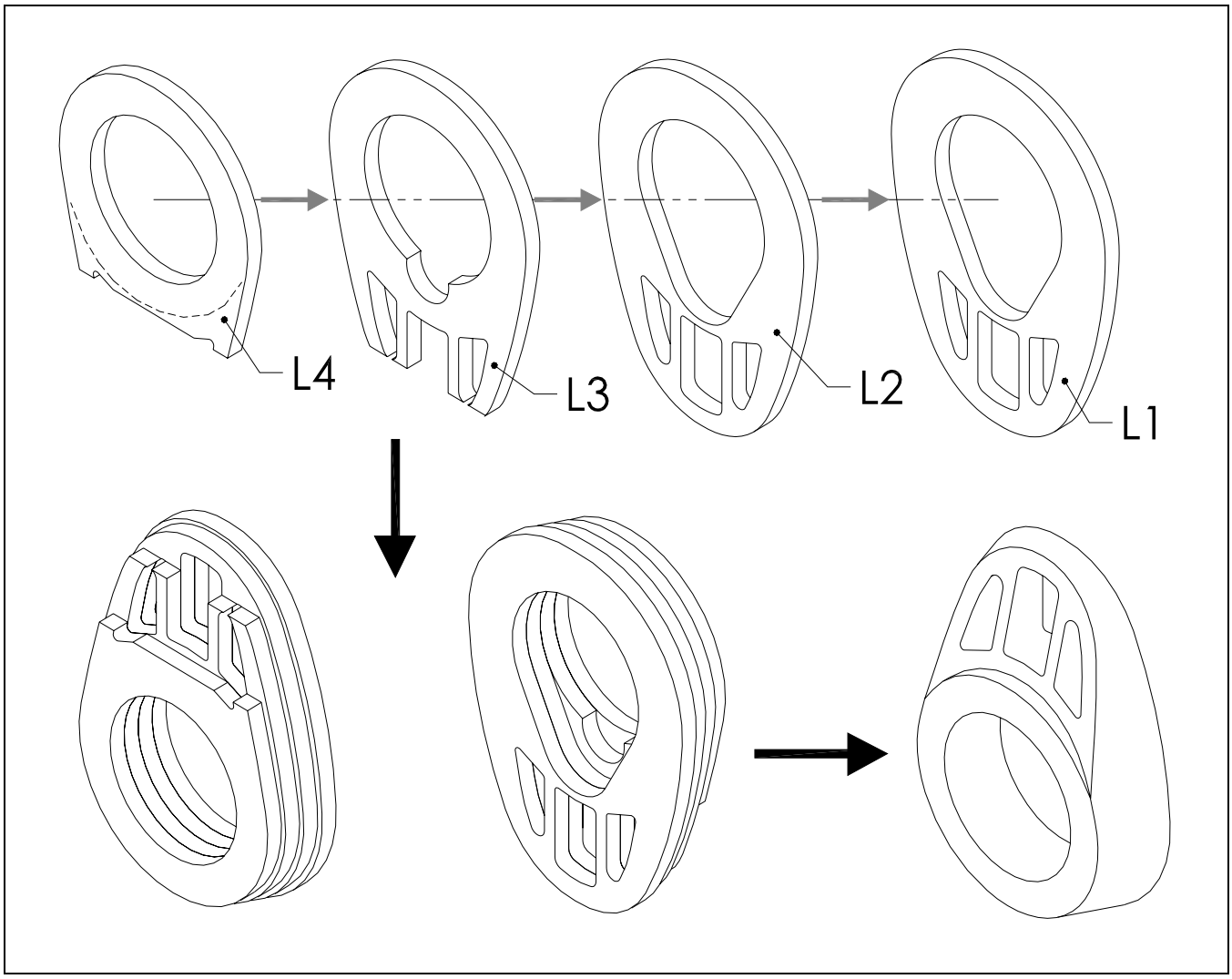


Figure 10

Build Section #2 – Fuselage Construction

The fuselage of the P-38 is constructed in two halves and then glued together to form the complete fuselage. The fuselage building section of the plans refer to "**Right Fuselage Half**" and "**Left Fuselage Half**".

Fuselage Halves

- ❑ Pin fuselage keels **F11**, **F12**, and nose gear former **G1** over the "**Left Fuselage Half"** ("**Right Fuselage Half**" when working through this section for the second time) shown on the plans and glue adjacent edges.

- ❑ Glue fuselage formers **F1**, **F2**, **F3**, **F4**, **F6**, **F7**, **F8**, **F9**, and **F10** to **F11**, **F12**, and **G1** making sure they are perpendicular to the building surface. Be sure to orient each of the fuselage formers so that the notches that accept **F13** are in a line as you site down the fuselage.

- ❑ Install, but **DO NOT** glue the fuse former **F5**.

- ❑ Glue **F13** into the notches of each of the fuselage formers **F1** through **F10**. Note that **F13** orients **F5** at the proper angle to interface the wing. Finish by gluing **F5** to **F11**, **F12**, and **F13**.

- ❑ Glue servo mount **M2** to **F6**, and **F7** as shown in Figure 11. Note **M2** is **NOT** installed in the **"Right Fuselage Half"**.

- ❑ Install the rudder and steering servo with the mounting screws included with the servo. Note the orientation shown in Figure 11. The servo arm should be trimmed/modified to an "L" shape; this matches the arm shown in Figure 11.

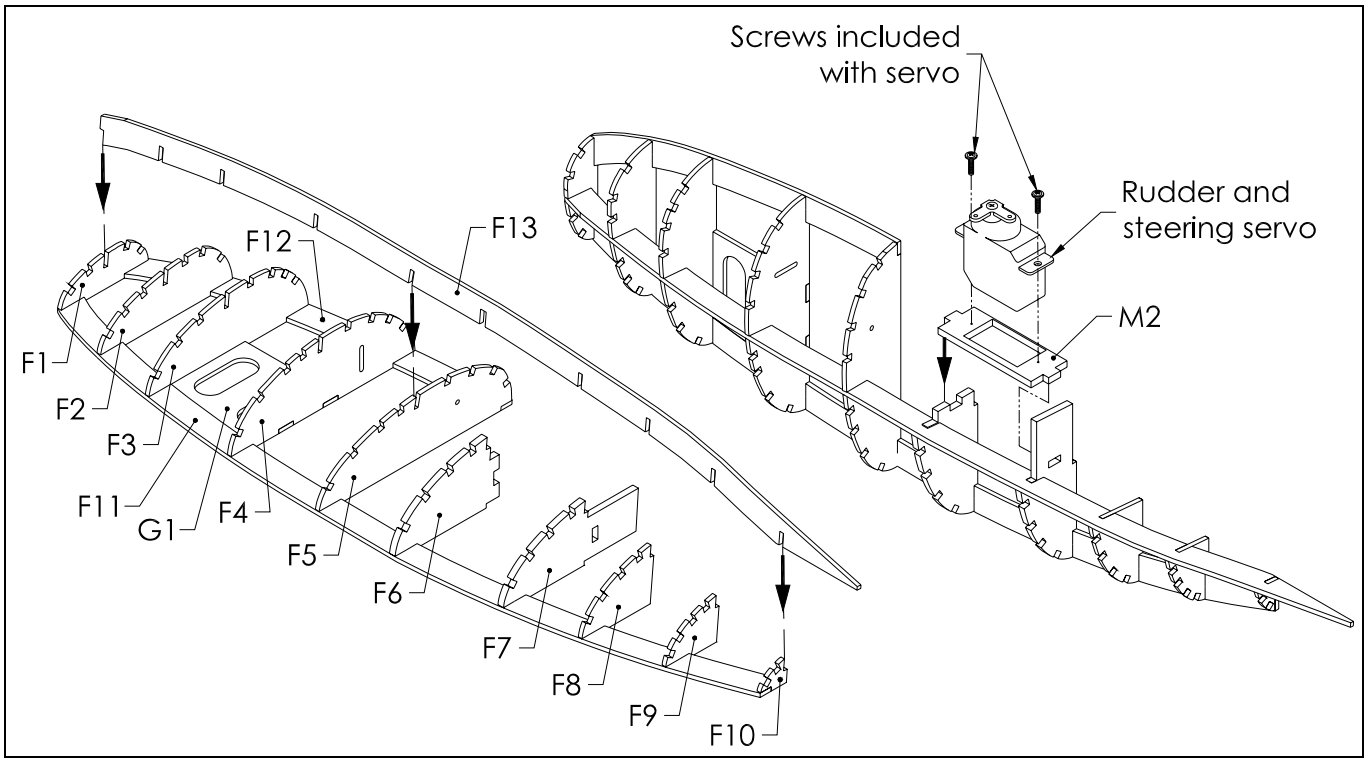


Figure 11

- ❑ Glue **G2** and **G3** to **G1**, **F3**, **F4**, and **F11**. When **G2** and **G3** are installed there should be a 1/16" gap between them, which receives the nose gear assembly. Be sure to fit the 1/16" nose gear wire into the gap so it that rotates without excessive friction.

- ❑ Glue **N1**, **N2**, **N3**, and **N4** to **F1** and each other with wood glue.

- ❑ Construct the nose gear as shown in "**Nose Gear Bending Template and Assembly"** section of the plans. Insert the nose gear assembly into the 1/16" gap between **G2** and **G3**. The plastic 1/8" O.D. plastic tubing sections will ride on the top and bottom of **G1**, **G2**, and **G3**.

- ❑ Glue **G4** to **G2**, **G3**, **F3**, and **F4** to encapsulate the nose gear assembly. Be careful not to get glue on any part of the nose gear assembly. The nose gear is now a permanent part of the left fuselage half and should rotate freely. Note the nose gear assembly will be tilted at an angle while it is pinned to the building surface.

- ❑ Drill a 1/16" DIA. hole through the center of the **3/16" SQ. X 1/4" LG. Hardwood block** and glue the **plywood nose gear arm** to it as shown in Figure 12.

- ❑ Construct the **Nose Gear Actuation Link** that connects the nose gear assembly to the rudder and steering servo as shown in "**Nose Gear Actuation Link**" section of the plans.

- ❑ Insert the **Nose Gear Actuation Link** into the hole and slot of fuselage formers **F3** and **F4**.

- ❑ Slide the **Hardwood block/plywood nose gear Arm** assembly onto the "Z" Bend of the **Nose Gear Actuation Link** as shown in Figure 12. Next, slide the **Hardwood block/plywood Nose Gear Arm** assembly onto the nose gear assembly so that it lines up flush with the end of the 1/16" wire. This is illustrated in Figure 12 and should be glued with 5-minute epoxy to ensure a strong bond. Once the stringers are installed it will be difficult to gain access to this area of the fuselage again.

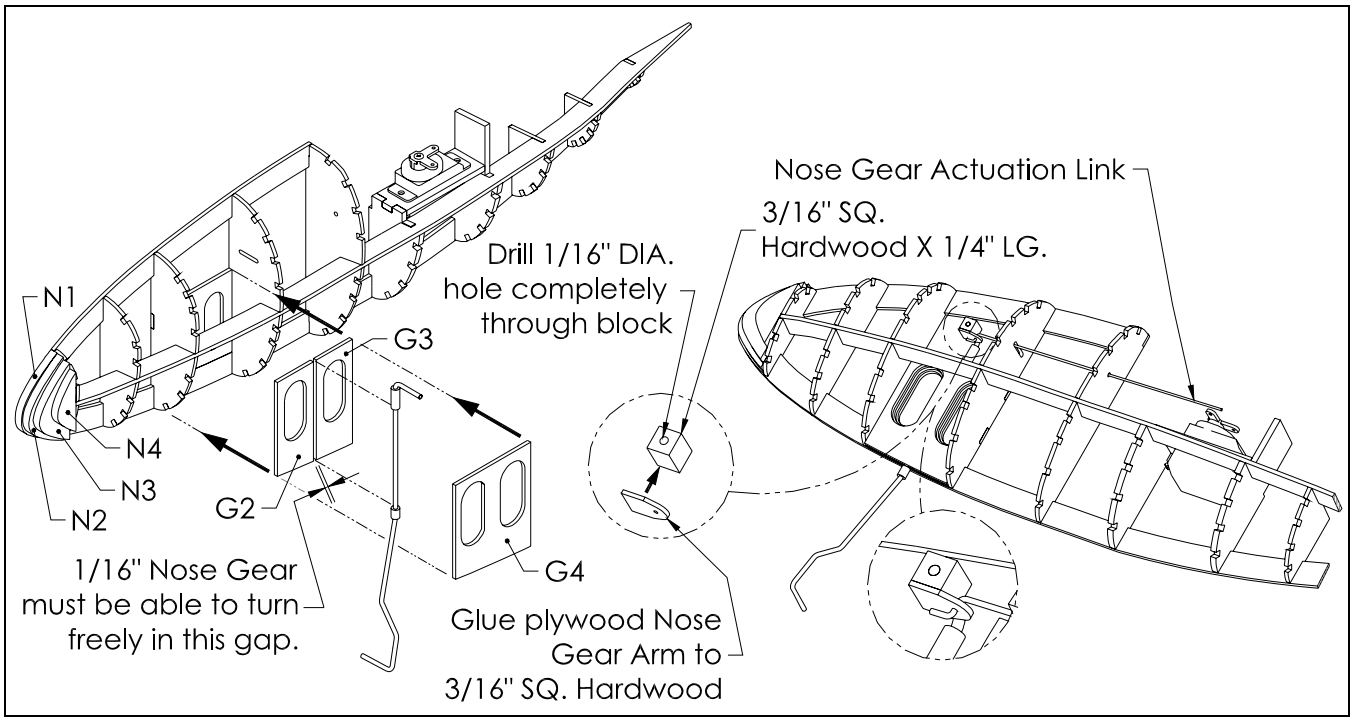


Figure 12

- ❑ Glue **3/32" SQ. Balsa Stringers** to the fuselage formers as shown in Figure 13 and the plans. Figure 13 illustrates important areas of the fuselage where stringers end.

- ❑ At this point the left fuselage half is complete and can be unpinned from the building board. Do not be concerned if the fuselage half is a bit warped when it is removed from the building board, this will be corrected when the boom halves are glued together.

- ❑ Build the right fuselage half by starting at the beginning of the **Fuselage Halves** section of this manual and working from the "**Right Fuselage Half**" section of the plans. Note that the right fuselage half will not include any of the provisions to mount the nose gear or rudder and steering servo. Only the left fuselage half contains structure and hardware for the nose gear.

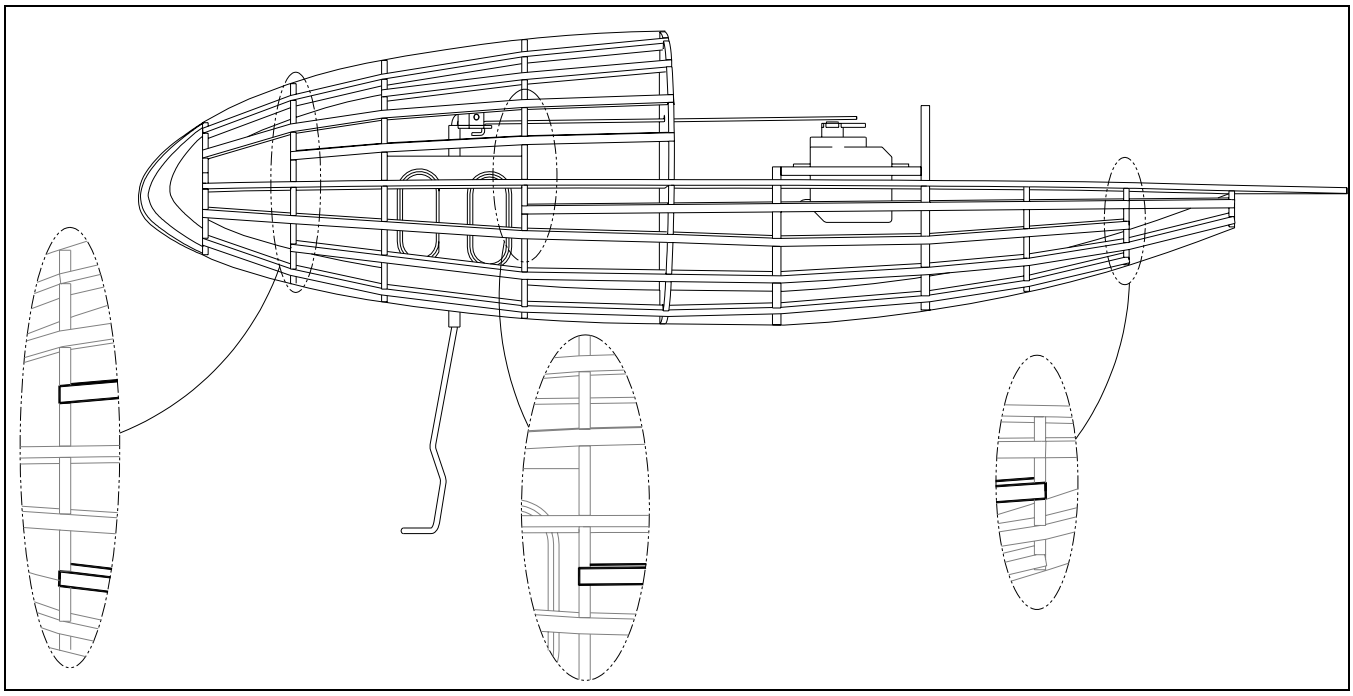


Figure 13

Fuselage Halves Joined

- ❑ Glue the left fuselage and right fuselages halves together. Take care to insure the mating formers **F1** through **F10** are aligned and flush with each other. Be sure to glue each of the mating formers and keels. A longer, more precise tip on your CA glue bottle can help here.

- ❑ Glue **T1** through **T10** to **F13**s, **F10**, and each other with wood glue.

- ❑ Install the nose gear wheel. The nose gear wheel is held on with short section of 1/8" O.D. plastic tubing cut to 1/8" LG. The plastic tubing is attached with thin CA glue to the nose gear wire, be careful not to get any glue on the wheel. This is illustrated in Figure 14. (Note, the Du-bro wheels may have to be drilled out to fit the nose gear wire)

- ❑ Install the Micro Connector to the servo arm in the location illustrated in Figure 14. Slide the **Nose Gear Actuation Link** into the Micro Connector, center the nose gear and tighten the Micro Connector screw to retain the **Nose Gear Actuation Link.**

- ❑ Sand the nose and tail of the fuselage smooth to blend into the shape of the fuselage. Also, sand the fuselage to eliminate uneven rough wood surfaces and excess dried glue. At this point the fuselage is complete.

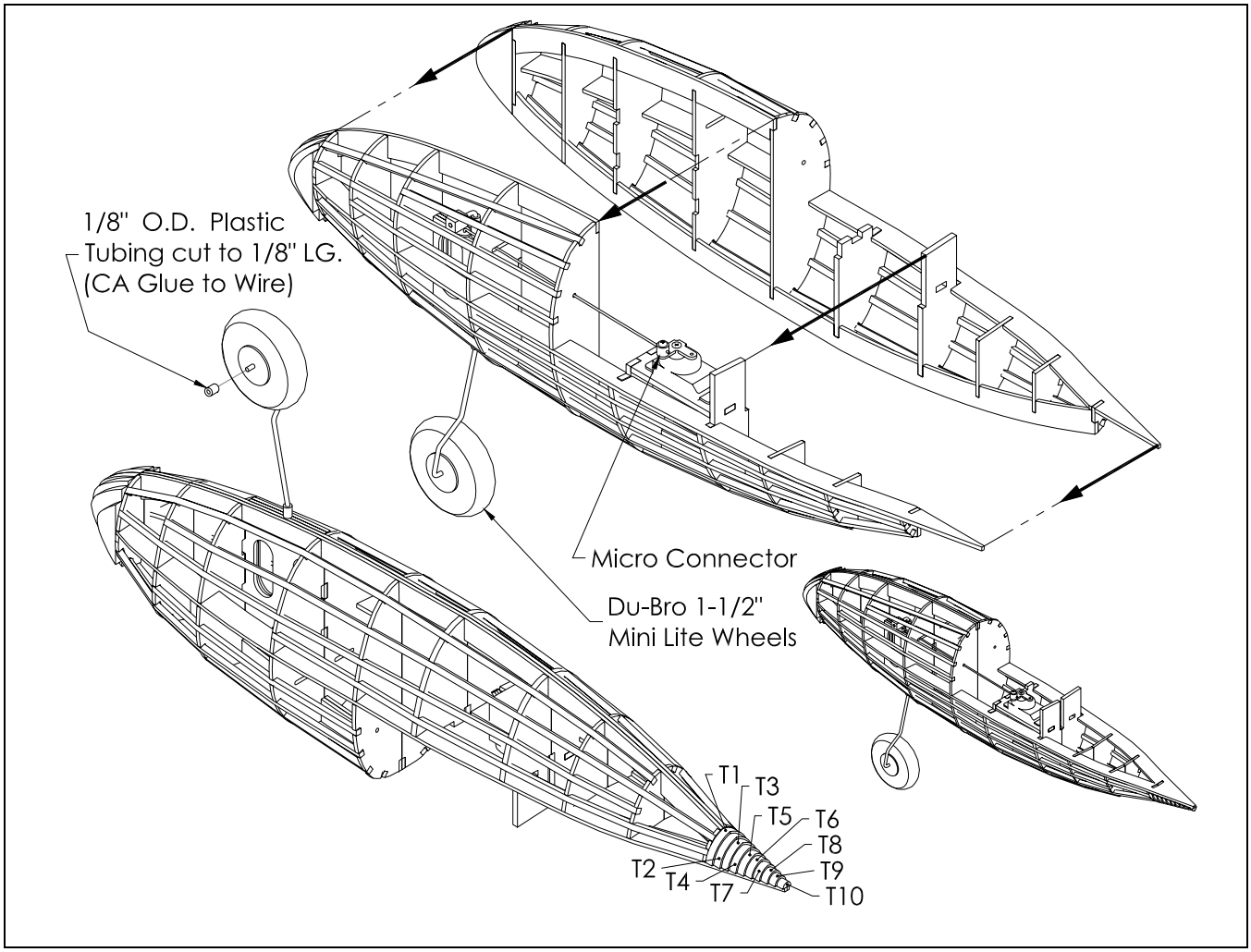


Figure 14

Build Section #3 – Wing Construction

The wing of the P-38 is constructed in two halves and then glued together to form the complete wing.

Wing Halves

- ❑ Create the laminated spars, **S1** and **S2** by gluing two **S1**'s and two **S2**'s together by using the "**Spar Lamination**" section shown on the plans. Laminate these spars with wood glue or epoxy and pin over the plans to make sure they remain straight and true.

- ❑ Pin **laminated S2**, **3/32" SQ. Balsa**, **W11**, and **E1** over one of the wing halves shown on the plans and glue adjacent edges.

- ❑ Glue **R2** through **R15** to **laminated S2**, **3/32" SQ. Balsa**, **W11**, and **E1** making sure they are perpendicular to the building surface. Note **R2** has to be scored on the etched line with your modeling knife to fit the shape shown on the plans. Flood the scored line of **R2** with CA glue after it is pinned to the shape shown on the plans.

- ❑ Glue **R1** to the laminated **S2**, **3/32" SQ. Balsa**, and **E1** making sure it is tilted to the angle created with the use of the "**Rib R1 angle gauge**" shown on the plans and illustrated in Figure 15.

- ❑ Glue **W12** and **W13** to **W11** and **R15**.

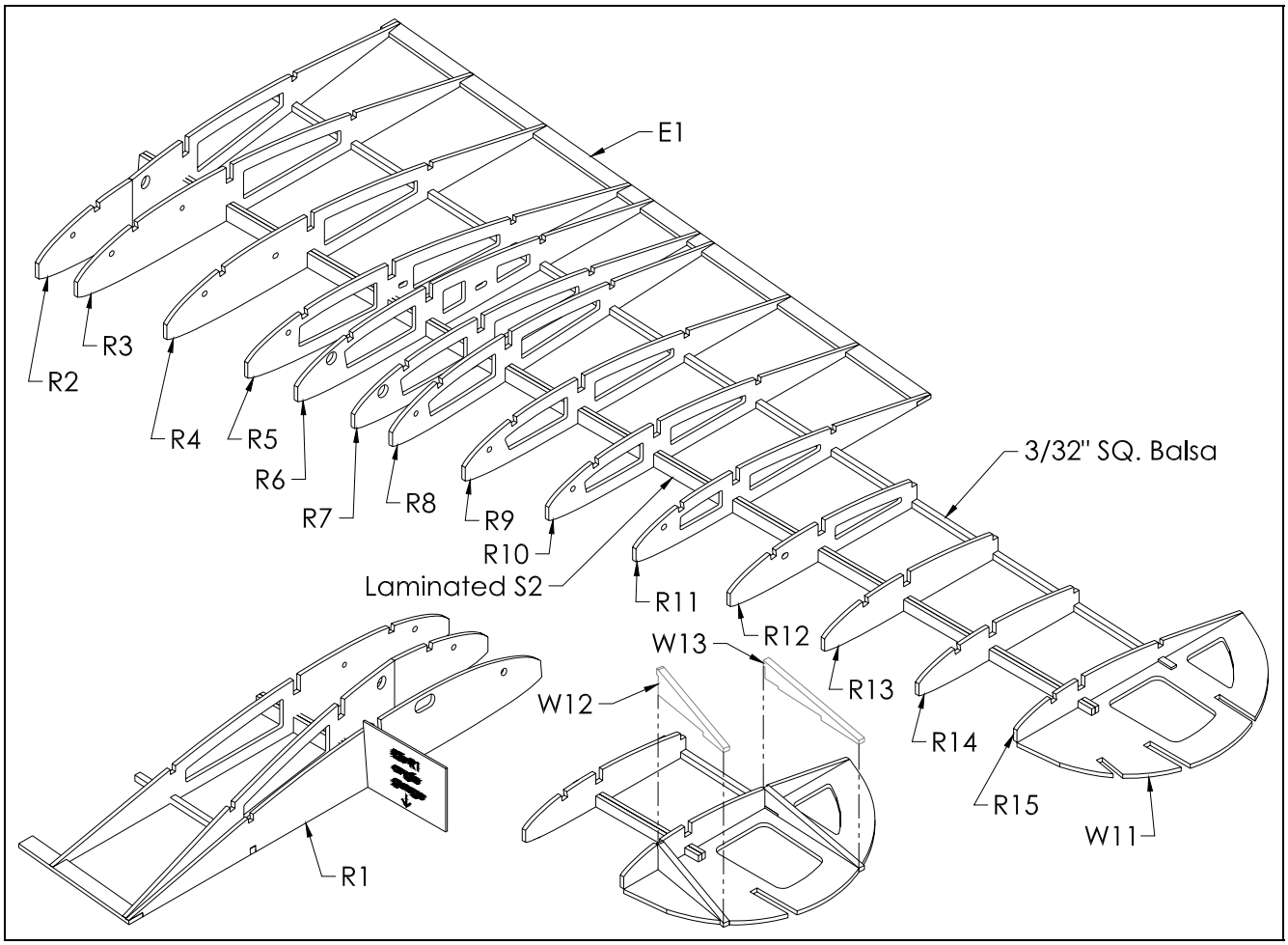


Figure 15

- ❑ Glue **laminated S1**, **3/32" SQ. Balsa**, and **LE** to **R1** through **R15** and **W11** where applicable.
- ❑ Glue **A9** to **R13** and the bottom **3/32" SQ. Balsa**.

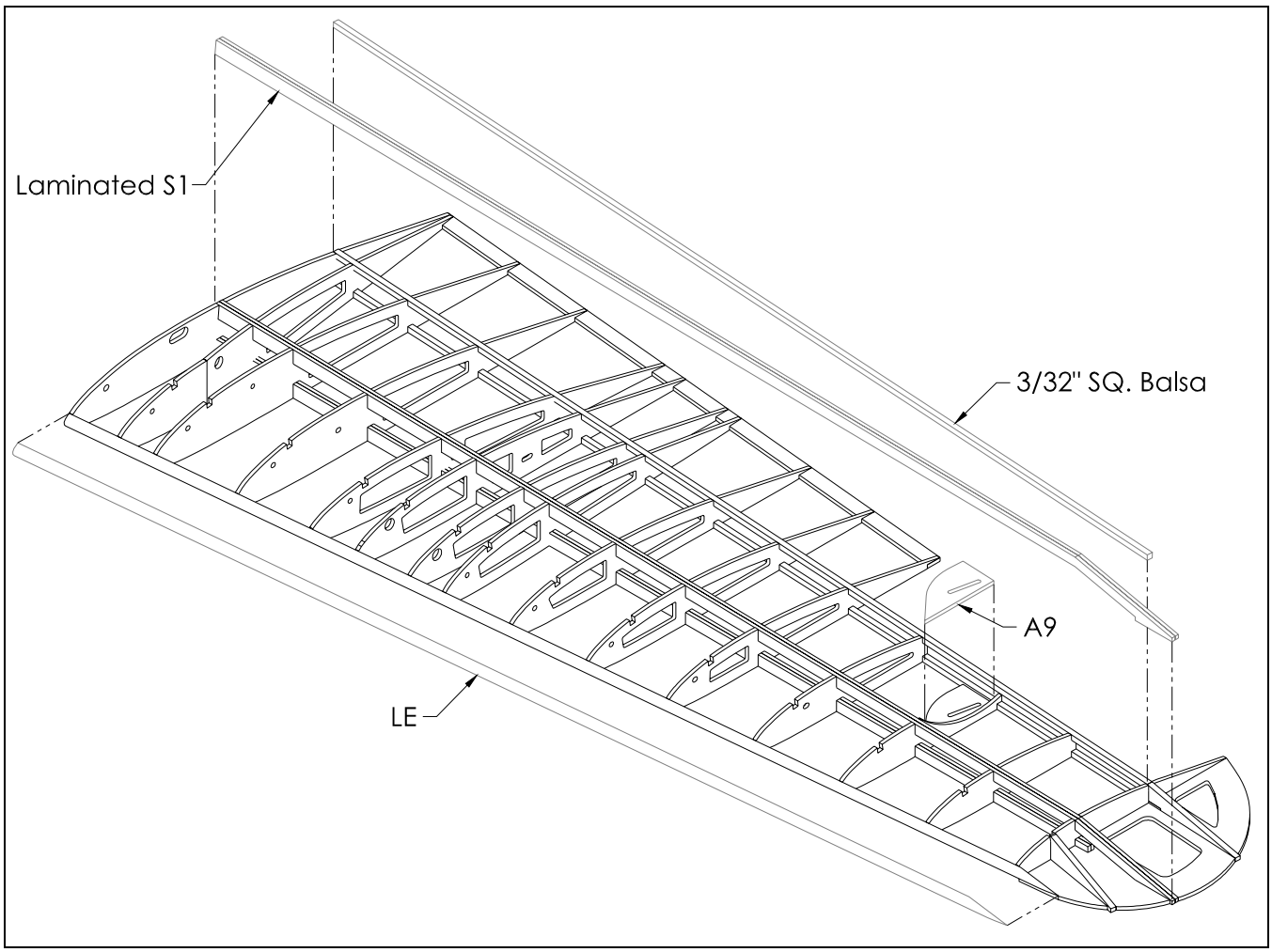


Figure 16

- ❑ Glue the two **3/32" SQ. Balsa** to **R1** through **R15**.
- ❑ Glue **A8** to the two **3/32" SQ. Balsa**, **R15**, and **R11**.
- ❑ Glue shear webs **W1** through **W10** to laminated Spars **S1**, **S2**, and adjacent ribs. Note that the grain of these shear webs is always perpendicular to the building surface. The orientation of each shear web can be seen in Figure 17.

Ailerons

- ❑ Pin **E2** over one of the ailerons shown on plans.
- ❑ Glue and pin **A1** through **A5** to **E2** making sure they are perpendicular to the building surface.
- ❑ Glue **A7** to **A1** through **A5**.
- ❑ Glue **A6** to **E2** and **E7**. The gap between **A6** and **A3** is intentional and allows a place for the aileron control horns to be glued.

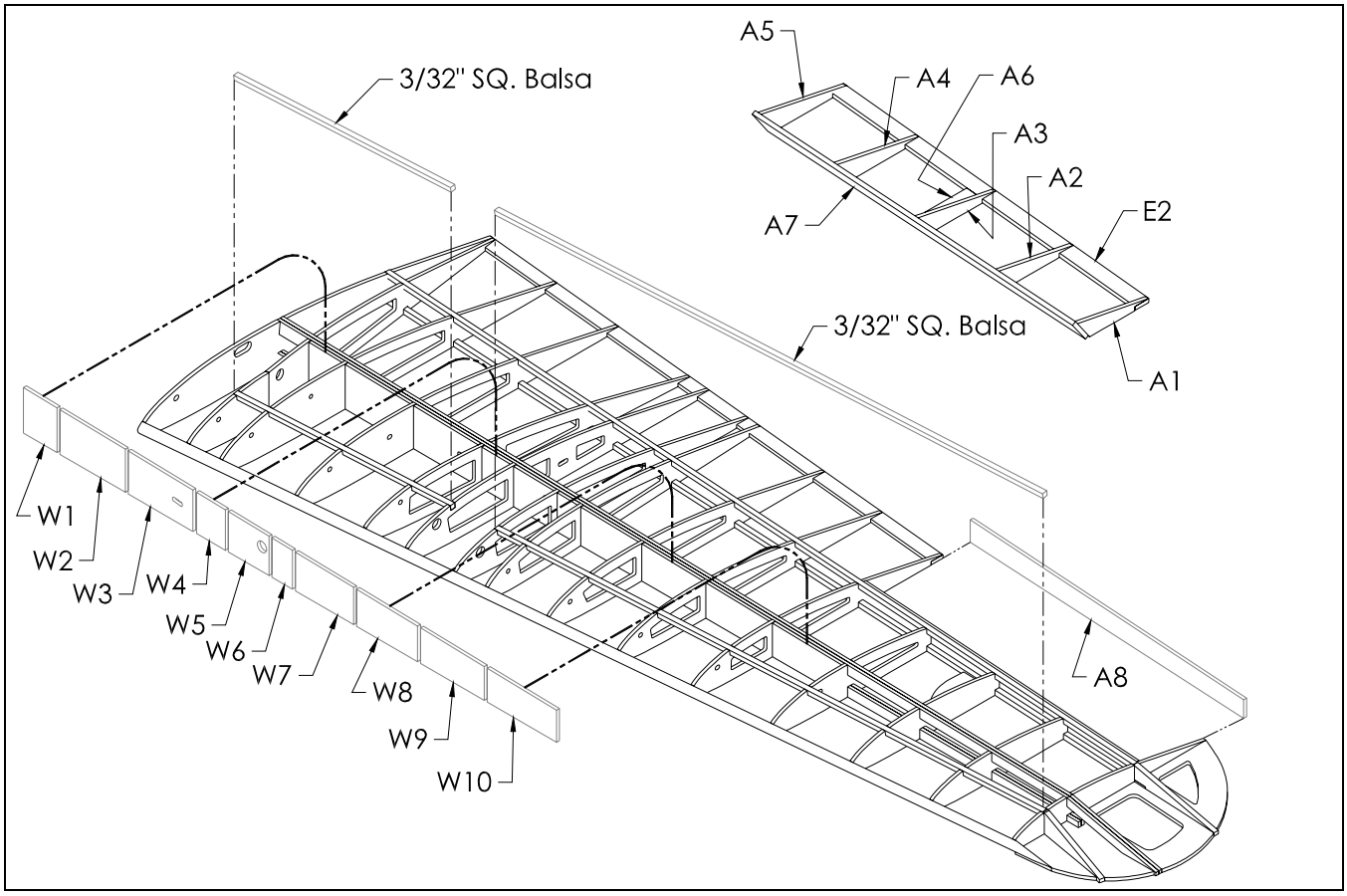


Figure 17

- ❑ Build the other wing half and aileron by starting at the beginning of the **Wing Halves** section of this manual and working from the plans.

Wing Halves Joined

- ❑ With one wing half fixed flat to the building surface, glue on the other wing half with the tip elevated to the dimension shown in Figure 18. Join the two wing halves with Epoxy.

- ❑ Sand the leading edge of the wing blending it into the shape of the wing/airfoil. Also, sand the wing to eliminate uneven rough wood surfaces and excess dried glue.

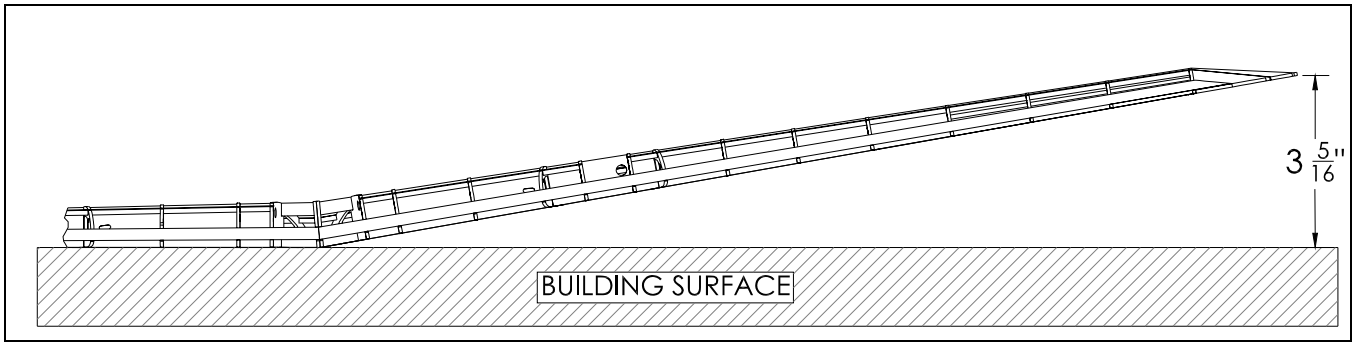


Figure 18

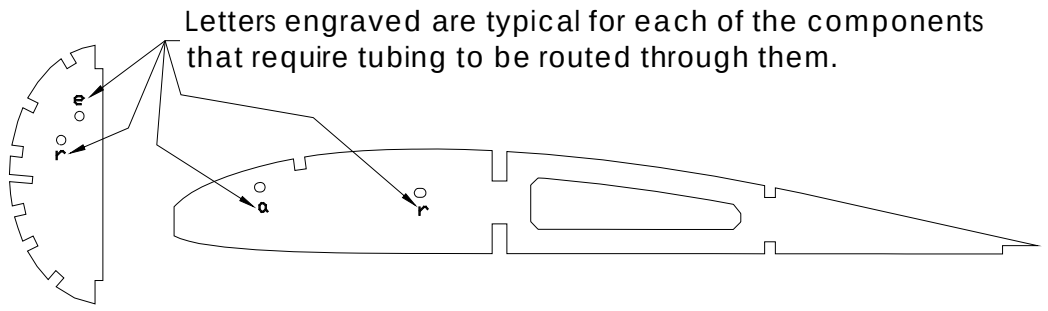
Build Section #4 – Horizontal/Vertical Stabilizer, Elevator, and Rudder Construction

- ❑ Build the horizontal stabilizer, elevator, vertical stabilizers, and rudders per the **"Tail Components"** section of the plans.

Build Section #5 – Control Installation

To maintain scale functionality, manage weight, and minimize the number of servos, the Molt Models P-38 makes use of a creative control system. The rudder servo is mounted in the fuselage and is required to operate the nose gear (if installed) as well as both rudders. The elevator servo is mounted in the left boom, and the aileron servo is mounted in the right boom.

Each component containing a hole with an engraved letter next to it designates a place where a control tube will be routed through. The letter "r" designates a hole where a rudder control tube will pass through, and similarly, "a" for aileron, and "e" for elevator. In most areas where a control tube passes through you should glue the tubing to the component. However, there are areas where the tubing **SHOULD NOT** be glued to a component and those areas are marked with an exclamation point enclosed in a triangle. See Figure 19.



⚠ Designates an area where tubing should not be glued to a component.

Figure 19

Wing

- ❑ Install the flexible plastic tubing in the wing as shown in Figure 20. The tubes for the rudder will hang loose towards the trailing edge of the wing for the time being.

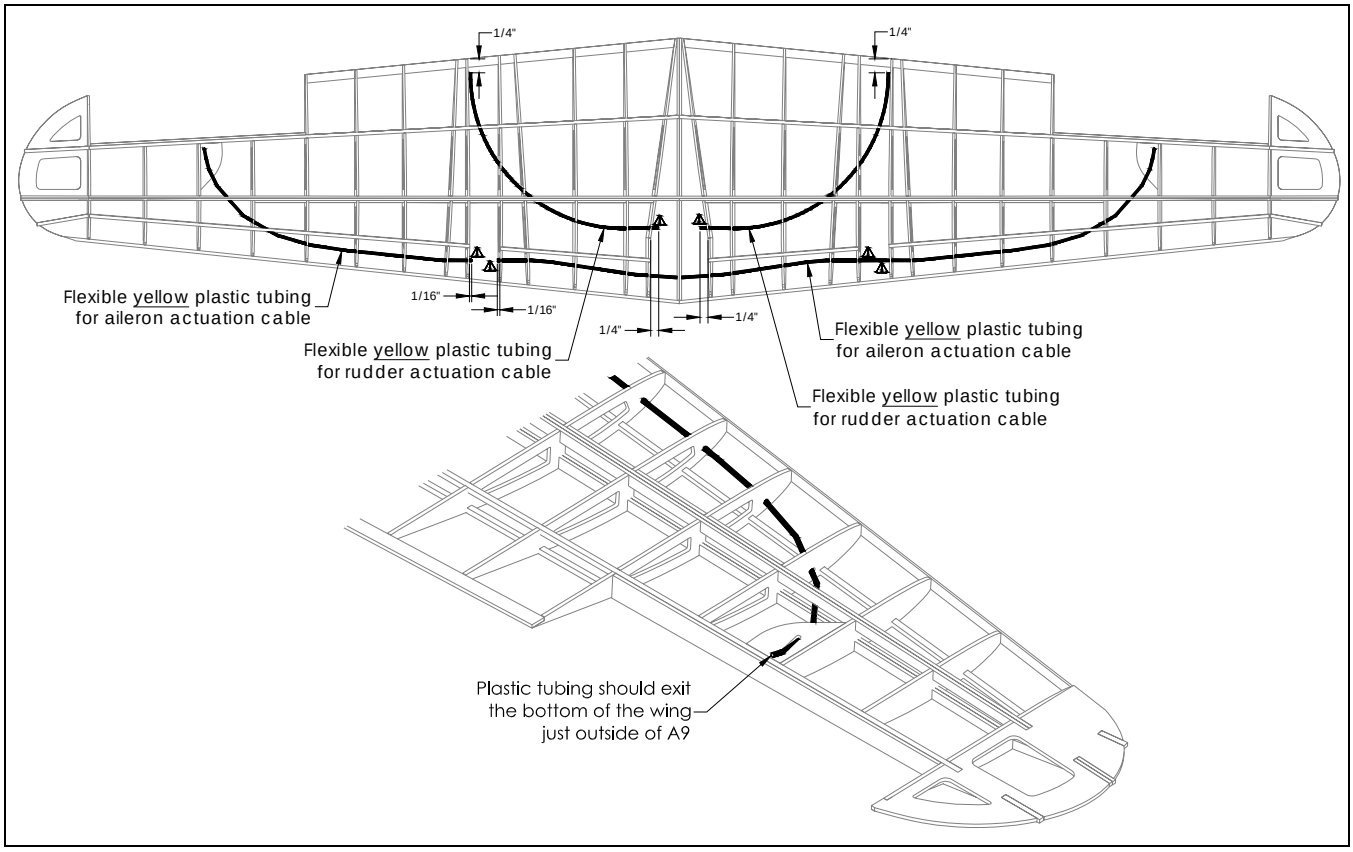


Figure 20

Left Boom

- ❑ Install the flexible plastic tubing in the left boom as shown in Figure 21.
- ❑ Install the elevator servo with the mounting screws included with the servo. Note the orientation shown in Figure 21. The servo arm should be trimmed/modified to the shape matching the arm shown in Figure 21.
- ❑ Install the Micro Connector to the servo arm as illustrated in Figure 21.

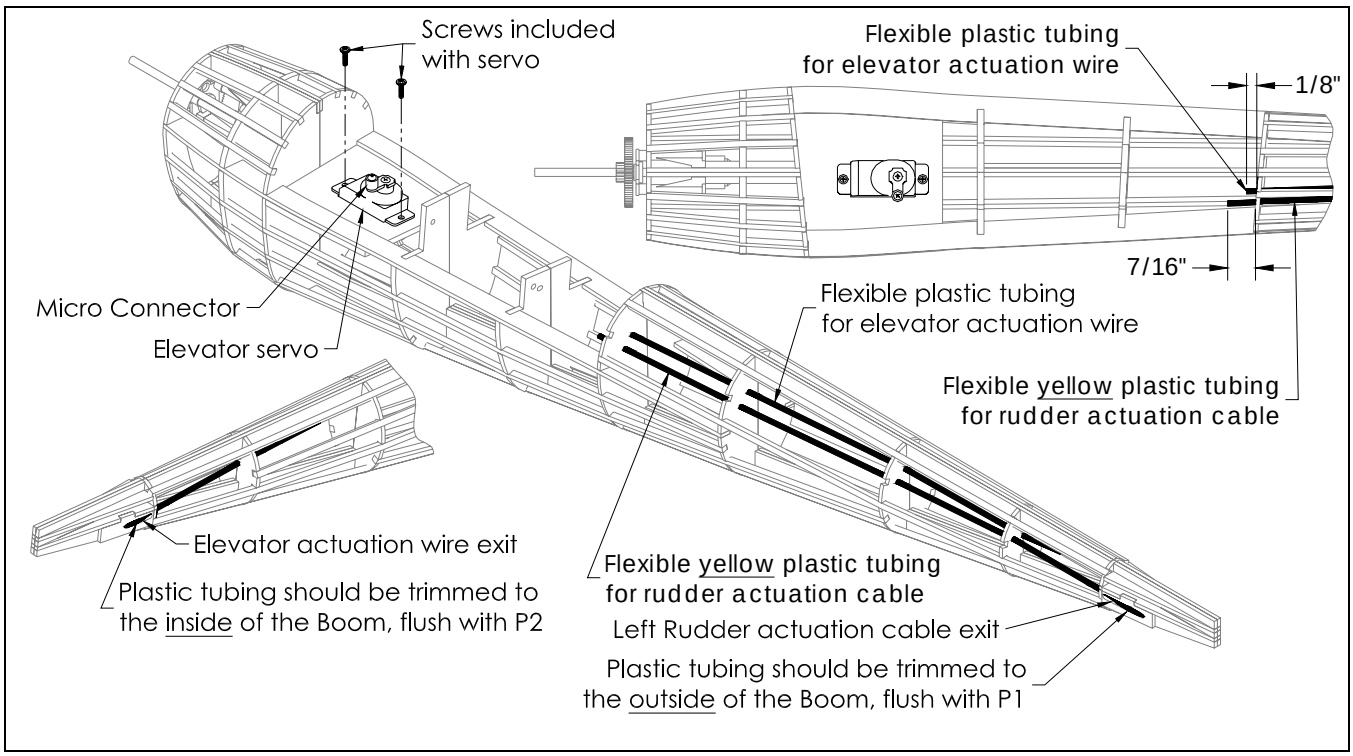


Figure 21

Right Boom

- ❑ Install the flexible plastic tubing in the right boom as shown in Figure 22. Note that there isn't a control tube for the elevator in this boom.

- ❑ Install the aileron servo with the mounting screws included with the servo. Note the orientation shown in Figure 22. The servo arm should be trimmed/modified to the shape matching the arm shown in Figure 22.

- ❑ Install the Micro Connector to the servo arm as illustrated in Figure 22.

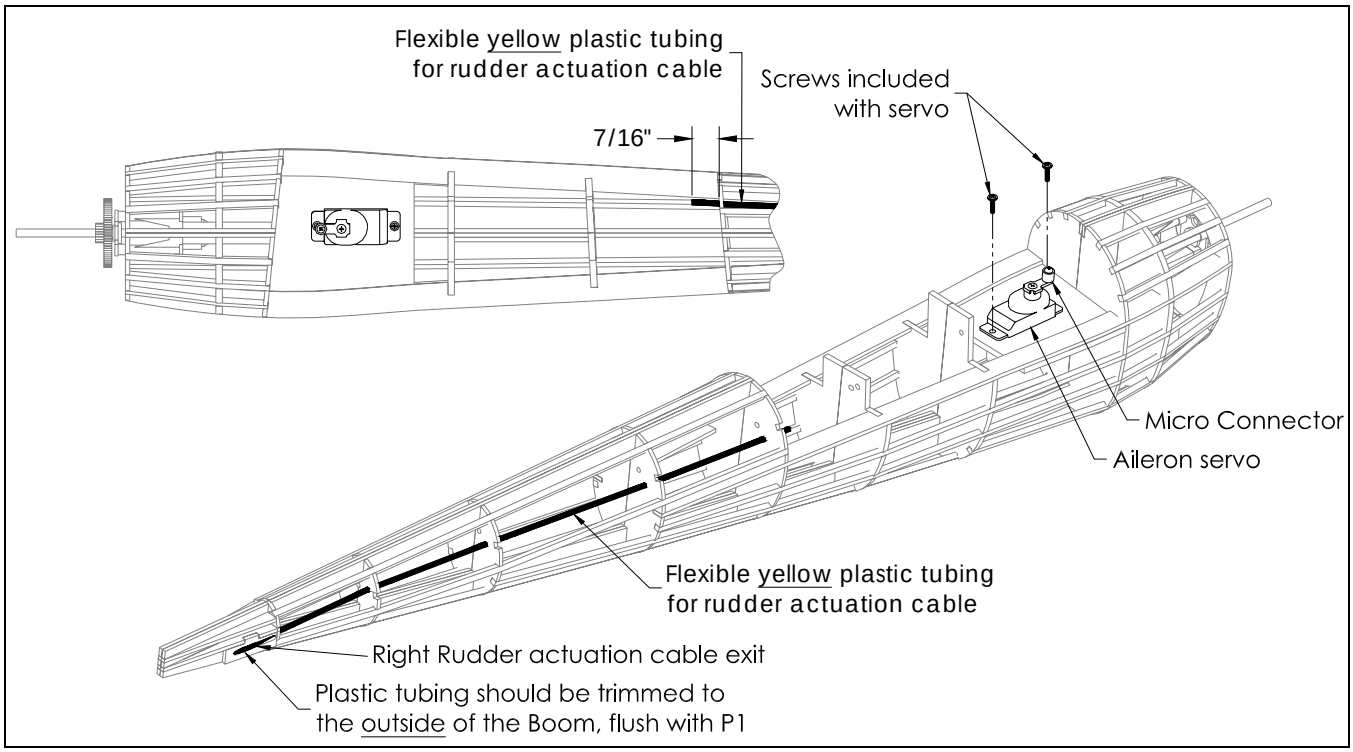


Figure 22

Build Section #6 – Covering

Covering the P-38 is easy, but it is important to examine the next few steps so that covering is left out of critical areas that interface each other. Before covering any of your P-38 Lightning, I recommend taking a look forward to **Build Section #7 - Assembly and Finishing**. It is helpful to test fit the wing, booms, boom covers, fuselage, tail, and all control surfaces as opposed to waiting to see if they fit after covering. If necessary, parts should be sanded to achieve a proper fit. When you are comfortable with the fit of the major parts, return to **Build Section #6 – Covering**, and proceed through the manual.

Wing

- ❑ Cover the entire wing except for the section between ribs **R6** and **R7,** and the section between both **R2**'s. Also, **DO NOT** cover the leading and trailing edge between these ribs. This is illustrated in Figure 23 and shown by bold lines. These areas interface the booms and fuselage.

- ❑ Completely cover each of the ailerons. **DO NOT** be concerned about hinging the control surfaces at this point.

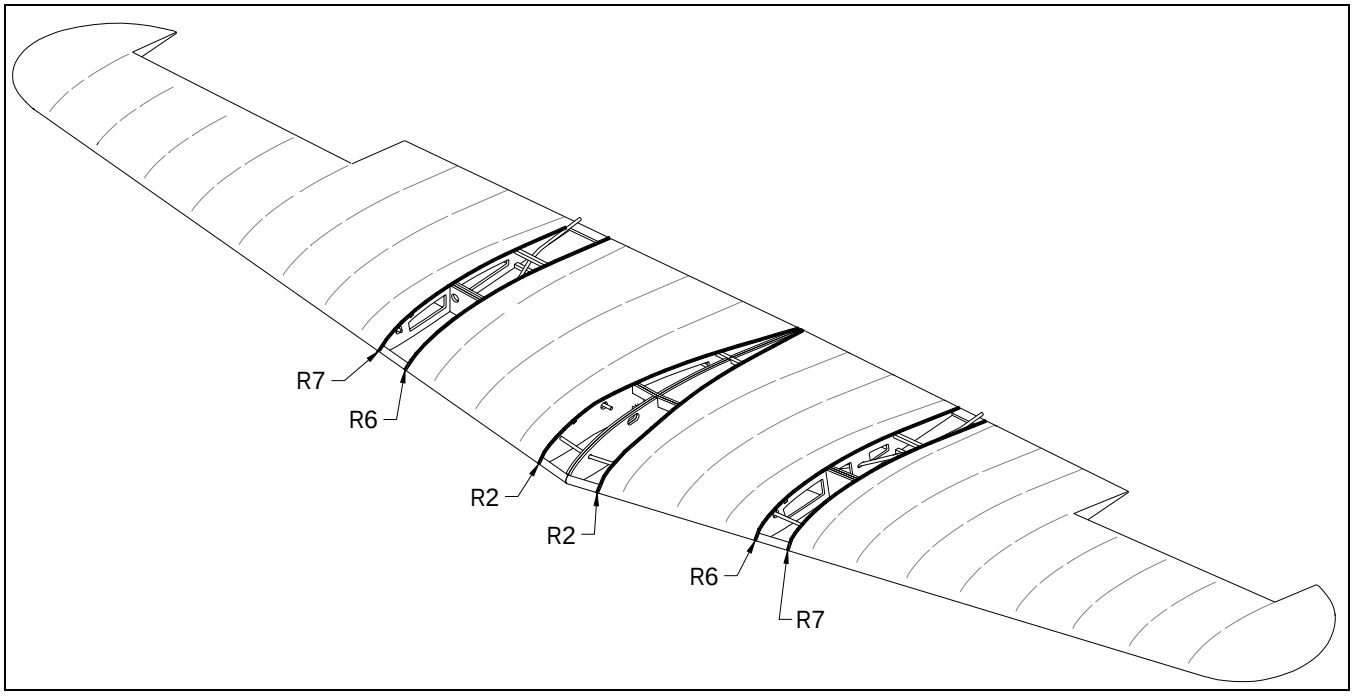


Figure 23

Fuselage and Tail

- ❑ Cover the entire fuselage except for the section illustrated in Figure 24 and shown by bold lines. This area interfaces the wing.

- ❑ Cover the entire horizontal stabilizer/elevator and vertical stabilizer/rudder except for the section illustrated in Figure 24 and shown by bold lines. These areas interface the boom. **DO NOT** be concerned about hinging the control surfaces at this point.

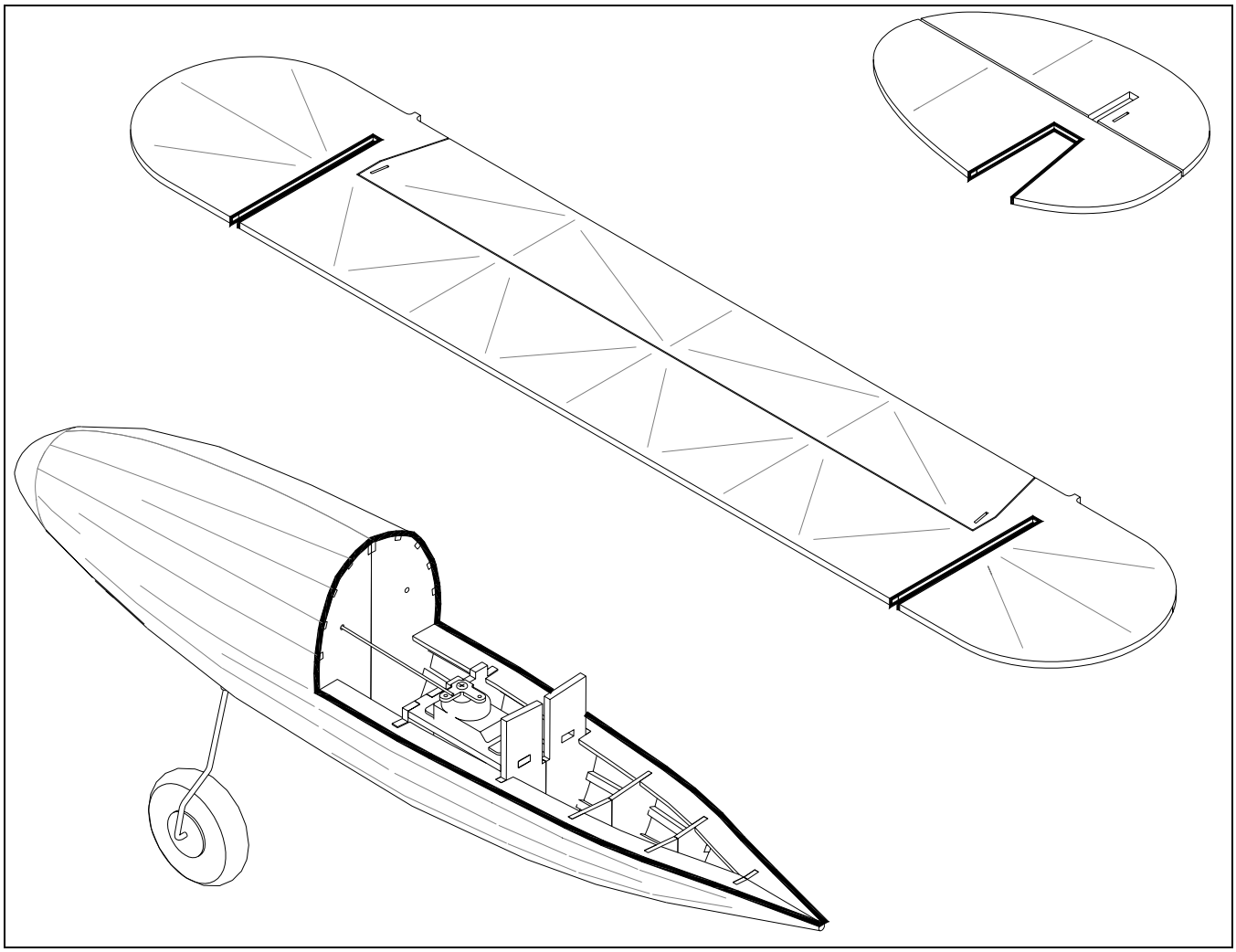


Figure 24

Booms

- ❑ Cover the entire boom except for the section between **B11** and **B12** (on both sides of the boom) and the other areas illustrated in Figure 25 and shown by bold lines. These areas interface the horizontal stab and wing.

- ❑ Completely cover the top of each of the boom covers.

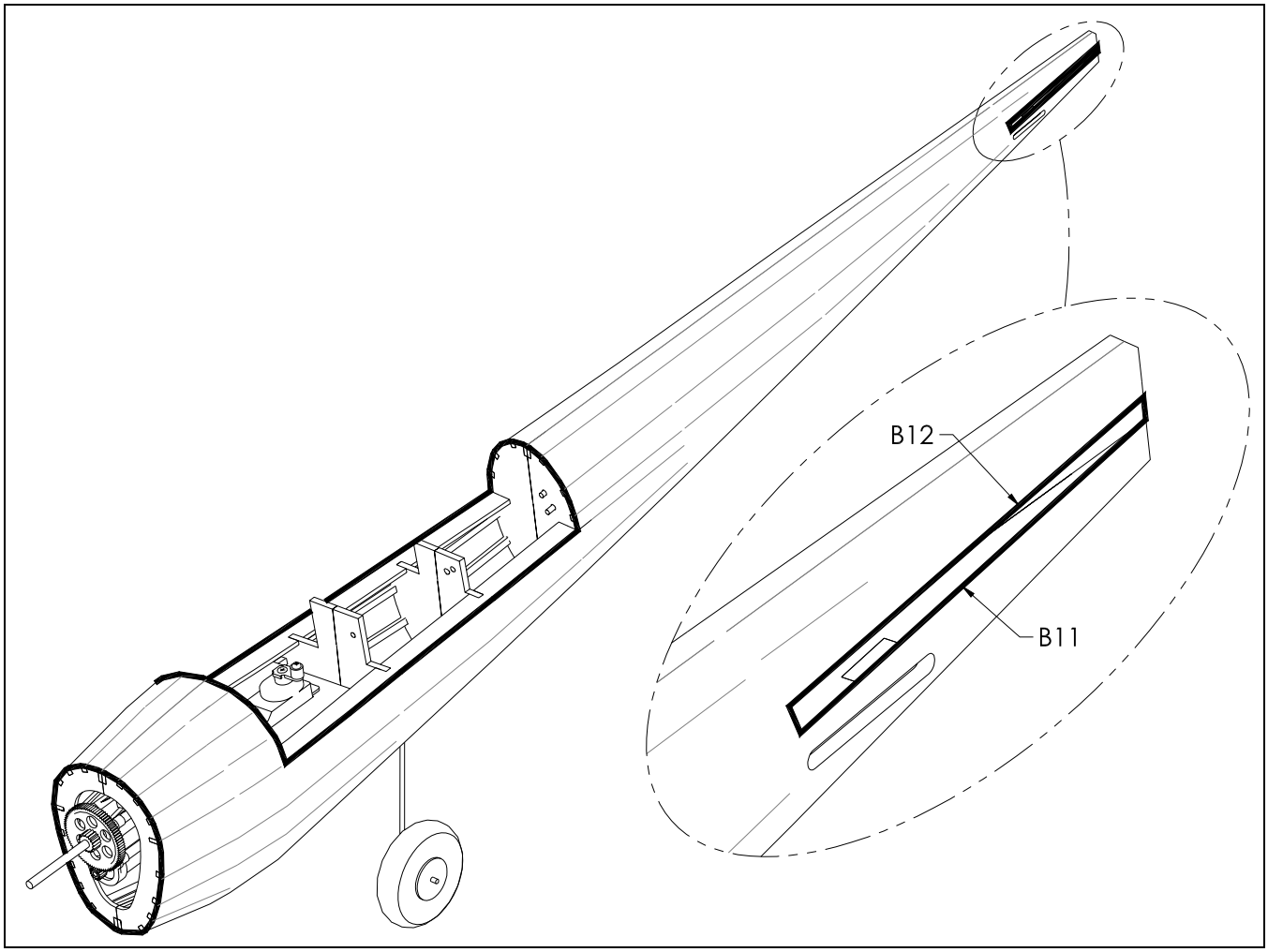


Figure 25

Building Section #7 – Assembly and Finishing

Assembling the P-38 is easy, but it is important to examine the next few steps so critical areas that interface each other are done properly. In this building section **my** preference is CA glue, but feel free to use slower drying epoxy if you want more time to align the adjoining pieces.

Boom and Wing

- ❑ Slide the boom into the wing noting that both of the spars in the wing are positioned ahead of the boom formers. You'll have to do this while Inserting the tube for the rudder that hangs loose towards the trailing edge of the wing through the hole in former **O5**.

- ❑ The boom is fully interlocked into the wing when the tops of the boom formers are aligned with or slightly above the top of the wing spars. Be sure the bottom of the wing ribs are aligned on top of the boom keels **K8** and **K9** as well.

- ❑ When you're sure things are fitting properly, soak every connecting surface of the wing and boom with CA glue. This includes the leading edge, trailing edge, and spars of the wing to the their adjacent boom formers as shown in Figure 26.

- ❑ Repeat the previous steps to glue the opposite boom to the wing.

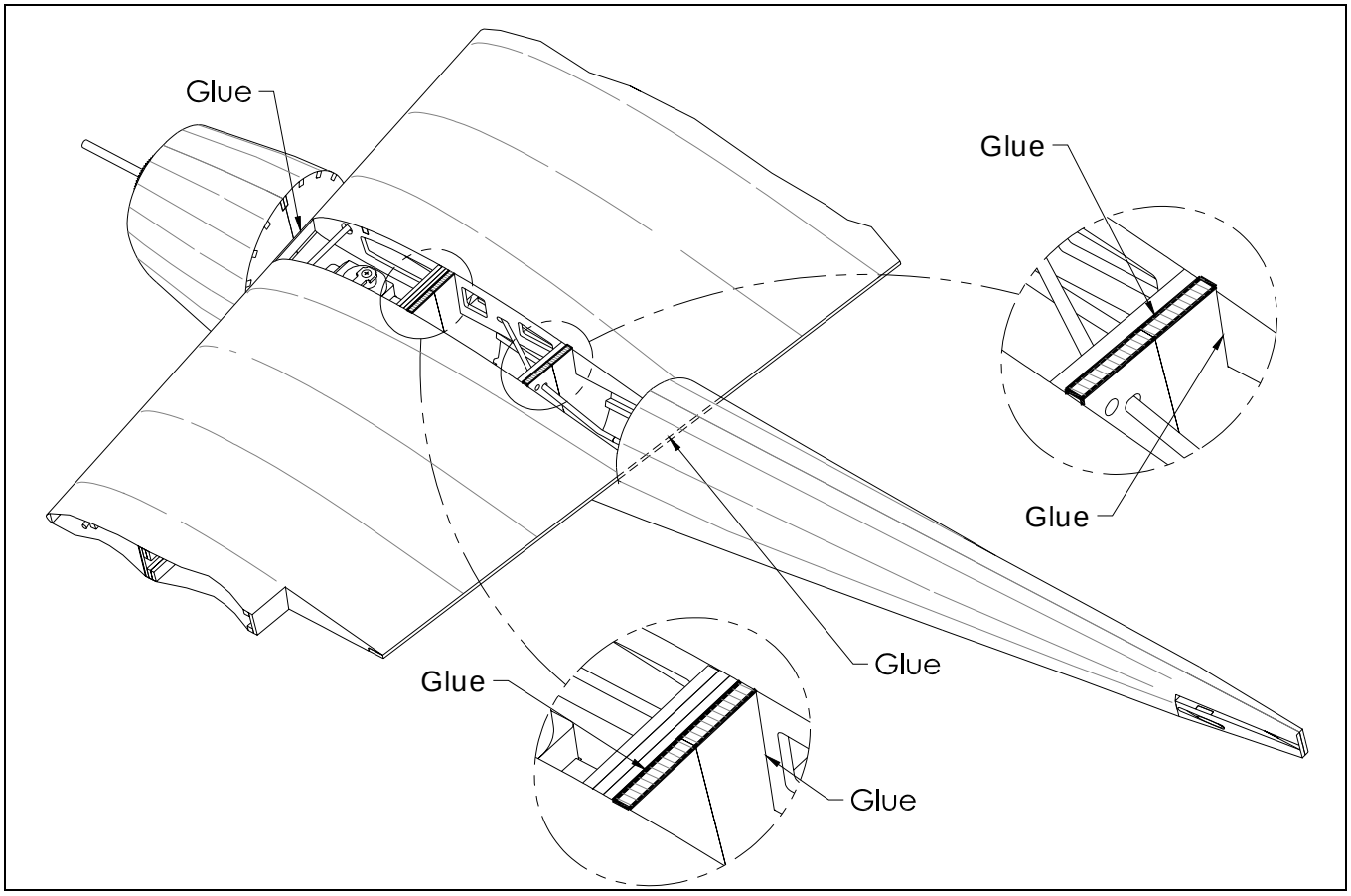


Figure 26

Vertical Stabilizers, Horizontal Stabilizer and Booms

- ❑ Slide each of the vertical stabilizers over their respective booms making sure they are centered on seam created by the joined boom halves. Use a fine tipped ink pen or marker to trace a line around each of the vertical stabilizers on the boom. Remove the vertical stabilizers and get rid of the covering contained in lines created on the boom. Now reinstall the vertical stabilizers making sure they are centered on the boom, use some stickpins to help hold them in place while you add the horizontal stabilizer. Make sure a wood-to-wood joint exists between the vertical stabilizers and the booms.

- ❑ Slide the horizontal stabilizer over the vertical stabilizers and into the receiving slots built into the booms. You may need to trim the notches in the horizontal stabilizer to get it to fit properly over the vertical stabilizers and receiving slots of the boom. Use a fine tipped ink pen or marker to trace a line around the boom and vertical stabilizers on the horizontal stabilizer. Remove the horizontal stabilizer and get rid of the covering contained in lines created on the horizontal stabilizer. Now reinstall the horizontal stabilizer and use stickpins to hold it in place. Make sure a wood-to-wood joint exists between the vertical stabilizers, booms, and horizontal stabilizer.

- ❑ Glue the vertical stabilizers, and horizontal stabilizer to the booms making sure each of the vertical stabilizers are perpendicular to the horizontal stabilizer as illustrated in Figure 27.

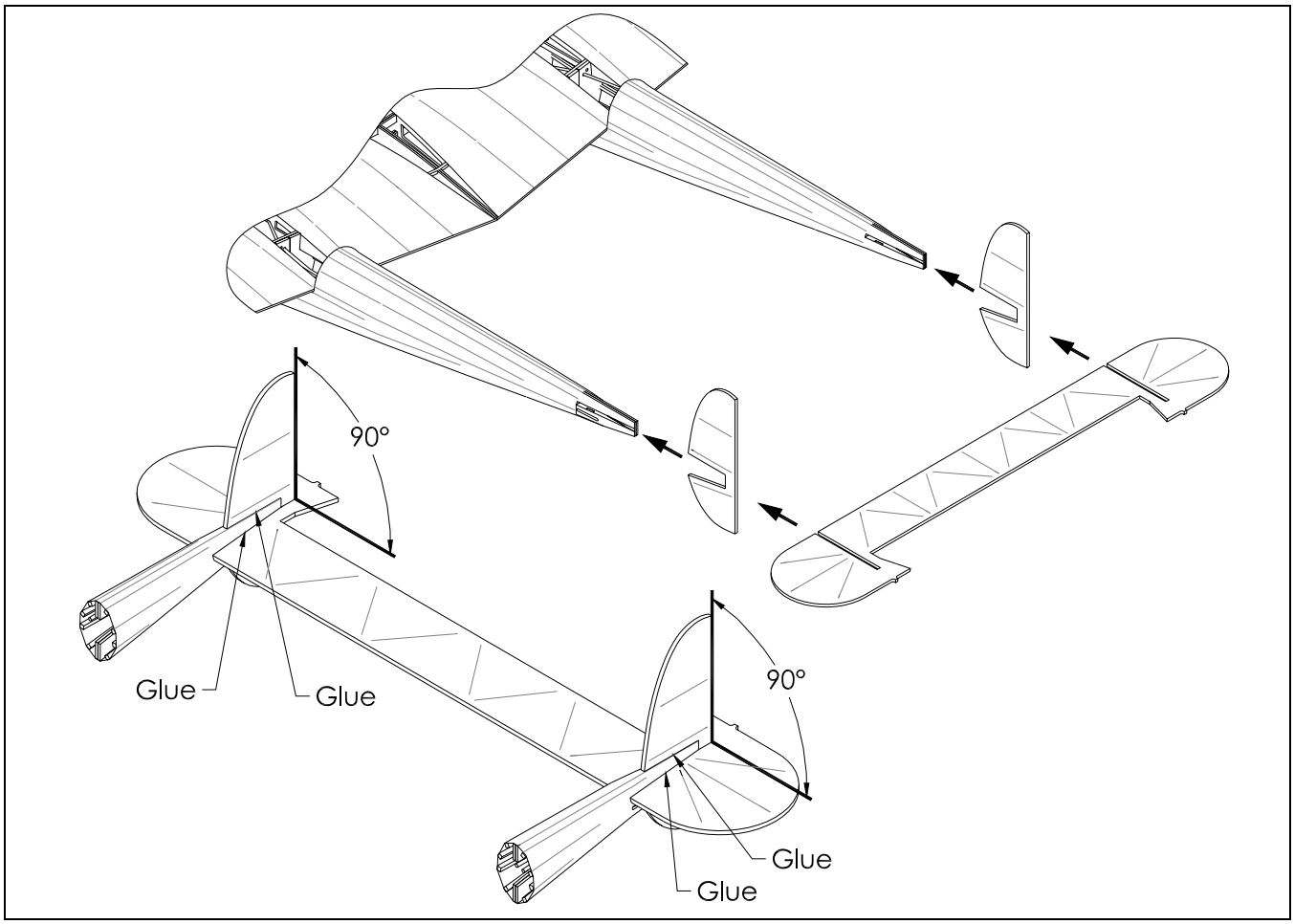


Figure 27

Control Surface Horns

- ❑ Glue the plywood control horns in the control surfaces as shown in Figure 28 noting orientation. The plywood control horns for the elevator and each rudder are identical and should be inserted into the slot until they are flush with the opposite side of the control surface.

- ❑ Install the Micro Connectors in the plywood control horns shown in Figure 28.

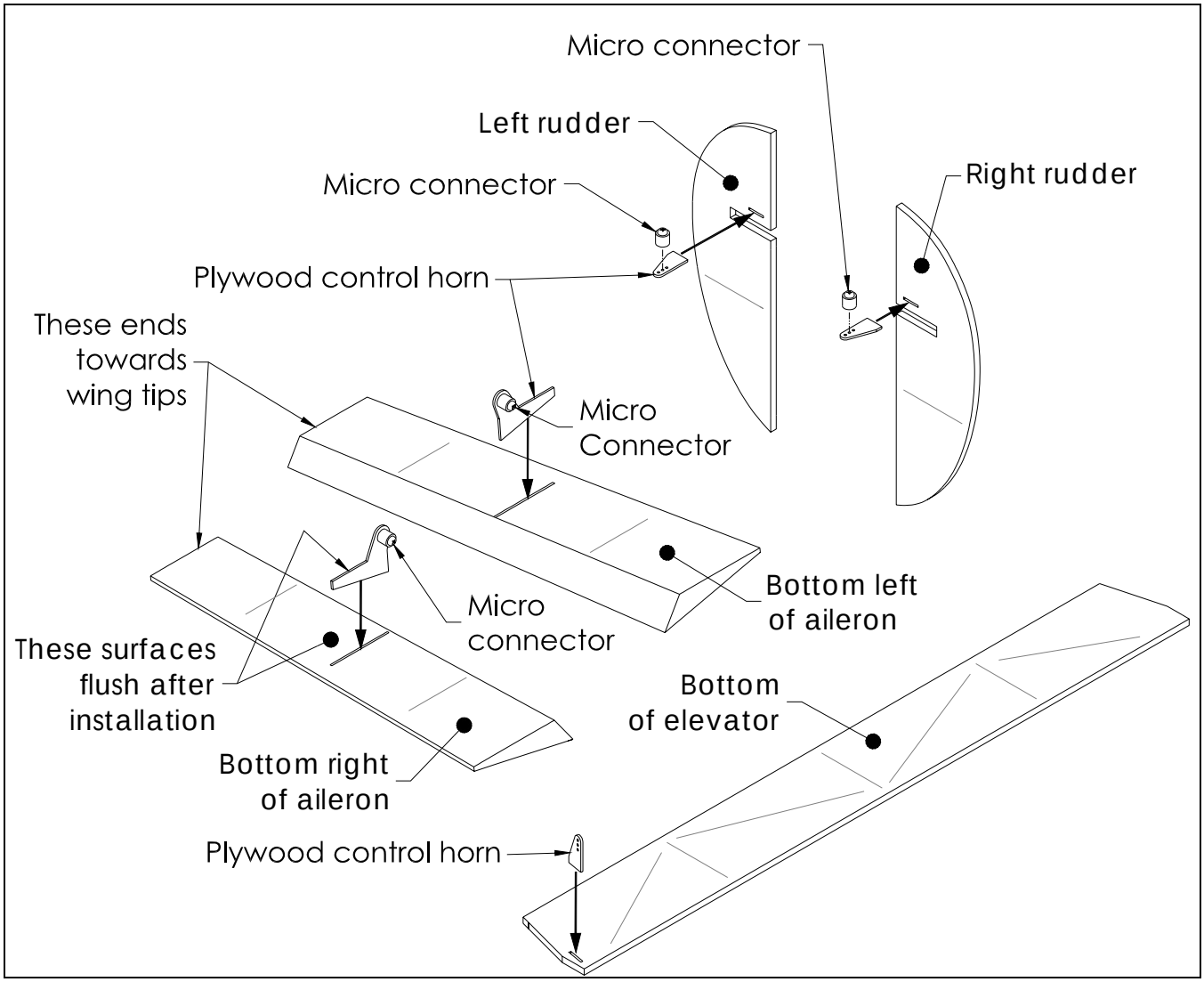


Figure 28

Control Surface Hinges and Actuation

On all of my parkflyers I have used 3/4" transparent tape, which is readily available in most major discount stores. Some people don't care for this control surface hinge technique, but I can honestly say I've never had a hinge fail when you make sure the tape is pressed firmly onto the covering.

- ❑ Tape the control surfaces to their proper locations making sure to leave a 1/32" to 1/16" gap on the hinge side to allow for rotation as illustrated in Figure 29. Make sure that the ailerons fit into their openings without rubbing on adjacent surfaces.

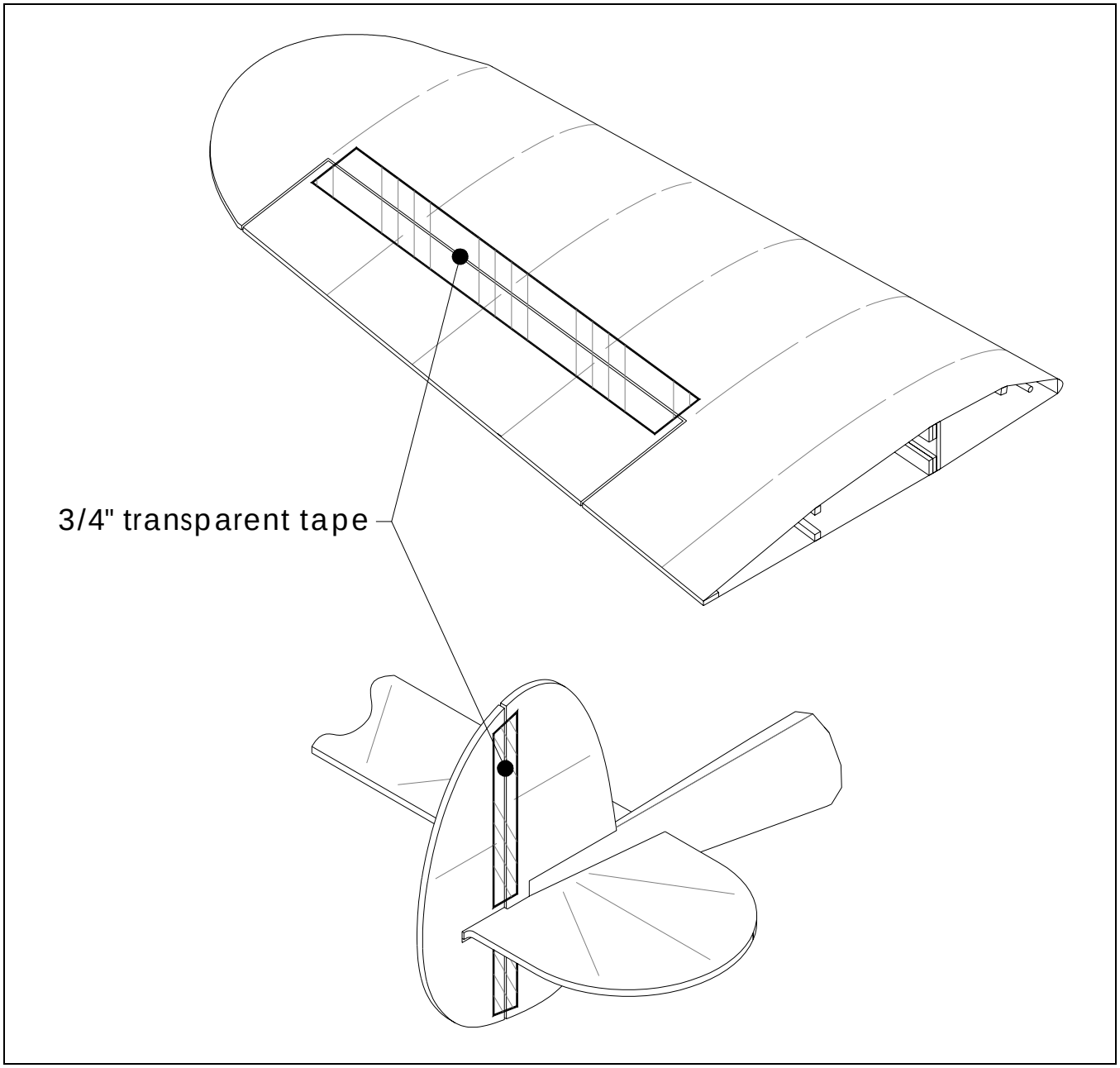


Figure 29

- ❑ Construct the elevator actuation rod as shown in "**Elevator Actuation Rod**" section of the plans.

- ❑ Insert the "Z" Bend end of the Elevator Actuation Rod into the elevator control surface horn then slide the elevator actuation rod into the plastic tubing installed in the boom as illustrated in Figure 30. Be sure to continue to slide the elevator actuation rod through the micro connector in the elevator servo and tighten the setscrew with the elevator lined up with the horizontal stabilizer.

- ❑ Tape the elevator to its proper location making sure to leave a 1/32" to 1/16" gap on the hinge side to allow for rotation as illustrated in Figure 30. Make sure that the elevator fits into its opening without rubbing on adjacent surfaces.

- ❑ Cut a 32.5" length of the 1/32" diameter flexible steel cable to actuate the ailerons. Begin installation by sliding the previously cut cable through the Micro Connector installed in one of the aileron horns and into the yellow plastic tubing exiting the wing. Continue to slide the steel cable through the tubing and through the Micro Connector installed on the aileron servo. Lastly, slide the cable through the remainder of the yellow plastic tubing for aileron control which exits the opposite bottom of the wing and through the Micro Connector on the opposite aileron horn. Center the ailerons in their wing openings and tighten each of the 3 Micro Connector setscrews.

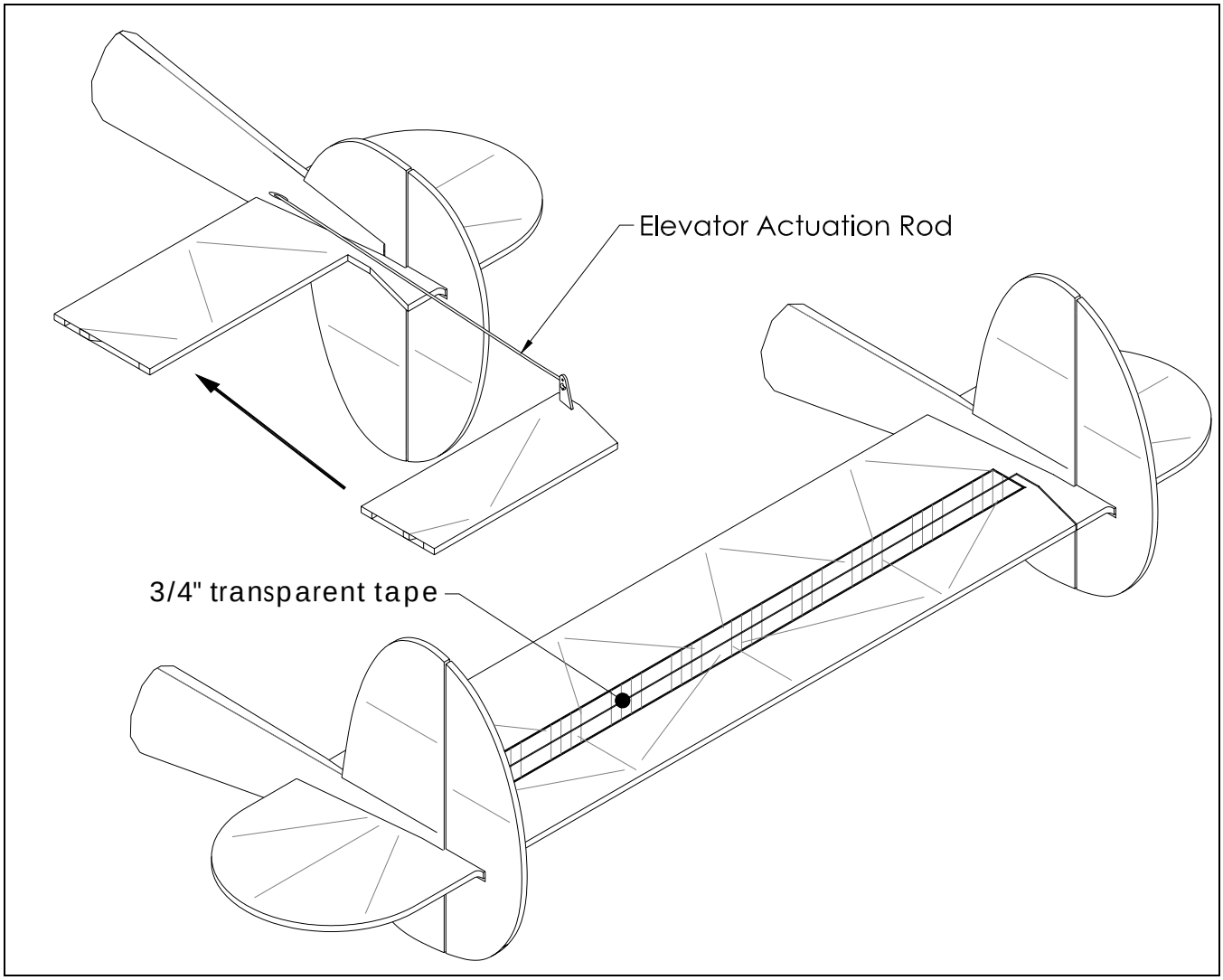


Figure 30

- ❑ Install a piece of 1/8" diameter X 1/2" long heat shrink tubing over the two separate yellow plastic tubes in the boom and wing to create a continuous run of tubing. Make sure you trim the adjoining plastic tubes so that a smooth continuous curve is created; otherwise you will have some unwanted friction between the cable and the tubing. Heat the heat shrink tubing with a heat gun or your covering iron to create a tight fit over the yellow plastic tubing. Do this for each of the boom/wing interfaces. This is illustrated in Figure 31

- ❑ Cut a 43" length of the 1/32" diameter flexible steel cable to actuate the rudders. Begin installation by sliding the previously cut cable through the Micro Connector installed in one of the rudder horns and into the yellow plastic tubing exiting the boom. Continue to slide the steel cable through the tubing and through the Micro Connector installed on the rudder/steering servo. Lastly, slide the cable through the remainder of the yellow plastic tubing for rudder control which exits the opposite boom and through the Micro Connector on the opposite rudder horn. Align the rudders with their vertical stabilizers and tighten each of the 3 Micro Connector setscrews.

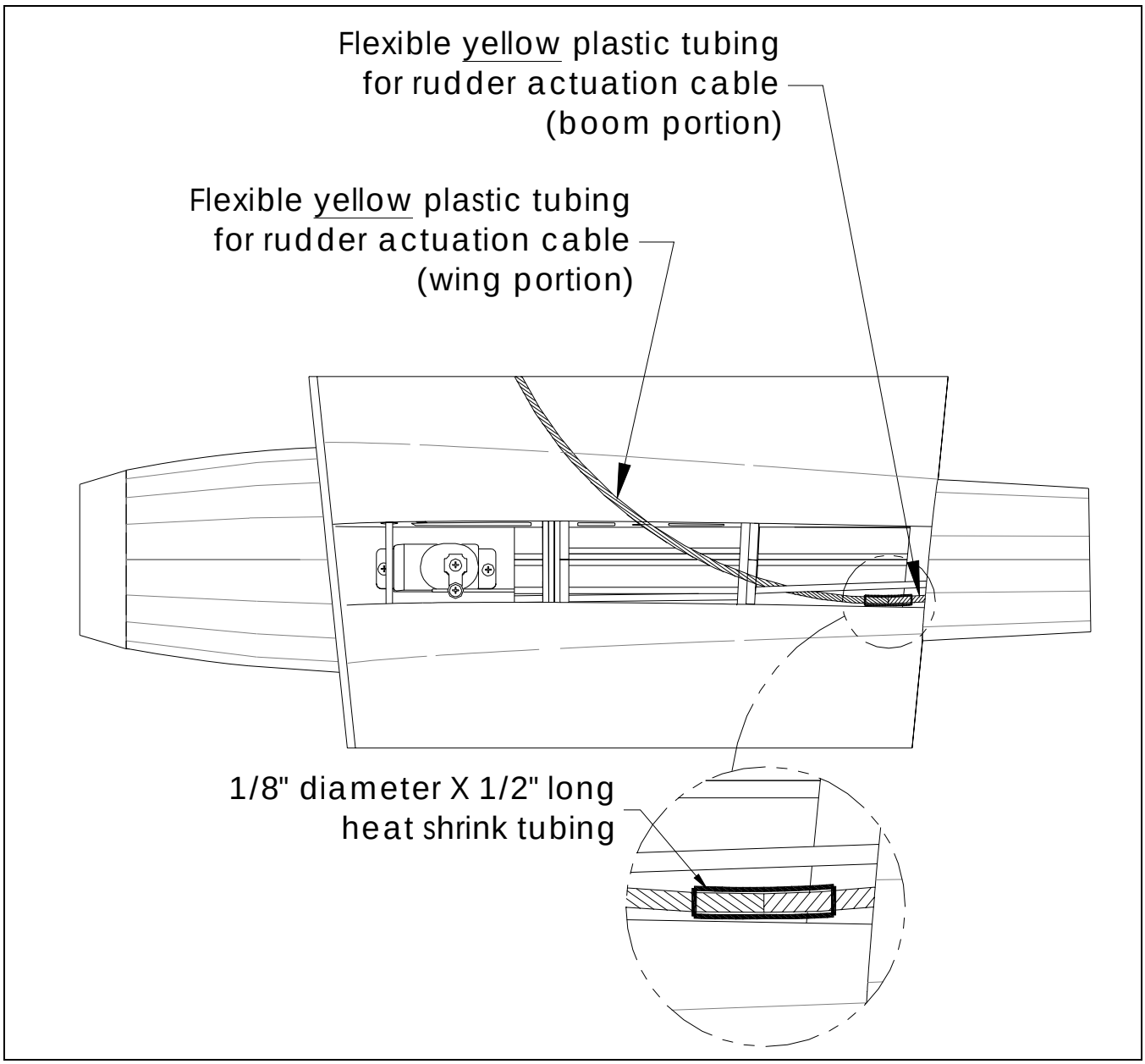


Figure 31

Main Landing Gear and Boom Cowlings

- ❑ Tape the boom cowlings to each boom as illustrated in Figure 32. A small piece of 3/4" transparent tape on each side of the boom cowling is all that is required to attach it to the boom.
- ❑ Construct a left and right main landing gear as shown in "**Main Landing Gear Bending Template"** section of the plans.
- ❑ Glue each the left and right main landing gear to their respective booms as illustrated in Figure 32.
- ❑ Install the two main landing gear wheels. The main landing gear wheels are held on with a short section of 1/8" O.D. Plastic Tubing cut to 1/8" LG. The plastic tubing is attached with thin CA glue to the main landing gear wire, be careful not to get any glue on the wheel. This is illustrated in Figure 32. (Note, the Du-bro wheels may have to be drilled out to fit the main landing gear wire)

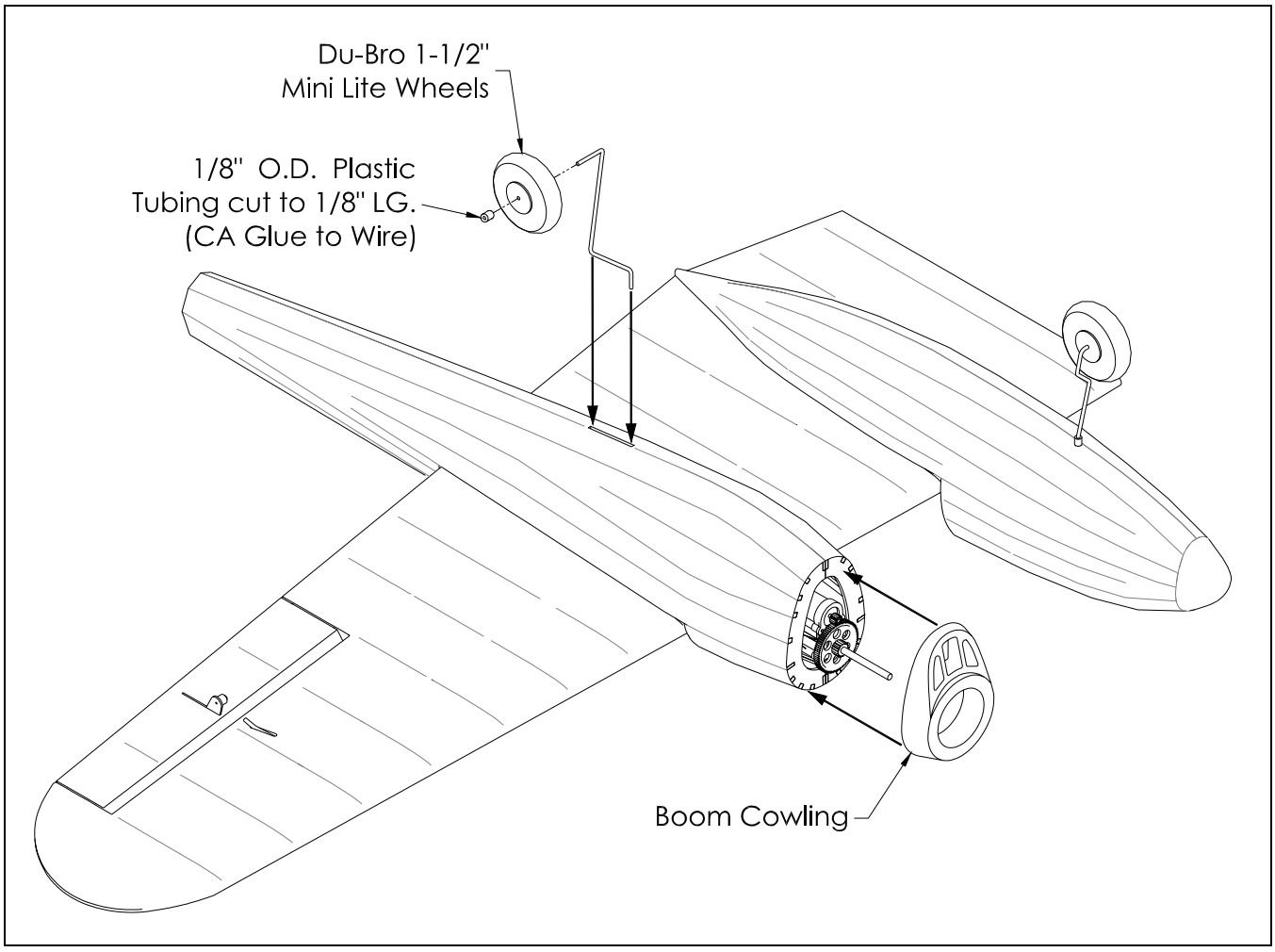


Figure 32

Boom Scoops

- ❑ Trim each of the vacuum formed boom scoops to approximately match what is illustrated in Figure 33.
- ❑ Paint the boom scoops to your liking.

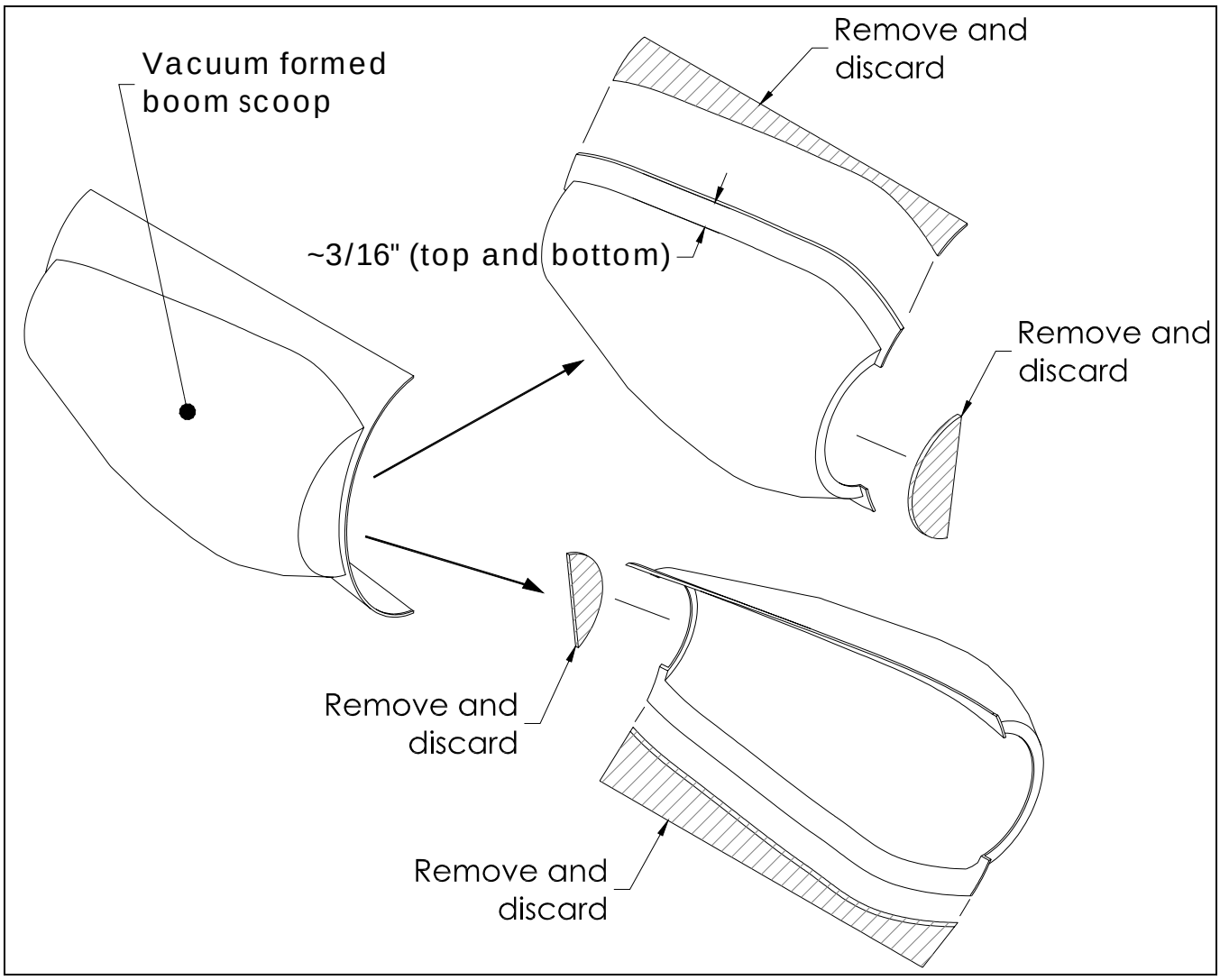


Figure 33

- ❑ Glue the boom scoops to the inside and outside of the booms between formers **I7/O7** and **I8/O8**, and directly onto the covering with a light amount of 5-minute epoxy. This is illustrated in Figure 34.

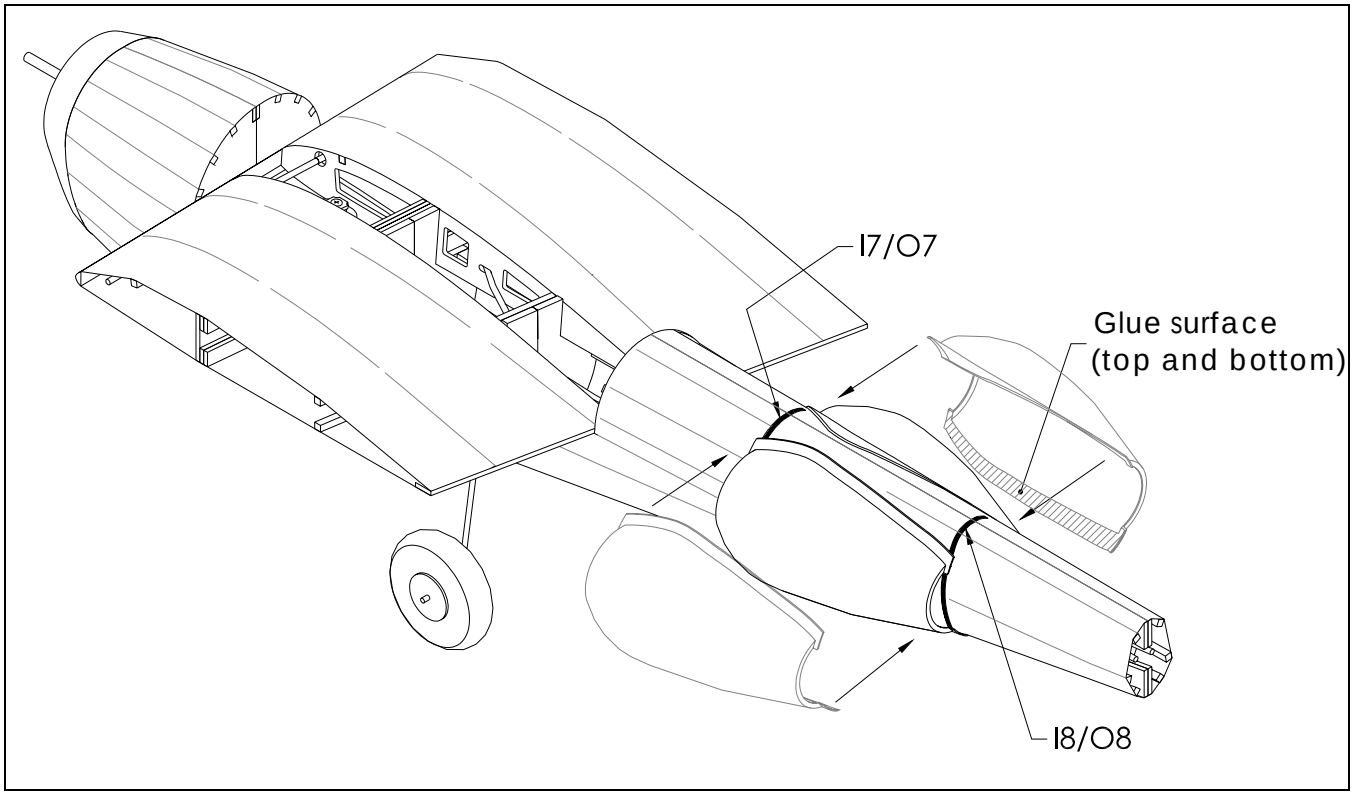


Figure 34

Boom Covers

❑ Tape the boom covers to their Booms as illustrated in Figure 35.

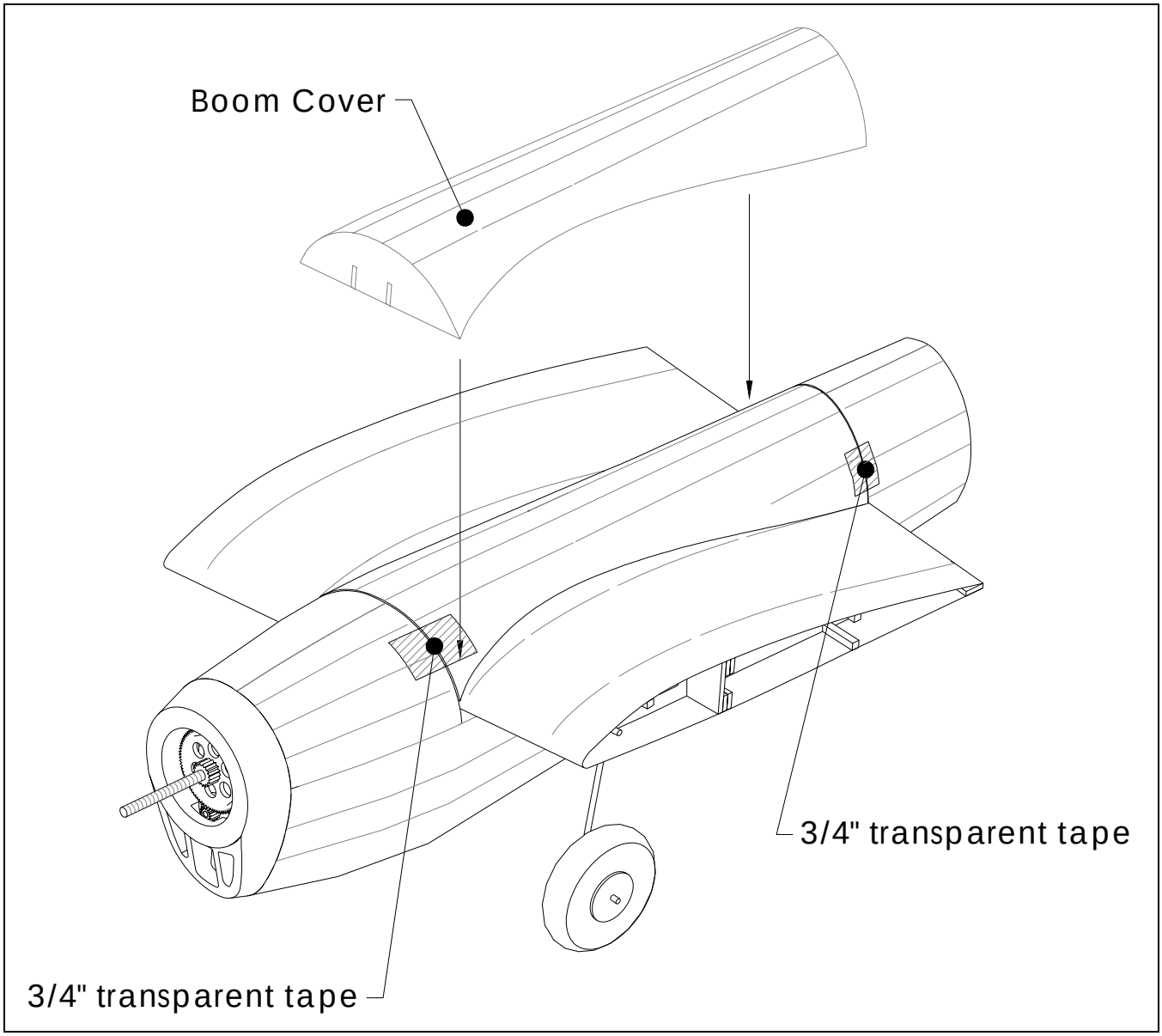


Figure 35

Battery Tray

- ❑ Glue both **X2** components perpendicular to **X1** in the orientation illustrated in Figure 36. These parts create the battery tray.
- ❑ Glue the battery tray assembly to ribs **R2**, and fuselage formers **F5** with 5-minute epoxy**.**
- ❑ Glue some Velcro to the battery tray and battery pack as illustrated in Figure 36 with 5-minute epoxy.
- ❑ Glue a magnet to the center ribs **R1** as illustrated in Figure 36 with 5-minute epoxy. This magnet serves as one half the canopy latch.

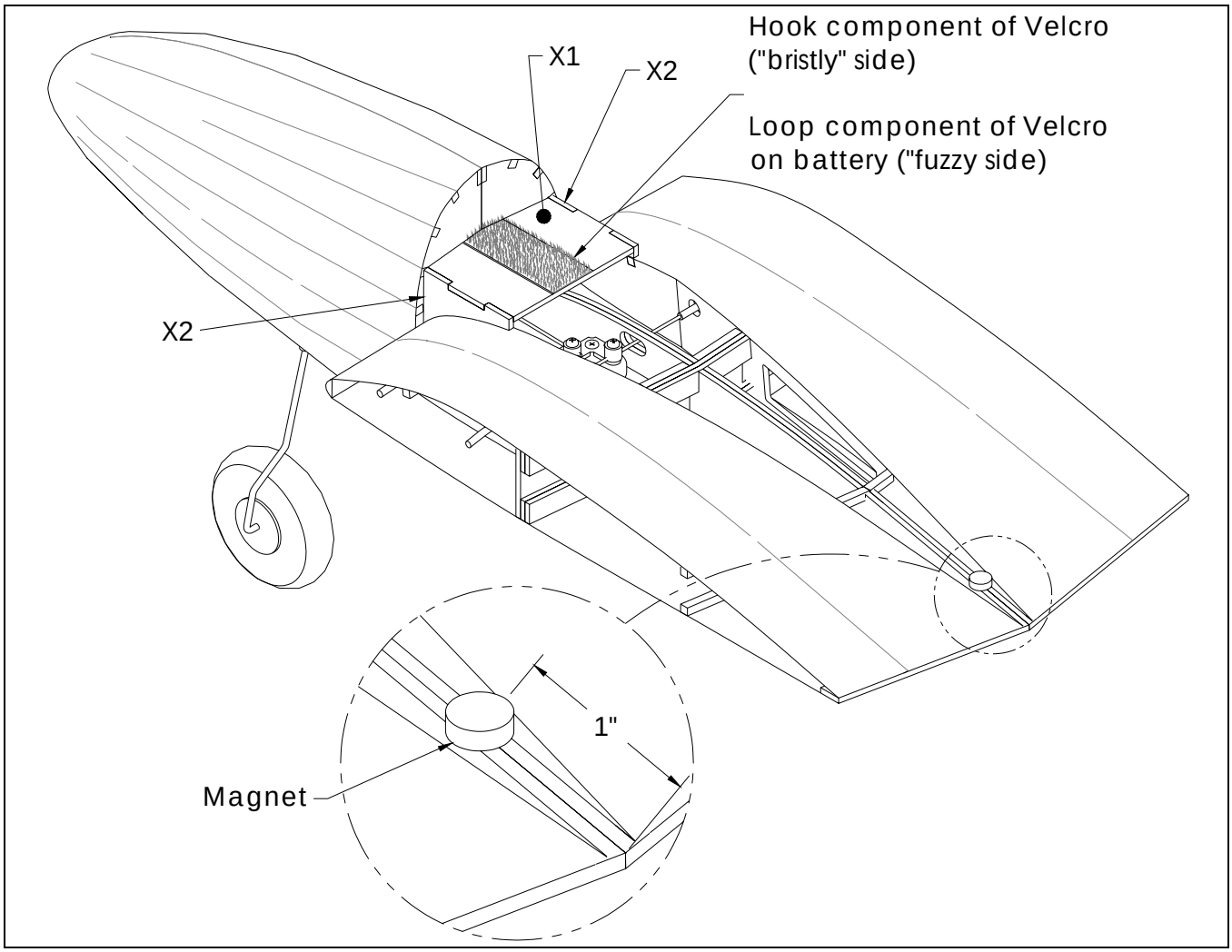


Figure 36

Canopy

- ❑ Trim the vacuum formed canopy to approximately match what is illustrated in Figure 37.

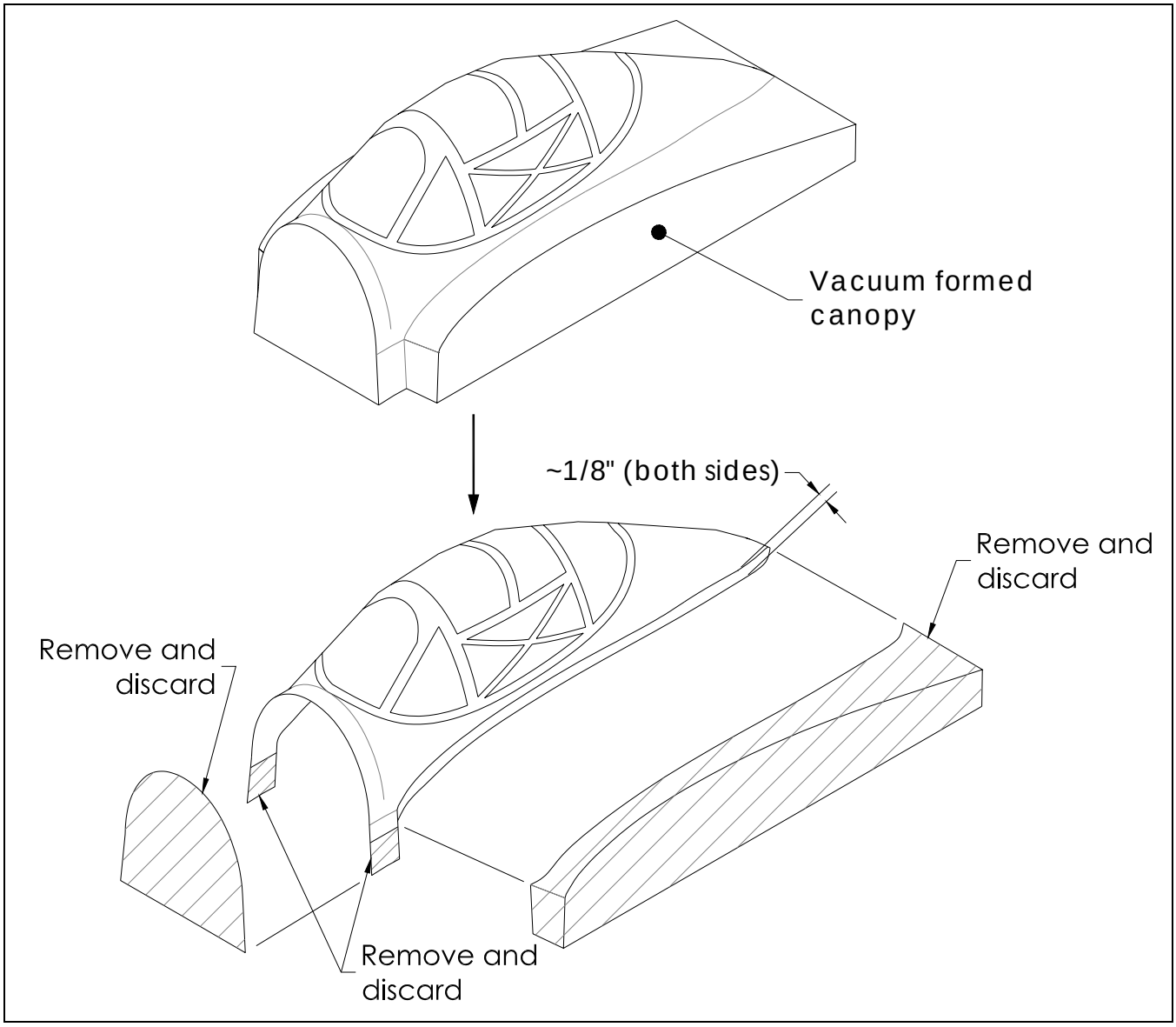


Figure 37

- ❑ Install the canopy over the wing and fuselage adjusting where necessary to achieve a good fit.
- ❑ From a piece of 1/16" balsa scrap and magnet, fabricate the remaining half of the canopy latch as illustrated in Figure 38. Make sure the magnet is oriented so that it is attracted to the magnet installed in the fuselage. Adjust the 1/16" balsa scrap and magnet in the canopy to a depth that creates a nice tight fit between the canopy and the wing. Glue these to the canopy with 5-minute epoxy.
- ❑ Remove the canopy and paint it to your liking.
- ❑ Install a small piece of 3/4" tape on the front of the canopy as illustrated in Figure 38. This piece of tape acts as a hinge allowing you to open the canopy to replace batteries.

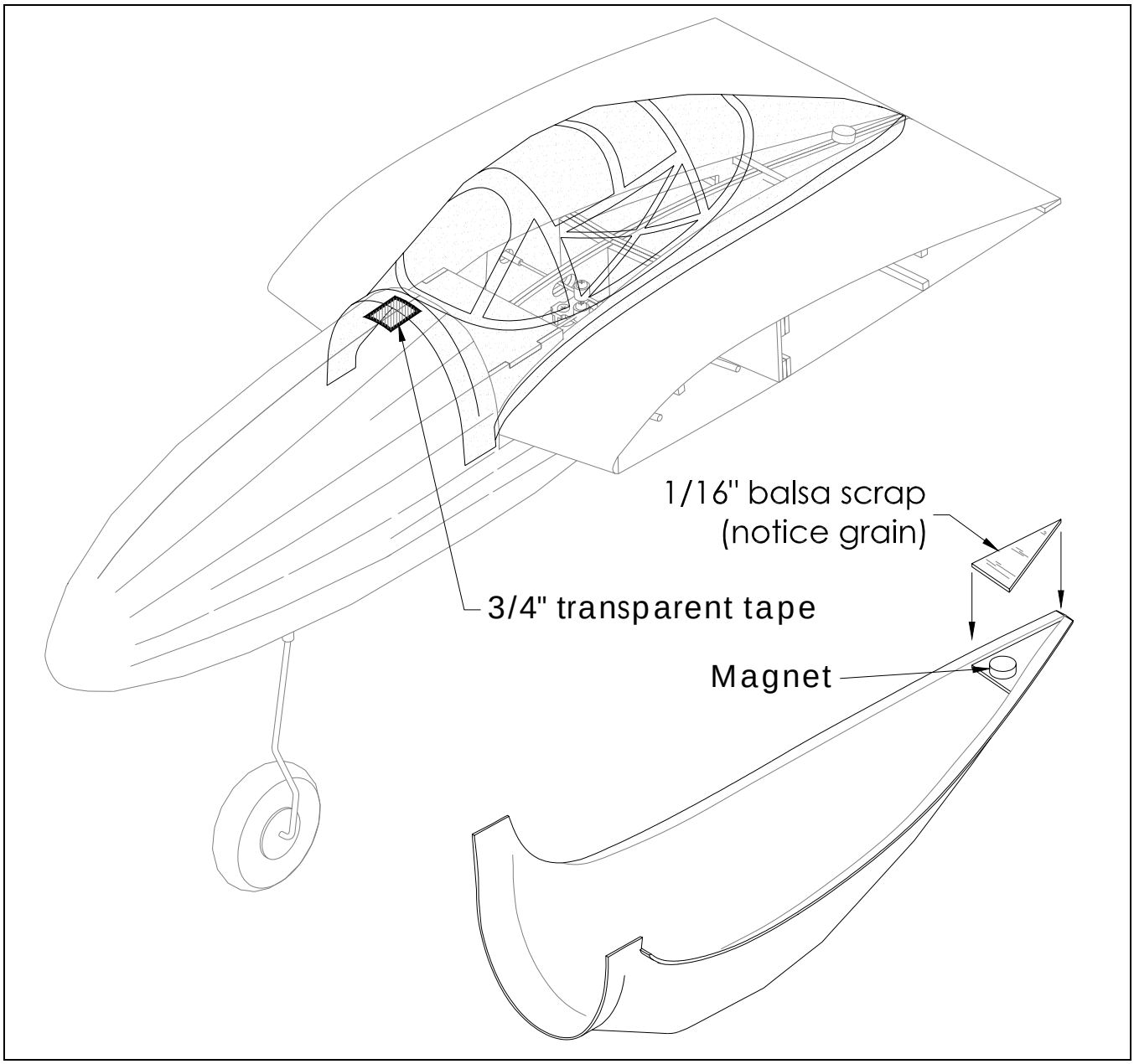


Figure 38

Spinner

- ❑ Modify the GWS IPS rubber spinner included with your IPS to match what is illustrated in Figure 39.
- ❑ Trim the plastic vacuum formed spinner to match what is illustrated in Figure 39.

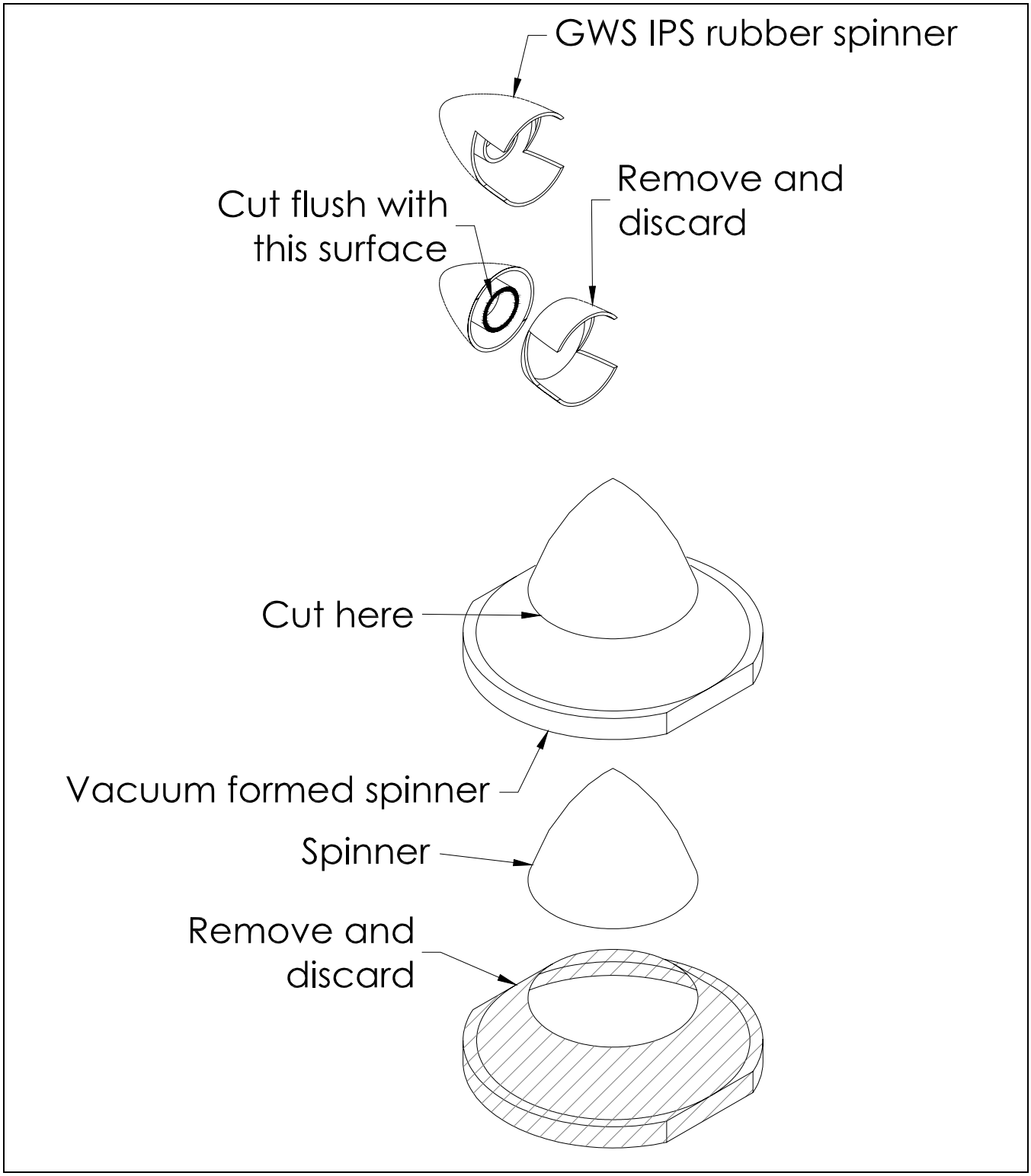


Figure 39

- ❑ Install the spinner alignment plate, and modified GWS IPS rubber spinner onto the prop shaft.
- ❑ Using the spinner alignment plate to support the back of the spinner, glue the spinner onto the modified IPS rubber spinner with 5-minute epoxy as illustrated in Figure 40.
- ❑ When the glue is dry, remove the spinner from the prop shaft. Next, remove and discard the spinner alignment plate.
- ❑ Install the propeller you wish to use for your model, and then reinstall the spinner onto the prop shaft. You will have to trim small sections of the spinner away to fit around the propeller. Do this for both spinners.

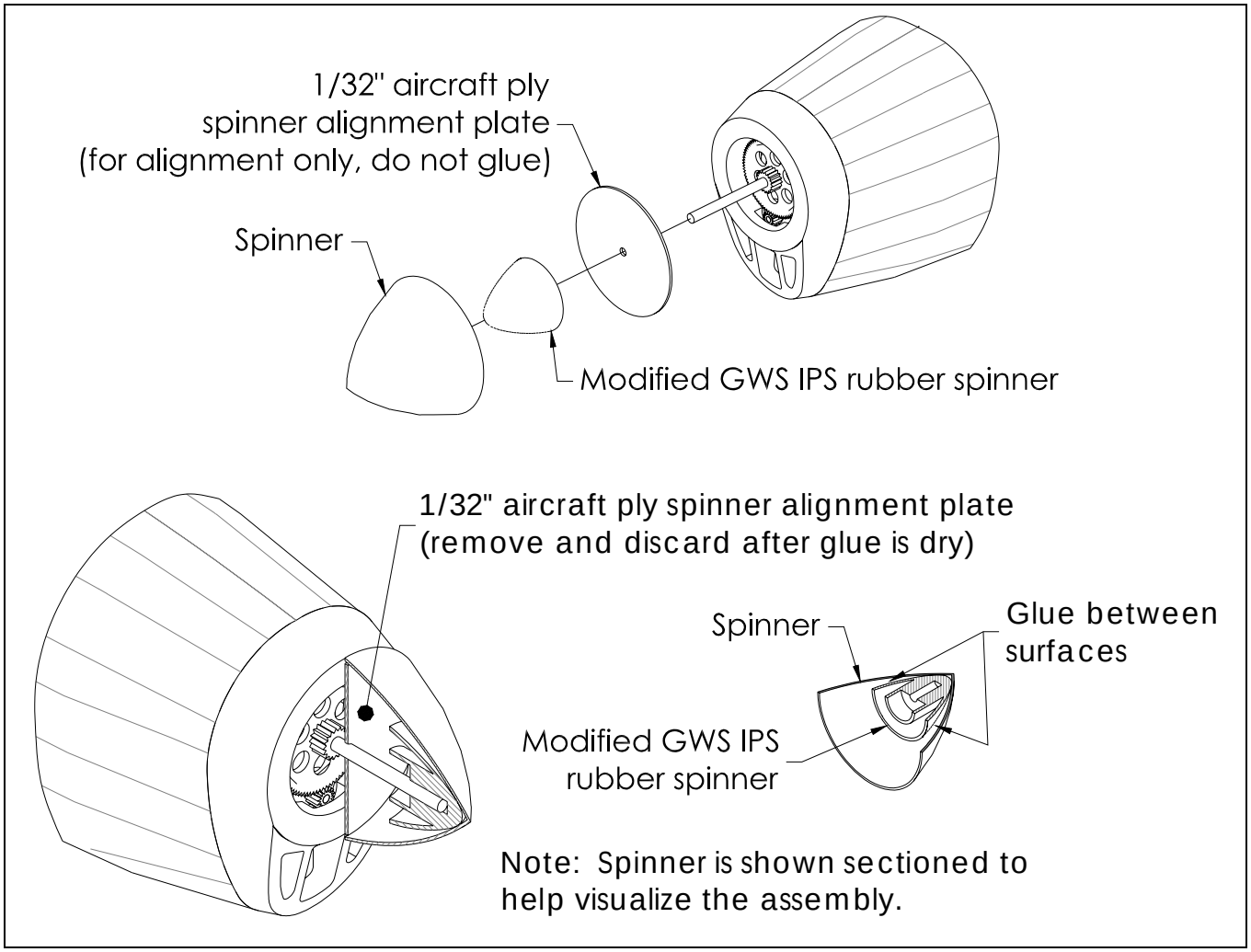


Figure 40

Wiring

- ❑ Build the motor wiring harness as shown in Figure 41. The motors are wired in parallel.
- ❑ Route the harness through each wing half and boom, then connect it to each of the GWS IPS'.
- ❑ Find a place for the Electronic Speed Control (ESC), and receiver in the fuselage. Connect the ESC connector, and all servo connectors to their appropriate receiver channel. Note, you will need a 12" servo wire extension for the elevator and aileron servo.

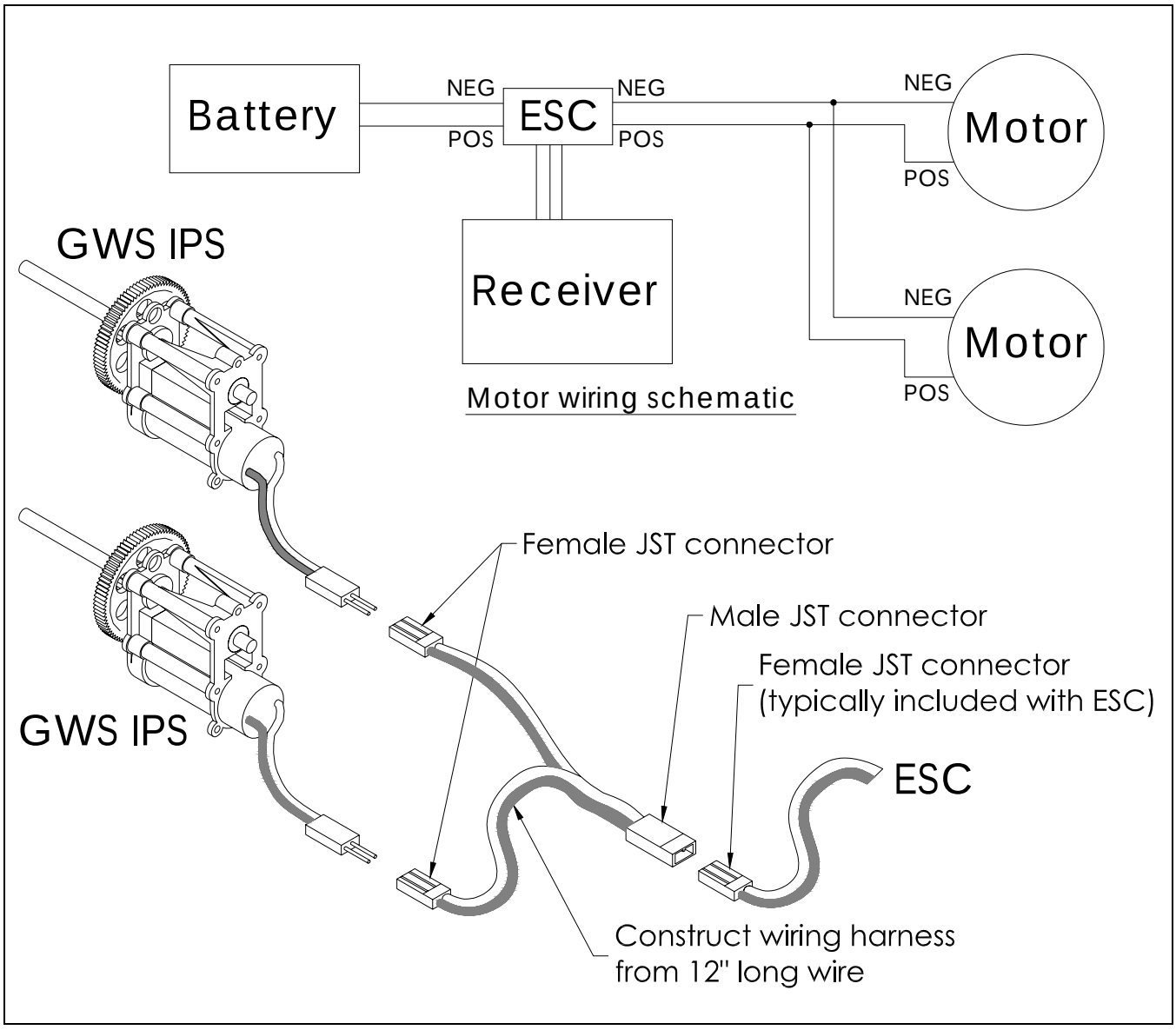


Figure 41

Final Flight Preparation

- ❑ I recommend you set the amount of control surface throw to the following settings...
  Ailerons: 3/8" either direction
  Rudders: maximize in either direction without interfering with horizontal stabilizer
  Elevator: 3/8" either direction

- ❑ The battery is held to the battery tray with Velcro supplied with the kit.

- ❑ **With everything installed in your P-38 Lightning, be sure the plane balances at the point a 1/4" in front of the main wing spar S2.** After your test flight, feel free to move the balance point to get the desired performance.

- ❑ With proper balance you're ready for your first flight with the P-38 Lightning. On the first flight, get the P-38 Lightning high enough that you can let off the control sticks to see what it does without risking a crash. The P-38 Lightning is a very forgiving model and depending on the equipment you chose to finish it, you may have to trim it out as necessary. If you experience some adverse yaw with your P-38 Lightning, I've found that it is quite useful to coordinate the turns by adding some rudder. This can be done manually, or by mixing some rudder output with the aileron channel on a computer transmitter.

Enjoy your Molt Models P-38 Lightning!