# Tutor™ Trainer

## INSTRUCTION MANUAL

Park Flyers

Wing Span - 44-3/4 in
Wing Area - 305.7 sq in
Weight - 9.5 – 13.5 oz
Wing Loading - 4.5 – 6.4 oz/sq ft
Fuse Length - 28-5/8 in

MADE IN USA

### WARRANTY

**Great Planes® Model Manufacturing Co.** guarantees this kit to be free from defects in both materials and workmanship at the date of purchase. This warranty does not cover any component parts damaged by use or modification. **In no case shall Great Planes' liability exceed the original cost of the purchased kit.** Further, Great Planes reserves the right to change or modify this warranty without notice.

In that Great Planes has no control over the final assembly or material used for final assembly, no liability shall be assumed nor accepted for any damage resulting from the use by the user of the final user-assembled product. By the act of using the user-assembled product, the user accepts all resulting liability.

**If the buyers are not prepared to accept the liability associated with the use of this product, they are advised to return this kit immediately in new and unused condition to the place of purchase.**

**READ THROUGH THIS MANUAL FIRST. IT CONTAINS IMPORTANT INSTRUCTIONS AND WARNINGS CONCERNING THE ASSEMBLY AND USE OF THIS MODEL.**

GREAT PLANES® MODEL MANUFACTURING COMPANY

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# INTRODUCTION

Congratulations and thank you for purchasing the **Great Planes Tutor™ Trainer.** The Tutor is one in a series of ***Park Flyers*** from Great Planes designed to be flown in small areas. Park Flyers are a relatively new class of small, lightweight, slow-flying, fast-building models. Since Park Flyers are small and fly slowly, little space is required. A nearby park, schoolyard or vacant lot becomes an impromptu flying site (see ***"Find a Safe Place to Fly"*** on page 22). Additionally, Park Flyers are perfect for those evenings at the field when everybody else is packing up their gear, the wind has died, and there is still enough light to fly a small, slow model that can be kept close-in.

The Tutor Trainer is a slow flying, high-wing model that is about as simple to build as they get. However, if you have never flown an R/C model before, learning to fly the Tutor all by yourself is not recommended. As with any trainer airplane, you should find an experienced modeler to help you with your first flights. Information about R/C clubs and instructors is provided later in this manual.

# PROTECT YOUR MODEL, YOURSELF & OTHERS...FOLLOW THESE IMPORTANT SAFETY PRECAUTIONS


**Attention:** The product you have purchased is powered by a rechargeable battery. At the end of its useful life, under various state and local laws, it may be illegal to dispose of this battery into the municipal waste system. Check with your local solid waste officials for details in your area for recycling options or proper disposal.

**This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.**

1. Even though the **Great Planes Tutor Trainer** is small, lightweight and flies slowly, if it is not assembled and operated correctly it could possibly cause injury to yourself or spectators and damage property.

2. Build the plane according to the plans and instructions. Do not alter or modify the model, as doing so may result in an unsafe or unflyable model. In a few cases the instructions may differ slightly from the photos. In those instances the plans and written instructions should be considered as correct.

3. Take time to build straight, true and strong.

4. Use an R/C radio system that is in first-class condition. This Park Flyer requires micro servos, a micro receiver and a micro speed control able to handle 5 amps.

5. You must properly install all R/C and other components so that the model operates properly on the ground and in the air.

6. You must test the operation of the model before every flight to insure that all equipment is operating, and that the model has remained structurally sound. Be sure to check connectors often and replace them if they show signs of wear or fatigue.

**Note: We, as the kit manufacturer, provide you with a top quality kit and great instructions, but ultimately the quality and flyability of your finished model depends on how you build it; therefore, we cannot in any way guarantee the performance of your completed model, and no representations are expressed or implied as to the performance or safety of your completed model.**

**Remember: Take your time and follow directions to end up with a well-built model that is straight and true.**

**If you're an inexperienced modeler, we recommend that you get assistance from an experienced, knowledgeable modeler to help you with assembly and your first flights.** You'll learn faster and avoid risking your model before you're truly ready to solo. Your local hobby shop has information about flying clubs in your area whose membership includes qualified instructors.

You can also contact the national Academy of Model Aeronautics (AMA), which has more than 2,500 chartered clubs across the country. Through any one of them, instructor training programs and insured newcomer training are available. Contact the AMA at the address or toll-free phone number below.

**Academy of Model Aeronautics**
5151 East Memorial Drive
Muncie, IN 47302-9252
Tele. (800) 435-9262
Fax (765) 741-0057
Or via the Internet at:
http://www.modelaircraft.org

**Before starting to build, compare the parts in this kit with the Parts List, and note any missing parts. Also inspect all parts to make sure they are of acceptable quality. If any parts are missing, broken or defective, or if you have any questions about building or flying this airplane, please call us at (217) 398-8970 or e-mail us at:**

***productsupport@greatplanes.com.***

**If you are contacting us for replacement parts, please be sure to provide the full kit name GP Tutor and the part numbers as listed in the Parts List.**

**You can also check our web site at *www.greatplanes.com* for the latest GP Tutor updates.**

## *DECISIONS YOU MUST MAKE*

This is a list of items required to finish the Tutor that must be purchased separately. For some of these items there is more than one option which will require a bit of decision making ahead of time. Order numbers (in parentheses) are provided for your convenience.

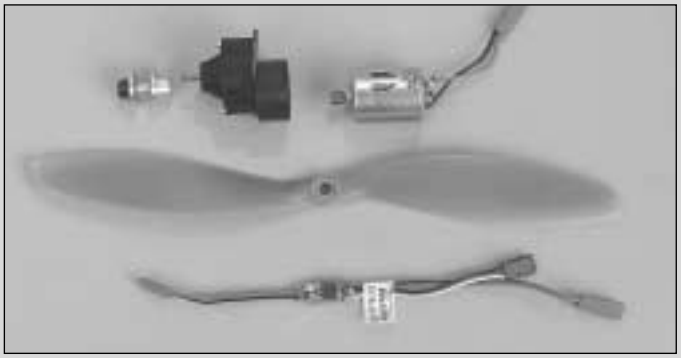
***Radio Equipment***
The Tutor requires a micro receiver and two micro servos. Futaba® S3103 (FUTM0037) or Hobbico® CS-5 (HCAM0090) micro servos are suitable.

The Tutor may be built either with or without ailerons. Ailerons are not necessary, because the Tutor flies well without them. Less experienced pilots should build the Tutor without ailerons. However, some modelers insist on flying with ailerons, so this option is covered in the instructions. No additional materials are required to build the Tutor with ailerons except for a third micro servo and a #68 (or 1/32") [.8mm] drill bit.

If flying the Tutor without ailerons, a three (or more) channel radio may be used. If flying the Tutor with ailerons, a four (or more) channel radio will be required.

***Speed Control***
An electronic speed control with BEC (Battery Eliminator Circuitry) is required. The BEC allows both the motor and the radio system to be powered by the same battery (thus eliminating an additional battery typically required to power the radio). The Great Planes ElectriFly™ C-5 Nano™ High Frequency Electronic Speed Control (GPMM2000) is recommended for the Tutor. If you purchase the complete motor and gear drive system, the speed control is included (refer to the "Motor System" section that follows).

***Motor System***



The Tutor is designed to use the Great Planes ElectriFly T-280GD ESC motor system and gear drive for electric flight (GPMG0430). This system includes a T-280 Ferrite Motor, S-280 4.1:1 ratio gearbox, 3mm prop adapter, APC 10 x 4.7 propeller and the ElectriFly C-5 Nano High Frequency Electronic Speed Control w/BEC. The same components are also available without the speed control by ordering number GPMG0445.

***Battery recommendations***
There are mainly two kinds of battery packs used for electric R/C models; nickel-metal hydride (NiMh) packs, and nickel-cadmium (NiCd, pronounced ny-cad) packs. NiMh batteries are recommended for the Tutor because they provide nearly twice the capacity of a NiCd for their size. However, it should be noted that nickel-metal hydrides cannot be charged as fast as NiCds.

Each individual cell that makes up a battery is 1.2 volts. Simply stated, a volt is the amount of power a battery pack can deliver (a 6-cell battery pack is 7.2 volts). Batteries are also rated by their capacity in mAh (milli-Amp-hours), or how

much energy they store. A 550 mAh battery can supply 1 *Ampere* for .55 hours (about 30-minutes). A 1200 mAh battery pack is about twice the size of a 550 mAh battery pack.

*These are the battery packs recommended for the Tutor:*

Panasonic 6-cell 550 mAh NiMh pack (GPMP0100) for beginners due to its light weight.

Panasonic 7-cell 550 mAh NiMh pack (GPMP0101) for advanced pilots who are capable of flying in slightly windier conditions.

***Chargers***
The best type of charger to use is a peak charger, because it charges the batteries until they are fully charged, then automatically switches to a trickle charge mode. The Great Planes ElectriFly™ Peak Charger (GPMM3000) is suitable for nickel-metal hydride batteries, NiCds and transmitter battery packs.

If you have another type of charger that is not a peak charger, you will have to calculate the length of time it takes to charge the batteries yourself, then turn the charger off when the batteries are fully charged. Overcharging the batteries may damage them. Before you can calculate the time it takes to charge a battery pack, you first have to know the charge rate you are going to use. Nickel-metal hydrides must be charged at a rate of no more than 1/10 of their capacity. For the 550 mAh batteries recommended for the Tutor this would be a charge rate of approximately 50 mAh. Divide the capacity of the battery pack by the charge rate to calculate the charge time. A discharged 550 mAh battery pack charged at 50 mAh will take 11 hours to charge.

*Charge rate/time recommendations:*

Charge the 6-cell 550 mAh battery pack at 50 mAh for 11 hours.
Charge the 7-cell 550 mAh battery pack at 50 mAh for 11 hours.
Charge the 7-cell 1200 mAh battery pack at 100 mAh for 12 hours.

**IMPORTANT:** Monitor the temperature of the battery frequently. If the battery becomes warm, disconnect it from the charger.

A Hobbico R/C Multi-Charger (HCAP0100) is suitable for charging the battery packs used in the Park Flyers.

**Note:** The period required to charge the batteries in the examples above is for discharged batteries. If the battery you are going to charge is not discharged (and you are not using a peak-charger), connect it to the motor on your model. Run the motor until the propeller is turning slowly, thus discharging the battery.

***Covering***
There are several types of covering that may be used on the Tutor, and a few that are not recommended. Use a covering suitable for lightweight models. Top Flite® EconoKote® and Coverite™ Micafilm™ are suitable for the Tutor. EconoKote is similar to MonoKote® (used on most regular-size sport models), except EconoKote is lighter and does not shrink as tightly, thus making it suitable for lightweight structures such as that of the Tutor. EconoKote also has an adhesive on the back which is activated by the heat of a model airplane covering iron.

Coverite Micafilm is another covering suitable for lightweight structures (and is the covering that is on the model featured on the box label). Micafilm has fibers imbedded in the film and is exceptionally strong, yet remains lightweight because it has no adhesive on the back. Therefore, you must apply an adhesive to the structure before application. Use Coverite Balsarite™ (COVR2500) for Micafilm. Do not use Balsarite "film formula" to apply Micafilm.

Transparent MonoKote film is also suitable for covering the Tutor, because it is lighter and does not shrink as tightly as opaque MonoKote film. Opaque MonoKote film is not recommended for the Tutor because it is too heavy and shrinks too tightly for the structure to withstand.

***Building Board***
You will need a flat board to lay over your workbench that you can stick pins into. The back of a 2' x 4' ceiling tile or a section cut from a sheet of Celotex insulation board is ideal.

# ADDITIONAL ITEMS REQUIRED

## Building Supplies

In addition to the equipment listed in the **"Decisions You Must Make"** section, the following is a "short list" of the most important building supplies required to build the Tutor. *We recommend **Great Planes Pro**™ CA and Epoxy glue.*

- ❑ 1/2 oz. thin Pro CA (GPMR6001)
- ❑ 1/2 oz. medium Pro CA+ (GPMR6007)
- ❑ Hobby knife (HCAR0105)
- ❑ #11 blades (HCAR0211)
- ❑ Single-edge razor blades (HCAR0212)
- ❑ Small T-pins (HCAR5100)
- ❑ Builder's triangle (HCAR0480)
- ❑ Electric drill and 1/16" [1.6mm] drill bit
- ❑ Small phillips and flat blade screwdrivers
- ❑ Pliers with wire cutter (HCAR0630)
- ❑ Great Planes Plan Protector (GPMR6167) or wax paper
- ❑ Sanding tools and sandpaper assortment
- ❑ Sealing iron (TOPR2100)
- ❑ Double-sided foam tape (GPMQ4440) for mounting servos
- ❑ Great Planes Hook & Loop Material (GPMQ4880)

## Optional Supplies & Tools

Here is a list of optional tools mentioned in the manual that will help you build the Tutor.

- ❑ Great Planes C.G. Machine™ (GPMR2400)
- ❑ Top Flite® Precision Magnetic Prop Balancer™ (TOPQ5700)
- ❑ Top Flite Hot Sock™ iron cover (TOPR2175)

- ❏ Straightedge with scale (HCAR0475)
- ❏ Cutting mat (HCAR0456)
- ❏ Masking tape (TOPR8018)
- ❏ CA Debonder (GPMR6039)
- ❏ CA Applicator tips (GPMR6033)
- ❏ Great Planes 5-1/2" [140mm] Bar Sander (GPMR6169) and 150-grit adhesive back sandpaper (GPMR6183)
- ❏ Top Flite 320-grit sandpaper (TOPR8030) and 400-grit sandpaper (TOPR8032)

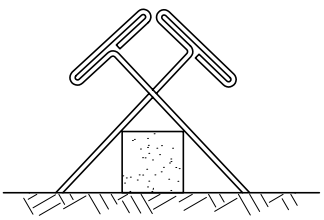
## *IMPORTANT BUILDING NOTES*

For the best performance, the Tutor must be built light. One of the best ways to insure light weight is to build neatly and make good-fitting glue joints that require less glue. Here are some tips to help you build neatly and light.


1. The easiest way to cut balsa sticks is with a single-edge razor blade. To do so, position the stick over the plan, then place the razor blade on the stick where you wish to cut it. Press down lightly on the razor blade to make a mark where the stick is to be cut.

2. Take the stick off the plan and cut it over a cutting mat or a scrap piece of wood *(Okay, if you're careful you could go ahead and cut the stick right over the plan, but if you do, you may cut through the plan protector, allowing the CA to soak through and glue the structure to the plan).*

3. Because of the small balsa sticks used in the tail, small T-pins may be used to hold the sticks to your building board, but only where **necessary.** Use small T-pins (HCAR5100) or small straight pins found in craft stores. Do not stick pins into the sticks near the ends, or the wood may split.



4. If you have difficulty with the T-pins splitting the small sticks, an alternate method is to use the "crossed-pin" technique. Insert the T-pins into the building board in a cris-cross fashion to hold the sticks to the plan.

5. Only a small amount of CA should be used to glue the parts together. Use the included CA applicator tips to control and pinpoint the amount of CA that comes from the bottle. When the tip becomes clogged, cut the tip off and continue. In addition to unnecessary weight, excess CA is difficult to sand. If you require additional CA tips, order no. GPMR6033, (qty. 5).

6. When applying CA, be careful to not glue your fingers to the structure. In the process of *unsticking* your fingers you can inadvertently damage the structure, thus requiring repairs and adding additional weight *(not to mention the aggravation)!*

7. Sanding requires a light touch to avoid damage. We found the best method for sanding is to use light strokes in the direction of the longest sticks. Be certain the sandpaper is **thoroughly** bonded to the bar sander. Lifted edges will catch the structure, causing damage. Use medium-grit sandpaper such as 120 or 150.

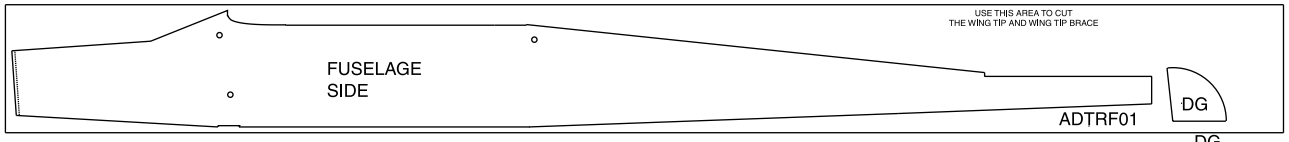
8. One of the best ways to insure a lightweight model is to proceed slowly and **build neatly.** Good glue joints with minimal adhesive are stronger, lighter and have a better appearance than poor-fitting joints with too much CA. Of course, you should take this approach with **all** of your projects!

9. Work over a flat surface. Cover the plans with Great Planes Plan Protector (GPMR6167) or wax paper so the parts will not adhere to the plan.

10. If you would like to remove the charred edges from the laser cut parts, use a cloth that has been damped with bleach.

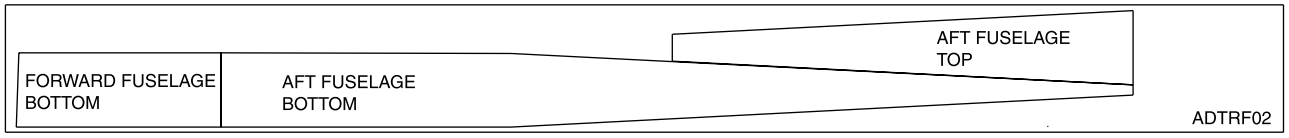
## PATTERNS

ADTRF01 — 2 PER KIT



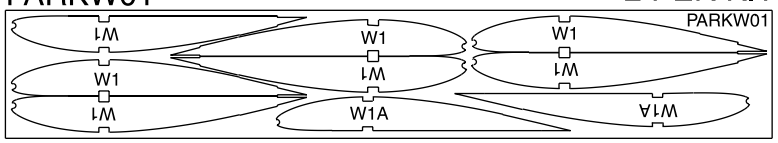

1/16" X 3" X 30" BALSA

ADTRF02 — 1 PER KIT




1/32" X 3" X 30" BALSA

PARKW01 — 2 PER KIT



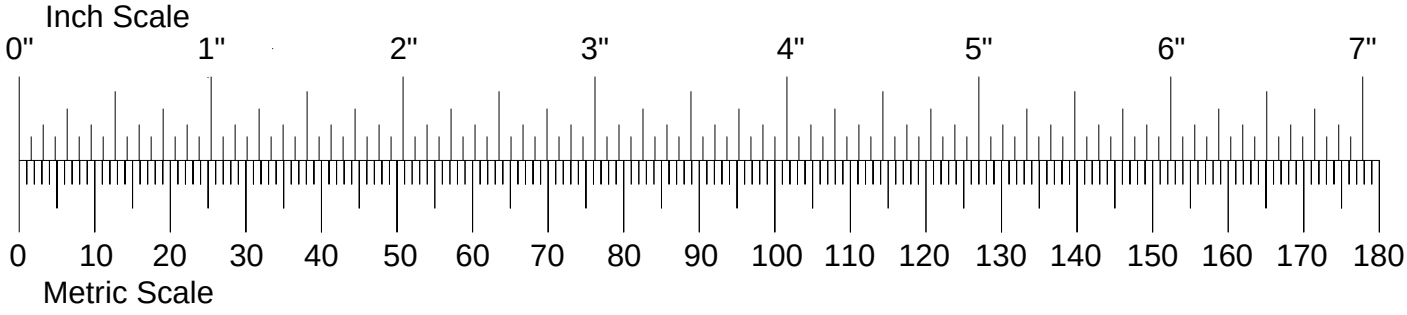

1/16" X 3" X 18" BALSA

ADTRW01 — 1 PER KIT


1/16" x 1-7/8" x 4-7/32" PLY

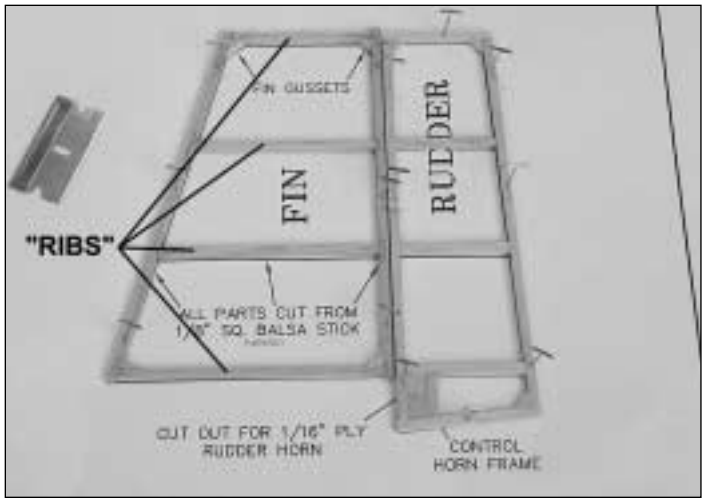
### Metric Conversions

| | | | |
|---|---|---|---|
| 1/64" = .4mm | 3/16" = 4.8mm | 1" = 25.4mm | 18" = 457.2mm |
| 1/32" = .8mm | 1/4" = 6.4mm | 2" = 50.8mm | 21" = 533.4mm |
| 1/16" = 1.6mm | 3/8" = 9.5mm | 3" = 76.2mm | 24" = 609.6mm |
| 3/32" = 2.4mm | 1/2" = 12.7mm | 6" = 152.4mm | 30" = 762mm |
| 1/8" = 3.2mm | 5/8" = 15.9mm | 12" = 304.8mm | 36" = 914.4mm |
| 5/32" = 4mm | 3/4" = 19mm | 15" = 381mm | |



## BUILD THE TAIL SURFACES

❑ 1. Unroll the plan sheets. Reroll them inside-out so they will lie flat. Place the fin/rudder portion of the fuse plan over your flat building board, then cover it with Great Planes Plan Protector or waxed paper so glue will not adhere to the plan.



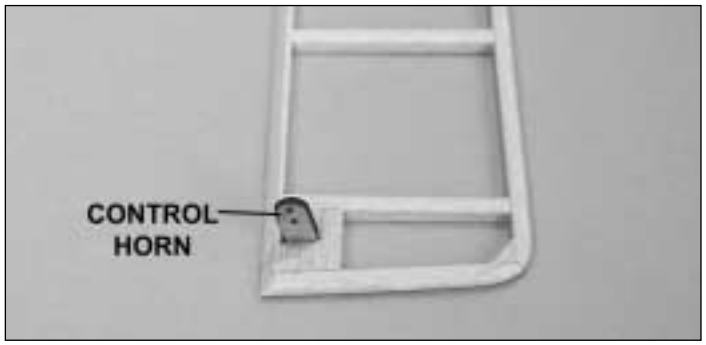

❑ 2. Build the **fin** and the **rudder** from two 1/8" x 1/8" x 24" [3.2 x 3.2 x 610mm] balsa sticks. **Hint:** When cutting the "ribs" (the horizontal sticks), start with the longest ones first. If you accidentally cut one too short, use it for the shorter rib above it, thus minimizing wasted material.

❑ 3. Remove the fin and rudder from the plan. Use a bar sander with 150-grit sandpaper to **carefully** sand both sides of the fin and rudder flat and even. Round the corners as shown on the plan. Refer to the Expert Tip that follows, then round the leading edge and top of the fin and the trailing edge and top of the rudder.

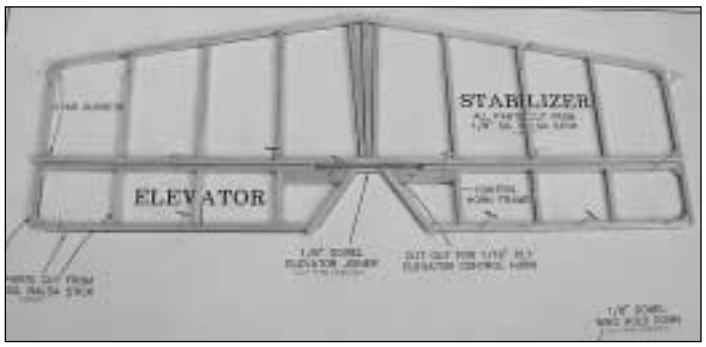
EXPERT TIP

*To round the edges of the tail pieces, place one of them on your workbench so the edge you are rounding extends just beyond the edge of the bench. Use a bar sander to hold it down. Use another bar sander to do the sanding.*

❑ 4. Sand a bevel on the leading edge of the rudder as shown in the cross-section on the plan.

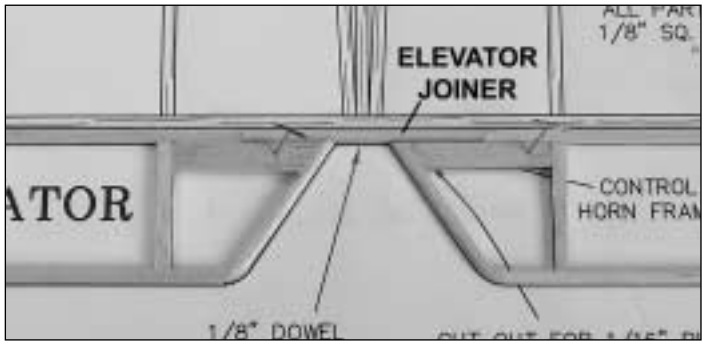



❑ 5. Use a #11 blade to cut the notch in the rudder where shown on the plan for the laser-cut 1/16" [1.6mm] plywood **control horn.** Glue the control horn into the notch on the **left** side of the rudder. **Note:** Use a pin to enlarge the holes for the pushrod, if needed.




❑ 6. Build the **stab** and **elevators** from the four 1/8" x 1/8" x 24" [3.2 x 3.2 x 610mm] balsa sticks. Do not join the elevators with the 1/8" [3.2mm] dowel until instructed to do so.

❑ 7. The same as you did the fin and rudder, sand the stab and elevators flat and even, then round the corners where shown on the plan. Round the tips of the stab and elevators and round the leading edge of the stab and the trailing edge of the elevators. Bevel the leading edge of both elevators as shown in the cross-section on the plan.




❑ 8. Pin both elevators to the plan. Make the **elevator joiner** by trimming the 1/8" x 3" [3.2 x 75mm] hardwood dowel to the correct length. Use medium CA to securely glue the elevator joiner to both elevators.

❑ 9. Remove the elevators from the plan. Use a #11 blade followed by a bar sander with 150-grit sandpaper to bevel

the elevator joiner to match the leading edge of the elevators.

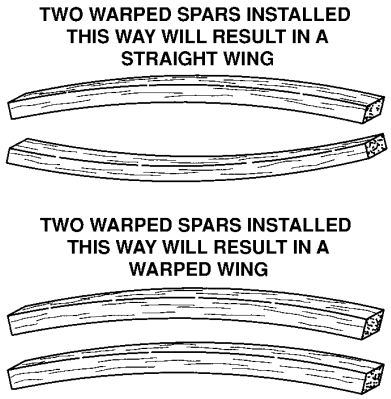
❏ 10. Use a #11 blade to cut the slot for the control horn, then glue the control horn into position on the **bottom** of the elevator.

## BUILD THE WING

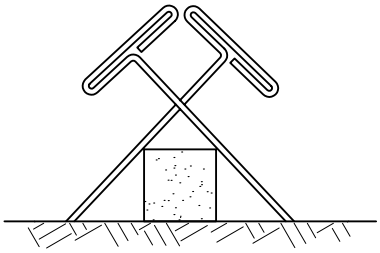
### Build the Wing Panels

*Start by building the left wing panel first so your progress matches the photos.*

❏ 1. Cover the **left** wing panel plan with Great Planes Plan Protector.



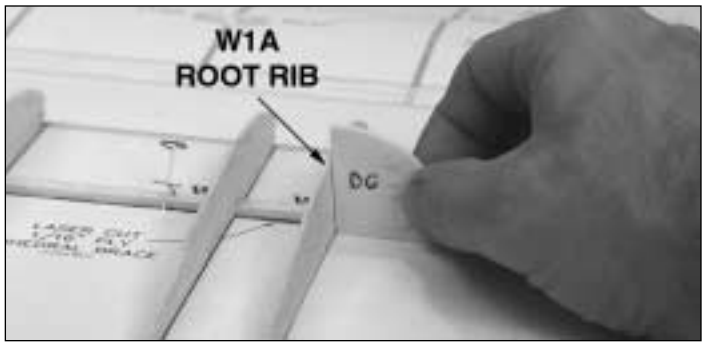

❏ ❏ 2. Match the 1/8" x 1/4" x 24" [3.2 x 6.4 x 610mm] balsa **main spars** so any warps will counteract each other.



❏ ❏ 3. Pin one of the main spars in position over the plan, aligning one end of the main spar with the outside edge of the root rib W-1.


❏ ❏ 4. Pin one of the 1/32" x 3/4" x 24" [.8 x 19 x 610mm] balsa **trailing edge sheets** in position over the plan, aligning one end of the trailing edge sheet with the outside edge of the root rib W-1.

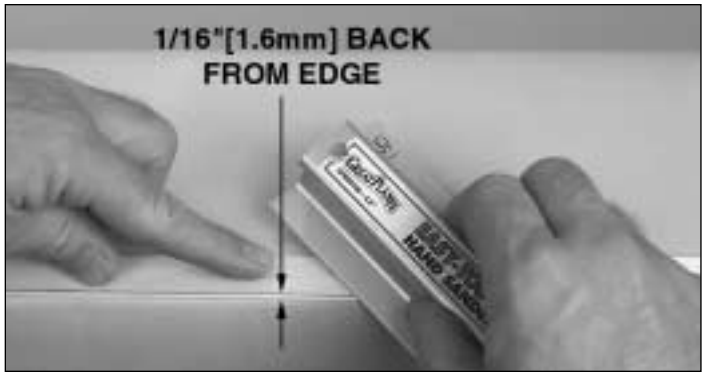

❏ ❏ 5. Starting at the wing tip, glue the seven laser-cut 1/16" [1.6mm] balsa **W-1** and one **W-1A ribs** over the main spar and trailing edge sheet, perpendicular to the building board. I**MPORTANT: Do not** install the **W-1A root rib** until the next step.



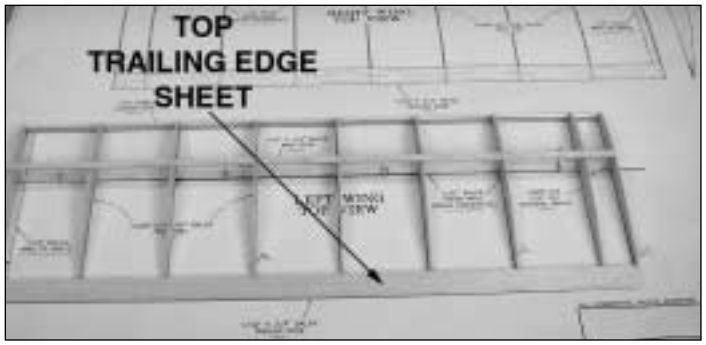

❏ ❏ 6. Position the W-1A root rib in place over the main spar. Use the laser-cut 1/8" [3.2mm] ply **dihedral gauge** to set the rib at the proper angle before gluing it to the main spar and the trailing edge sheet.

❏ ❏ 7. Position the top 1/8" x 1/4" x 24" [3.2 x 6.4 x 610mm] balsa main spar in the rib notches with one end flush with the outside edge of the root rib and glue to all the ribs.


❏ ❏ 8. Cut one of the 1/8" x 24" [3.2 x 610mm] hardwood dowels so that it fits in the notches at the front of the wing ribs, from the root to the tip rib.Save the leftover dowel for the fuselage. Glue the dowel to the ribs.

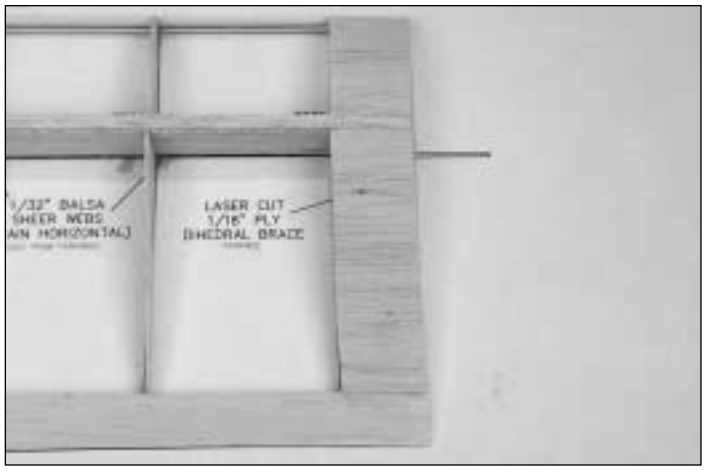



❏ ❏ 9. To make a **top trailing edge sheet,** draw a line 1/16" [1.6mm] from the edge of a second 1/32" x 3/4" x 24" [.8 x 19 x 610mm] balsa sheet. Sand a taper along the edge up to the line. The sheet should fit in the notches at the trailing edge of the wing ribs and blend into the bottom trailing edge sheet. **Hint:** To avoid breaking the trailing edge sheet when sanding the taper, sand across the grain, not lengthwise.



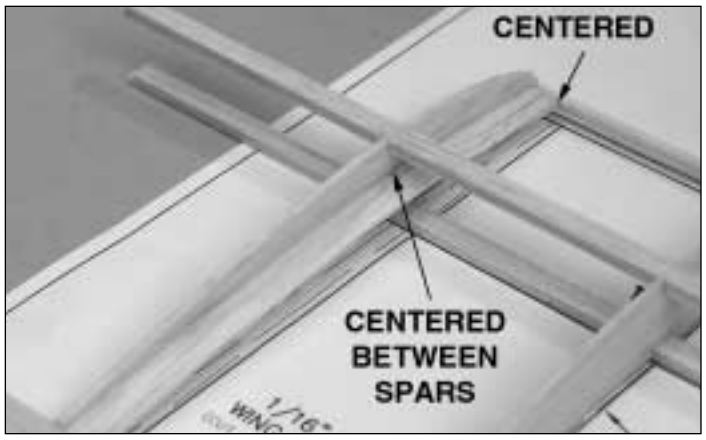

❏ ❏ 10. Glue the top trailing edge sheet to the top of the wing ribs and the bottom trailing edge sheet.


❏ ❏ 11. From a 1/32" x 3/4" x 24" [.8 x 19 x 610mm] balsa sheet, cut and glue **shear webs,** horizontally, to the top and bottom spars in the locations shown on the plan. Make sure they are glued securely to the wing spars and ribs. **Do not install shear webs in the rib bay between the W-1A ribs.**

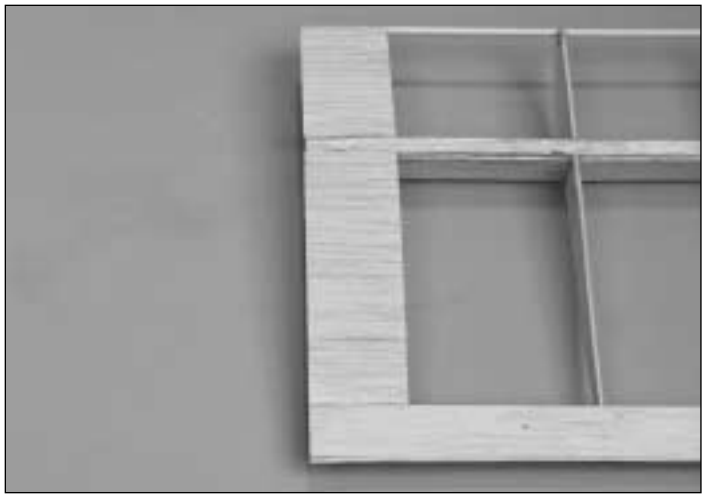



❏ ❏ 12. From a 1/32" x 3" x 15" [.8 x 75 x 380mm] balsa sheet, cut pieces to make the **top center sheeting** to fit between the wing spar and trailing edge sheet and between the wing spar and the leading edge dowel. When satisfied with the fit, apply medium CA to the top of the W-1A ribs and press the sheeting in place.

❏ ❏ 13. Carefully sand the top center sheeting flush with the wing spar, leading edge dowel and trailing edge sheet.




❏ ❏ 14. Use the wing tip brace pattern on the plan to make the **wing tip brace** from leftover 1/16" [1.6mm] balsa. Glue the wing tip brace into position.

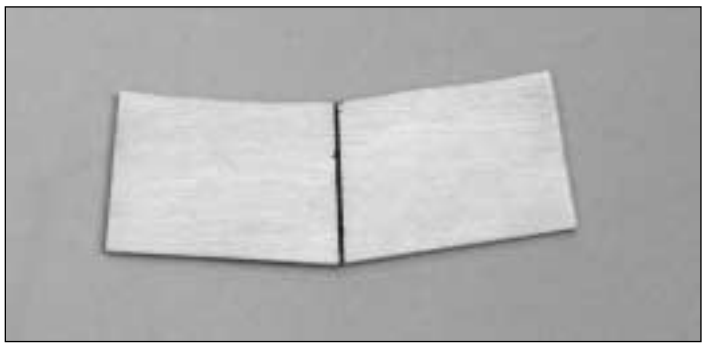


❑ ❑ 15. Remove the wing from your building board and carefully sand off any glue blobs. From the remaining 1/32" x 3" x 15" [.8 x 75 x 380mm] balsa sheet, cut pieces to make bottom center sheeting to fit between the leading edge dowel and wing spar and from the wing spar to the trailing edge sheet.

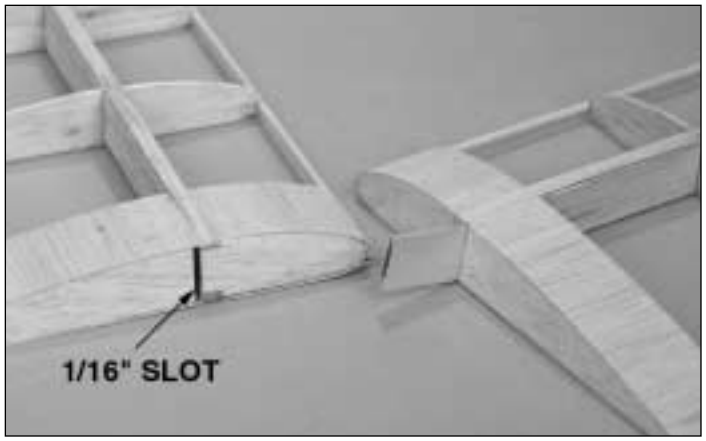
❑ ❑ 16. Cut and sand the wing spars and trailing edge sheeting flush with the wing tip rib.

❑ 17. Return to step 2 and build the right wing panel. **Remember!** Build it over the right wing plan.

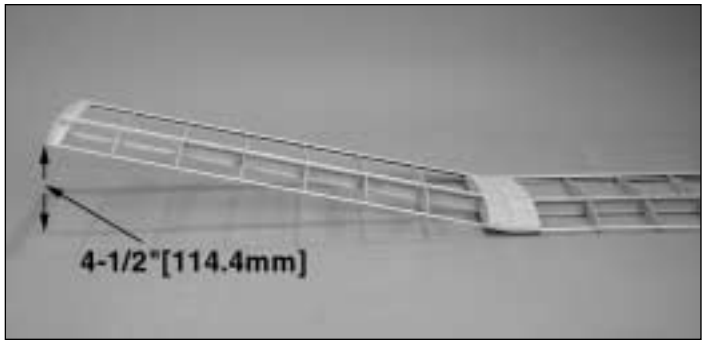
## *JOIN THE WING PANELS*



❑ 1. Draw a centerline on the laser-cut 1/16" [1.6mm] ply **dihedral brace.**




❑ 2. Using a hobby knife, carefully cut a 1/16" [1.6mm] slot in ribs W-1A, just behind the main spar. Test fit the dihedral brace in the slots.

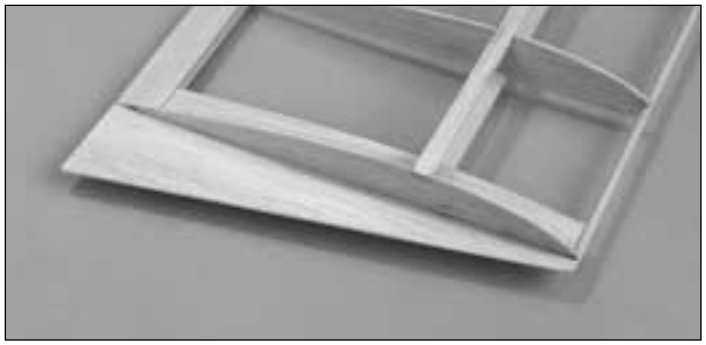



❑ 3. Test fit the wing halves together. With one wing half flat on your building board, block-up the wing tip of the other wing half so that it is 4-1/2" [114mm] off of your building board. Use a bar sander to sand the center joint as necessary until the wing halves fit together without any gap.

❑ 4. When satisfied with the fit, apply **medium CA** to the face of half of the dihedral brace. Insert the dihedral brace into one of the wing halves so that the brace is attached to the two main spars. After the CA has cured, apply medium CA to the face of the other half of the dihedral brace and the root rib. With one wing half flat on your building board and the wing tip of the other wing half blocked up as before, quickly slide the two wing halves together. Before the CA hardens, make sure the trailing edges are aligned. **Note:** If you prefer more working time for joining the wings, use epoxy for this step.

❑ 5. Sand the leading and trailing edges of the wing joint flush.

❑ 6. Use the **wing tip template** on the wing plan to make two **wing tips** from the unused portion of 1/16" [1.6mm] balsa that the fuselage sides came from.

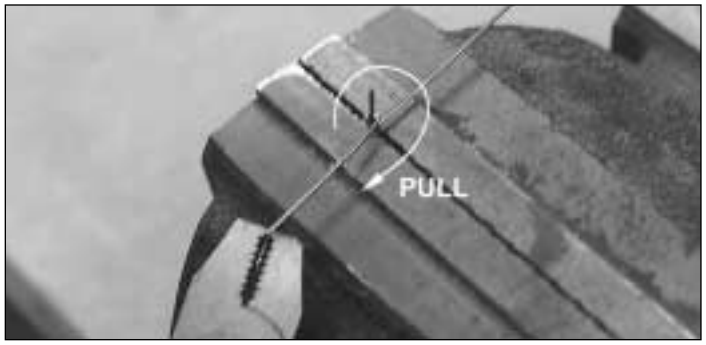


❏ 7. Glue one wing tip to each end of the wing. Round the corners slightly as shown on the plan.

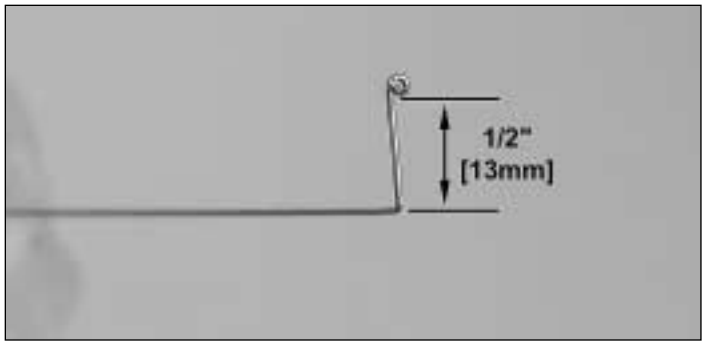
If you plan to fly your Tutor with rudder only, proceed to **"Build the Fuselage."** If you plan to fly your Tutor with ailerons, follow the proceeding instructions to build the ailerons.

## *Build the Ailerons*

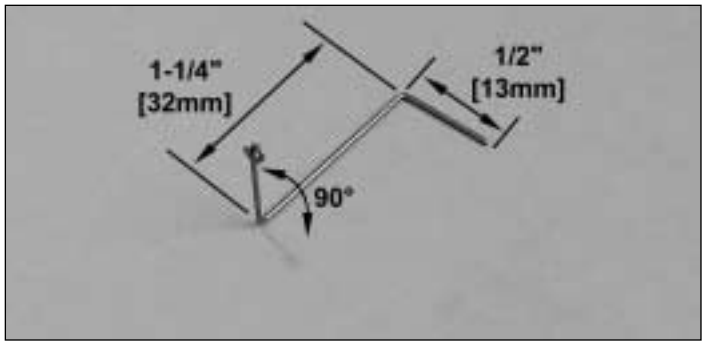
❏ ❏ 1. Using the drawings on the wing plan, follow the procedure below to make a **left aileron torque rod** from one of the .030" x 20" [.76 x 508mm] wires.




❏ ❏ A. Cut 1" [25mm] from one end of the .030" x 20" [.76 x 508mm] wire and clamp it in a vice. Make a loop near one end of the remaining wire by pulling it around the wire clamped in the vice.

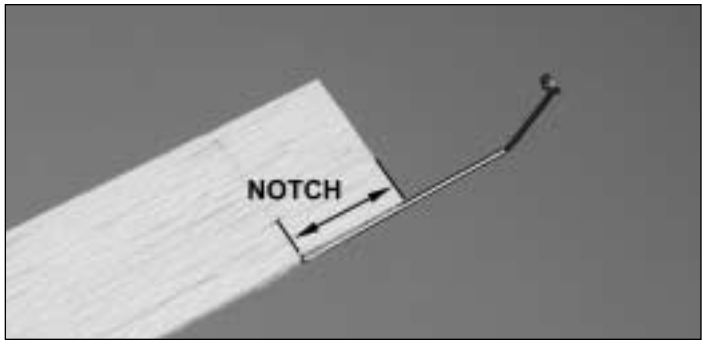



❏ ❏ B. Cut the excess wire from the loop, then use the drawing on the plan to make the next bend as shown in the photo.




❏ ❏ C. Make the final bend, then cut the wire to the length shown on the plan. Be certain the horizontal portion of the torque rod is perpendicular to the vertical portion of the rod that goes into the aileron.

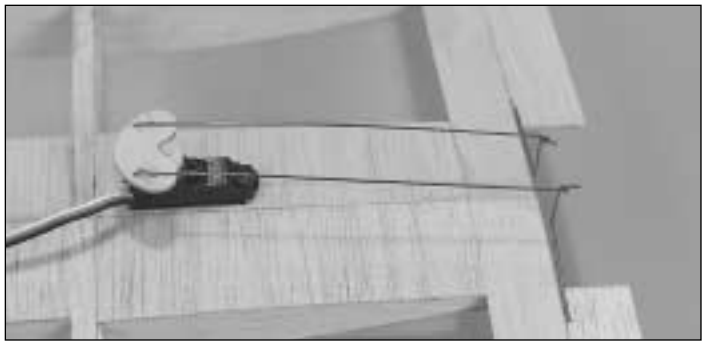
❏ ❏ 2. Cut one of the 1/16" x 3/4" x 24" [1.6 x 19 x 610mm] balsa **ailerons** to the length shown on the wing plan. Drill a #68 (or 1/32") [.8mm] hole into the leading edge of the aileron where shown on the plan for the aileron torque rod.




❏ ❏ 3. Cut a notch in the leading edge of the aileron between the hole you drilled and the end to accommodate the torque rod. Glue the torque rod to the aileron with medium CA.

❏ 4. Return to step 1 and make the right aileron torque rod and aileron the same way.

**Refer to this photo for the following four steps.**



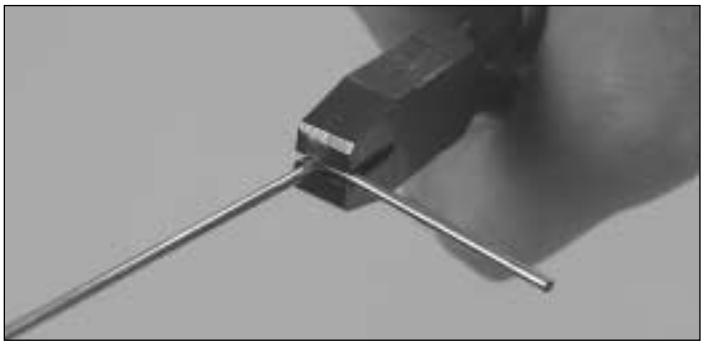
❏ 5. Temporarily tape both ailerons to the wing. Glue the laser cut ply servo horn to the plastic servo horn included with your servo, then connect the pushrods as shown on the plan. With this servo horn, the ailerons will travel up more than down, reducing adverse yaw, which is the tendency for the nose of the model to turn away from the direction of banked turns.

❑ 6. Cut the bottom sheeting for the aileron servo, so that the servo can be mounted to the side of the center rib.

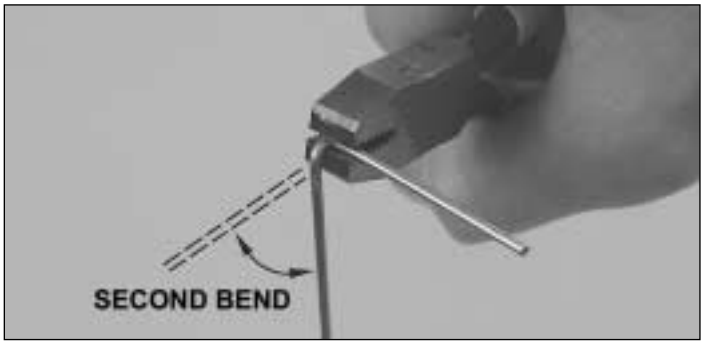
❑ 7. Clean the aileron servo case with a tissue dampened with alcohol or other suitable solvent. Mount the aileron servo to the side of the center rib with double-sided foam mounting tape (GPMQ4440, not included).

❑ 8. Use the remainder of the .030" [.76mm] wire you used for the torque rods to make the **aileron pushrods.** Note that the pushrods are connected to the torque rods with a "Z-bend" on both ends. If you do not have Z-bend pliers, or do not know how to make a Z-bend with regular pliers, follow the procedure below. (For clarity, larger wire than is supplied with this kit was used in the photos.)

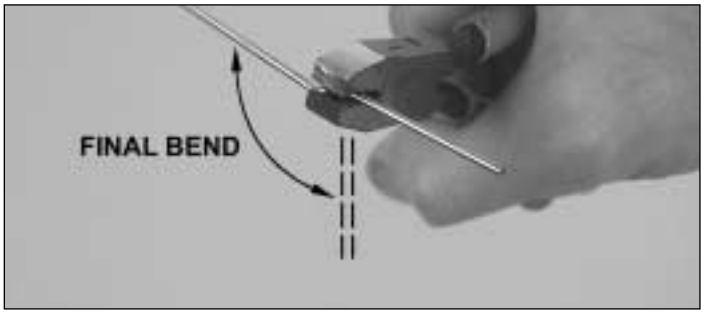
❑ A. Make the first 90° bend near one end of the wire.



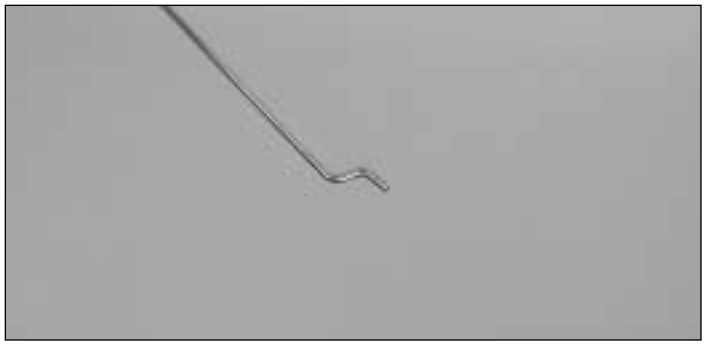
❑ B. Hold the wire in the pliers as shown.




❑ C. Make the second 90° bend downward.




❑ D. Make the final 90° bend upward to form the "Z."



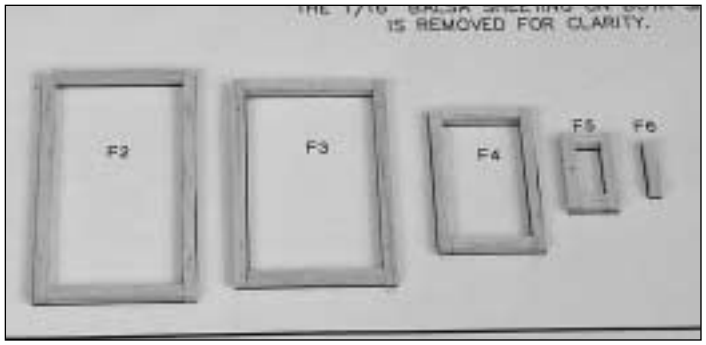
❑ E. Cut the excess wire near the end.
**Note:** This procedure does not work for all types of wire, but will work on the thin music wire supplied with this kit.

❑ 9. Connect the aileron servo to the aileron torque rods with the pushrods you just made.

## BUILD THE FUSELAGE

### Build the Formers

❑ 1. Cover the fuselage former drawings on the plan with Great Planes Plan Protector.

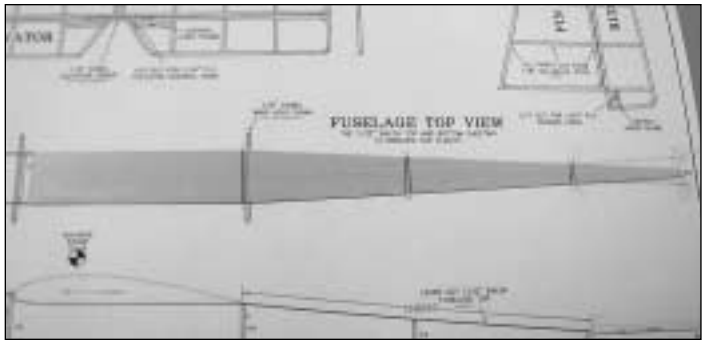



❑ 2. Use the remaining 1/8" x 1/8" x 24" [3.2 x 3.2 x 610mm] balsa sticks to build **formers F2** through **F6** over the plan. **Hint:** First cut the vertical sticks a little long, then pin them to the plan. Next, cut and glue the horizontal sticks into position. Lastly, trim the ends of the vertical sticks even with the horizontal sticks.

❑ 3. Remove the formers from the plan and use a bar sander with 150-grit sandpaper to sand them flat and even.

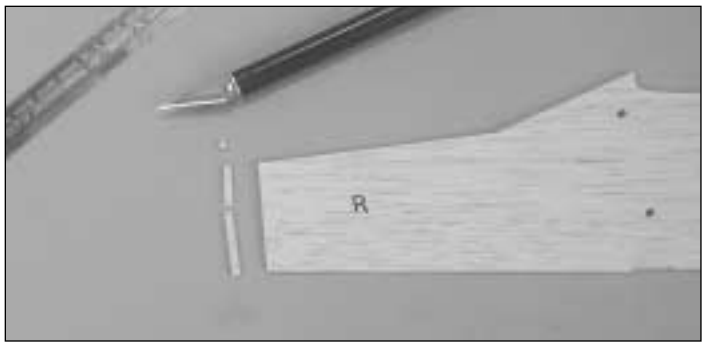
## *Frame the Aft End of the Fuselage*

❑ 1. Cover the top view of the fuse plan with Plan Protector.

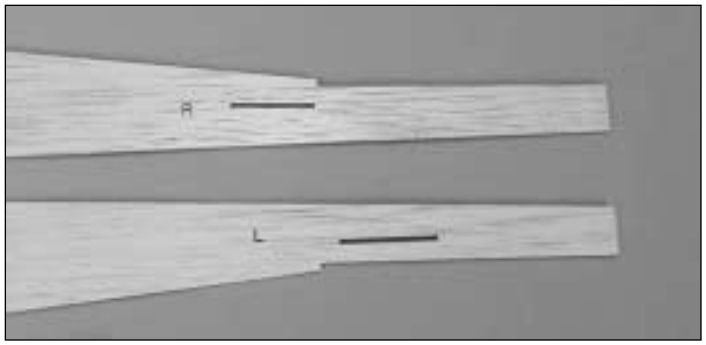



❑ 2. Pin the laser-cut 1/32" [0.8mm] balsa **aft fuse bottom** over the top view of the fuselage plan. Use a ballpoint pen and a straightedge to mark the location of formers F3, F4 and F5 on the aft fuse bottom.


❑ 3. Glue formers F3, F4 and F5 to the aft fuse bottom. Use a small builder's square to make certain the formers are perpendicular to the fuse bottom.

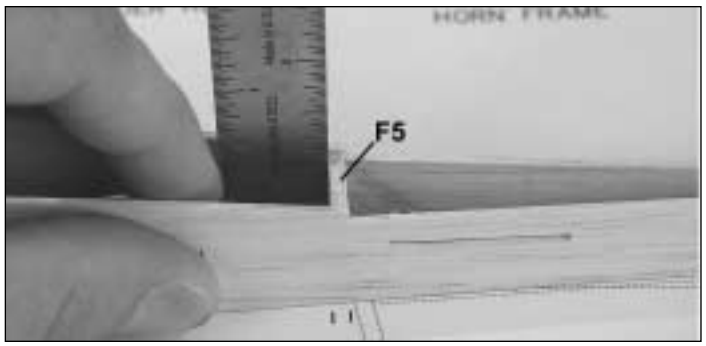


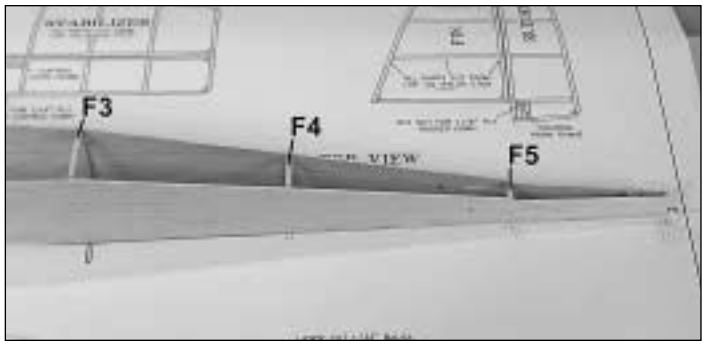

❑ 4. Use a straightedge and a hobby knife to trim the front edge of **one** of the laser-cut 1/16" [1.6mm] balsa **fuselage sides** along the laser-cut line. Mark the inside of that fuse side with an "R", designating it as the **right** side.




❑ 5. Cut the **forward** pushrod exit slot in the **right** fuse side where shown on the plan. Cut the **aft** pushrod exit slot in the other laser-cut 1/16" [1.6mm] balsa fuselage side where shown on the plan, which is now the **left** side.

❑ 6. Position both fuselage sides against the formers on the fuse bottom over the plan. Make certain the right fuse side is on the right, and the left fuse side is on the left.



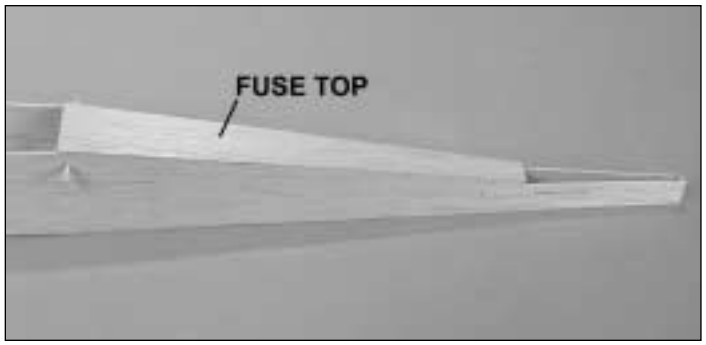




❑ 7. Accurately align the fuse sides, so the notches for the stab align with the top of former F5 and the notches for the wing align with the top of former F3. Holding the fuse sides in position, use a small builder's square to make certain F5 is perpendicular to the fuse bottom, then use thin CA to glue the fuse sides to F5. Glue F6 into position at the rear of the fuselage.

❑ 8. Use the same procedure to glue the fuse sides to F4, then to F3. Glue the fuse sides to the fuse bottom. As you proceed, make certain the bottom edges of both fuse sides are fully contacting the fuse bottom.

❑ 9. Make a **wing hold-down dowel** by cutting the remainder of a 1/8" [3.2mm] dowel leftover from the leading edge of one of the wing halves to a length of 3" [75mm]. Round both ends of the dowel and insert it into the aft holes in the fuse sides. Center the dowel, then use a builder's square to hold the fuse sides perpendicular to the building

board. Glue the dowel into position. **Note:** If you will be adding ailerons to your Tutor, do not use the aft holes. Drill two holes directly behind the top of F3. Glue the dowel into these holes.

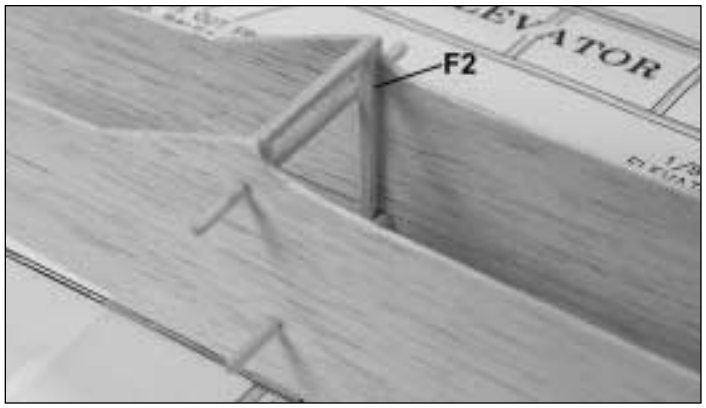



❑ 10. Use a bar sander with 150-grit sandpaper to lightly sand the tops of the formers and the top edges of the fuse sides even. Test fit, then use medium CA to glue the laser-cut 1/32" [.8mm] balsa **fuse top** into position. Remove the fuse from the plan.

❑ 11. From F3 aft, use a bar sander with 150-grit sandpaper to sand the fuse top and bottom even with the fuse sides.

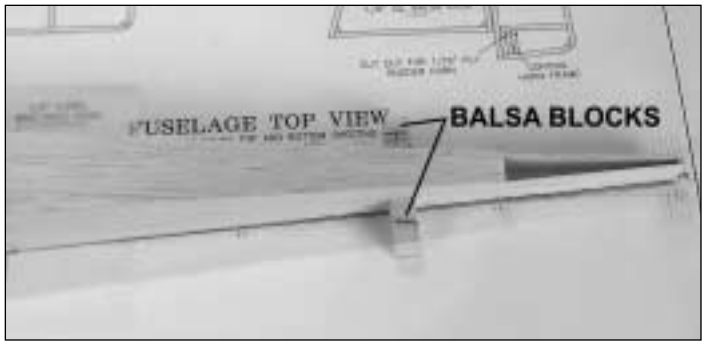
## *Frame the Front End of the Fuselage*

❑ 1. Make another wing hold-down dowel by cutting the remainder of the 1/8" [3.2mm] dowel leftover from the leading edge of the other wing half to a length of 3" [75mm]. Locate the remaining 1/8" x 3" [3.2 x 75mm] dowel supplied with this kit. Round both ends of both dowels.

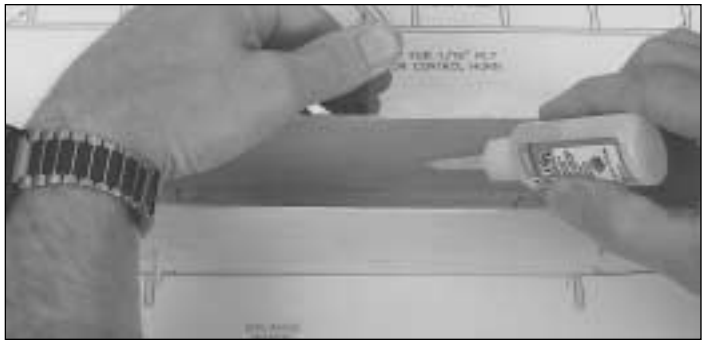



❑ 2. Insert the dowels through the holes in the front of the fuse for the forward **wing hold-down dowel** and the **landing gear dowel.** Fit, but do not glue former F2 in the fuse between the forward wing hold down dowel and the landing gear dowel.

❑ 3. Accurately reposition the fuse over the top view of the plan. Pin the aft end of the fuse bottom to the plan with a T-pin through the bottom of former F5. Pin the front end of the fuse bottom to the plan from F3 forward with four or five more T-pins.




❑ 4. Use T-pins to hold two balsa blocks or something similar to the building board, aligning the aft end of the fuse over the plan. Remove the T-pin from former F5 and raise the aft end of the fuse until the bottom of the fuse sides in the cabin area (under the wing) are contacting the fuse bottom. Note that the balsa blocks hold the aft end of the fuse in alignment even though it has been raised off the plan.



❑ 5. Hold the fuse sides to the fuse bottom, then glue them together.

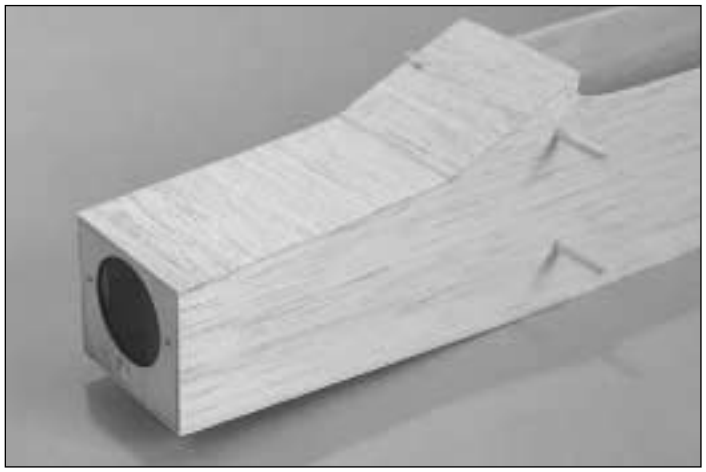
❑ 6. Temporarily fit, but do not glue the laser-cut 1/16" [1.6mm] ply **landing gear plate** between the notches in the fuse bottom. Be certain the forward wing dowel and the landing gear dowel are centered, then glue former F2 to the fuse sides, but not to the landing gear plate.


❑ 7. Use balsa sticks to hold the laser-cut 1/32" [.8mm] balsa forward fuse bottom up to the fuse sides. Glue the **forward fuse bottom** to the fuse sides.

❑ 8. Use a bar sander with 150-grit sandpaper to **lightly** sand the edges of the laser-cut 1/16" [1.6mm] ply **former F1,** so glue will adhere. Glue strips of leftover 1/16" [1.6mm] balsa to the back of F1 over the holes as shown on the plan.

❑ 9. Drill 1/16" [1.6mm] holes through the marks in F1 and the balsa strips.

❑ 10. Use medium CA to glue F1 to the fuse sides and to the forward fuse bottom. (You can see F1 in the following photo.) Be certain F1 is in alignment with the edges of the fuse sides as this sets the correct motor right-thrust and down-thrust. Also be certain that the hole for the motor in F1 is nearest the top.



❑ 11. Use leftover 1/32" [.8mm] balsa to sheet the front of the fuselage. Note that the grain runs across the fuse. Sand the edges of the sheeting flush with the fuse sides.


❑ 12. Test fit, then glue the landing gear plate to the bottom of the fuse and former F2.

❑ 13. Use a bar sander with 150-grit paper to sand the fuse top and bottom even with the fuse sides. Slightly round the corners as shown in the cross-sections on the fuse plan. Sand the fuse smooth with progressively finer grits of sandpaper.

## COVER THE MODEL

❑ 1. If you haven't done so already, sand all parts of the model smooth with 320-grit, then 400-grit sandpaper.

❑ 2. Use compressed air (be careful!), a dust brush or a tack cloth to remove balsa dust from the model.

❑ 3. Determine what material you will be covering the model with. If using Top Flite EconoKote®, the model is ready to cover. If using Coverite™ Micafilm™, coat the areas to be covered with Coverite Balsarite™ (COVR2500). Be certain you use the formula for Micafilm, and not the formula for regular film covering.

❑ 4. Follow the suggested covering sequence to cover the model.

## *Suggested Covering Sequence*

**IMPORTANT:** Do not shrink the covering until both sides of each part are covered. This will reduce the tendency for the surfaces to twist.

**Tail Surfaces:**
❑ 1. The bottom, then the top of the stabilizer
❑ 2. Bottom, then top of elevators
❑ 3. Fin
❑ 4. Rudder

**Fuselage:**
❑ 1. The bottom of the fuse
❑ 2. Sides
❑ 3. Top

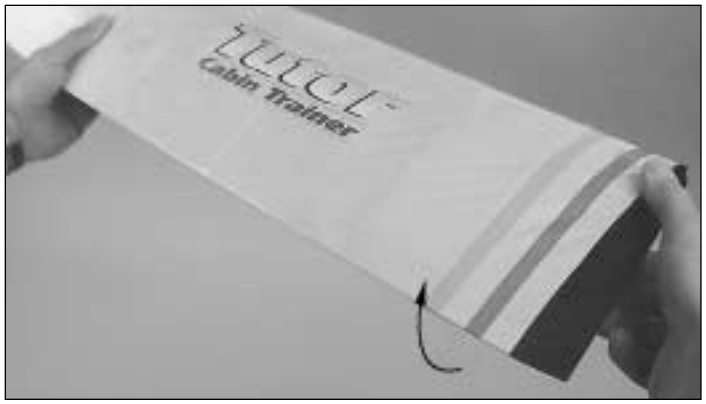
**Wing:**
❑ 1. The bottom of the wing
❑ 2. Top of the wing
❑ 3. Ailerons (if used)

**Note:** It may be easier to cover the wing tips separately, after the rest of the wing has been covered.

❑ 1. After all the tail pieces are covered, inspect the stab and fin for twists. If necessary, lightly twist the part in the opposite direction and apply heat to the covering until you can get it flat.

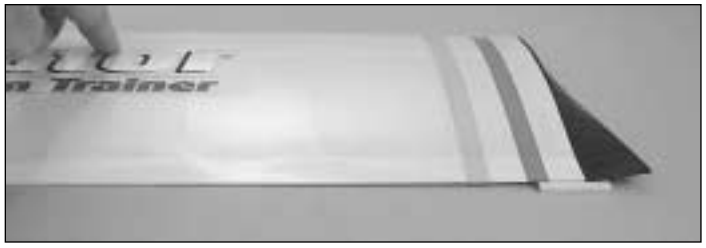
## *Add "Washout"*

An important characteristic of most airplanes is their ability to resist stalling, or to stall gently. Simply stated, a stall is when the wing no longer produces lift–basically the model quits flying until it regains airspeed. A stall can occur when attempting to climb too rapidly, or when the model runs out of airspeed (such as when trying to land too slowly). One way to prevent or delay a stall is to add "washout" to the wing. Washout is an upward twist at both wing tips, so that the trailing edge is higher than the leading edge. If the wing tips are raised slightly, or are at a lower angle than the rest of the wing, the outer portion of the wing will continue to produce lift (fly) even though the rest of the wing has quit flying, thus resisting a stall. Because the Tutor is designed to be light, it would be difficult to build this required twist into the wing. The following procedure explains how to add washout, which is common for lightweight structures such as this.




❏ 1. Start with the right wing panel. Holding the middle of the wing, twist the trailing edge of the right wing tip upward. The amount of washout to shoot for is 1/8" [3mm], so begin by twisting about 1/2" [13mm] (because the wing will "spring" partway back to its original position after re-shrinking the covering in the next step).

❏ 2. Note the wrinkles in the covering while holding the wing. Have an assistant heat the covering on the top and the bottom until the wrinkles disappear. Allow the covering to fully cool before letting go.



❏ 3. Lay the right wing panel on your flat workbench. Apply light pressure to hold it down, then use a 1/8" [3mm] piece of balsa as a gauge to see if you have added the correct amount of washout. If necessary, continue to twist the wing and remove the wrinkles until the correct amount of washout is achieved.

❏ 4. Add washout to the left wing panel the same way.

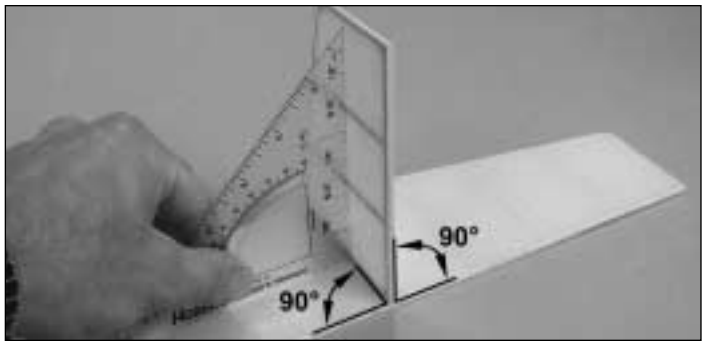
**Note:** For a small, lightweight model such as the Tutor, it is not critical to get **exactly** 1/8" of washout. However, it is important that ***some*** washout be present in **both** wing tips. Do your best to achieve the washout recommended, but don't spend hours trying to do so. A slight variance in both wing tips is acceptable, as long as neither of the wing tips has any "wash-in."

❏ 5. Check the wing periodically to be sure the washout remains. Twist and shrink the covering as necessary to retain the washout.

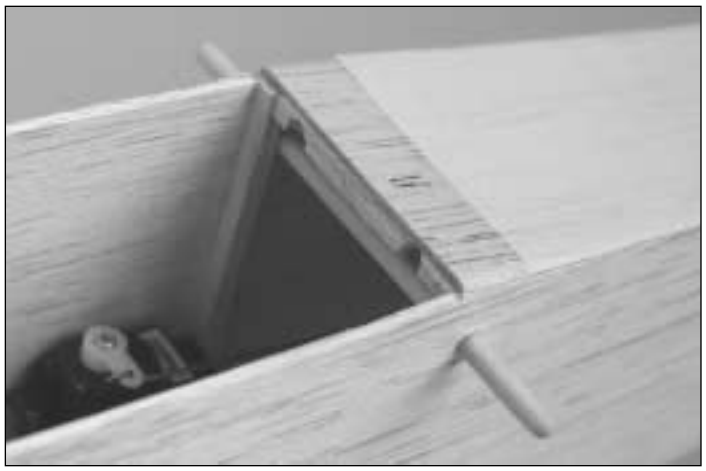
# FINAL ASSEMBLY

## Join the Tail Surfaces

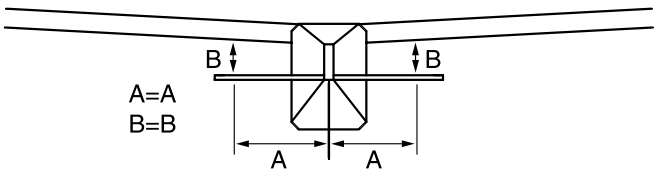
❏ 1. Use a small pin to poke several holes through the covering in the top of the stab along the center rib. These holes will absorb the CA that will be used to glue the fin to the stab and will make for a stronger glue joint.

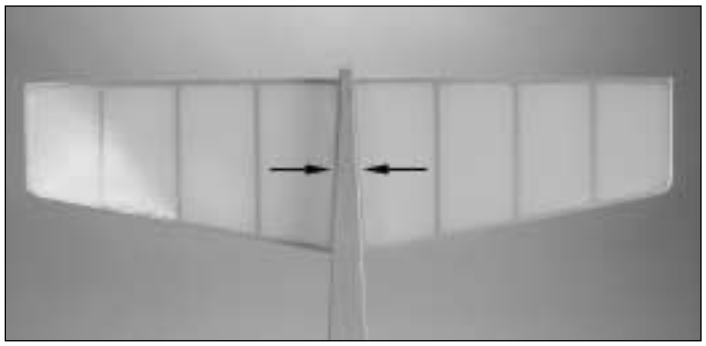



❏ 2. Position the fin over the center rib on the stab. Be certain the trailing edge of the stab is 1/8" [3.2mm] **ahead** of the trailing edge of the fin as shown on the plan. Use a builder's square to get the base of the fin perpendicular to the trailing edge of the stab. Holding the fin in position, use the builder's square to hold the fin vertical, then glue it to the stab with thin CA.



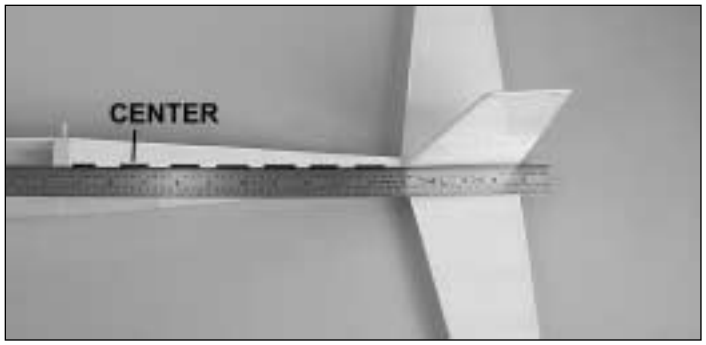
❏ 3. Mount the wing to the fuse with two #32 rubber bands. (When it's time to fly the Tutor, use four #32 rubber bands.) **Note:** If you have built your wing with ailerons, trim the front edge of the aft fuse top sheeting and cut notches in the top of former F3 to accommodate the aileron torque rods. (Even though the fuse is not completely covered in this photo, it should be on your model at this time.)



❑ 4. Place the stab on the fuse, making sure it is centered as shown in “A” = “A” in the sketch above. **Hint:** If the covering on the stab is transparent, align the sticks on both sides of the center stick with the fuse.

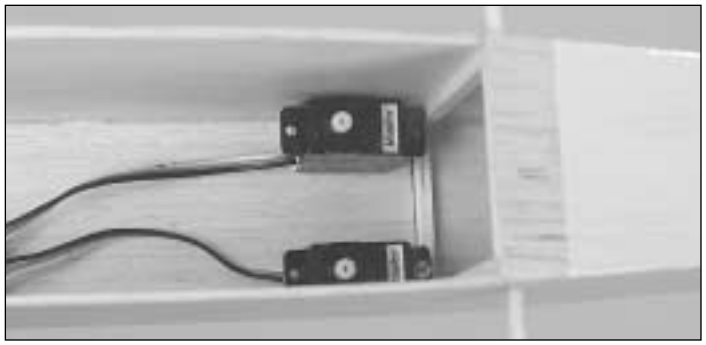
❑ 5. View the model from the rear and see if the stab is level with the wing as shown in “B” = “B”. If the stab is not level with the wing, carefully sand the “high side” of the fuse until you can get the stab to align.




❑ 6. With the stab on the fuse, use a straightedge to align the fin with the center of the top of the fuse. Glue the stab to the fuse with thin CA.

## *Hook Up the Controls*

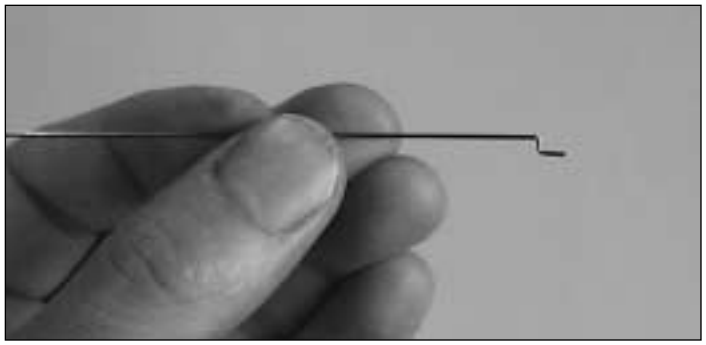
❑ 1. Before proceeding, charge the motor battery (and your transmitter if needed). When it’s time to set up the radio, you won’t have to stand by while the batteries are charging.

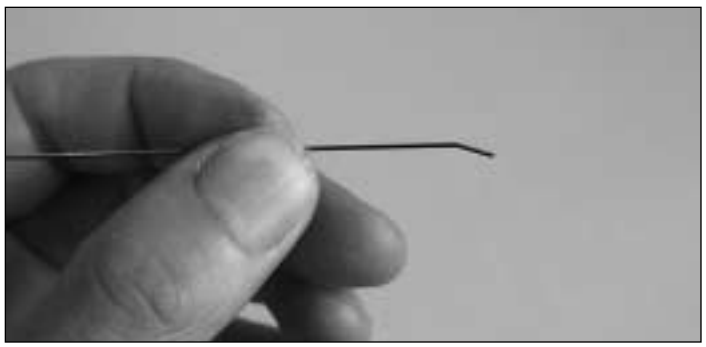


❑ 2. Use a tissue dampened with denatured alcohol or other suitable solvent to clean the servo cases so the mounting tape will adhere. Use double-sided foam mounting tape (GPMQ4440, not included) to mount the elevator and rudder servos to the fuse sides where shown on the plan.

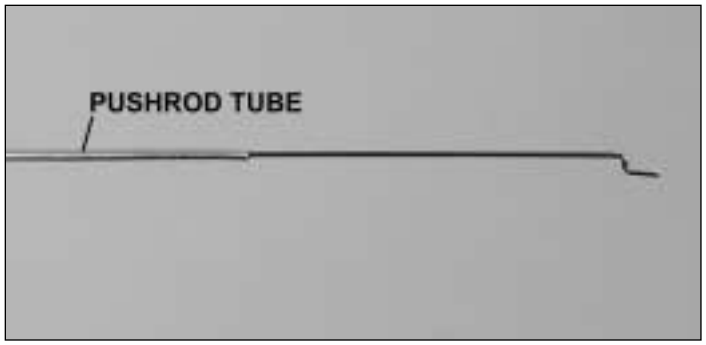
❑ 3. Cut the covering from the elevator and rudder pushrod exit slots near the aft end of the fuse.

❑ 4. Thoroughly clean the remaining .030" x 20" [.76 x 508mm] wire with alcohol or similar solvent, then scuff it with 320-grit sandpaper so glue will adhere.





❑ 5. Cut 3-1/2" [90mm] from the wire. Make a Z-bend on one end and a slight bend on the other of the 3-1/2" [90mm] piece. This is a **pushrod end.**



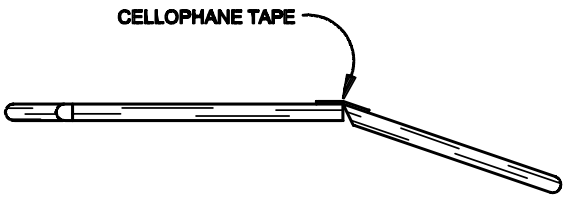

❏ 6. Use pliers to insert the pushrod end 1-1/4" [32mm] into a 1/16" x 12" [1.6 x 305mm] aluminum **pushrod tube.** Use thin CA to glue the pushrod end into the pushrod tube.

❏ 7. Make another pushrod end just the same as the first and insert it into the same pushrod tube, but **do not** glue it in. This will be the **elevator pushrod.**

❏ 8. Make sure the pushrod end that is not glued into the tube fits tightly and will not easily slide in and out. It will be permanently glued in after the model has been set up and the exact length of the pushrod has been determined.

❏ 9. **Refer to this photo for the following three steps.** Insert the elevator pushrod into the fuse through the slot in the right side. The pushrod end that is not glued into the tube should be at the rear.

❏ 10. Connect the front of the pushrod to the servo arm, then mount the servo arm to the elevator servo. Connect the other end of the pushrod to the outer hole in the elevator control horn, then hold the elevator up to the stab.




❏ 11. Slide the pushrod end in or out of the pushrod tube until the elevator is centered when the servo is centered. Use cellophane tape to hinge the elevator to the stab as shown in the sketch.

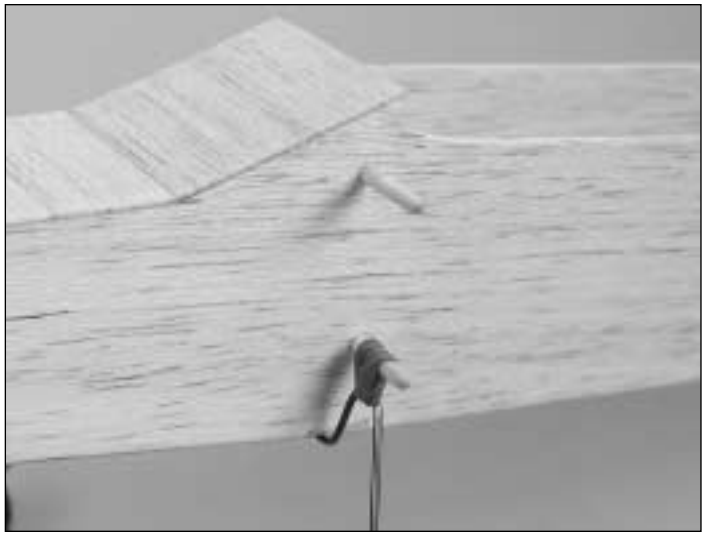
❏ 12. Make the rudder pushrod and join the rudder to the fin the same way.

❏ 13. Attach the ailerons to the wing with cellophane tape the same as you did the elevators and rudder.

## *Mount the Landing Gear*

❏ 1. Make the **tail skid** as shown on the plan from leftover 1/8" x 1/8" [3.2 x 3.2mm] balsa, then glue it to the fuse.

❏ 2. Install the wheels on the 1/16" [1.6mm] wire **landing gear.** Secure the wheels with the nylon retainers supplied with this kit.



❏ 3. Mount the landing gear to the fuse with #14 rubber bands on both sides. Both rubber bands must be stretched enough to wrap around the gear and dowel at least eight times. (Even though the fuselage is shown without covering, yours should be covered at this time.)

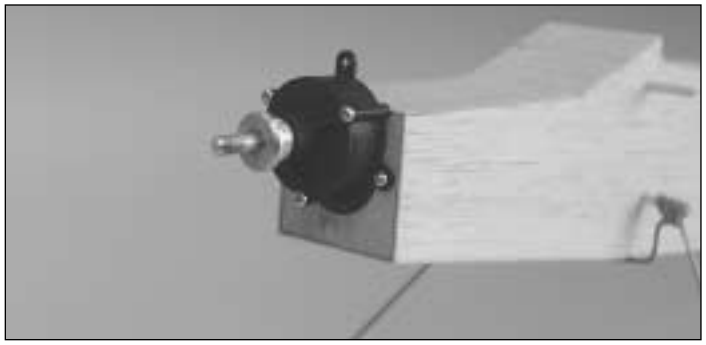
## *Assemble the Gear Drive*

Follow these assembly instructions for the Great Planes ElectriFly™ T-280GD ESC motor system and gear drive (GPMG0430).


❏ 1. Use denatured alcohol or other solvent to clean the motor shaft. Roughen the shaft with 320-grit sandpaper so glue will adhere.

❏ 2. Apply a small drop of medium CA to the hole in the pinion gear, then press the gear onto the motor shaft using the base of a large screwdriver or something similar. While doing this, do not rest the base of the motor on your workbench, but support the motor shaft with a piece of hardwood. This way, the pressure applied to the gear will not displace the armature in the motor.

❏ 3. Press the motor by hand as far as it will go into the gear drive unit.



❏ 4. Connect the motor to the speed control. Guide the speed control and wiring through the hole in F1, then mount the motor to F1 with two #2 x 3/8" [13mm] screws.

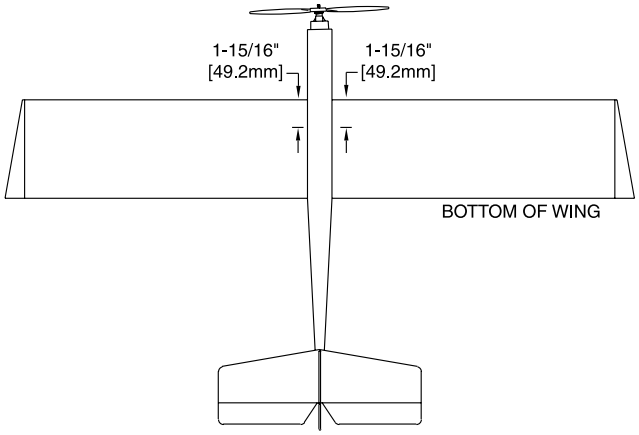
❏ 5. Follow the instructions that came with your speed control to connect the servos and the receiver to the speed control. Temporarily position the receiver inside the fuse and lay the antenna along the outside of the fuse over the stab.

❏ 6. Mount the propeller to the motor using the prop adapter. If necessary, enlarge the spacer in the prop with a 3/16" drill bit or a hobby knife with a #11 blade.

# PREPARE THE MODEL FOR FLYING

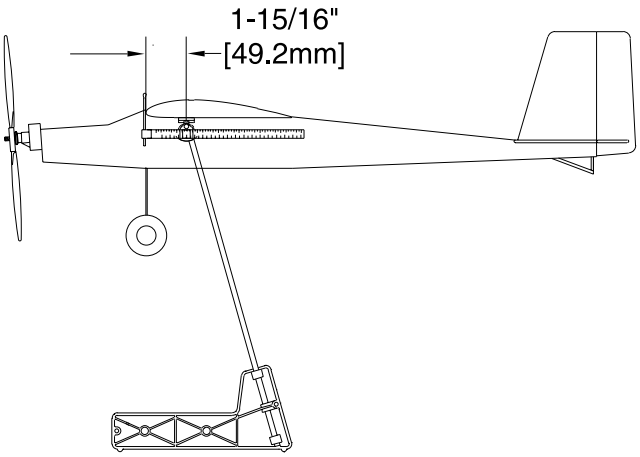
## Balance the Model

**Note: This section is VERY important and must NOT be omitted! A model that is not properly balanced will be unstable and possibly unflyable.**



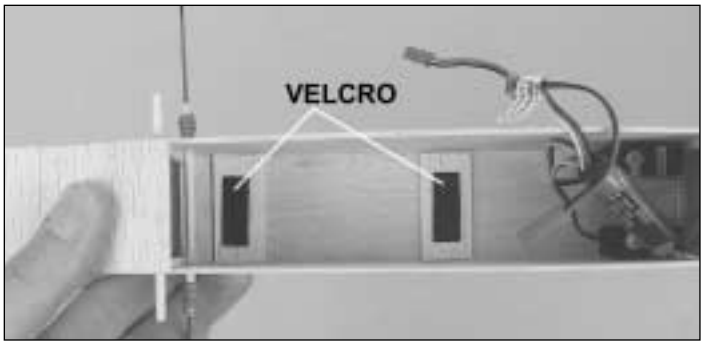

❏ 1. Use a fine-point felt-tip pen or 1/8" [3mm] wide striping tape to accurately mark the balance point on the bottom of the wing on both sides of the fuselage. The balance point (C.G.) is shown on the fuse plan and is located 1-15/16" [49.2mm] back from the leading edge of the wing. This is the balance point at which your model should balance for your first flights. After the initial trim flights and when you become more acquainted with the Tutor, you may wish to experiment by shifting the balance up to 1/4" [6mm] forward or backward to change its flying characteristics. Moving the balance point forward may improve the smoothness and stability, but the model may then require more speed for takeoff and may become more difficult to slow down for landing. Moving the balance aft makes the model more agile with a lighter “feel.” In any case, start at the location we recommend. Do not at any time balance your model outside the recommended range.

❏ 2. Mount the wing to the fuse with two #32 rubber bands (when it’s time to fly the Tutor, the wing will be mounted to the fuse with four #32 rubber bands, cris-crossing the last two.




❏ 3. With the model ready to fly and all parts installed **except** for the battery, position the battery pack on top of the wing as shown in the photo. Lift the model at the balance point or place it on a Great Planes C.G. Machine. If the tail drops, the model is “tail heavy”. If the nose drops, it is “nose heavy”. Position the battery on top of the wing so the model will balance. This is the location where the battery must be mounted inside the fuselage to balance the model, thus eliminating additional ballast (nose or tail weight). Because weight is critical to the flight performance of Park Flyers, it is best to balance the plane by mounting the battery in the optimum location. Minor C.G. changes can be made by changing the location of the receiver as well.

❏ 4. Mark the location of the battery on the outside of the fuselage.




❏ 5. Use Great Planes Velcro® (GPMQ4480, not included), or another suitable method to mount the battery. Keep in mind that the battery should be readily removable to allow it to cool, and in case you have additional battery packs. **Note:** If using Velcro to mount the battery, reinforce the fuse bottom with two 3/4" [19mm] wide strips of leftover 1/16" [1.6mm] balsa. Additionally, only a couple of 1/4" [6mm] wide strips of Velcro are required to secure the battery-do not use a whole sheet. Otherwise, you may damage the model while removing the battery!

❏ 6. Mount the battery. Mount the receiver to one of the fuse sides or to the fuse bottom with Velcro or double-sided foam mounting tape.

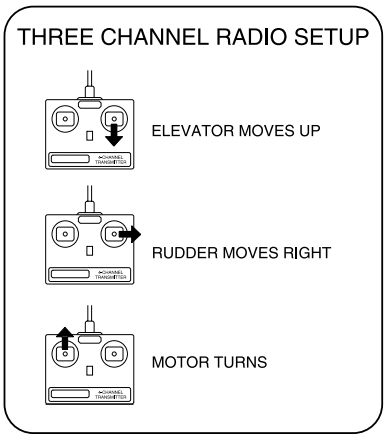
❏ 7. Determine your method for extending the receiver antenna and routing it through the fuselage. Something as simple as drilling a 1/16" [1.6mm] hole through the top of the fuselage, guiding the antenna through, and taping it to the stab or fin is acceptable. Be certain there is no way that the antenna can reach the propeller! Never coil-up the antenna inside the fuselage, nor cut it. The antenna is tuned to a certain length.

❏ 8. Recheck the C.G. to make certain the model balances. If the battery is held in place with Velcro, you will be able to shift it slightly to fine tune the C.G.

## *Set the Control Throws*

❏ 1. For safety, remove the propeller from the motor. Move the throttle stick to the off position, or towards you. Connect the charged battery to the speed control. Turn on the transmitter, then follow the instructions that came with your speed control to turn on the receiver.

**WARNING:** Whenever the model is not being flown or setup, the battery should be disconnected.




❏ 2. Center the trims on the transmitter. Operate the servos by moving the control sticks. Check that the servos respond in the correct direction as shown in the diagram. If necessary, use the servo reversing function in your transmitter to get the controls to respond correctly.

❏ 3. If necessary, remove the servo arms from the servos, then remount them so they are centered.

❏ 4. Now that the servos and the servo arms are centered, center the rudder and elevator by adjusting the position of the aft wire pushrod ends inside the pushrod tubes. Permanently glue the pushrod ends in the pushrod tubes with thin CA. If you have built the Tutor with ailerons, carefully bend the aileron torque rods or the pushrods until both ailerons are centered.

❏ 5. Operate the controls with the transmitter and use a ruler to measure the throws. Use the ATV function in the transmitter to set the control throws according to the chart that follows. **Note:** If necessary, the control throws may be increased by moving the pushrod to the inner hole on the control horn on the elevator and rudder.

**These are the recommended control throws:**

| | | |
|---|---|---|
| **Elevator:** | 5/8" [16mm] up | 5/8" [16mm] down |
| **Rudder:** | 7/8" [22mm] right | 7/8" [22mm] left |
| **Ailerons:** | 3/8" [9mm] up | 3/8" [9mm] down |

**IMPORTANT:** The Tutor has been extensively tested. These are the control throws at which it flies best. If, after you become comfortable with the way the Tutor flies, you would like to adjust the throws to suit your taste, that is fine. However, remember that too much throw can make the plane more difficult to control and force it into a stall or a snap roll, so remember, "more is not always better."

❏ 6. Switch off the transmitter and disconnect the battery.

# PREFLIGHT

## Charge the Batteries

Follow the instructions that came with your radio to charge the batteries the evening before you plan to fly. You should always charge the transmitter batteries before flying and at other times as recommended by the radio manufacturer.

## Identify Your Model

No matter if you fly at an AMA sanctioned R/C club site or if you fly somewhere on your own, you should always have your name, address, telephone number and AMA number on or inside your model. It is **required** at all AMA R/C club flying sites and AMA sanctioned flying events. Fill out the identification tag on page 24 and place it on or inside your model.

## Ground Inspection

Before you fly you should perform one last overall inspection to make sure the model is truly ready to fly and that you haven't overlooked anything. If you are not thoroughly familiar with the operation of R/C models, ask an experienced modeler to perform the inspection. Check to see that you have the radio installed correctly and that all the controls are connected properly. The motor must also be checked by confirming that the prop is rotating in the correct direction and the motor sounds like it is reaching full power. Make certain all control surfaces (elevators, rudder, ailerons-if used) are secure, the pushrods are connected, the controls respond in the correct direction, radio components are securely mounted, and the C.G. is correct.

## Range Check

Ground check the operational range of your radio before the first flight of the day. With the transmitter antenna collapsed and the receiver and transmitter on, you should be able to walk at least 100 feet away from the model and still have control. Have an assistant stand by your model and, while you work the controls, tell you what the control surfaces are doing. Repeat this test **with the motor running** at various speeds with an assistant holding the model, using hand signals to show you what is happening. If the control surfaces do not respond correctly, **do not fly!** Find and correct the problem first. Look for loose servo connections or broken wires, corroded wires on old servo connectors, poor solder joints in your battery pack or a defective cell, or a damaged receiver crystal from a previous crash.

# PERFORMANCE TIPS

## Cycle the Batteries

For the longest flight duration, and to get the most from a new battery, the battery should be cycled. "Cycling" a battery means to fully charge ("peak" charge) the battery, then to discharge it. Many battery chargers have peak charging and automatic discharging capabilities. If you do not have a charger that is able to discharge batteries, you can discharge the battery yourself by running the motor with the

propeller attached until the propeller turns slowly. Charge and discharge the battery 3 or 4 more times on the ground before flying. Be sure to remove the battery from the airplane between each cycle and allow it to cool before recharging.

## Examine the Propeller

Use fine sandpaper to remove imperfections along the edges of the propeller. For the best performance, use a Top Flite Precision Magnetic Prop Balancer™ (TOPQ5700) to balance the propellers (this is a necessity on glow-powered engines, but less critical on small electric models).

## Motor Care

1. Using multiple battery packs for successive flights may cause the motor to become excessively hot, thus causing damage. Allow the motor to cool for at least 10 minutes between flights.

2. The ideal power source for the Tutor system is a 6 to 7-cell (7.2 - 8.4 volt) battery pack. The use of a higher voltage battery may reduce motor life.

## Oil the Wheels

If taking off from the ground, the wheels must spin freely. Check the wheels for binding when moved from side to side and put a drop of oil on each axle.

## MOTOR SAFETY PRECAUTIONS

**Note:** Failure to follow these safety precautions may result in severe injury to yourself and others.

Get help from an experienced pilot when learning to operate motors.

Use safety glasses when running motors.

Do not run the motor in an area of loose gravel or sand; the propeller may throw such material in your face or eyes.

Keep your face and body as well as all spectators away from the path of the propeller as you start and run the motor.

Keep items such as these away from the prop: loose clothing, shirt sleeves, ties, scarfs, long hair or loose objects (pencils, screwdrivers) that may fall out of shirt or jacket pockets into the prop.

The electric motor and motor battery used in your Tutor are very powerful and the spinning propeller has a lot of momentum; therefore, if you touch the propeller while it is spinning it may inflict severe injury. Respect the motor and propeller for the damage it is capable of and take whatever precautions are necessary to avoid injury. Always disconnect and remove the motor battery until you are ready to fly again and always make sure the switches are turned off before connecting the battery.

## AMA SAFETY CODE (excerpt)

Read and abide by the following Academy of Model Aeronautics Official Safety Code:

**GENERAL**

1. I will not fly my model aircraft in competition or in the presence of spectators until it has been proven to be airworthy by having been previously successfully flight tested.

2. I will not fly my model aircraft higher than approximately 400 feet within 3 miles of an airport without notifying the airport operator. I will give right of way to and avoid flying in the proximity of full scale aircraft. Where necessary an observer shall be utilized to supervise flying to avoid having models fly in the proximity of full scale aircraft.

3. Where established, I will abide by the safety rules for the flying site I use and I will not willfully and deliberately fly my models in a careless, reckless and/or dangerous manner.

7. I will not fly my model unless it is identified with my name and address or AMA number, on or in the model.

**RADIO CONTROL**

1. I will have completed a successful radio equipment ground check before the first flight of a new or repaired model.

2. I will not fly my model aircraft in the presence of spectators until I become a qualified flyer, unless assisted by an experienced helper.

3. I will perform my initial turn after takeoff away from the pit, spectator and parking areas and I will not thereafter perform maneuvers, flights of any sort or landing approaches over a pit, spectator or parking area.

4. I will operate my model using only radio control frequencies currently allowed by the Federal Communications Commission.

# FIND A SAFE PLACE TO FLY

Though the Tutor is a “Park Flyer,” the **best** place to fly **any** model is at an AMA chartered club field. Club fields are set up for R/C flying, making your outing safer and more enjoyable. We recommend that you join the AMA and a local club so you can have a safe place to fly and have insurance to cover you in case of a flying accident. The AMA address and telephone number are in the front of this manual.

If there is no club or R/C flying field in your area, find a suitable site that is clear of trees, telephone poles, buildings, towers, busy streets and other obstacles. Since you are not flying at a sanctioned AMA site, be aware that there may be others like yourself who could be flying nearby. If both of your models happen to be on the same frequency, interference will likely cause one or both of the models to crash. An acceptable minimum distance between flying models is five miles, so keep this in mind when searching for a flying site.

In addition to obstacles, it is important to be aware of people who may wander into the area once you begin flying. At AMA club flying sites it is a severe rule infraction to fly over others. You should NEVER fly over people no matter where you fly. R/C models tend to attract onlookers whose numbers can soon multiply to form small, uncontrolled crowds. Onlookers pose two main problems. First is the danger of actually crashing your model into a person, causing injury. Second is the distraction of those who ask you questions while you are trying to concentrate on flying. To minimize or avoid this problem, have an assistant standing by who can spot people who wander into your flying site (so you can avoid flying over them) and who can perform “crowd control” if people start to gather.

# FLYING

**IMPORTANT:** If you are an inexperienced modeler we strongly urge you to seek the assistance of a competent, experienced R/C pilot to check your model for airworthiness AND to teach you how to fly. No matter how stable or “forgiving” the Tutor is, attempting to learn to fly on your own is dangerous and may result in the destruction of your model or even injury to yourself and others. Therefore, find an instructor and fly only under his or her guidance and supervision until you have acquired the skills necessary for safe and fully controlled operation of your model.

## Takeoff

We recommend flying the Tutor when the wind is no greater than five miles per hour. Less experienced flyers should fly the Tutor only in calm (less than one mile per hour) conditions. Frequently, winds are calm in the early morning and early evening. These are the most enjoyable times to fly anyway!

Until you have the Tutor properly trimmed for level flight, we recommend having an assistant hand-launch the model instead of taking off from the ground. Of course, experienced modelers can hand-launch the model themselves.

Turn on the transmitter and plug the battery into the speed control. Turn on the receiver by following the instructions that came with your speed control.

**IMPORTANT:** Confirm that the transmitter operates the controls by moving the sticks and watching the surfaces respond. Occasionally, electric models have been launched with the transmitter turned off or the battery disconnected from the speed control!

When ready to launch, the assistant should hold the bottom of the fuselage behind the landing gear, then raise the model high above his head and point it **into the wind.** With the pilot *(that would be you!)* standing behind the plane, fully advance the throttle to start the motor. As soon as the motor is at full power, the hand launcher should gently toss the plane into the air at a **level** or **slightly** nose-up attitude. Be certain the model is being launched **into** the wind and be immediately ready to make corrections to keep the airplane flying straight, level and into the wind.

When the model has gained adequate flying speed under its own power, **gently** pull the elevator stick back until the airplane starts a gradual climb. Many beginners tend to pull too hard causing the model to stall, so be gentle on the elevator and don’t panic. If you do pull too hard and you notice the model losing speed, release the elevator stick and allow the model to regain airspeed.

Continue a **gradual** climb and establish a gentle turn (away from yourself) until the airplane reaches an altitude of 75 to 100 feet.

## Flight

The main purpose of the first few flights is to learn how the model behaves and to adjust the trims for level flight. After the model has climbed to a safe altitude, reduce the throttle slightly to slow the model, yet maintain altitude. The Tutor should fly well and maintain adequate airspeed at about 1/2 to 3/4 throttle.

Adjust the elevator trim so the model flies level at the throttle setting you are using. Adjust the aileron trim (if used) and rudder trim to level the wings. It may take a few passes to get the trims adjusted, but this should be your first priority once at a comfortable altitude. Continue to fly around, executing turns and making mental notes (or having your assistant take notes for you) of what additional adjustments or C.G. changes may be required to fine tune the model so it flies the way you like.

If the Tutor reaches a high enough altitude, you may periodically cut off the motor power and glide. This may

extend the flight time by several minutes, especially if you fly into a rising air current.

## *Landing*

Because the Tutor flies slowly, it requires little room to land. Begin the landing approach by flying downwind at an altitude of approximately 20 feet [6 meters]. When the airplane is approximately 50 to 100 feet [15 to 30 meters] past you, cut off the motor power and make the “final” 180-degree turn into the wind, aligning the airplane with the runway or landing area. Do not dive the airplane, as it will pick up too much speed. Instead, when you cut the power, allow the airplane to establish a gradual descent. Concentrate on keeping it heading into the wind toward the runway. When the plane reaches an altitude of about 4 feet [1 meter], gently apply a little “up elevator” to level the plane, but be careful as too much up elevator will cause it to stall. While holding a slight amount of up elevator the airplane will slow and descend as it loses flying speed, thus touching down on the runway.

Until you are able to accurately judge how far the Tutor can glide, if flying with three channels (rudder only), it may be helpful to reserve some battery power to run the motor so the plane can be flown back to the runway.

## *ROG (Rise Off Ground) Takeoff*

When speaking of small models, frequently a takeoff from the ground is called an “ROG” *(rise off ground)* takeoff. Landings on grass will be a little rough, but doing a ROG takeoff from grass will probably not be possible with the Tutor. If planning an ROG takeoff, find a paved surface.

After you have trimmed the Tutor for flight and have become familiar with its flight characteristics, you may execute ROG takeoffs. With the model on the runway and pointing into the wind, gently apply power. Initially, the plane may turn to the left or right because it has not gained enough speed for the controls to become effective. Do your best to get through this brief moment and maintain a heading down the runway and into the wind. Make corrections with the rudder to keep it rolling straight into the wind. If the model veers too far off, cut the throttle and try again. As the model begins to gain speed the controls will become effective.

After the airplane has gained adequate speed (this requires experience to gauge), gently pull back on the elevator stick allowing the airplane to become airborne. Establish a gentle climb the same as when you were hand-launching.

***Best of luck and happy flying!***

This model belongs to:

Name

Address

City, State Zip

Phone number

AMA number

**TWO VIEW DRAWING**