

AVISTAR^{elite}

INSTRUCTION MANUAL



ARF
ALMOST READY-TO-FLY

SPECIFICATIONS

Wingspan: 62.5 in [1590 mm]	Weight: 6.5–7 lb [2950–3170 g]	Glow: .46–.55 cu in
Wing Area: 672 in ² [43.3 dm ²]	Length: 55 in [1395 mm]	Engine: [7.5–9 cc] two-stroke
Wing Loading: 22–24 oz/ft ² [67–73 g/dm ²]	Radio: 4-5 channels	Electric: RimFire .46 (42-60-800)
		Power: Outrunner Brushless

WARRANTY

Great Planes® Model Manufacturing Co. guarantees this kit to be free from defects in both material 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 buyer is not prepared to accept the liability associated with the use of this product, the buyer is advised to return

this kit immediately in new and unused condition to the place of purchase.

To make a warranty claim send the defective part or item to Hobby Services at the address below:

Hobby Services
3002 N. Apollo Dr. Suite 1
Champaign IL 61822 USA

Include a letter stating your name, return shipping address, as much contact information as possible (daytime telephone number, fax number, e-mail address), a detailed description of the problem and a photocopy of the purchase receipt. Upon receipt of the package the problem will be evaluated as quickly as possible.

READ THROUGH THIS MANUAL BEFORE STARTING CONSTRUCTION. IT CONTAINS IMPORTANT INSTRUCTIONS AND WARNINGS CONCERNING THE ASSEMBLY AND USE OF THIS MODEL.



Champaign, Illinois (217) 398-8970
E-mail: airsupport@greatplanes.com

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INTRODUCTION

Congratulations on your purchase of the Hobbico Avistar Elite .46 GP/EP ARF! This latest version of the popular Avistar is just what you need as a stepping stone from your flat-bottomed wing trainer, or is also suitable as a first plane with help from an instructor. The components of the Avistar Elite can be assembled without the use of glue. The self-aligning, bolt-on tail and pre-hinged control surfaces speed up assembly time. The included IsoSmooth™ engine mount reduces engine vibration which could cause fuel to foam and parts to loosen over time. The Avistar can also be built with brushless motor power. A pre-assembled brushless motor mount is included and is designed for the recommended motor. A magnetic battery hatch allows you easy access to your flight battery. In addition, you will find other time-saving steps already completed for you such as the assembly of the fuel tank, flat spots ground into the axles for wheel collars, control horns pre-installed, etc. Once in the air, you'll find the Avistar to be a pleasure to fly and capable of performing basic aerobatics. The high wing design is self-righting and can fly well at only 1/2 throttle which will help new pilots learn the basics.

For the latest technical updates or manual corrections to the Avistar Elite visit the Hobbico web site at www.hobbico.com. Open the "Airplanes" link, then select the Avistar Elite ARF. If there is new technical information or changes to this model a "tech notice" box will appear in the upper left corner of the page.

AMA

We urge you to join the AMA (Academy of Model Aeronautics) and a local R/C club. The AMA is the governing body of model

aviation and membership is required to fly at AMA clubs. Though joining the AMA provides many benefits, one of the primary reasons to join is liability protection. Coverage is not limited to flying at contests or on the club field. It even applies to flying at public demonstrations and air shows. Failure to comply with the Safety Code (excerpts printed in the back of the manual) may endanger insurance coverage. Additionally, training programs and instructors are available at AMA club sites to help you get started the right way. There are over 2,500 AMA chartered clubs across the country. 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>

IMPORTANT!!! Two of the most important things you can do to preserve the radio controlled aircraft hobby are to avoid flying near full-scale aircraft and avoid flying near or over groups of people.

SAFETY PRECAUTIONS

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

1. Your Avistar Elite should not be considered a toy, but rather a sophisticated, working model that functions very much like a full-size airplane. Because of its performance capabilities, the Avistar, if not assembled and operated correctly, could possibly cause injury to yourself or spectators and damage to property.

2. You must assemble the model **according to the 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 written instructions should be considered as correct.

3. You must take time to **build straight, true and strong**.

4. You must use an R/C radio system that is in first-class condition, and a correctly sized engine and components (fuel tank, wheels, etc.) throughout the building process.

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

6. You must check 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 clevises or other connectors often and replace them if they show any signs of wear or fatigue.

7. If you are not an experienced pilot or have not flown this type of model before, we recommend that you get the assistance of an experienced pilot in your R/C club for your first flights. If you're not a member of a club, your local hobby shop has information about clubs in your area whose membership includes experienced pilots.

8. While this kit has been flight tested to exceed normal use, if the plane will be used for extremely high stress flying, such as racing, or if an engine larger than one in the recommended range is used, the modeler is responsible for taking steps to reinforce the high stress points and/or substituting hardware more suitable for the increased stress.

9. **WARNING:** The optional cowl and wheel pants available separately for this kit are made of fiberglass, the fibers of which may cause eye, skin and respiratory tract irritation. Never blow into a part (wheel pant, cowl) to remove fiberglass dust, as the dust will blow back into your eyes. Always wear safety goggles, a particle mask and rubber gloves when grinding, drilling and sanding fiberglass parts. Vacuum the parts and the work area thoroughly after working with fiberglass parts.

We, as the kit manufacturer, provide you with a top quality, thoroughly tested kit and 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 the instructions to end up with a well-built model that is straight and true.

DECISIONS YOU MUST MAKE

This is a partial list of items required to finish the Avistar Elite that may require planning or decision making before starting to build. Order numbers are provided in parentheses.

Radio Equipment

A basic 4-channel radio with five standard servos (only four are needed if you install a brushless motor) is required to fly

the Avistar Elite. If you plan to set up your model with flaps, two additional standard servos are required along with a flap channel on your transmitter. Recommended part numbers are provided below:

- Futaba® 6JA 6-Channel 2.4GHz S-FHSS Air/4 S3004 Servos (FUTK6001)
- Futaba S3004 Standard Ball Bearing Servo (FUTM0004)

In addition, two 12" [305mm] servo extensions are required for the aileron servos. One dual servo extension is needed if you plan to join the aileron servos together in the same channel (typical installation), and an additional dual servo extension is needed if you plan to use flaps. An electric power system will also require a 6" [152mm] servo extension to connect the ESC to the receiver.

- Hobbico® 12" Extension Futaba J (HCAM2100)
- Futaba Dual Servo Extension 6" J (FUTM4130)
- Hobbico 6" Extension Futaba (HCAM2000)

The receiver battery that fits well on the receiver tray and is shown in the manual is:

- Hobbico HydriMax™ NiMH 4C 4.8V 1600mAh 2/3A Flat Rx U (HCAM6308)

Power System Recommendations

The recommended engine size range for the Avistar is .46 to .55 cu in [7.5–9cc] two-stroke glow engine or a RimFire™.46 (42-60-800) brushless outrunner motor. Recommended part numbers are provided below:

- O.S.® 46AX ABL w/Muffler (OSMG0547)
- O.S. 46AX II w/Muffler (OSMG0548)
- Great Planes® RimFire™.46 42-60-800 Outrunner Brushless (GPMG4725)

If you are installing the recommended brushless motor, you will also need the following items:

- Great Planes Silver Series 45A Brushless ESC 5V/2A BEC (GPMM1840)
- FlightPower® LiPo EON-X™ 30 4S 14.8V 3350mAh 30C (FPWP6356)

A LiPo compatible charger is required for the recommended battery. An all-purpose charger such as the Triton EQ AC/DC will charge virtually any type of battery and has a built in cell balancer. A more economical charger would be the Triton Jr. DC charger which is capable of charging NiCd, NiMH, Li-Ion, LiPo and lead acid batteries. The Triton Jr. is a DC only charger and will also require an external cell balancer. Part numbers are provided.

- Great Planes ElectriFly™ Triton™ EQ AC/DC Charger (GPMM3155)
- Great Planes ElectriFly Triton™ Jr DC Computer Charger (GPMM3152)
- Great Planes ElectriFly Equinox™ LiPo Cell Balancer (GPMM3160)

Propeller

If using the recommended glow engine, we suggest installing a 12×5 sport prop. If using the recommended brushless motor, a 12×6 E prop will provide good power and flight time. Part numbers are provided.

- **Glow:** APC 12×5 Sport Propeller (APCQ1205)
- **EP:** APC 12×6 Thin Electric Propeller (APCQ4130)

ADDITIONAL ITEMS REQUIRED

Required Hardware & Accessories

This is the list of hardware and accessories required to finish the Avistar Elite ARF. Order numbers are provided in parentheses.

- Hobbico Latex Foam Rubber 1/4" (HCAQ1000)
- Great Planes Pro™ CA Glue Thin 1/2 oz (GPMR6001)
- Revell® #1 Light Duty Economy Knife w/Blade & Safety Cap (RMXR6909)
- Great Planes Pro Threadlocker (GPMR6060)
- Drill bits: 1/16" [1.6mm], 5/64" [2mm]
- Felt-tip pen
- Pliers
- Wire cutter
- Wrench set
- 3/32" [2.4mm], 7/64" [2.8mm] allen wrench
- Small clamps or masking tape
- Household oil

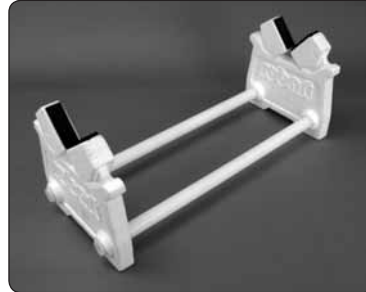
Optional Supplies and Tools

Here is a list of optional supplies and tools that are useful for assembling the Avistar Elite.

- CA applicator tips (HCAR3780)
- CA debonder (GPMR6039)
- Pro 6-minute epoxy (GPMR6045)
- Epoxy brushes (6, GPMR8060)
- Mixing sticks (50, GPMR8055)
- Mixing cups (GPMR8056)
- Curved-tip canopy scissors for trimming plastic parts (HCAR0667)
- Hobbico High Precision Diagonal Cutter 5" (HCAR0630)
- Pliers with wire cutter (HCAR0625)
- Robart Super Stand II (ROBP1402)
- 12"×18" [300×460mm] Builder's Cutting Mat (HCAR0454)
- 18"×24" [460×610mm] Builder's Cutting Mat (HCAR0455)
- 24"×36" [460×910mm] Builder's Cutting Mat (HCAR0456)
- T.A. Emerald Performance Duster Compressed Air 10 oz (TAEC1060)
- Panel Line Pen (TOPQ2510)
- Servo horn drill (HCAR0698)
- Hobby Heat™ micro torch (HCAR0755)

- AccuThrow™ Deflection Gauge (GPMR2405)
- CG Machine™ (GPMR2400)
- Great Planes Clevis Installation Tool (GPMR8030)
- Great Planes 4-In-1 Installation Tool (GPMR8035)
- Precision Magnetic Prop Balancer (TOPQ5700)
- Great Planes ElectriFly PowerMatch™ Power Meter Balancer (GPMM3220)

Building Stand



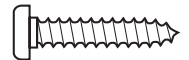
A building stand or cradle comes in handy during the build. We use the Robart Super Stand II (ROBP1402) for all our projects in R&D, and it can be seen in pictures throughout this manual.

IMPORTANT BUILDING NOTES

- There are three types of screws used in this kit:

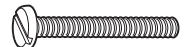
Sheet Metal Screws are designated by a number and a length. For example #6 × 3/4" [19mm].

This is a number six screw that is 3/4" [19mm] long.



Machine Screws are designated by a number, **threads per inch**, and a length. For example 4-40 × 3/4" [19mm].

This is a number four screw that is 3/4" [19mm] long with forty threads per inch.



- **Photos** and **sketches** are placed **before** the step they refer to. Frequently you can study photos in following steps to get another view of the same parts.
- The Avistar Elite ARF is factory-covered with Top Flite® MonoKote® film. Should repairs ever be required, MonoKote can be patched with additional MonoKote purchased separately. MonoKote is packaged in six-foot rolls, but some hobby shops also sell it by the foot. If only a small piece of MonoKote is needed for a minor patch, perhaps a fellow modeler would give you some. MonoKote is applied with a model airplane covering iron, but in an emergency a regular iron could be used. A roll of MonoKote includes full instructions for application. Following are the colors used on this model and order numbers for six foot rolls.

Orange TOPQ0202	Royal Blue TOPQ0221
Missile Red TOPQ0201	Jet White TOPQ0204

- The stabilizer and wing incidences and engine thrust angles have been factory-built into this model. However, some technically-minded modelers may wish to check these measurements anyway. To view this information visit the web site at www.hobbico.com and click on "Technical Data."

Due to manufacturing tolerances which will have little or no effect on the way your model will fly, please expect slight deviations between your model and the published values.

KIT INSPECTION

Before starting to build, take an inventory of this kit to make sure it is complete, and inspect the parts to make sure they are of acceptable quality. If any parts are missing or are not of acceptable quality, or if you need assistance with assembly, contact **Product Support**. When reporting defective or missing parts, use the part names exactly as they are written in the Kit Contents list on this page.

Hobbico Product Support Ph: (217) 398-8970 ext. 5
3002 N Apollo Drive Suite 1 Fax: (217) 398-7721
Champaign, IL 61822

E-mail: airsupport@hobbico.com

ORDERING REPLACEMENT PARTS

Replacement parts for the Hobbico Avistar Elite ARF are available using the order numbers in the **Replacement Parts List** that follows. The fastest, most economical service can be provided by your hobby dealer or mail-order company. Parts may also be ordered directly from Hobby Services, but full retail prices and shipping and handling charges will apply. Illinois and Nevada residents will also be charged sales tax.

To locate a hobby dealer, visit the Hobbico web site at www.hobbico.com. Choose "Where to Buy" at the bottom of the menu on the left side of the page. Follow the instructions provided on the page to locate a U.S., Canadian or International dealer.

Parts may also be ordered directly from Hobby Services by calling (217) 398-0007, or via facsimile at (217) 398-7721, but full retail prices and shipping and handling charges will apply.

Illinois and Nevada residents will also be charged sales tax. If ordering via fax, include a Visa® or MasterCard® number and expiration date for payment.

Mail parts orders **Hobby Services**
and payments by 3002 N Apollo Drive, Suite 1
personal check to: Champaign IL 61822

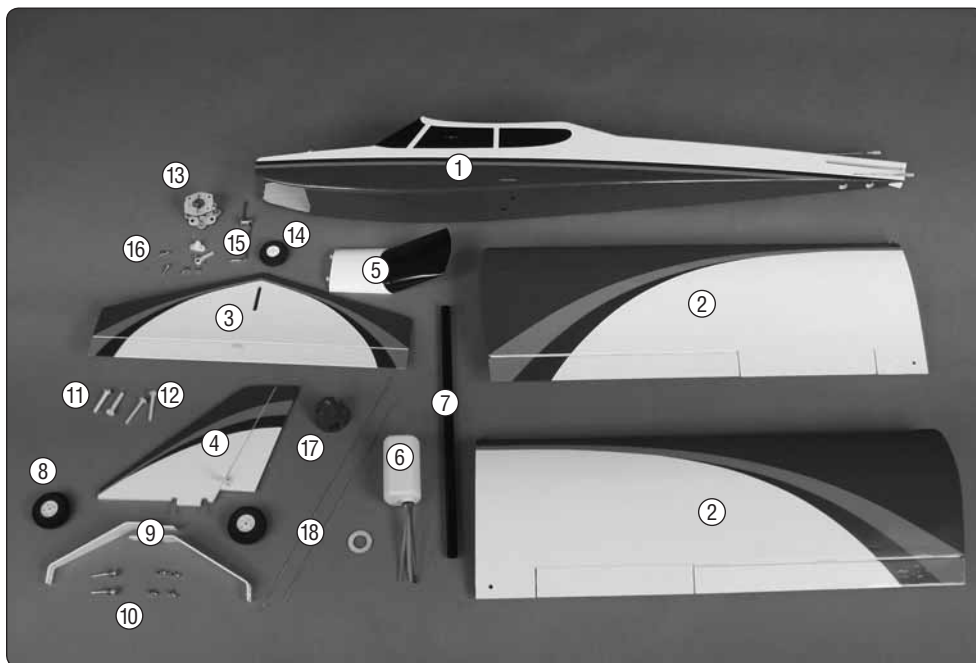
Be certain to specify the order number exactly as listed in the **Replacement Parts List**. Payment by credit card or personal check only; no C.O.D.

If additional assistance is required for any reason contact Product Support by e-mail at productsupport@hobbico.com, or by telephone at (217) 398-8970.

REPLACEMENT PARTS LIST

Order No.	Description
GPMA4280	Wing Set
GPMA4281	Fuselage Set w/o Engine Mount
GPMA4282	Tail Surfaces Set
GPMA4283	Hatch
GPMA4284	Landing Gear Set
GPMA4285	Wing Joiner Tube
GPMA4286	Electric Motor Mount
GPMA4287	Propeller 12x5
GPMA4288	Fuel Tank
GPMA4289	Decals
HCAA3739	Engine Mount
HCAA3740	Isosmooth Engine Mount Parts
HCAA3748	Tail Mounting Screws (2)
GPMQ4522	2.5" Red Spinner
OSMG0548	.46 AXII ABL Engine

KIT CONTENTS



Kit Contents

1. Fuselage
2. Left & Right Wing Panel
3. Horizontal Stabilizer
4. Vertical Fin
5. Hatch
6. Fuel Tank
7. Wing Joiner Tube
8. Main Wheels
9. Main Landing Gear
10. Axle Hardware
11. Tail Mounting Screws
12. Wing Bolts
13. Electric Motor Mount
14. Nose Wheel
15. Nose Gear
16. Nose Gear Hardware
17. Spinner
18. Pushrods

PREPARATIONS

- ❑ 1. If you have not done so already, remove the major parts of the kit from the box and inspect for damage. If any parts are damaged or missing, contact Product Support at the address or telephone number listed in the "Kit Inspection" section on page 5.



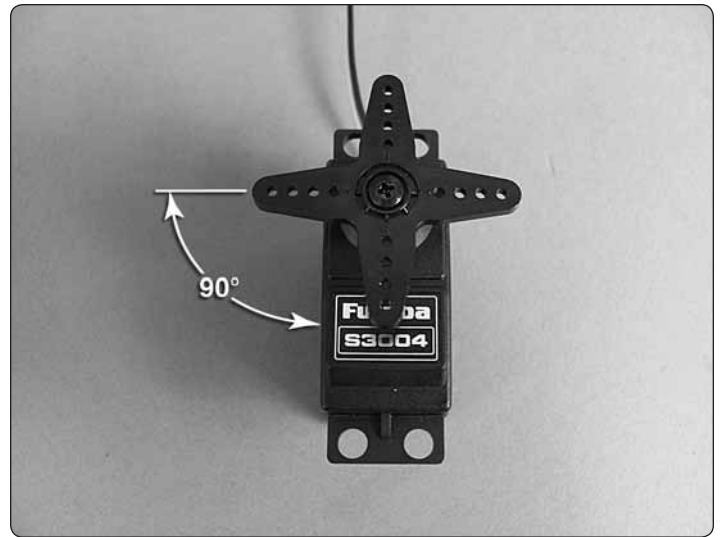
- ❑ 2. During transit and storage, it is not uncommon for the MonoKote covering to develop some wrinkles. Although the covering is applied tight at the factory, humidity and temperature change may cause the wood structure of the plane's components to expand or contract which allows the covering to relax. Before you begin assembly, we recommend that any wrinkles in the covering be tightened using a covering iron with a covering sock on high heat. A covering iron can be purchased from your hobby retailer and will also be useful if you ever need to make repairs to the MonoKote covering in the future. When using the iron, apply pressure over sheeted areas to **thoroughly** bond the covering to the wood. Work gently around open structure (such as the area between the wing ribs) and allow the heat of the iron to shrink the covering until it is pulled drum tight.

BUILDING INSTRUCTIONS

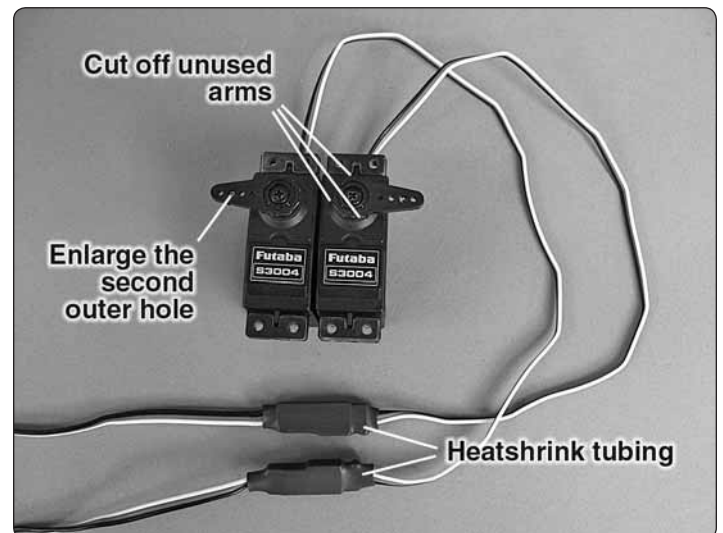
Assemble the Wing Panels

After step 2, the photos in this section show the assembly of the left wing panel. As you work through the steps, be sure to work on both the left and the right wing panels.

No glue is required to assemble the Avistar Elite. However, several steps recommend using thin CA glue to harden the wood surrounding holes for self-tapping screws. Although CA glue is not absolutely necessary, it will strengthen the wood and it will be less likely that these screw holes will strip out over time from fuel exposure and vibration.



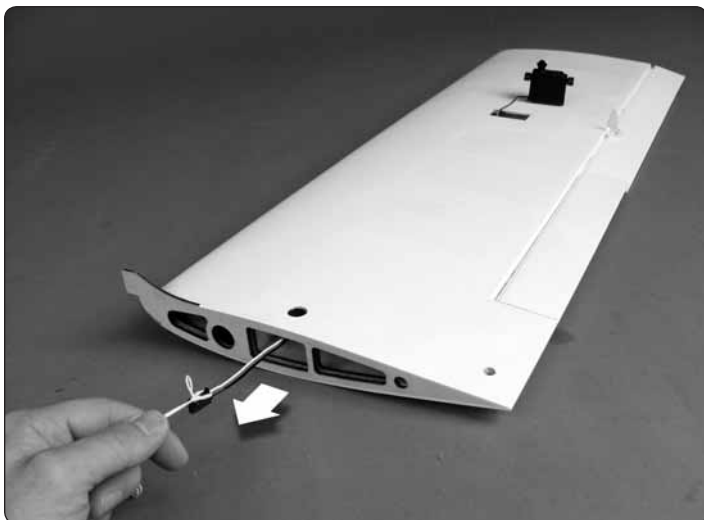
- ❑ 1. Begin by removing the screws that secure the aileron servo arms and pull the arms off the servos. Connect your aileron servos to your radio system (see your radio manual for details about the radio operation) and use the radio system to center the servos. Reinstall the four-armed servo arms onto the servos (ensuring the servos remain centered) and determine the best orientation of the servo arms so that they are perpendicular to the servo cases as shown.



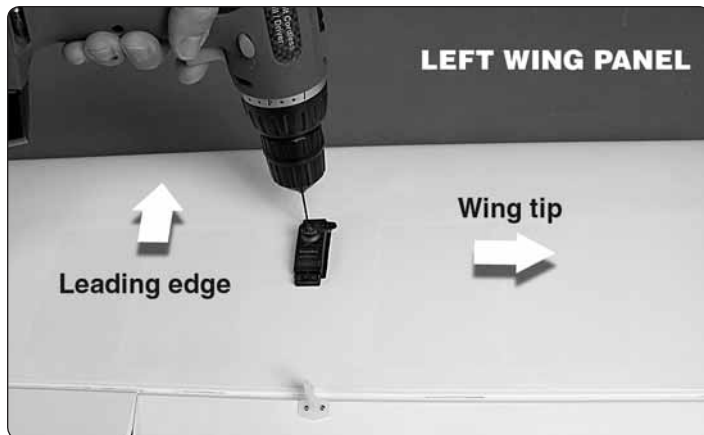
- ❑ 2. Using the picture as a guide, cut away three unneeded arms for each aileron servo, being sure to prepare a left and a right aileron servo (always be sure to reinstall the servo arm screws). Enlarge the **second outer hole** of each remaining arm with a 5/64" [2mm] drill bit. Attach a 12" [305mm] servo extension to each aileron servo. Slide a piece of the included heat shrink tubing over each of the connections. Use a heat gun or hair dryer to apply heat to the tubing so that it shrinks tightly around the connectors. This will prevent the connectors from separating during flight.



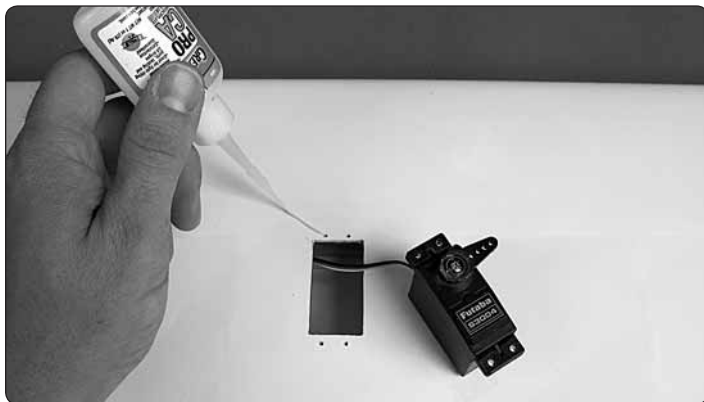
❑ 3. If you have not already done so, install the rubber grommets and eyelets (included in your servo hardware bag) onto the servo mounting tabs.



❑ 4. Use the strings taped inside the aileron servo openings to pull the servo leads through the wing.



❑ 5. Fit the servos into the servo openings and drill 1/16" [1.6mm] holes through the mounting tabs on the servo cases into the rails.



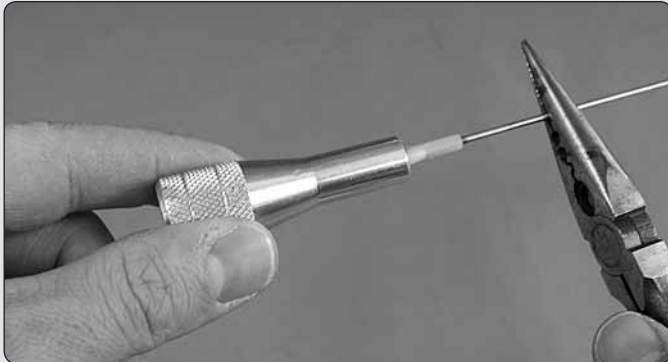
❑ 6. Thread a servo mounting screw (included with the servo) into each hole and back it out. Apply a drop of thin CA to each hole to harden the wood surrounding it. When the CA has

dried, install the servos into the openings using the screws supplied with the servos.

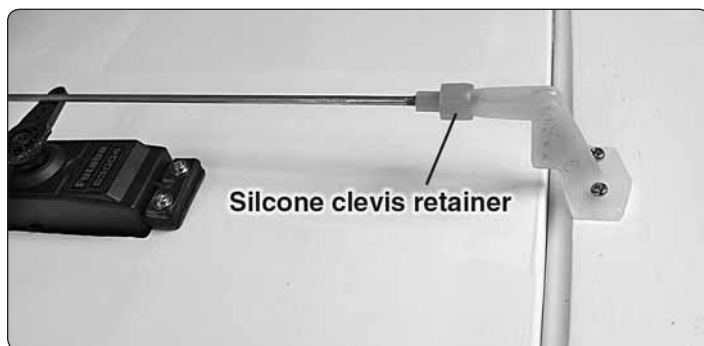
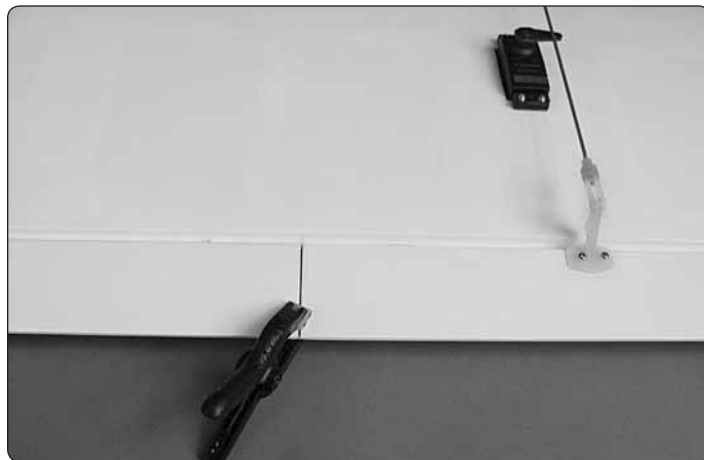


- ❑ 7. Thread a nylon clevis onto two 6-1/4" [159mm] pushrods 20 complete turns.

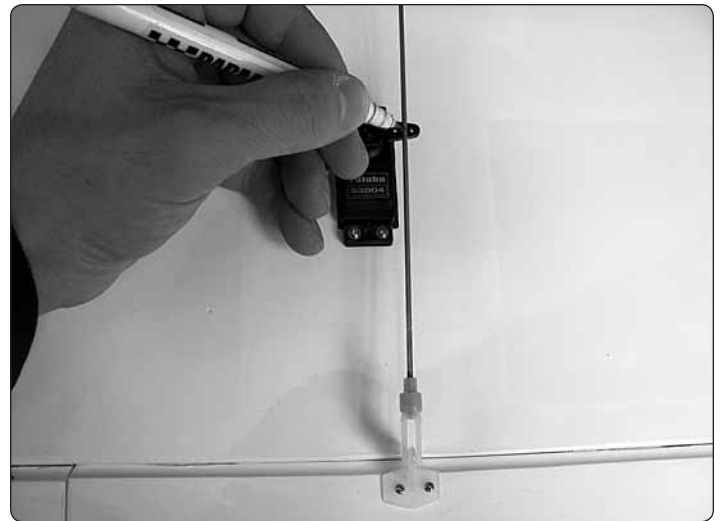
Builder's Tip



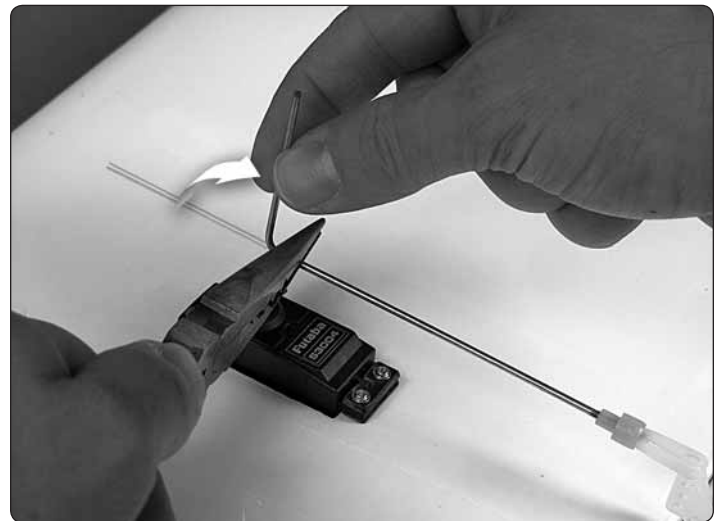
Installation of the clevises will be much easier using a clevis installation tool (GPMR8030 or GPMR8035). Nylon clevises are used on many models so this inexpensive tool will be a valuable investment for all your future building.



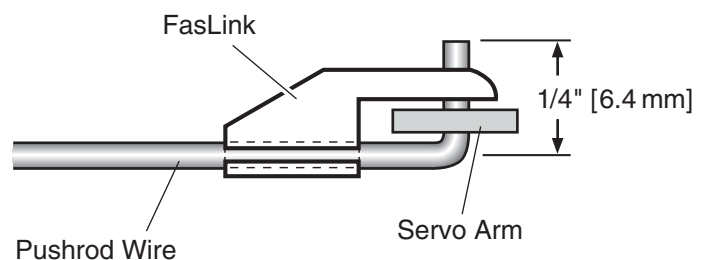
- ❑ 8. Center the positions of the ailerons by using small clamps or tape to secure them inline with the flaps. Slide a silicone clevis retainer onto the base of each clevis. Attach the clevises on the pushrods to the outer holes in the aileron control horns.



- ❑ 9. With the ailerons and servos still centered, make a mark on the pushrods where they cross the second outer holes in the aileron servo arms.

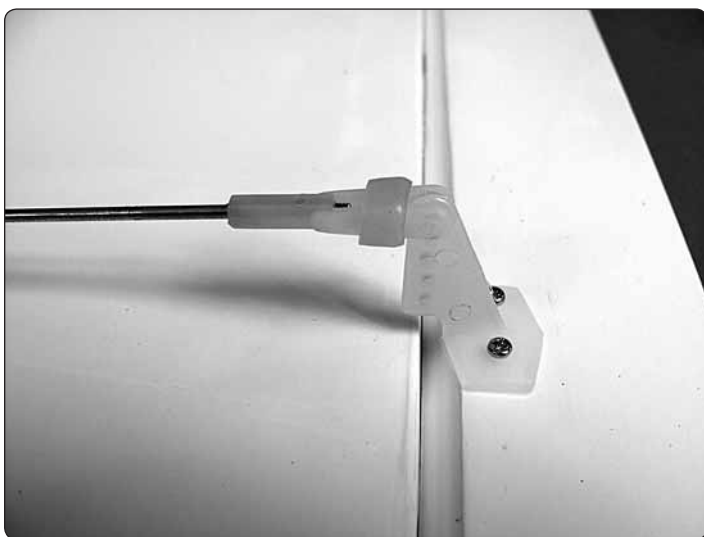
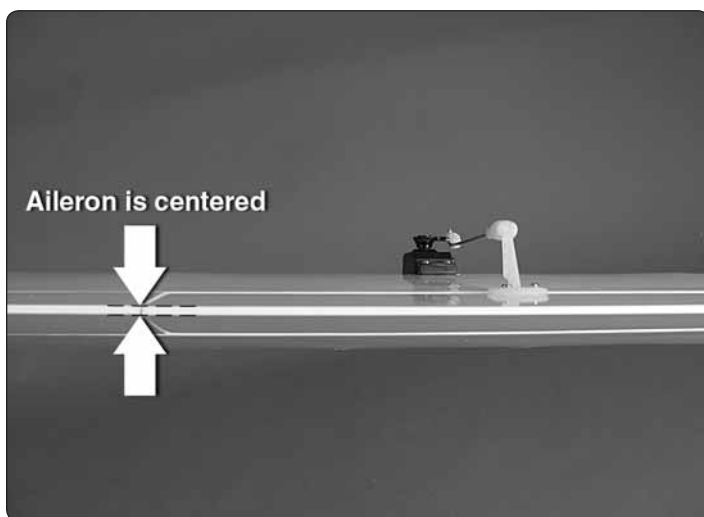


- ❑ 10. Bend each pushrod at a 90 degree angle at the marks you made.





- ❑ 11. Cut off the excess pushrod 1/4" [6.4 mm] beyond the bends. Attach the pushrods to the servo arms using nylon FasLinks.

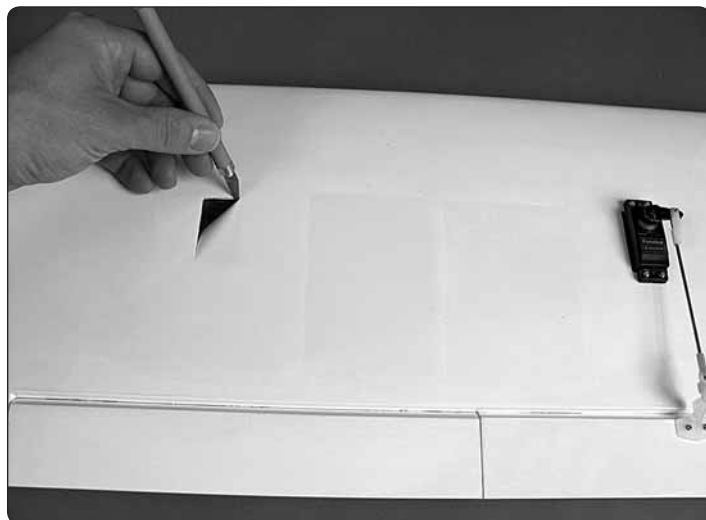


- ❑ 12. Thread the clevises up or down on the pushrods as necessary to center the ailerons with the servo arms still perpendicular to the servo cases. When satisfied, slide the silicone clevis retainers to the ends of the clevises to secure them.

- ❑ 13. If you plan to install the optional flaps, proceed to the next section. If not, skip the next section and set aside the wing as it will not be needed again until the final setup of the Avistar.

Optional Flaps

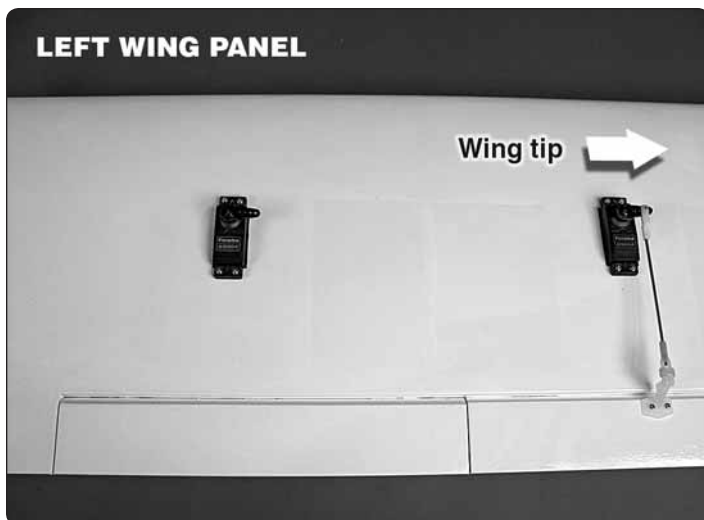
Installing flaps will require a 5+ channel radio system and two additional standard servos. The addition of flaps will allow the plane to fly slower for takeoffs and landings. Note that the flaps are pinned in place during manufacturing and will not be able to move until they are cut free at the end of this assembly section.



- ❑ 1. Locate the rectangular flap servo bays beneath the covering. If you cannot see them, look at the wing at a shallow angle or feel around the area shown in the picture and gently push in on the covering to locate the corners of the bays. Use a sharp hobby knife to trim the covering along the edges of the bays.



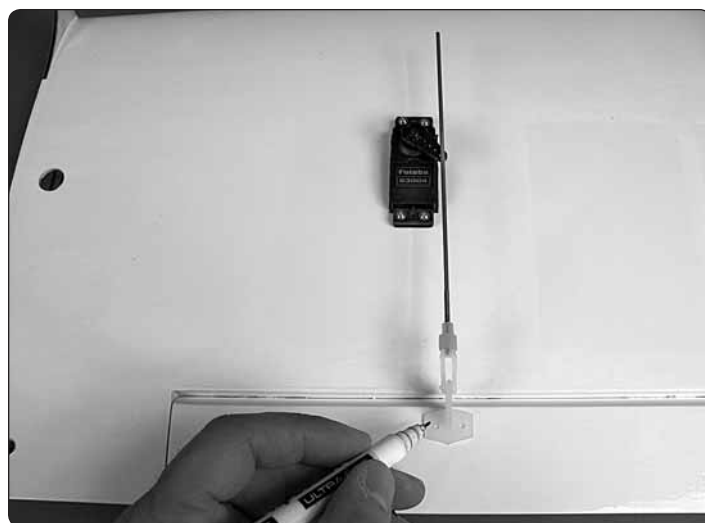
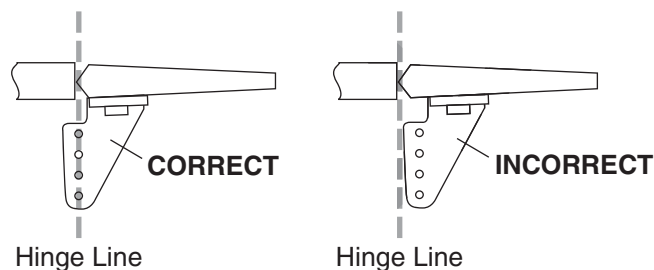
- ❑ 2. Temporarily connect each flap servo to the **aileron** channel on your receiver and use the radio system to center the servos. Install a four-armed servo arm onto each servo perpendicular to the servo cases and cut away the other three arms. **NOTE:** Unlike the aileron servos, the servo arms of the flap servos must both point in the **same direction**. Enlarge the outer most holes of each servo arm with a 5/64" [2mm] drill bit.



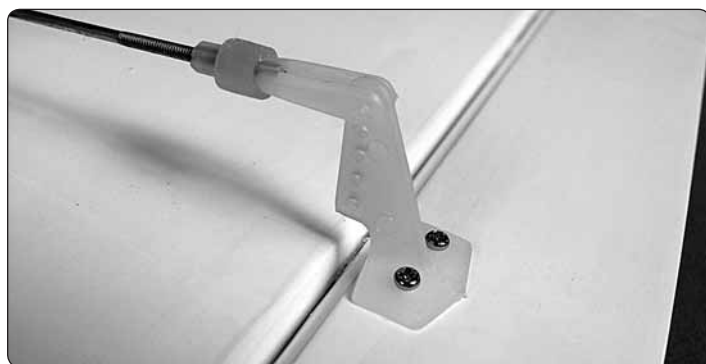
❑ 3. Install the rubber grommets and eyelets on the servos. Route the servo leads through the wing ribs and out the root ribs (the distance through the wing for the flap servo leads is shorter than the ailerons so using string to pull them through is not necessary). Fit the servos in place and drill the servo mounting holes using a 1/16" [1.6mm] drill bit. Apply a drop of thin CA to each hole. Then install the servos using the screws provided in the servo hardware bag. The servo arm of the left flap servo should point to the wing tip and the servo arm of the right flap servo should point to the wing root.



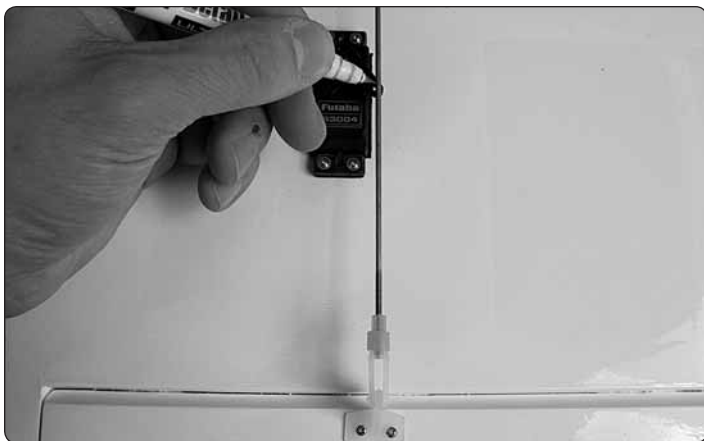
❑ 4. Now connect each flap servo to the **flap** channel on your radio and use the flap dial on your transmitter to rotate the servo arms toward the flaps as far as the radio will allow.



❑ 5. As you did with the aileron pushrods, install a clevis 20 complete turns onto two 6-1/4" [159mm] pushrods and slide a silicone clevis retainer onto each clevis. Connect the clevises to the outer holes of two control horns. Hardwood plates are installed beneath the covering of the flaps for mounting the control horns. The edges of the plates can be seen by viewing the wing at a shallow angle. Position the control horns over the hardwood plates with the pushrods parallel to the servo cases and aligned over the outer holes of the servo arms. The holes in the control horns should be directly over the hinge line of the flaps. When satisfied with the position of the control horns, use a felt-tip pen to mark the location of the control horn mounting holes onto the flaps.



❑ 6. Drill 1/16" [1.6mm] holes through the hardwood plates at the marks you made on the flaps. **Take care to only drill through the plates. Do not drill completely through the flaps!** The holes only need to be 3/8" [9.5mm] deep. Thread a #2 x 3/8" [9.5mm] self-tapping screw into each hole and back it out. Apply a drop or two of thin CA glue to each hole and allow the glue to harden. Install the control horns onto the flaps using four #2 x 3/8" [9.5mm] self-tapping screws.



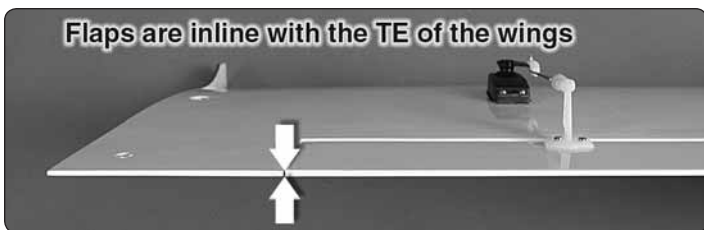
- ❑ 7. Use a felt-tip pen to mark the location where the pushrods cross the outer holes of the flap servo arms.



- ❑ 8. Just as you did with the aileron pushrods, bend each pushrod at a 90 degree angle at the marks you made. Cut off the excess pushrod 1/4" [6.4 mm] beyond the bends. Attach the pushrods to the servo arms using nylon FasLinks.



- ❑ 9. Wooden pins were installed at the factory that lock the flaps in place for those modelers who choose not to have operational flaps. Use a razor saw or similar tool to cut through the pins (the pins can be seen by looking at the inboard ends of the flaps). Take care not to cut into the flaps or wings.

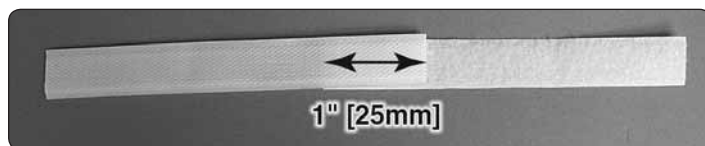


- ❑ 10. Test the operation of the flaps with your radio system. Unlike the ailerons, the flaps will only move in the down direction. If necessary, thread the clevises up or down on the pushrods so that the flaps are inline with the trailing edge of the wings when the flap dial is rotated fully to its stop point. When satisfied, slide the silicone clevis retainers to the end of the clevises.

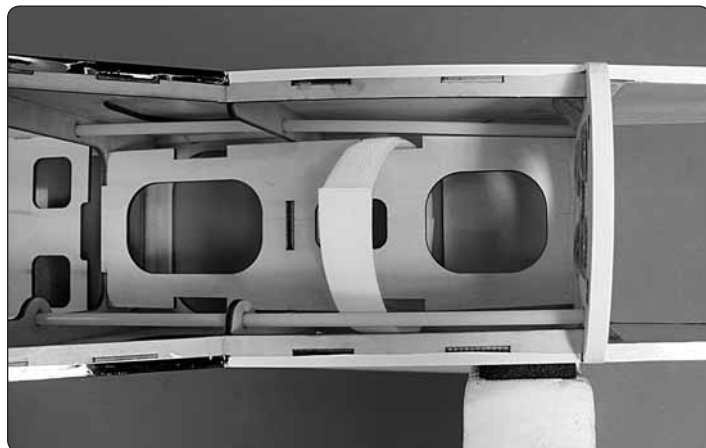
- ❑ 11. You are now completed with the wing assembly. It can be set aside as it will not be needed again until the final setup of the Avistar.

Glow Engine Installation

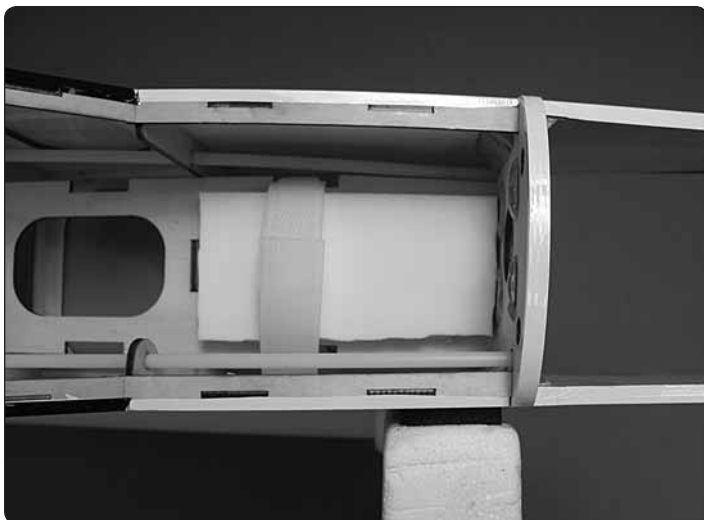
This section only contains information relevant to installing a glow engine. Skip this section if you plan to install a brushless motor.



- ❑ 1. Cut 6-1/2" [165mm] from the included hook and loop strap material. Join the two pieces together to make the fuel tank strap by overlapping the mating ends 1" [25mm].



- ❑ 2. Lift off the fuselage hatch by sliding it back and up. Route the strap around the underside of the fuel tank tray. There are notches on the sides of the tray for the strap.



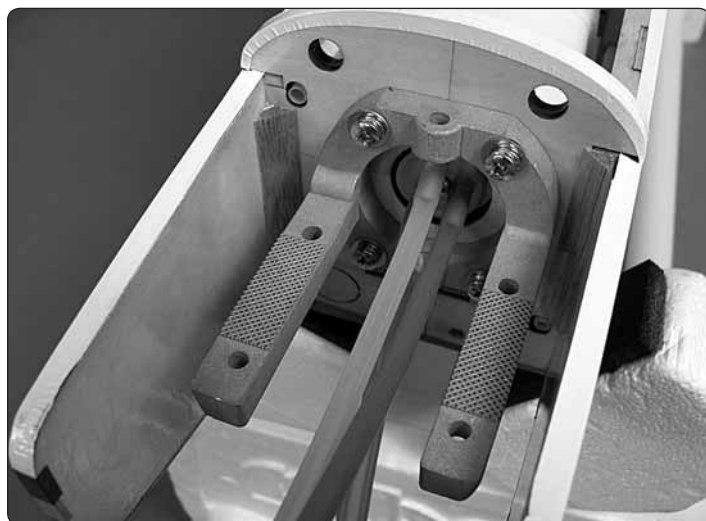
❑ 3. Cut a piece of 1/4" [6.4mm] foam rubber (not included) to a size of 2" x 4-3/8" [51mm x 111mm] to line the top of the fuel tank tray. The purpose of the foam rubber is to dampen the vibrations from the engine to help prevent the fuel from foaming.



❑ 4. Take a close look at the fuel tank, making note of the three colored fuel lines. The pink line is the **vent line** and is connected to the muffler to provide pressure to the fuel tank. The green line is the **fill line** and should remain plugged with the included fuel line plug. The plug is removed to fill and empty the fuel tank using your fuel pump (not included). The blue line is the **carb line** and is connected to the fuel inlet on your engine (be sure to read and fully understand the instruction manual of your glow engine). A plywood spacer disk is included to fit around the neck of the fuel tank as shown. Also, before installing the tank, confirm that the screw in the stopper is tight (do not apply excessive force to the screw as it may damage the tank).



❑ 5. Fit the fuel tank neck through the hole in the firewall and push it forward as far as it will go. Pull the strap ends tightly around the top of the fuel tank and connect the mating ends (be sure the strap sides are aligned in the notches in the tray).



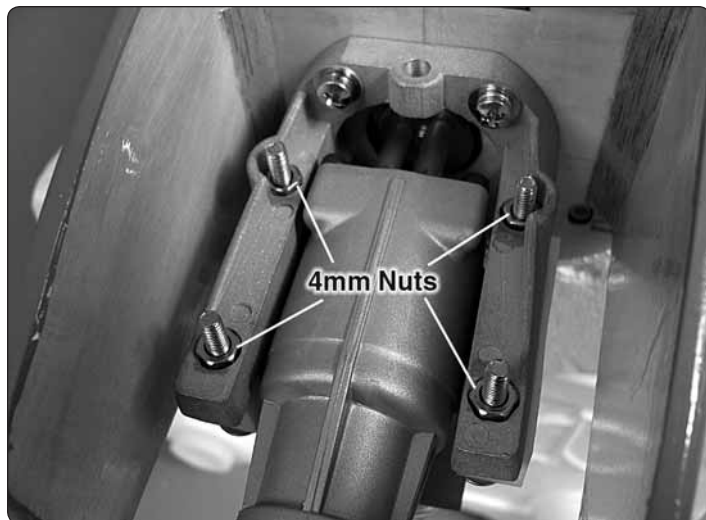
❑ 6. Locate the aluminum engine mount, four 6-32 x 3/4" [19mm] machine screws, four #6 flat washers and four #6 lock washers. Slide a lock washer followed by a flat washer onto each screw. Apply a couple drops of thread locking compound onto the threads of each screw. Install the engine mount onto the firewall with the screws. Take care not to cross-thread the screws. If it feels like a screw is going in with resistance, back it out, ensure that it is going in straight and try it again. Confirm that all four screws are adequately tightened against the mount.



❑ 7. Fit the IsoSmooth rubber boots onto the engine mount tabs. The boots will reduce the amount of engine vibration that is transferred to the air frame. Note: the boots are designed to fit snugly onto the recommended O.S. engine. If you are installing another brand engine, you may need to enlarge the boots to fit over the mount tabs.



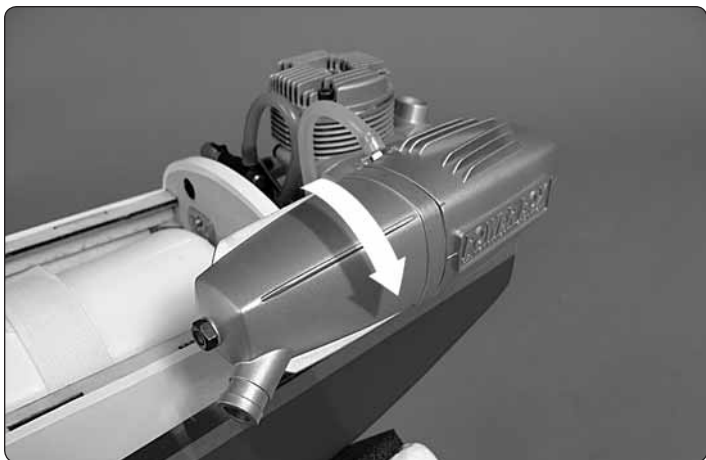
❑ 8. Press the IsoSmooth nylon brackets over the boots, being sure that they are fully seated on the boots.



❑ 9. Locate four 4x35mm machine screws, four 4mm flat washers, four 4mm lock washers (the 4mm washers are very similar to the #6 washers and are interchangeable), and four 4mm nuts. Slide a lock washer followed by a flat washer onto each screw. Fit the engine onto the engine mount and align the holes in the nylon brackets with the holes in the mount. Apply a drop or two of thread locking compound to the end of each screw. Fit the screws through the holes in the brackets and through the engine mount. Turn the fuselage on its side and thread the 4mm nuts onto the screws. Tighten the screws while allowing the nuts to become seated in the hexagonal pockets on the underside of the mount. Confirm that all four screws are tight.



❑ 10. Install the muffer onto the engine using the screws included with your engine. Connect the pink vent line to the muffer and the blue carb line to the needle valve. Route the green fill line toward the bottom of the fuselage. The fill line can be cut shorter during final setup to suit your preference.



- ❑ 11. If your muffler output is pointing up as shown in the picture in step 10, remove the muffler nut at the aft end of the muffler and loosen the muffler screw that passes through the length of the muffler. Rotate the muffler end so the outlet points down and away from the fuse. Tighten the muffler screw and reinstall the nut.

Brushless Motor Installation

*This section only contains information relevant to installing a brushless motor. Skip this section if you have already installed a glow engine. **NOTE:** It is required to disable the BEC circuit if using the recommended SS-45 ESC. Refer to the ESC manual for instructions on disabling the BEC.*



- ❑ 1. Lift off the fuselage hatch by sliding it back and up.

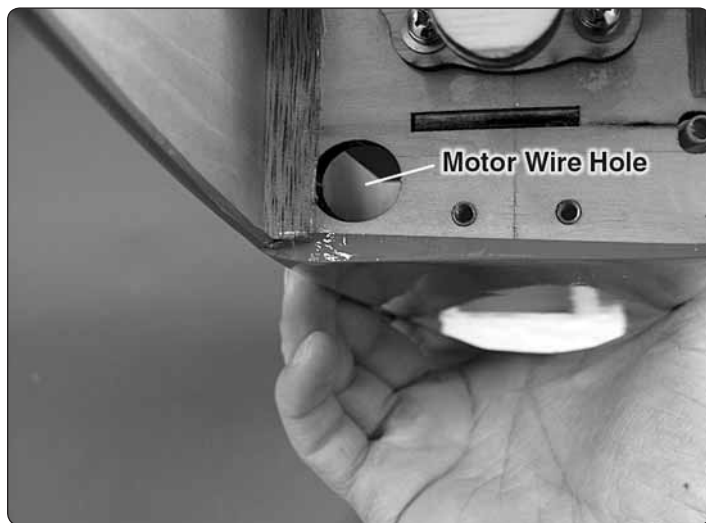


- ❑ 2. Install the aluminum 'X' mount to the back of the recommended RimFire .46 motor using the screws included

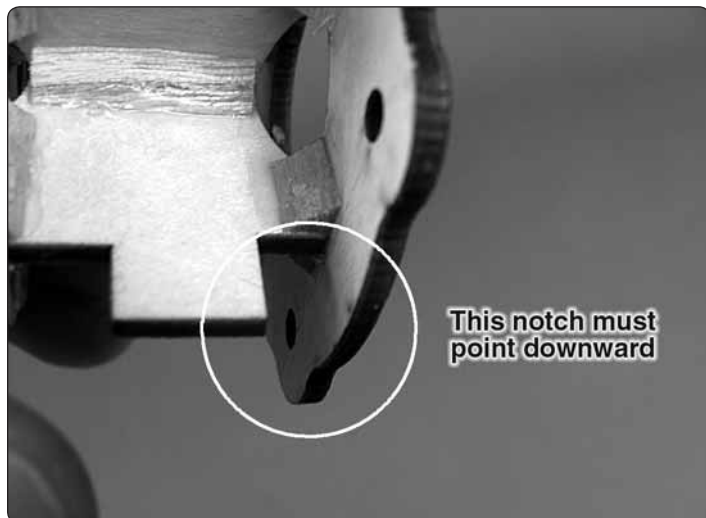
with the mount and a drop of thread locking compound on each screw. Pull off the gold female connectors from the ends of the motor leads. Since these are already installed on the ESC, you can set these aside and save them for a future use.

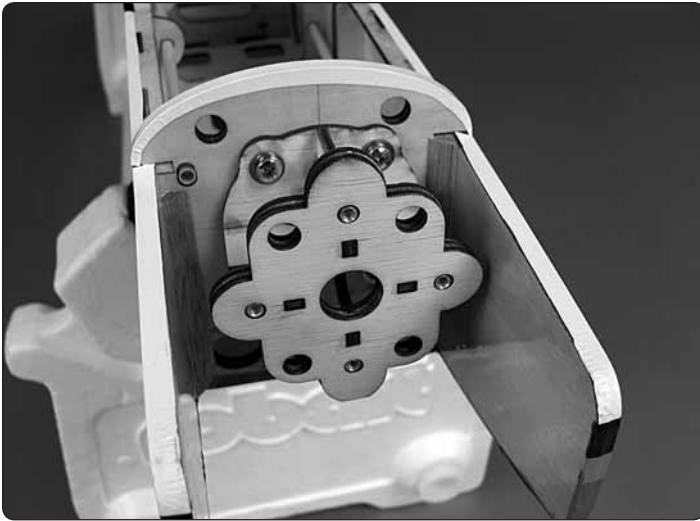


- ❑ 3. Install the prop adapter to the front of the motor with thread locking compound.

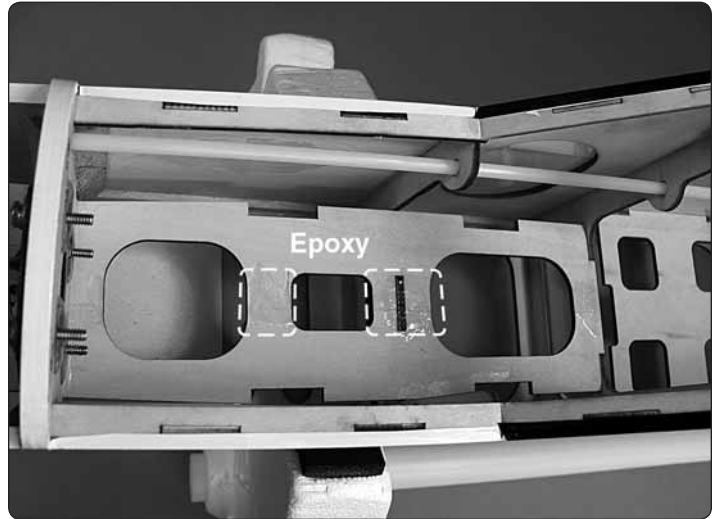
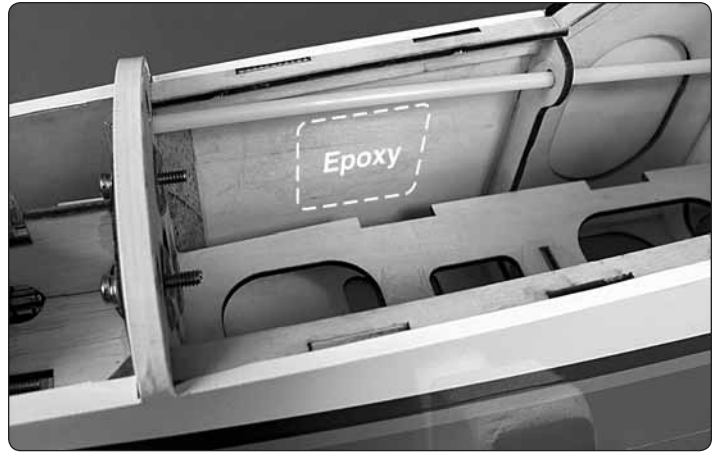


- ❑ 4. Use a sharp hobby knife to slit the small tabs that hold the motor wire hole plug in place. Use a hard, pointed tool such as the end of a pair of nose pliers or a heavy duty screwdriver to punch out the motor wire hole plug.





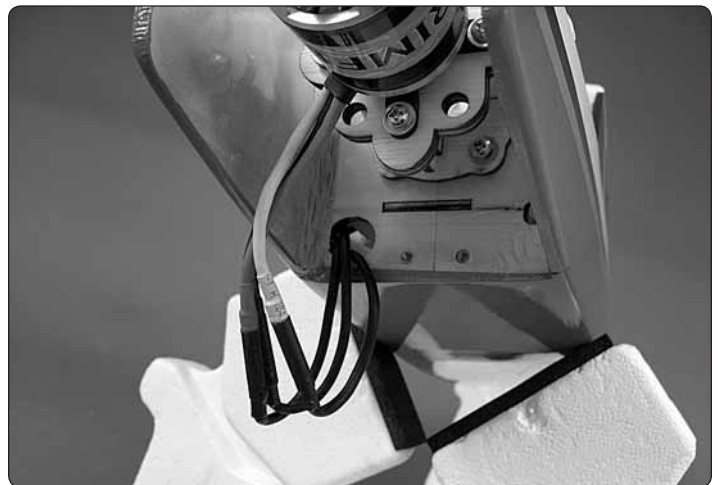
❑ 5. Locate the plywood brushless motor mount, four 6-32 x 3/4" [19mm] machine screws, four #6 flat washers and four #6 lock washers. Slide a lock washer followed by a flat washer onto each screw. Apply a couple drops of thread locking compound onto the threads of each screw. Note that there is a notch on one side near the back of the mount. The notch must point down to accommodate the nose gear wire. Install the motor mount onto the firewall with the screws. Take care not to cross-thread the screws. If it feels like a screw is going in with resistance, back it out, ensure that it is going in straight and try it again. Confirm that all four screws are adequately tightened against the mount.



❑ 7. To improve the adhesion of the double-sided tape and self-adhesive hook and loop material, mix up a small batch of epoxy (1/4 oz of 6 or 30 minute epoxy is fine) and apply a thin coating to the inside wall of the fuselage where the ESC will be installed. With epoxy brush in hand, apply a layer to the center areas of the battery tray as well. If you do not have epoxy, you can substitute another product that will bond to the wood and provide a glossy surface for the tape to stick to (such as lacquer or CA glue without the use of accelerator).



❑ 6. Install the motor onto the motor mount using four 6-32 x 3/4" [19mm] screws and four #6 flat washers. Be sure to apply some thread locking compound onto each screw. The motor should be oriented such that the motor leads are on the same side as the motor wire hole in the firewall.

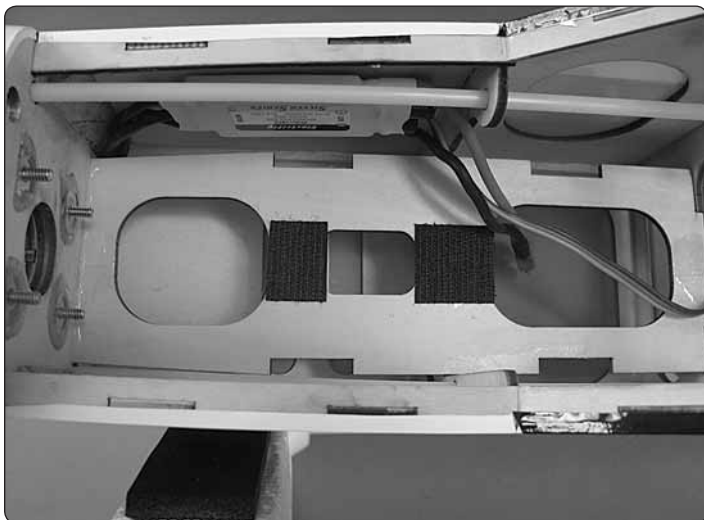


❑ 8. Feed the motor lead wires on the ESC along the side of the battery tray and out the motor wire hole in the firewall. Connect the three wires on the ESC to the motor wires. At

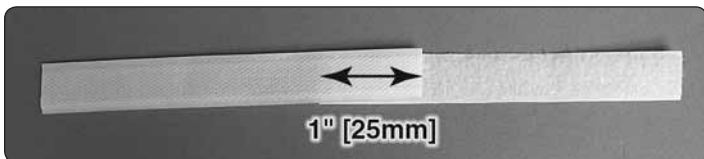
this time, the order is unimportant. Later on during setup, if you discover that the motor rotates in the wrong direction, you will simply need to swap the position of any two of the three wires in order to reverse the rotation of the motor.



- ❑ 9. Cut a piece from the included double-sided foam tape and stick it to the back of the ESC. Secure the ESC over the area that you applied the epoxy in step 7.



- ❑ 10. Cut pieces from the included self-adhesive hook and loop material and stick the hook side as shown on the battery tray.



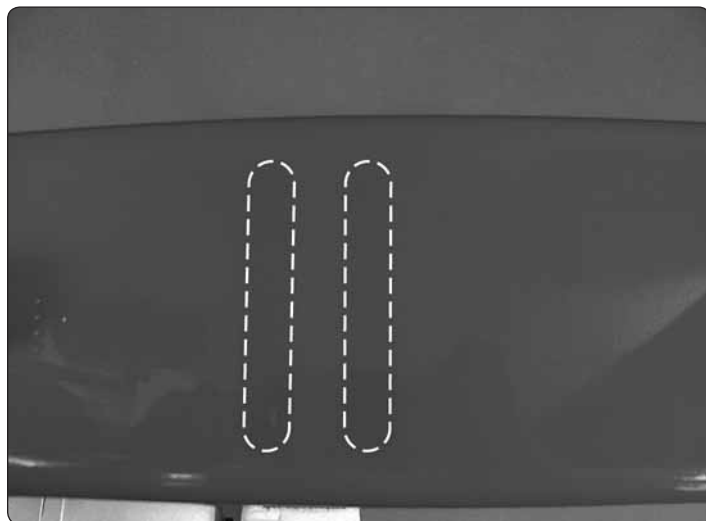
- ❑ 11. Cut 6" [152mm] from the included hook and loop strap material. Join the two pieces together to make the battery strap by overlapping the mating ends 1" [25mm].

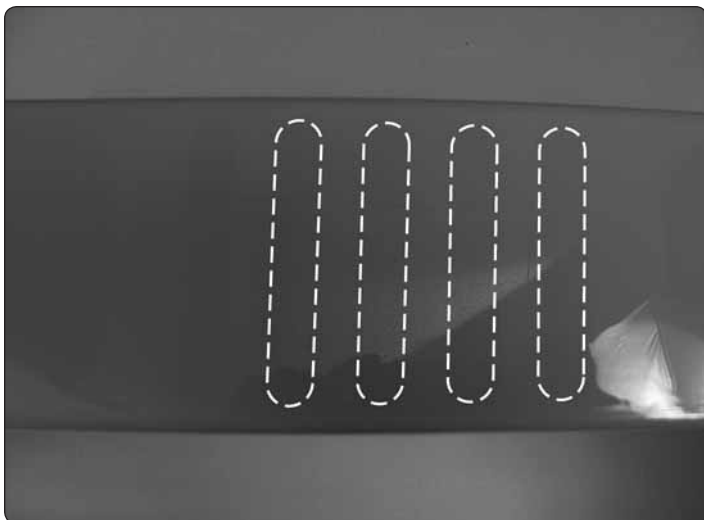


- ❑ 12. Route the strap around the underside of the fuel tank tray. There are notches on the sides of the tray for the strap.



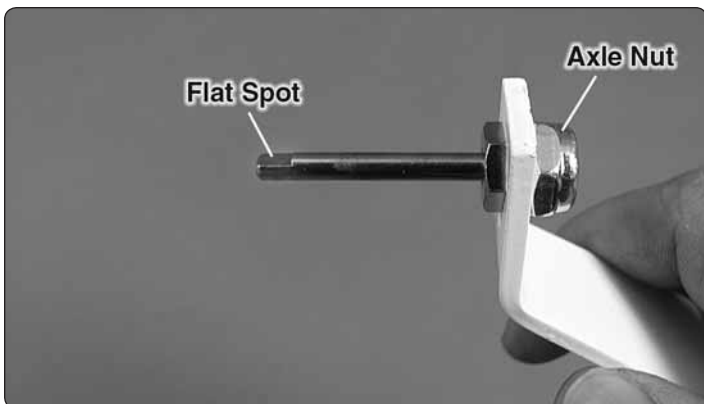
- ❑ 13. Apply a length of the soft side from the included self-adhesive hook and loop material to the underside of your flight battery. Test fit the battery onto the tray and draw the strap tightly around it. The exact placement of the battery on the tray will be determined when you balance the plane in a later section.





- ❑ 14. Locate the six oval cool air exit slots on the underside of the fuselage beneath the covering. There are two slots aft of the firewall and the other four slots are aft of the wing saddle. Use a sharp hobby knife to carefully trim the covering from the six slots.

Install the Landing Gear & Tail Section



- ❑ 1. Insert the threaded end of an axle into the hole at the end of one of the main landing gear legs. Thread a large axle nut on the axle and use two wrenches to thoroughly tighten the nut. The flat spot on the axle should be aligned with the bottom of the gear leg.

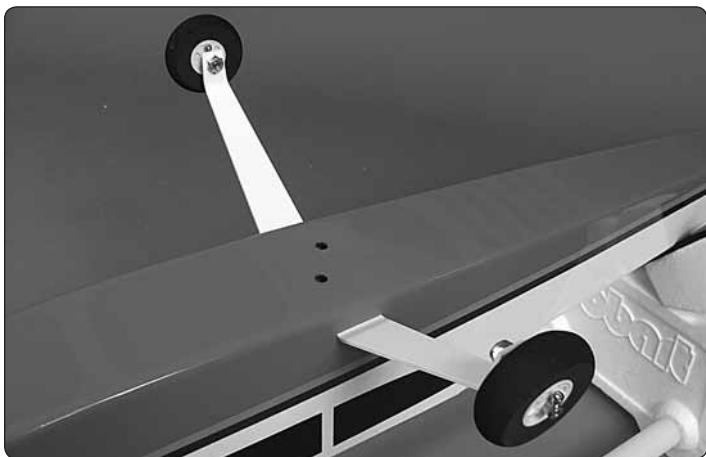
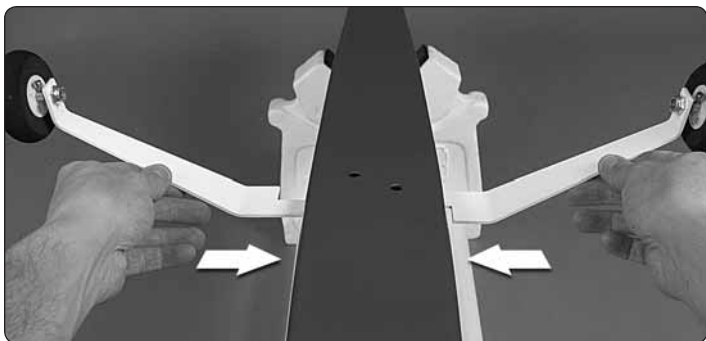


- ❑ 2. Loosely thread a 6-32 x 1/4" [6.4mm] socket head cap screw into a 5/32" [4mm] wheel collar. Slide the collar onto the axle and tighten the screw with a drop of thread locking compound. Apply a few drops of household oil to the axle.

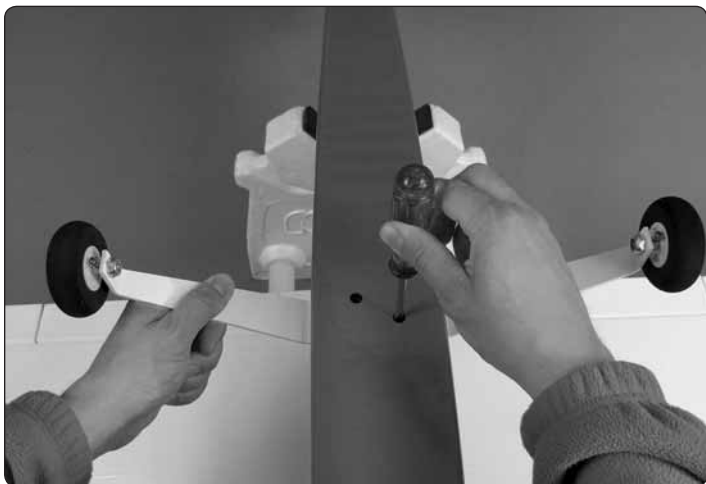


- ❑ 3. Put a 2-1/2" [6.4mm] wheel onto the axle. Follow the wheel with another 5/32" [4mm] wheel collar and 6-32 x 1/4" [6.4mm] socket head cap screw. Tighten the screw against the flat spot in the axle with some thread locking compound. Rotate the wheel on the axle and ensure that it rotates freely. If not, loosen the outside wheel collar, move it slightly away from the wheel and re-tighten it.

- ❑ 4. Repeat steps 1-3 for the other main landing gear leg.



- ❑ 5. Fit the main landing gear legs into the slots in the fuselage. Push them in until the landing gear retaining mechanism inside the fuselage locks the gear in place. Pull on each leg to ensure they are secured in the fuselage.



Note: Should you ever need to remove the landing gear from the fuselage, insert a screwdriver into the hole under the fuselage further from the leg you want to remove. Apply light pressure to the tab inside the hole and pull the landing gear leg out. Once the tab is moved, the screwdriver must be removed to allow the leg to come all the way out. Do the same with the other landing gear leg.

If your landing gear legs spread after a hard landing, remove the legs from the airplane and bend them back to the correct position with a vise. Do not try to straighten the legs while installed in the airplane as that may damage the SnapGear Landing Gear mechanism.



- ❑ 6. Install the nose gear steering block onto the firewall using two 6-32 x 3/4" [19mm] screws, two #6 flat washers, and thread locking compound.

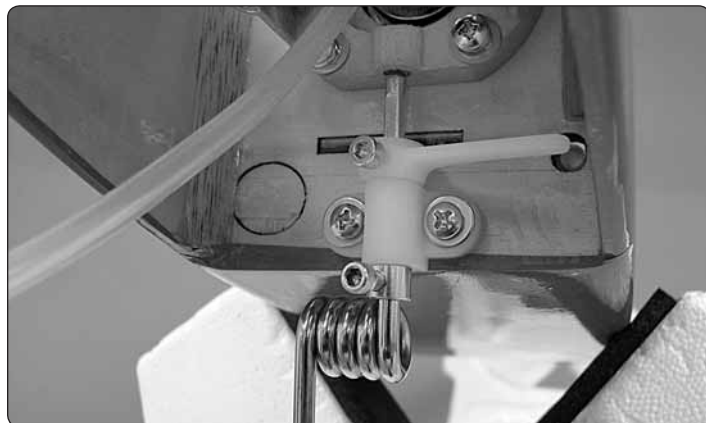


- ❑ 7. Fit a 5/32" [4mm] wheel collar into the nylon steering arm. Align the threaded hole in the wheel collar with the hole in the side of the arm. Enlarge the outer hole with a 5/64" [2mm] drill bit.



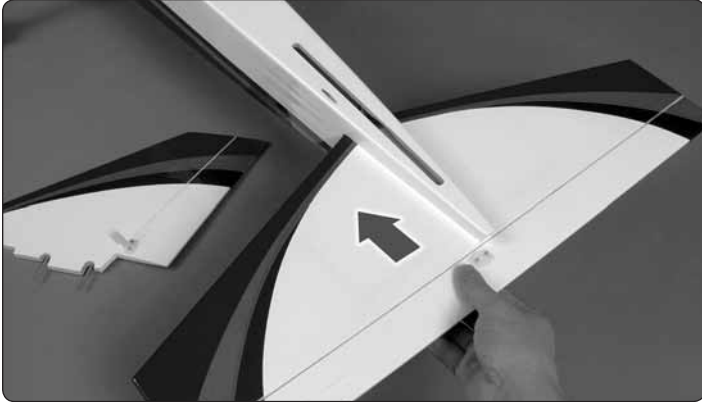
- ❑ 8. Loosely thread a 6-32 x 1/4" [6.4mm] socket head cap screw into a 5/32" [4mm] wheel collar. Slide the collar onto the nose gear axle and tighten the screw against the inner flat spot with a drop of thread locking compound. Apply a few drops of household oil to the axle. Put the 2" [51mm] nose wheel onto the axle followed by another wheel collar and cap screw. Tighten the cap screw with

thread locking compound against the outer flat spot on the axle. Be sure that the wheel rotates freely on the axle.



- ❑ 9. Loosely thread a 6-32 x 1/4" [6.4mm] socket head cap screw into the nylon steering arm with a drop of thread locking compound. Slide a wheel collar with a 6-32 x 1/4" socket head

cap screw loosely threaded in it onto the top of the nose gear wire up to the coil. Insert the nose gear wire into the steering block and slide the steering arm onto the nose gear in the orientation shown. Push the nose gear up as high as it will go and tighten the screw in the collar that is resting against the coil. Align the screw in the steering arm with the flat spot on the nose gear wire and tighten the screw in it. Ensure that the nose gear wire turns freely inside the steering block.



❑ 10. Slide the horizontal stabilizer into the stab slot in the aft end of the fuselage. Push it as far forward as it will fit. Center the stab in the slot. Look down through the vertical fin slot and ensure that the cutout in the horizontal stabilizer is aligned with the vertical fin slot.



❑ 11. Fit the vertical fin into the vertical fin slot. The metal posts in the fin should pass through the holes in the bottom of the fuselage.

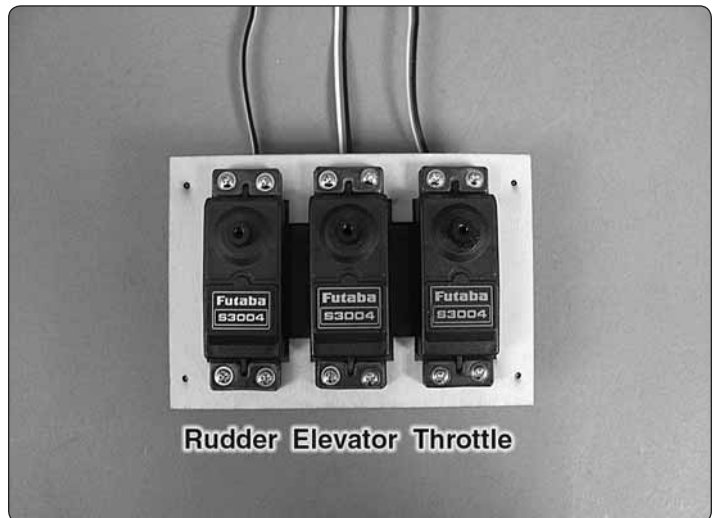
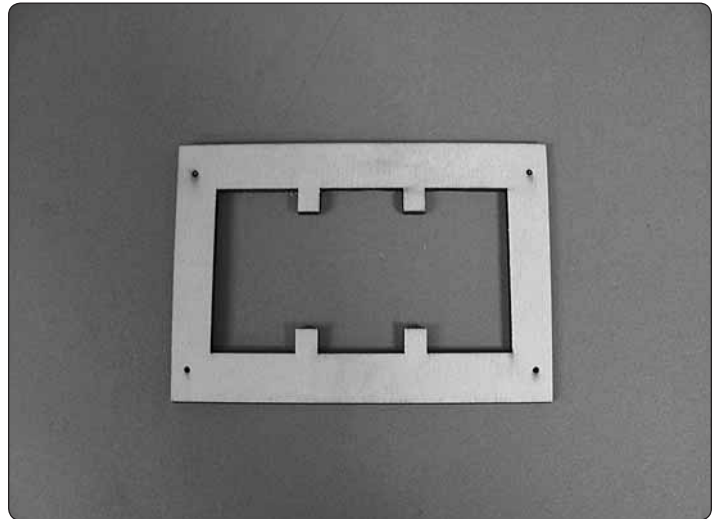


❑ 12. Locate the two EasyAlign tail bolts. Slide them into the holes in the underside of the fuselage and onto the threaded metal posts. The bolts should be tightened snugly so the tail

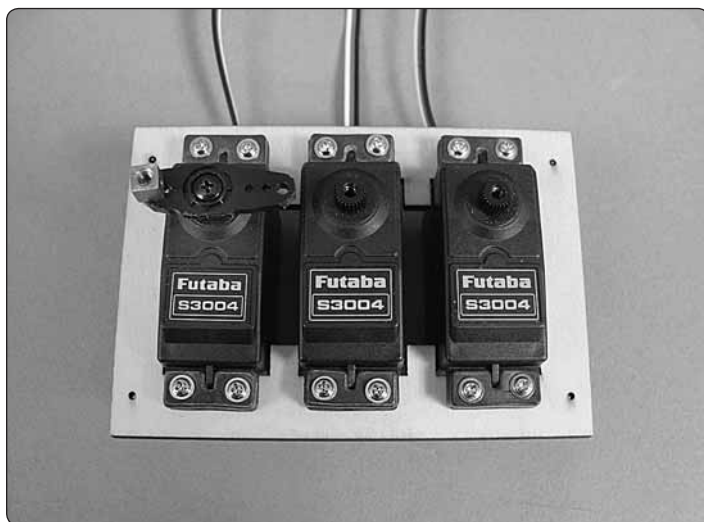
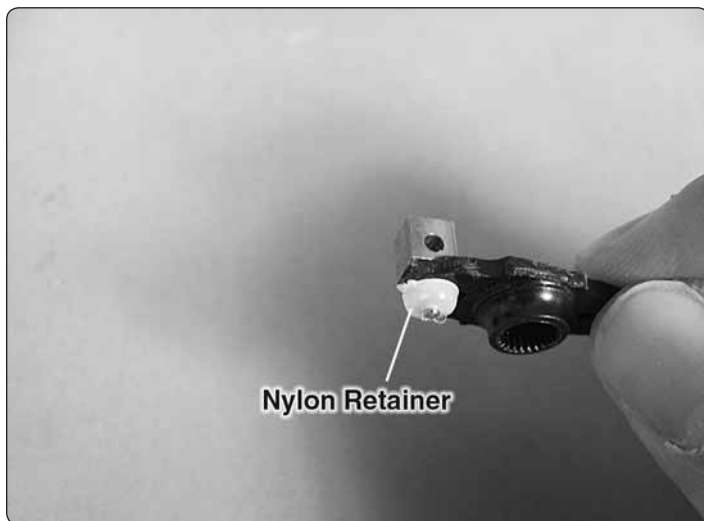
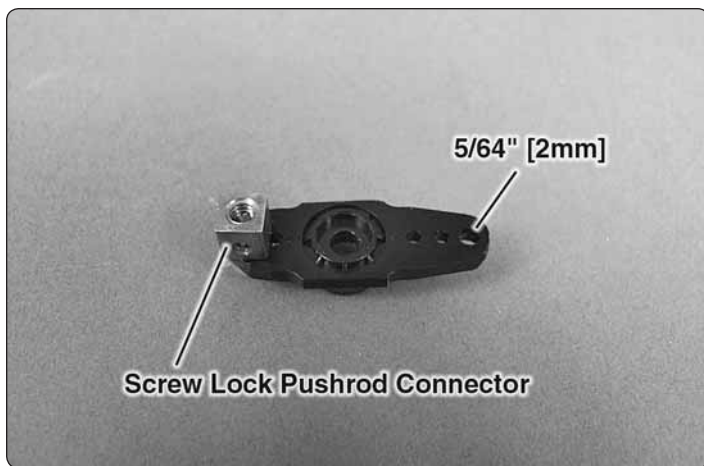
section is secure. Confirm that the horizontal stabilizer and vertical fin cannot shift in their slots. Take care not to over-tighten them as excessive force could damage the wood frame.

Install the Tail Surface Servos & Pushrods

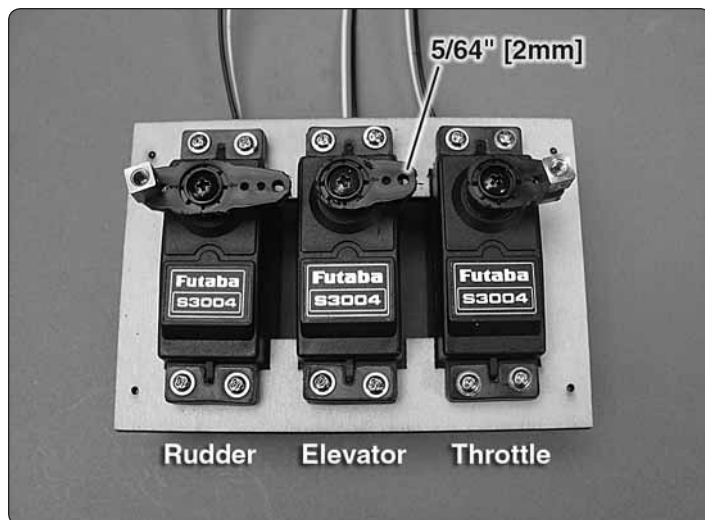
This section shows the installation of the throttle servo and pushrod for a glow engine. If you installed a brushless motor, follow only the instructions written for the elevator and rudder servos and ignore the throttle servo installation.



❑ 1. Locate the plywood tail servo tray. Use your radio system to center your elevator, rudder, and throttle servo (if you installed a glow engine). Move the throttle stick on your transmitter to the middle position to center the throttle servo. As you did with the aileron servos, use the hardware included with the tail and throttle servos to mount them to the servo tray. Use thin CA glue to harden the wood surrounding the screw holes.



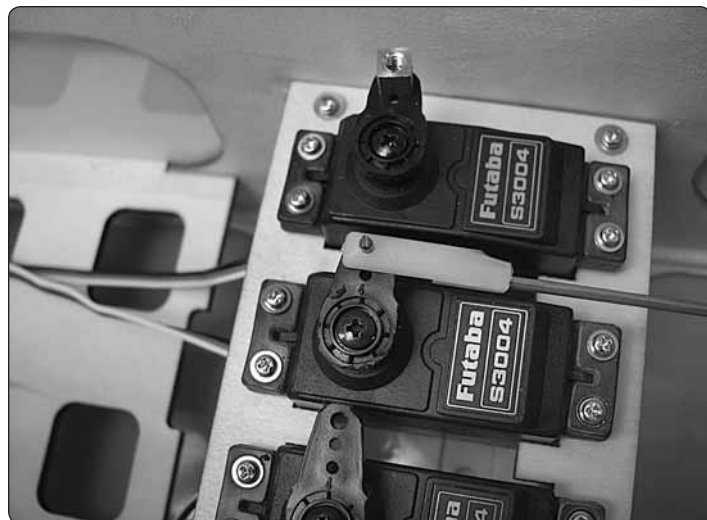
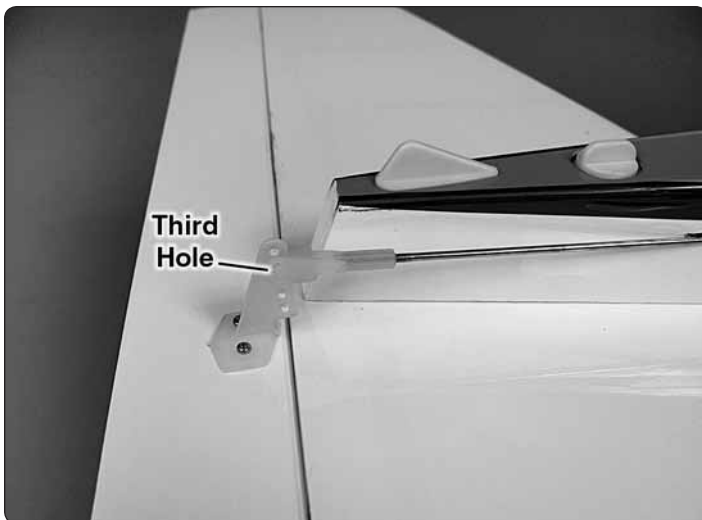
❑ 2. Test fit a four-armed servo arm onto the rudder servo to determine which way it fits perpendicular to the servo case. Cut off two unused arms as shown in the picture, and trim off the tips of the remaining two arms leaving only two holes on the left arm and three holes on the right arm. Enlarge the outer hole of the right arm with a 5/64" [2mm] drill bit. Install a brass screw-lock pushrod connector into the outer hole of the left arm and secure it with a nylon retainer. Install the servo arm onto the rudder servo perpendicular to the servo case. Be sure to reinstall the servo arm screw.



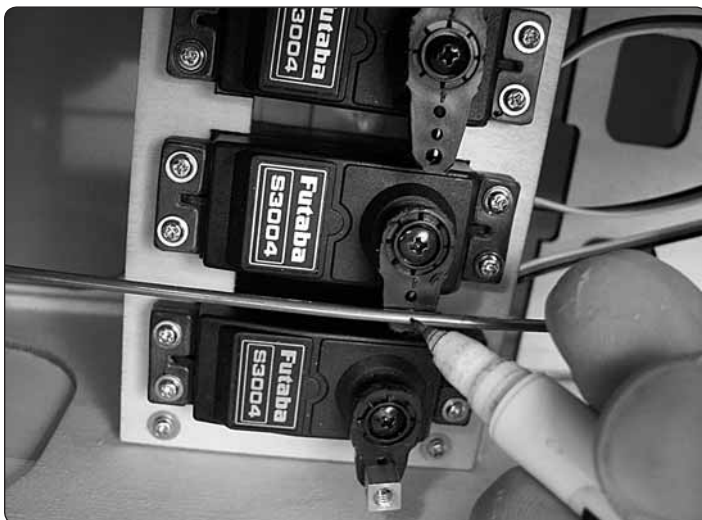
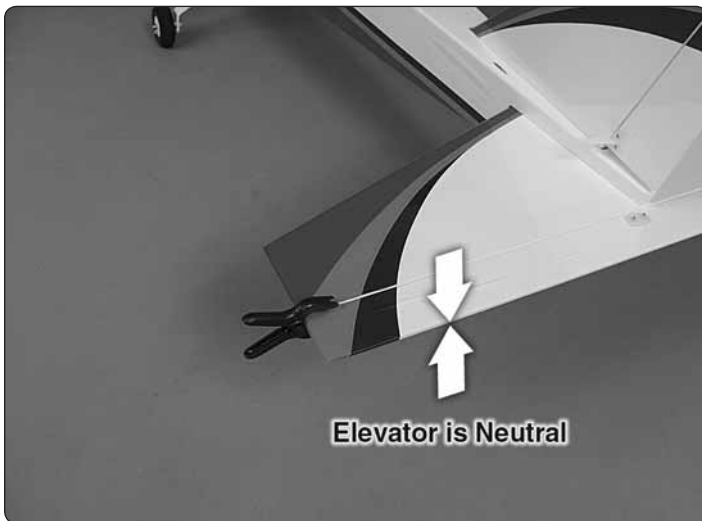
❑ 3. Install servo arms onto the elevator and throttle servos as shown, leaving only two holes in the arms. Enlarge the outer hole of the elevator servo arm with a 5/64" [2mm] drill bit. Install a screw-lock pushrod connector into the outer hole of the throttle servo arm and secure it with a nylon retainer. Confirm that you installed the servo arm screws.



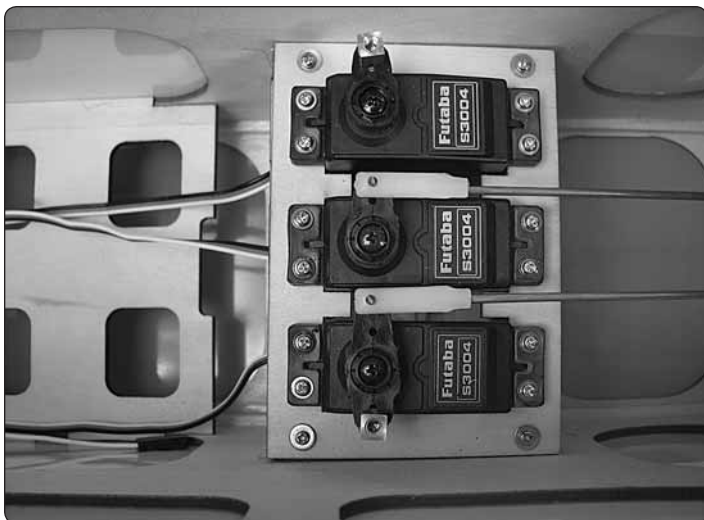
❑ 4. Thread in and remove a #2 x 3/8" [9.5mm] self-tapping screw into each of the four tail servo tray mounting holes that are in the fuselage. Apply a drop of thin CA glue to the mounting holes and allow the glue to harden. Fit the tail servo tray in place and screw it down using four #2 x 3/8" [9.5mm] self-tapping screws and four #2 flat washers.



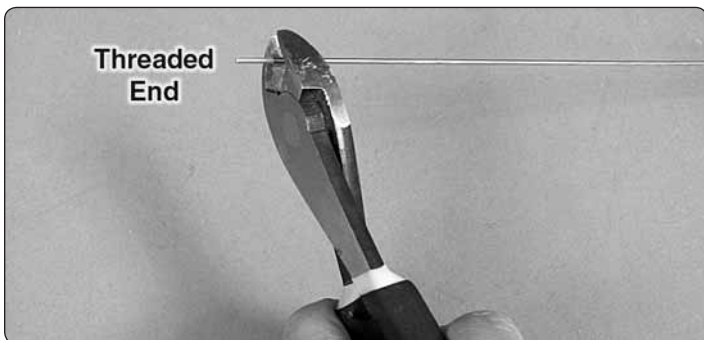
❑ 6. Remove the pushrod from the fuselage. As you did with the aileron pushrods, make a 90 degree bend at the mark you made and cut off the excess pushrod 1/4" [6.4 mm] beyond the bend. In order to reinstall the pushrod into the fuselage, you will need to first remove the clevis. Reinsert the pushrod through the elevator pushrod, thread the clevis back onto the pushrod 20 turns and reconnect it to the outer hole of the elevator control horn. Connect the forward end of the pushrod to the elevator servo arm and secure it with a nylon FasLink. Make any adjustments to the position of the clevis on the pushrod to ensure that the elevator is centered with the servo centered. When satisfied, slide the silicone clevis retainer to the end of the clevis.



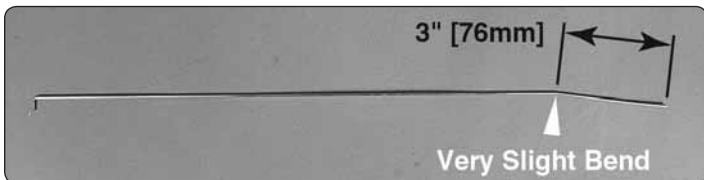
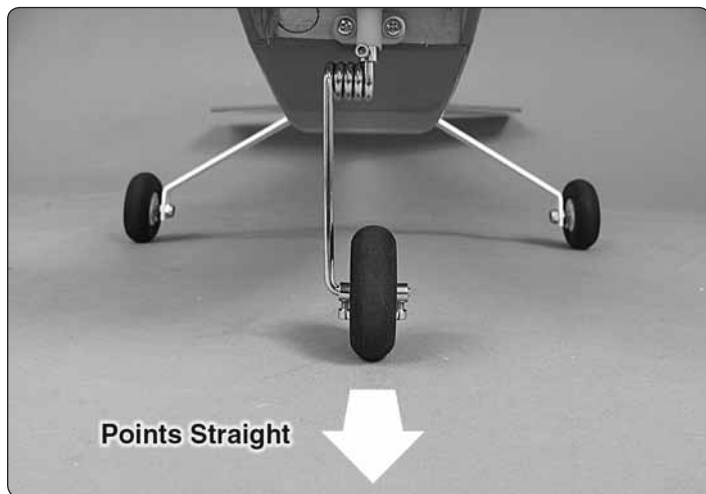
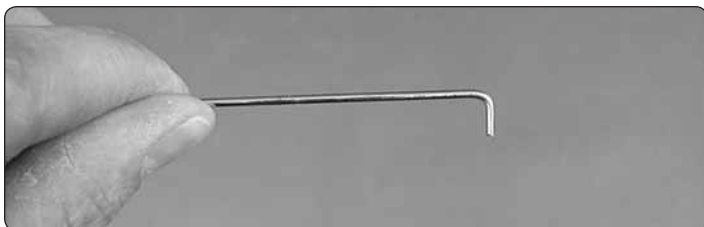
❑ 5. Thread a nylon clevis with silicone clevis retainer onto a 32-3/4" [832mm] pushrod 20 complete turns. Slide the pushrod into the elevator pushrod tube and temporarily connect the clevis to the **third** outer hole from the base of the elevator control horn. Use tape or a small clamp to hold the elevator in the neutral position. Make a mark on the pushrod where it crosses the hole in the elevator servo arm.



❑ 7. Install the rudder pushrod just as you did the elevator pushrod. The clevis should be in the outer hole of the rudder control horn.

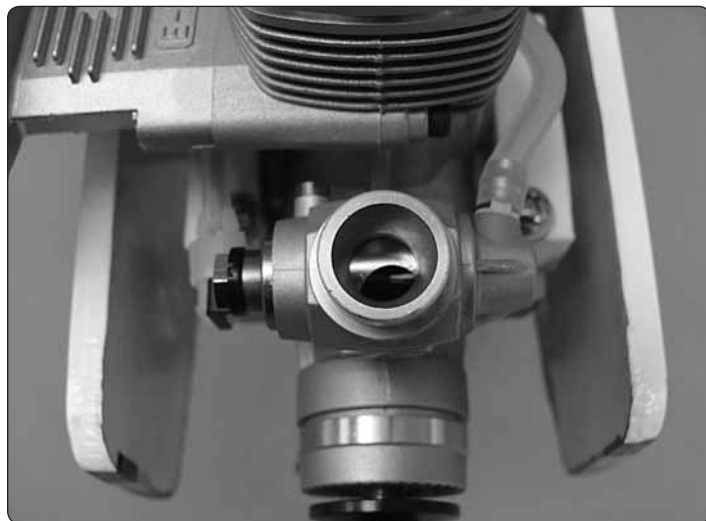
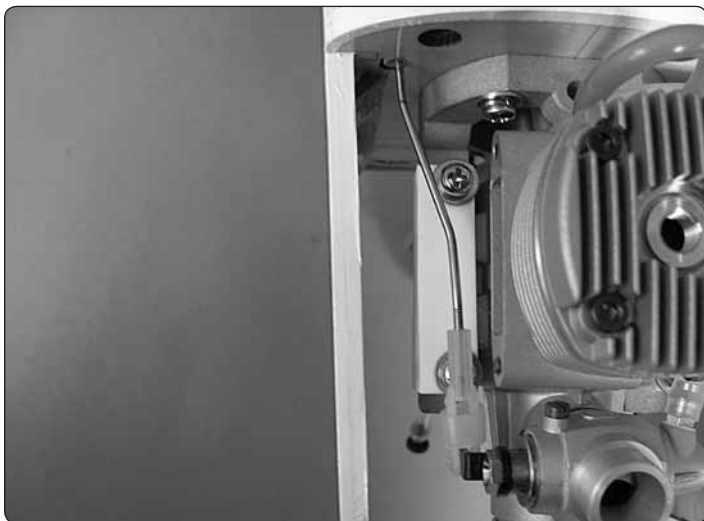
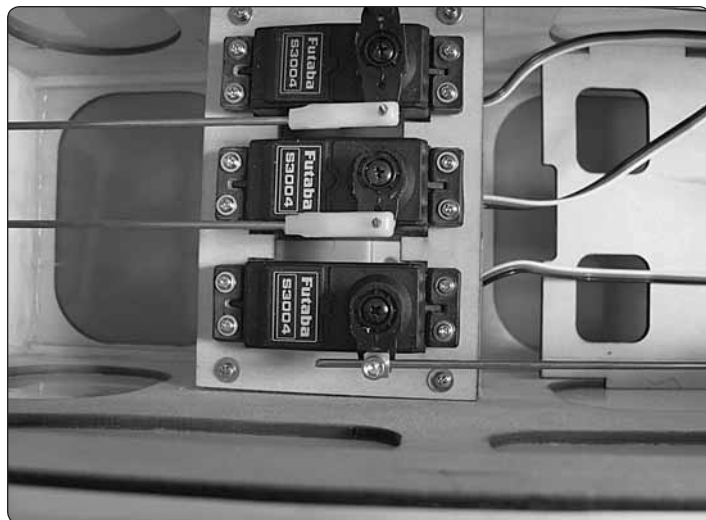
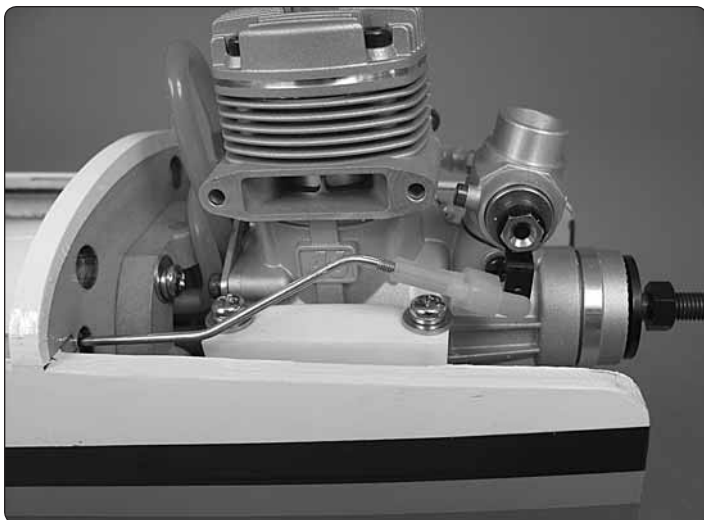


❑ 9. Insert the pushrod you made in the previous step into the steering pushrod tube and into the screw-lock pushrod connector on the rudder servo. Fit the 90 degree bend in the wire into the outer hole of the steering arm. Loosely thread a 4-40 x 1/4" [6.4mm] socket head cap screw into the screw-lock connector.



❑ 8. Cut off the threaded end from a 17-3/4" [451mm] pushrod. Make a 90 degree bend 1/4" [6mm] from the end of the pushrod. Make a very slight bend in the pushrod 3" [76mm] from the end of the pushrod. The bend should be made in the orientation shown in the picture.

❑ 10. Center the nose gear so that it points straight ahead. With the rudder servo still centered, use thread locking compound, and tighten the socket head cap screw in the screw-lock connector.



□ 11. Make the throttle pushrod by threading a nylon clevis and silicone clevis retainer onto the remaining 17-3/4" [451mm] pushrod. The pushrod must be bent so that the clevis will clear the engine mount screw nearest to the throttle arm on the carburetor. Before bending the wire, insert the pushrod into the throttle pushrod tube and mark on the wire where the bends will need to be made. Make any adjustments to the wire until the clevis can pass over the screw head without contact when the clevis is attached to the outer hole in the throttle arm. The pushrod must also be able to move the complete travel of the carburetor without binding. *Note: the muffler was removed to better show detail of the throttle pushrod.*

□ 12. When you are satisfied that the throttle pushrod will freely move the throttle arm, loosely thread a 4-40 x 1/4" [6.4 mm] socket head cap screw into the screw-lock connector on the throttle servo arm. Insert the throttle pushrod through the screw-lock connector and reconnect it to the throttle arm. Rotate the carb half open and tighten the socket head screw in the screw-lock connector.



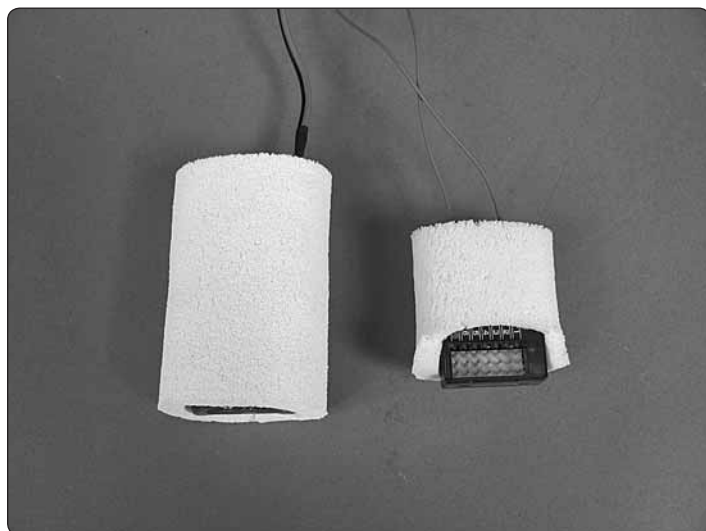
❑ 13. Temporarily connect the throttle servo to your radio system and turn on your transmitter to test the operation of the throttle. Moving the throttle stick down to the idle position should close the carburetor leaving approximately a 3/64" [1.2mm] opening as shown that will keep the engine running at idle. Moving the throttle stick up to full throttle should open the carburetor completely. Adjust the position of the pushrod in the screw-lock connector as necessary so your throttle matches the pictures.



❑ 14. When you wish to shut off the engine using the transmitter, you can either use the throttle trim button to close off the opening in the carburetor barrel completely or you can set up your transmitter with a "throttle cut" switch (most computerized radios have a throttle cut feature). The throttle cut switch is a toggle switch or button on the transmitter that, when activated, will close off the carb barrel completely in order

to kill the engine. The carburetor will return to its original idle position (the 3/64" [1.2mm] opening you set when positioning the pushrod in the screw-lock connector) when the switch is released. Refer to your radio manual for details on setting up a throttle cut switch.

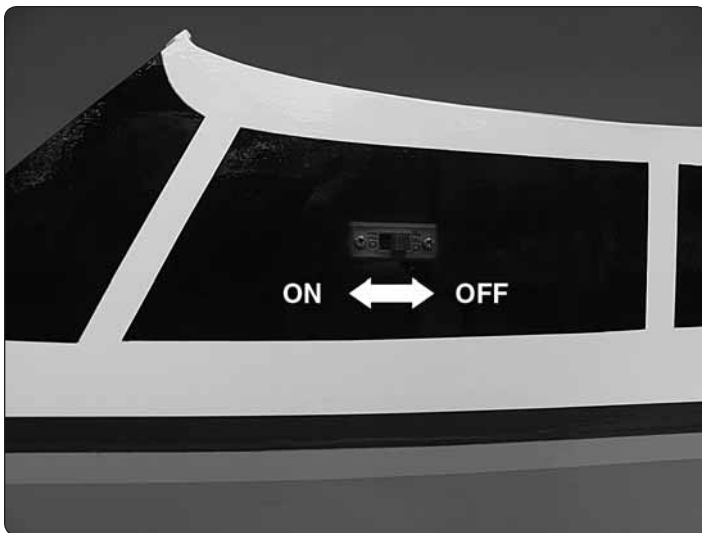
Finish the Model



❑ 1. Wrap your receiver battery and receiver with 1/4" [6mm] foam rubber. Cut the foam around the receiver so the servo plug sockets remain exposed.



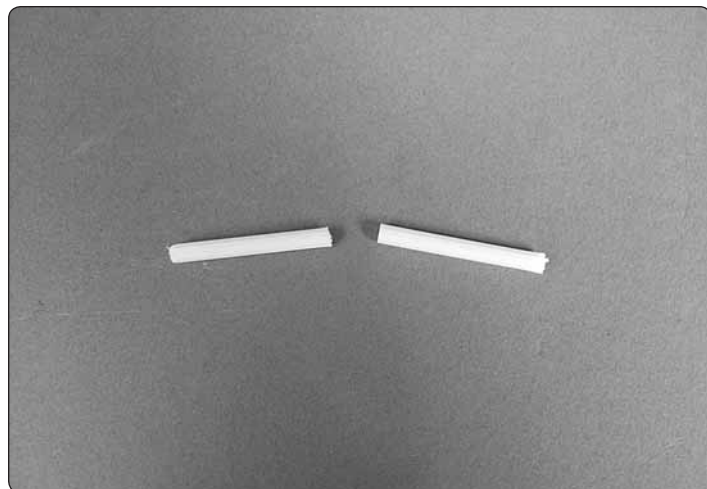
❑ 2. Make a strap from the remaining hook and loop material and use it to secure the receiver battery and receiver to the radio tray as shown.



❑ 3. If you installed a glow engine a cutout is provided for the receiver on/off switch on the left side of the fuselage. This cutout is sized for a Futaba mini switch harness (FUTM4370). If you are installing a different sized switch, you may need to modify the opening to accommodate your switch. Install your switch by removing the two screws that hold the front switch plate to the switch body. Separate the front plate from the body and reassemble the switch with it in place in the cutout in the fuselage.



❑ 4. Connect your servos (and ESC if used) to the receiver. Unless you plan to electronically mix your two aileron servos (and two flap servos if applicable) together, you will need a Y-harness for each pair of servos that you need to join together into one channel on your receiver. The picture shows a Futaba dual servo extension (FUTM4130) plugged into the aileron channel and another plugged into the flap channel. As you did with the aileron servo extensions, use the last piece of 3/8" [9.5mm] heat shrink tubing to secure the connection between your receiver battery and switch lead. Take a moment to bundle the servo wires together and neatly out of the way of the servos. We used small tie straps (not included) to do this.

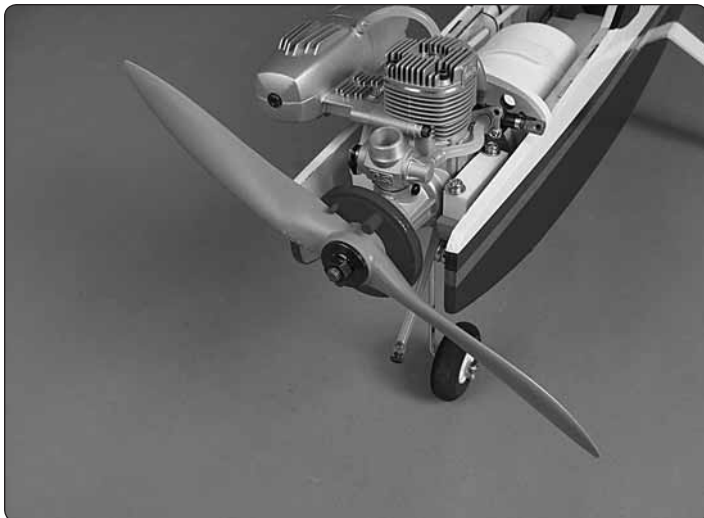


❑ 5. A 2" [51mm] piece of plastic tubing is provided for positioning the receiver antennas in the orientation described in your radio's manual. Cut the piece of tubing into two equal pieces if your receiver has dual antennas. Glue the tube halves to the side of the fuselage and insert the antenna ends into the tubes. The antennas can also be taped in place.

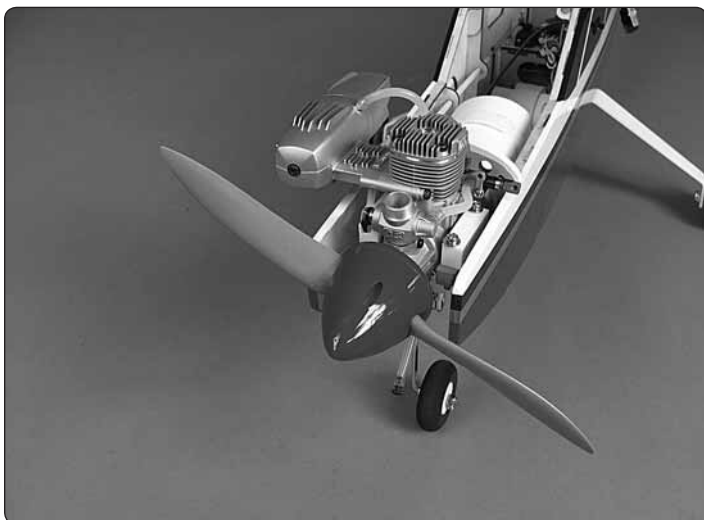


❑ 6. The charge lead on the switch harness is used for charging the receiver battery and for checking battery voltage before flight. This lead could be mounted on the side of the fuselage using a charge lead receptacle. However, since the

Avistar has a removable hatch, we simply left it inside the fuselage. It can be easily accessed by removing the hatch.



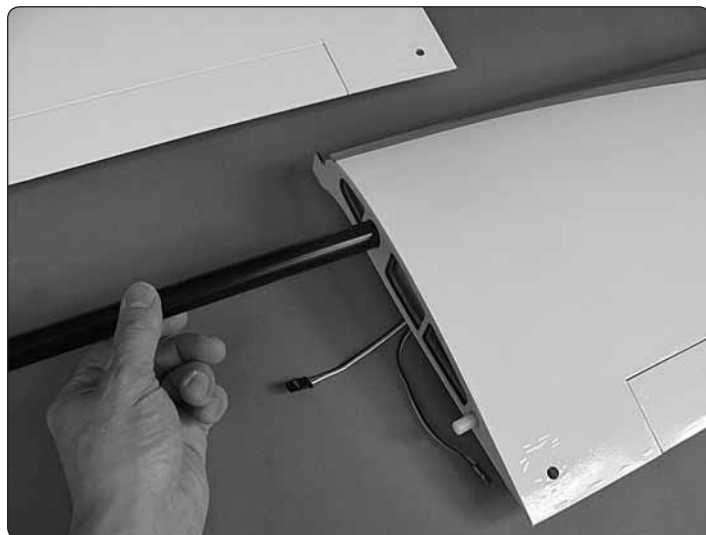
❑ 7. Slide the spinner backplate onto the engine crankshaft (or brushless motor prop adapter). Depending on the shaft size of your engine or motor, you may need to enlarge the hole in the spinner back plate. This can be done with standard drill bits. However, to ensure the spinner rotates concentrically, we recommend using a reamer (GPMQ5006 standard prop reamer, GPMQ5007 metric prop reamer). Balance and install the prop (ream if necessary) and thoroughly tighten it with the prop washer and nut (see page 31 about balancing propellers).



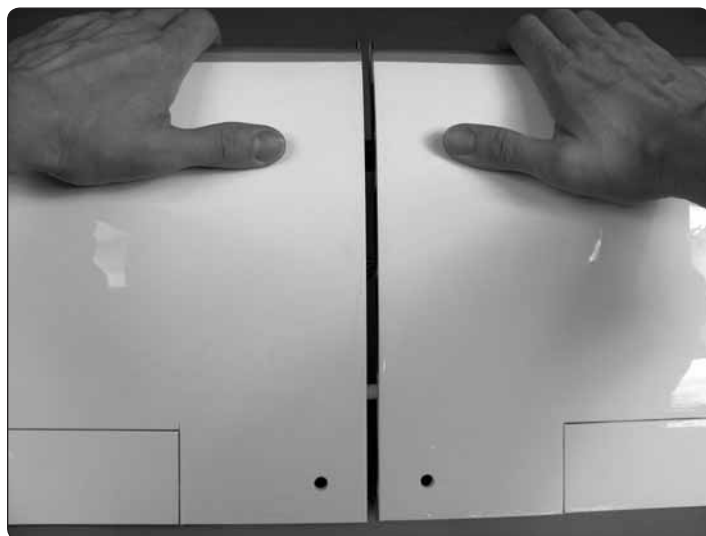
❑ 8. Install the spinner cone onto the backplate using the included spinner screws. You may need to widen the prop blade slots in the spinner cone with a hobby knife or rotary tool if it does not fit over the propeller.



❑ 9. Fit the servo leads in the wings through the holes in the underside of the wing panels. Optional flap servo leads are shown.



❑ 10. Insert the aluminum wing joiner tube into one of the wing panels.



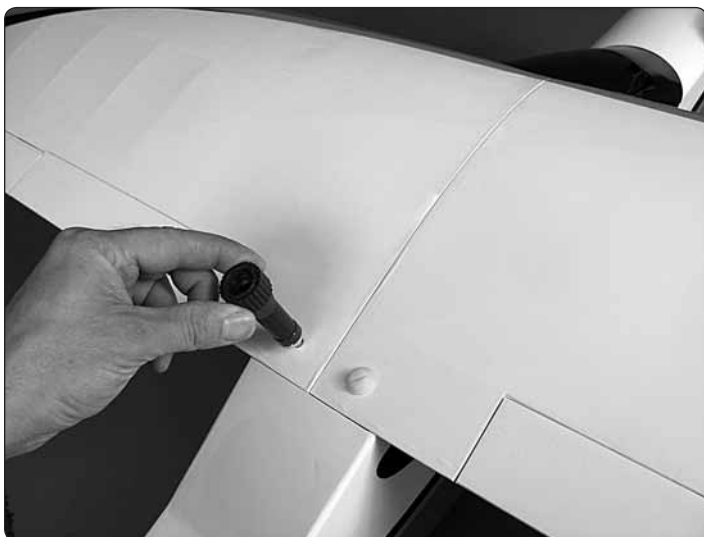
❑ 11. Slide the wing panels together onto the joiner tube.



- ❑ 12. Connect the aileron and flap servo leads to the dual servo extensions.



- ❑ 13. Fit the plywood wing root tabs into the slot in the fuselage.



- ❑ 14. Use the included 1/4-20 nylon wing bolts to secure the wing in place. The tool shown in the picture is a Great Planes 4-In-1 Installation Tool (GPMR8035 not included).



- ❑ 15. You are now completed with the assembly of your Avistar Elite. Charge your batteries if you have not already done so and complete the final setup of your model.

Apply the Decals

- ❑ 1. Use scissors or a sharp hobby knife to cut the decals from the sheet.

- ❑ 2. Be certain the model is clean and free from oily fingerprints and dust. Prepare a dishpan or small bucket with a mixture of liquid dish soap and warm water—about one teaspoon of soap per gallon of water. Submerge the decal in the soap and water and peel off the paper backing. **Note:** Even though the decals have a “sticky-back” and are not the water transfer type, submersing them in soap & water allows accurate positioning and reduces air bubbles underneath.

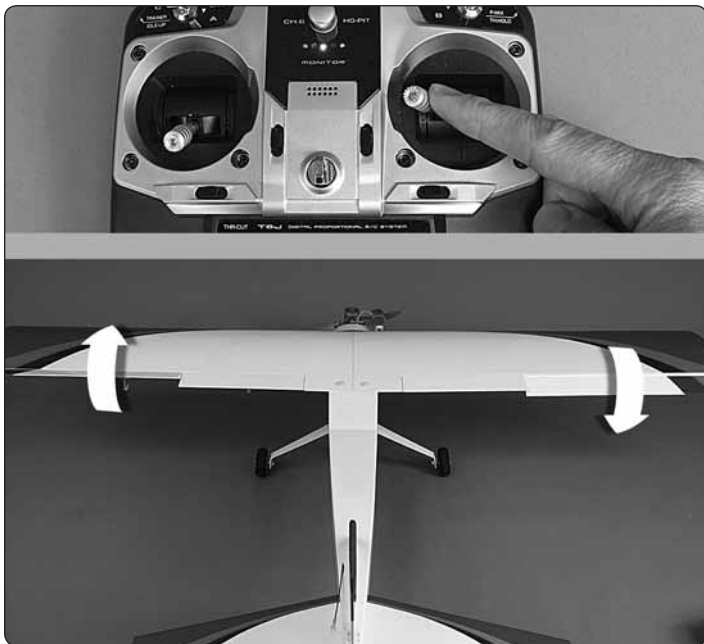
- ❑ 3. Position decal on the model where desired. Holding the decal down, use a paper towel to wipe most of the water away.

- ❑ 4. Use a piece of soft balsa or something similar to squeegee remaining water from under the decal. Apply the rest of the decals the same way.

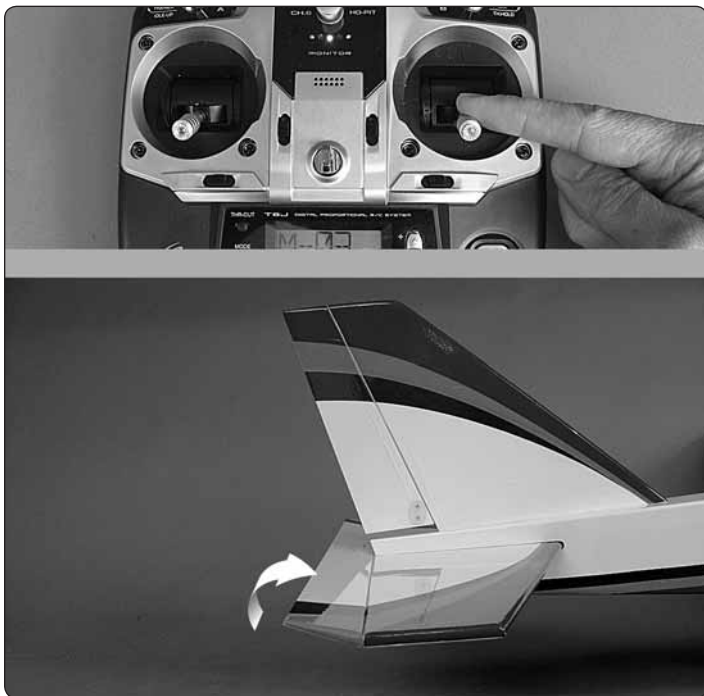
GET THE MODEL READY TO FLY

Check the Control Directions

- ❑ 1. Turn on the transmitter and receiver and center the trims. If necessary, remove the servo arms from the servos and reposition them so they are centered. Reinstall the screws that hold on the servo arms.
- ❑ 2. With the transmitter and receiver still on, check all the control surfaces to see if they are centered. If necessary, adjust the clevises on the pushrods to center the control surfaces.



- ❑ 3. Make certain that the control surfaces and the throttle respond in the correct direction as shown in the diagram. If any of the controls respond in the wrong direction, use the servo reversing in the transmitter to reverse the servos connected to those controls. Be certain the control surfaces have remained centered. Adjust if necessary.



Set the Control Throws

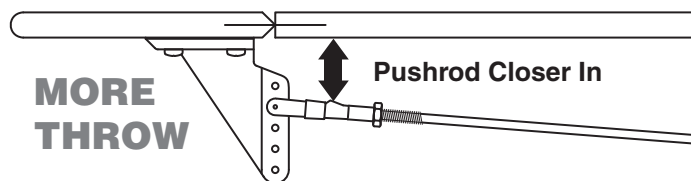
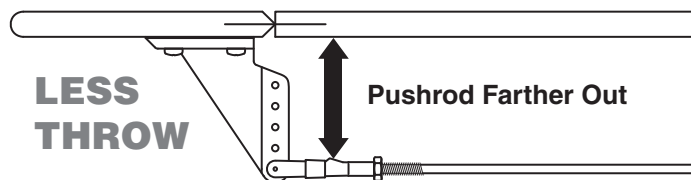
To ensure a successful first flight, set up your Avistar Elite according to the control throws specified in this manual. The throws have been determined through actual flight testing and accurate record-keeping, allowing the model to perform in the manner in which it was intended. If, after you have become accustomed to the way the Avistar Elite flies, you would like to change the throws to suit your taste, that is fine. However, too much control throw could make the model too responsive and difficult to control, so remember, "more is not always better."

Measure the **high rate** throws first...

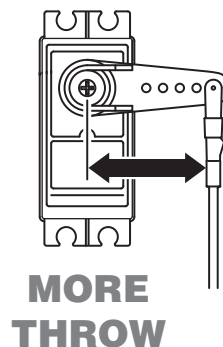


❑ 1. Place a ruler flat on your work surface against the elevator. Move the elevator up with your transmitter and move the ruler forward so it will remain contacting the trailing edge. The distance the elevator moves up from center is the "up" elevator throw. Measure the down elevator throw the same way.

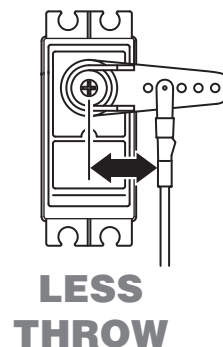
❑ 2. Compare your measurements to the control throw table. The plane was set up during your build so that the high rate throws should match or be very close to the measurements in the table. If they are slightly different, use the ATV (adjustable travel volume) or EPA (end point adjustment) in your transmitter to fine tune the throws to match. If the throws are significantly different (more than 1/8" [3mm]), we suggest altering the positions of the pushrods in the servo arms and control horns to mechanically change the control throw rather than changing it digitally. This will ensure that you do not lose "resolution" of your control throws. If necessary, change the positions of the pushrods according to the sketches.



Pushrod Farther Out



Pushrod Closer In



❑ 3. Measure and set the **low rate** elevator throws and the high and low rate throws for the rest of the control surfaces the same way. Refer to your radio manual for setting up and using low rates. Flying with low rates will reduce the chance of over-controlling the plane and is recommended for your first few flights if you are a beginning pilot. As you become more experienced, low rates may still be preferable for takeoffs and landings.

NOTE: The throws are measured at the **widest part** of the elevator, rudder and ailerons.

These are the recommended control surface throws:

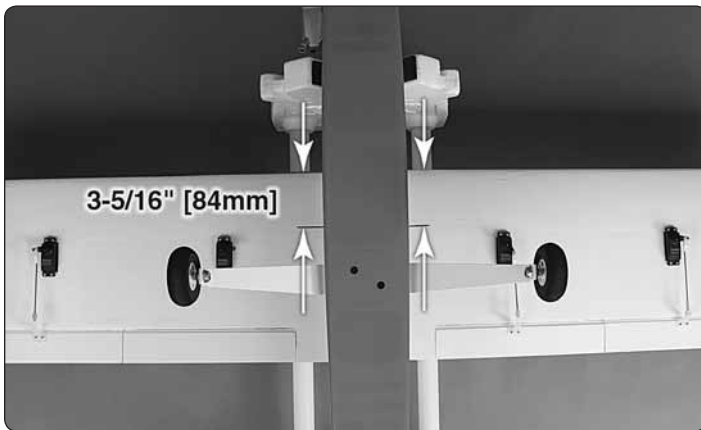
	LOW RATE	HIGH RATE
ELEVATOR	Up & Down 5/16" [8mm] 11°	Up & Down 7/16" [11mm] 16°
RUDDER	Right & Left 1/2" [13mm] 13°	Right & Left 7/8" [22mm] 22°
AILERONS	Up & Down 3/8" [10mm] 11°	Up & Down 9/16" [14mm] 17°

If your radio does not have dual rates, we recommend setting the throws at the low rate settings for your first few flights. We suggest waiting until you are accustomed to the flying characteristics of the Avistar before changing to high rates.

Balance the Model (C.G.)

More than any other factor, the C.G. (center of gravity/balance point) can have the greatest effect on how a model flies and could determine whether or not your first flight will be successful. If you value your model and wish to enjoy it for many flights, **DO NOT OVERLOOK THIS IMPORTANT PROCEDURE.** A model that is not properly balanced may be unstable and possibly unflyable.

At this stage the model should be in ready-to-fly condition with **all** of the components in place including the complete radio system, engine, muffler, propeller, and spinner (the flight battery should be in place if you installed a brushless motor). If you've built the glow version the fuel tank should be empty.



❑ 1. If using a Great Planes C.G. Machine, set the rulers to 3-5/16" [84mm]. If not using a C.G. Machine, use a fine-point felt tip pen to mark lines on the underside of the wing on both sides of the fuselage 3-5/16" [84mm] back from the leading edge. Apply narrow (1/16" [2mm]) strips of tape over the lines so you will be able to feel them when lifting the model with your fingers.

This is where your model should balance for the first flights. Later, you may experiment by shifting the C.G. 3/8" [9.5mm] forward or 3/8" [9.5mm] back to change the flying characteristics. Moving the C.G. forward will improve the smoothness and stability, but the model will then be less aerobatic (which may be fine for less-experienced pilots). Moving the C.G. aft makes the model more maneuverable and aerobatic for experienced pilots. In any case, **start at the recommended balance point** and do not at any time balance the model outside the specified range.



❑ 2. With the wing attached to the fuselage, all parts of the model installed (ready to fly) and an empty fuel tank, place the model on a Great Planes CG Machine, or lift it at the balance point you marked.

❑ 3. If the tail drops, the model is "tail heavy." If the nose drops, the model is "nose heavy." The receiver battery could be moved forward or aft inside the fuselage to shift the balance point of the model toward the recommended balancing point. If the receiver battery cannot be moved, or if additional weight is still required, nose weight may be easily added by using "spinner weight" (GPMQ4645 for the 1 oz. [28g] weight, or GPMQ4646 for the 2 oz. [57g] weight). If spinner weight is not practical or is not enough, or if tail weight is required, use Great Planes "stick-on" lead (GPMQ4485). To find out how much weight is required, place incrementally increasing amounts of weight on the top of the fuselage over the location where it would be mounted inside until the model balances. A good place to add stick-on nose weight is to the firewall. Once you have determined the amount of weight required, it can be permanently attached. If required, tail weight may be added by cutting open the bottom of the fuse and gluing it permanently inside.

Note: If mounting weight where it may be exposed to fuel or exhaust, do not rely upon the adhesive on the back to permanently hold it in place. Over time, fuel and exhaust

residue may soften the adhesive and cause the weight to fall off. Instead, permanently attach the weight with glue or screws.

❑ 4. **IMPORTANT:** If you found it necessary to add any weight, recheck the C.G. after the weight has been installed.

Balance the Model Laterally

❑ 1. With the wing level, have an assistant help you lift the model by the engine propeller shaft and the bottom of the fuse under the TE of the fin. Do this several times.

❑ 2. If one wing always drops when you lift the model, it means that side is heavy. Balance the airplane by adding weight to the other wing tip. **An airplane that has been laterally balanced will track better in loops and other maneuvers.**

PREFLIGHT

Identify Your Model

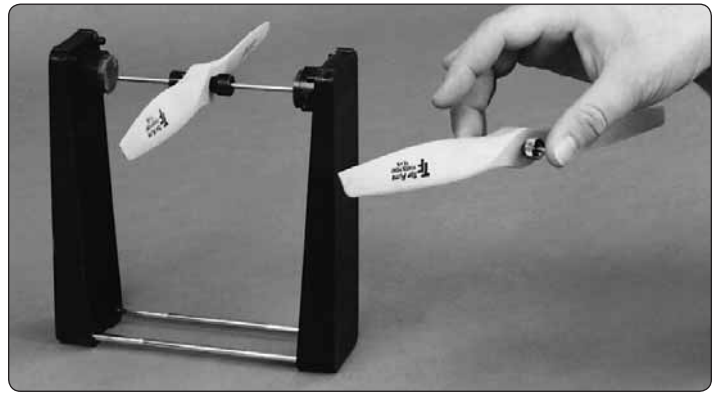
No matter if you fly at an AMA sanctioned R/C club site or if you fly somewhere on your own, you should always have your name, address, telephone number and AMA number on or inside your model. It is **required** at all AMA R/C club flying sites and AMA sanctioned flying events. Fill out the identification tag on page 35 and place it on or inside your model.

Charge the Batteries

Follow the battery charging instructions that came with your radio control system to charge the batteries. You should always charge your transmitter and receiver batteries the night before you go flying, and at other times as recommended by the radio manufacturer.

CAUTION: Unless the instructions that came with your radio system state differently, the **initial** charge on **new** transmitter and receiver batteries should be done for 15 hours **using the slow-charger that came with the radio system**. This will “condition” the batteries so that the next charge may be done using the fast-charger of your choice. If the initial charge is done with a fast-charger the batteries may not reach their full capacity and you may be flying with batteries that are only partially charged.

Balance Propellers



Carefully balance your propeller and spare propellers before you fly. An unbalanced prop can be the single most significant cause of vibration that can damage your model. Not only will engine mounting screws and bolts loosen, possibly with disastrous effect, but vibration may also damage your radio receiver and battery. Vibration can also cause your fuel to foam, which will, in turn, cause your engine to run hot or quit.

We use a Top Flite Precision Magnetic Prop Balancer (TOPQ5700) in the workshop and keep a Great Planes Fingertip Prop Balancer (GPMQ5000) in our flight box.

Ground Check

If the engine is new, follow the engine manufacturer's instructions to break-in the engine. After break-in, confirm that the engine idles reliably, transitions smoothly and rapidly to full power and maintains full power—indefinitely. After you run the engine on the model, inspect the model closely to make sure all screws remained tight, the hinges are secure, the prop is secure and all pushrods and connectors are secure.

Range Check

Ground check the operational range of your radio before the first flight of the day. Refer to your radio manual for the range checking procedure of your radio system. During the check, 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 engine 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.

ENGINE & ELECTRIC MOTOR SAFETY PRECAUTIONS

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

- Keep all engine fuel in a safe place, away from high heat, sparks or flames, as fuel is very flammable. Do not smoke near the engine or fuel; and remember that engine exhaust gives off a great deal of deadly carbon monoxide. Therefore **do not run the engine in a closed room or garage.**
- Get help from an experienced pilot when learning to operate engines and electric motors.
- Use safety glasses when starting or running your power system.
- Do not run the power system 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 plane of rotation of the propeller as you start and run the power system.
- Keep these items away from the prop: loose clothing, shirt sleeves, ties, scarfs, long hair or loose objects such as pencils or screwdrivers that may fall out of shirt or jacket pockets into the prop.
- Use a “chicken stick” or electric starter to start a glow engine. Do not use your fingers to flip the propeller. Make certain the glow plug clip or connector is secure so that it will not pop off or otherwise get into the running propeller.
- Make all engine adjustments from behind the rotating propeller.
- The engine or electric motor will get hot! Do not touch it during or right after operation. Make sure fuel lines are in good condition so fuel will not leak onto a hot engine, causing a fire.
- To stop a glow engine, use your radio system to completely shut the carburetor barrel or if that method fails to work, cut off the fuel supply by closing off the fuel line. Do not use hands, fingers or any other body part to try to stop the engine. Do not throw anything into the propeller of a running engine.

AMA SAFETY CODE EXCERPTS

Read and abide by the following excerpts from the Academy of Model Aeronautics Safety Code. For the complete Safety Code refer to *Model Aviation* magazine, the AMA web site or the Code that came with your AMA license.

General

- 1) I will not fly my model aircraft in sanctioned events, air shows, or model flying demonstrations 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 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.
- 5) I will not fly my model unless it is identified with my name and address or AMA number, on or in the model. Note: This does not apply to models while being flown indoors.
- 7) I will not operate models with pyrotechnics (any device that explodes, burns, or propels a projectile of any kind).

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 flier, unless assisted by an experienced helper.
- 3) At all flying sites a straight or curved line(s) must be established in front of which all flying takes place with the other side for spectators. Only personnel involved with flying the aircraft are allowed at or in the front of the flight line. Intentional flying behind the flight line is prohibited.
- 4) I will operate my model using only radio control frequencies currently allowed by the Federal Communications Commission.
- 5) **I will not knowingly operate my model within three miles of any pre-existing flying site except in accordance with the frequency sharing agreement listed [in the complete AMA Safety Code].**
- 9) Under no circumstances may a pilot or other person touch a powered model in flight; **nor should any part of the model other than the landing gear, intentionally touch the ground, except while landing.**

CHECK LIST

During the last few moments of preparation your mind may be elsewhere anticipating the excitement of the first flight. Because of this, you may be more likely to overlook certain checks and procedures that should be performed before the model is flown. To help avoid this, a check list is provided to make sure these important areas are not overlooked. Many are covered in the instruction manual, so where appropriate, refer to the manual for complete instructions. Be sure to check the items off as they are completed (that's why it's called a *check list*!).

- ☐ 1. Check the C.G. according to the measurements provided in the manual.
- ☐ 2. Be certain the battery and receiver are securely mounted in the fuse. Simply stuffing them into place with foam rubber is not sufficient.
- ☐ 3. Balance your model *laterally* as explained in the instructions.
- ☐ 4. Use thread locking compound to secure critical fasteners such as the screws that hold the wheel collars to the axles, engine mount screws, screw-lock pushrod connectors, etc.
- ☐ 5. Add a drop of oil to the axles so the wheels will turn freely.
- ☐ 6. Confirm that all hinges are **securely** glued in place.
- ☐ 7. Reinforce holes for wood screws with thin CA where appropriate (servo mounting screws, etc.).
- ☐ 8. Confirm that all controls operate in the correct direction and the throws are set up according to the manual.
- ☐ 9. Make sure there are silicone retainers on all the clevises and that all servo arms are secured to the servos with the screws included with your radio.
- ☐ 10. Secure connections between servo wires and servo extensions using the included heat shrink tubing.
- ☐ 11. Make sure any servo extension cords you may have used do not interfere with other systems (servo arms, pushrods, etc.).
- ☐ 12. Secure the pressure tap (if used) to the muffler with high temp RTV silicone, thread locking compound or J.B. Weld.
- ☐ 13. Make sure the fuel lines are connected and are not kinked.
- ☐ 14. Balance your propeller (and spare propellers).
- ☐ 15. Tighten the propeller nut and spinner.
- ☐ 16. Place your name, address, AMA number and telephone number on or inside your model.

☐ 17. Cycle your receiver battery pack (if necessary) and make sure it is fully charged.

☐ 18. If you wish to photograph your model, do so before your first flight.

☐ 19. Range check your radio when you get to the flying field.

FLYING

Do not attempt to fly by yourself if you are a beginning pilot. The Avistar's docile flying characteristics makes learning to fly R/C an easier experience, but the help from an instructor is invaluable. An instructor is going to be able to inspect your airplane to make sure everything is working correctly and he will also be able to give you a few tips and comments on how to improve your flying. Also, make sure you fly at an AMA sanctioned flying field.

CAUTION (THIS APPLIES TO ALL R/C AIRPLANES): If, while flying, you notice an alarming or unusual sound such as a low-pitched "buzz," this may indicate control surface *flutter*. Flutter occurs when a control surface (such as an aileron or elevator) or a flying surface (such as a wing or stab) rapidly vibrates up and down (thus causing the noise). In extreme cases, if not detected immediately, flutter can actually cause the control surface to detach or the flying surface to fail, thus causing loss of control followed by an impending crash. The best thing to do when flutter is detected is to slow the model **immediately** by reducing power, then land as soon as safely possible. Identify which surface fluttered (so the problem may be resolved) by checking all the servo grommets for deterioration or signs of vibration. Make certain all pushrod linkages are secure and free of play. If it fluttered once, under similar circumstances it will probably flutter again unless the problem is fixed. Some things which can cause flutter are; Excessive hinge gap; Not mounting control horns solidly; Poor fit of clevis pin in horn; Side-play of wire pushrods caused by large bends; Excessive free play in servo gears; Insecure servo mounting; and one of the most prevalent causes of flutter; Flying an over-powered model at excessive speeds.

Taxiing

Before the model is ready for takeoff, it must first be set up to roll straight down the runway. With the engine running at a low idle, place the plane on the runway and, if your flying field permits, stand behind the model. Advance the throttle just enough to allow the model to roll. If the model does not roll straight down the runway, shut the engine off and adjust the nose gear pushrod as necessary. Do not use the rudder trim to correct the nose wheel because this will also affect the rudder. **Note:** Crosswinds may affect the direction the model rolls, so this test should be done in calm conditions, or with the model facing directly into the wind.

Takeoff

It is typical when flying with an instructor to allow him or her to have control during take off and landing for at least your first couple of flights. Allow yourself time to become comfortable with the sticks in the air before attempting a complete flight on your own if you are a beginning pilot.

If possible, take off directly into the wind. If you are experienced, taking off in a crosswind is permissible (and sometimes necessary—depending upon the prevailing wind conditions and runway heading). Taking off into the wind will help the model roll straight and also reduces ground speed for takeoff. Taxi the model onto the runway or have an assistant carry it out and set it down, pointing down the runway into the wind. When ready, lower the flaps (if equipped) and gradually advance the throttle while simultaneously using the left stick (rudder/nose wheel) to steer the model. Gain as much speed as the runway and flying site will practically allow before gently applying up elevator lifting the model into the air. Be ready to make immediate corrections with the ailerons to keep the wings level, and be smooth on the elevator stick, allowing the model to establish a gentle climb to a safe altitude before making the first turn (away from yourself). Do not “yank” back the elevator stick forcing the plane into too steep of a climb which could cause the model to quit flying and stall.

Flight

Once airborne, maintain a steady climb and make the initial turn away from the runway. When at a comfortable, safe altitude, throttle back to slow the model and raise the flaps (if equipped), thus giving you time to think and react. The Avistar Elite should fly well at half or slightly less than half throttle. Adjust the trims so the plane flies straight and level. After flying around for a while, and while still at a safe altitude with plenty of fuel (or battery charge), practice slow flight and execute practice landing approaches by reducing the throttle further to see how the model handles when coming in to land. Add power to see how the model climbs as well. Continue to fly around while learning how the model responds. Mind your fuel level, but use this first flight to become familiar with the model before landing.

Landing

When ready to land, gently lower the flaps and pull the throttle stick fully back while flying downwind just before making the 180-degree turn toward the runway. Allow the nose of the model to pitch downward to gradually bleed off altitude. Continue to lose altitude, but maintain airspeed by keeping the nose down while turning. Apply up elevator to level the plane when it reaches the end of the runway and is about

five to ten feet off the ground. If the model is too far away, carefully add a small amount of power to fly the model closer. If going too fast, smoothly advance the throttle and allow the model to gain airspeed, then apply elevator to climb out and go around to make another attempt. When finally ready to touch down, continue to apply up elevator, but not so much that the airplane will climb. Continue to apply up elevator while the plane descends until it gently touches down.

After you have landed and shut the engine off, adjust the pushrods on the ailerons, elevator and rudder as necessary so the trim levers on the transmitter may be returned to center. This will not be required on any of the controls that did not need trim adjustments.

Final Note

One final note about flying your model. Have a goal or flight plan in mind for **every** flight. For beginners, your first few flights should be you becoming familiar with the basic controls of R/C. When the plane is flying toward you it is common for beginner pilots to hesitate or turn the plane in the wrong direction because the aileron and rudder control will act in reverse from the pilot's perspective as it was when flying away from them. Focus on flying the model as if you were sitting in the cockpit. With practice you will learn to do this without having to think about it.

As you progress, your flight plans should include smooth takeoffs and landings. Practice executing smooth landings such that the Avistar approaches the runway in a smooth and descending path with the correct airspeed and touches down without bouncing. If possible at your airfield, perform several “touch and go” landings until you are comfortable with the plane's landing characteristics.

Regardless of your objective for each flight, do not surprise yourself by impulsively attempting a maneuver and suddenly finding that you've run out of time, altitude or airspeed. Every maneuver should be deliberate, not impulsive. For example, if you're going to do a loop, check your altitude, mind the wind direction (anticipating rudder corrections that will be required to maintain heading), remember to throttle back at the top, and make certain you are on the desired rates (high/low rates). A flight plan greatly reduces the chances of crashing your model just because of poor planning and impulsive moves. **Remember to think.**

**Have a ball! But always stay in control
and fly in a safe manner.**

GOOD LUCK AND GREAT FLYING!



This model belongs to:

Name

Address

City, State, Zip

Phone Number

AMA Number

Hobbico®