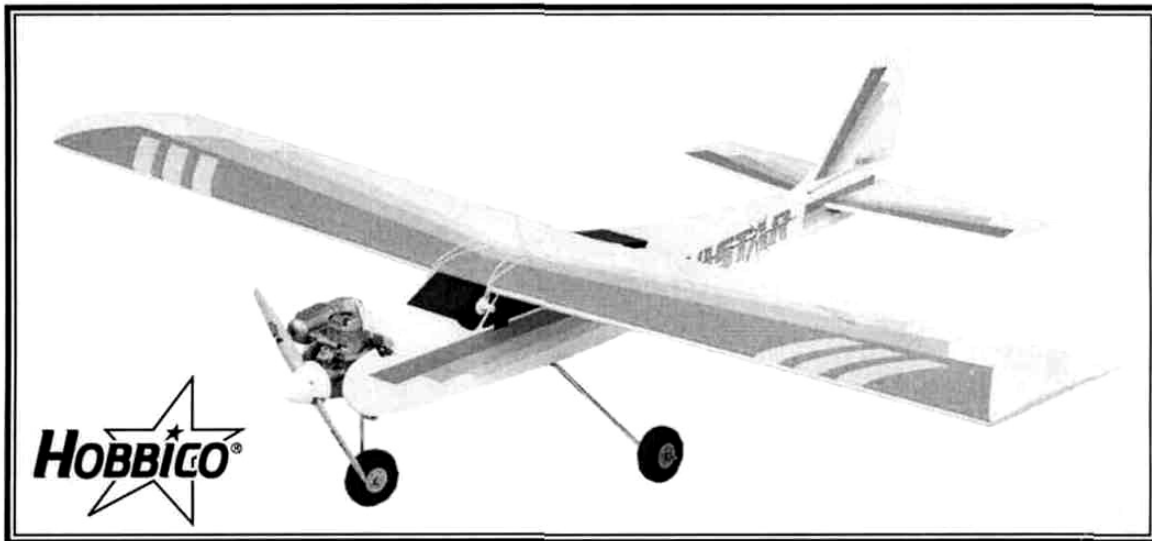# AVISTAR™

Almost-Ready-To-Fly Radio Control Advanced Trainer with **MonoKote®**

ASSEMBLY INSTRUCTIONS

HOBBICO®

90-Day Limited Warranty

If you, as the original owner of this model, discover defects in pans or workmanship wilhin 90 days of purchase, Hobbico will repair or replace it - at the option of our authorized U.S. repair facility, Hobby Services - without charge. Our liability does not include cost of shipping to us. However, Hobby Services will pay shipping expenses lo return your model to you. You must provide proof of purchase, such as your original purchase invoice or receipt, for your model's warranty to be honored. This warranty does not apply to damage or defects caused by misuse or improper assembly, service or shipment. Modifications, alterations or repair by anyone other than Hobby Services void this warranty. We are sorry, but we cannot be responsible for crash damage and/or resulting loss of kits. engines, accessories, etc.

Repair Service

Your Avistar must be returned directly to Hobby Services for warranty work. The address is: Hobby Services. Attn: Service Department. 1610 Interstate Drive, Champaign, Il. 61822 Phone: (217) 398-0007. Please follow the instructions below when returning your model. This will help our experienced technicians to repair and return it as quickly as possible.

1. ALWAYS return your entire system, including airplane and radio.
2. Disconnect the receiver battery switch harness and make sure that the transmitter is turned off Disconnect all batteries and drain all fuel.
3. Include a list of all items returned and a THOROUGH, written explanation of the problem and service needed. If you expect the repair to be covered under warranty, also include your proof of purchase.
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HOBBICO* AVISTAR 40 *ARF* IMPORTANT BUILDING NOTES?

Please make notes of the following points in your instruction manual **before** beginning assembly.

This kit contains an adjustable engine mount. This will allow you mount almost any engine quickly and easily. To use this mount, please replace the following steps in the manual with these:

1. On **page 16,** at **step 31,** drill a hole in the firewall so it is **9/16"** in from the right side and **3/8"** up from the bottom as shown in the sketch at right.

2. **On page 17, before step 35,** install the engine mount halves by fitting them together and attaching them to the firewall using four **6-32 x 3/4"** machine screws with washers. **Do not tighten completely until later.**

3. On **page** 17, at step 36, install the nose gear strut through the steering arm, followed by a 4mm collar. Next, slide the strut through the lower lug on the engine mount and install a second collar (see sketch at right). Tighten the collars using 3 x 5mm machine screws.

4. On **page 17,** at **step** 37, rotate the steering arm so it is 1/2" away from the firewall with the wheel pointing straight ahead.

5. **On page 18, after step 46,** once the engine in properly positioned, tighten the engine mount **to the firewall.**

6. **On page 19, step 47,** drill four **7/64"** holes at the marks. Do not drill 1/8" holes.

7. **On page 19, step 50** will tell you to mount the engine using four 3 x 25mm machine screws with washers and nuts. This hard **ware has been** replaced with four #6 x 3/4" sheet metal screws. Simply screw these into the mount to hold the engine in piace.
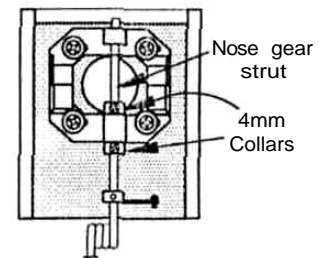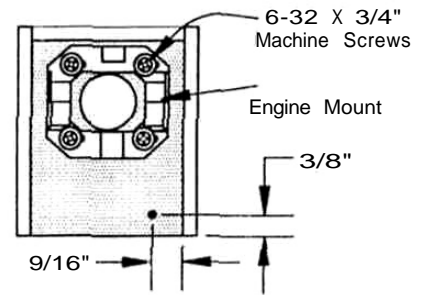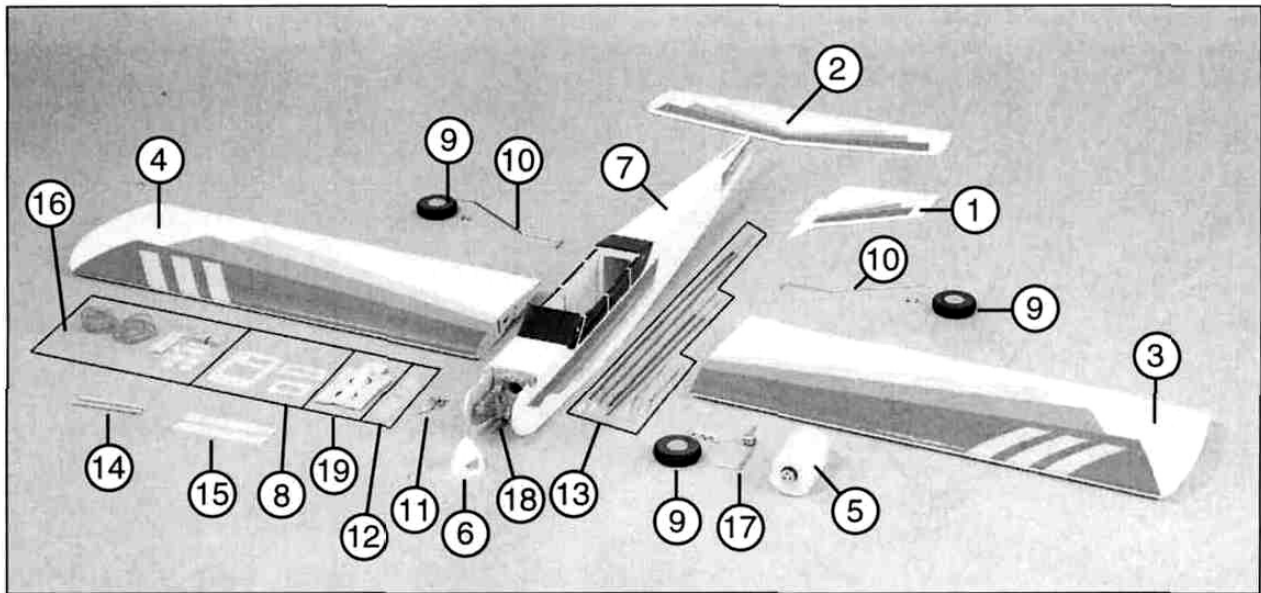
AV12ADD2

You're about to build in just days what took aviation pioneers years—a powered machine that flies. Specially created for you and other first-time radio control acrobatic pilots, Hobbico's Avistar 40 offers nearly all the excitement of piloting a real airplane...and develops skills that will take you anywhere you want in your new hobby.

Know Your Model's Parts
Take a moment now to match the box contents with the items listed below. Following the Avistar 40's assembly instructions will be quite easy if you identify and organize the parts before you begin.

1. RUDDER/FIN (C)
2. STABILIZER/ELEVATOR (C)
3. LEFT WING PANEL (A)
4. RIGHT WING PANEL (A)
5. FUEL TANK (B)
6. SPINNER (B)
7. FUSELAGE (B)
8. SERVO TRAY (B)
9. WHEELS (D)
10. MAIN LANDING GEAR (D)

11. METAL HARDWARE (B)
12. NYLON HARDWARE (B)
13. PUSHRODS (B)
14. WING DOWELS (B)
15. DIHEDRAL BRACES (A)
16. HARDWARE (B)
17. NOSE GEAR (D)
18. ONE-PIECE ALUMINUM ENGINE MOUNT (B)
19. BATTERY / RECEIVER TRAY (B)

Replacement Parts Available

HCAA3030.....WingKit(A)
HCAA3031.....FuselageKit(B)

HCAA3032.....FinSet(C)
HCAA3033.....Landing Gear Set (D)

() Letter indicates items included in each replacement set.

Other Items You'll Need

Glues

Choose any 6-minute epoxy, such as Great Planes® Pro™ Epoxy, which has been formulated especially for R/C model building. Epoxies offer a strong bond and a variety of curing times suited for every step of assembly. You'll also need an instant-setting CA (cyanoacrylate), a thicker CA+, and a 30-minute epoxy, plus rubbing alcohol and paper towels for easy epoxy cleanup.

Hardware

Tools and accessories required for assembly:

Hobby knife	Needle nose pliers
#11 knife blades	Large Phillips screwdriver
#64 Rubber bands	Small Phillips screwdriver
Ruler	3 ft of 3/32" fuel tubing
Drill with drill bits: 1/16", 3/32", and 3/16"	

Model Engine

Power your Avistar with any high-quality, .40-size model engine. The O.S.® .40 LA and SuperTigre® GS-40 are just a few examples. Look for features such as easy break-in, easy starting, efficient carburetion and low maintenance. Check the manufacturer's recommendations for propellers to use with your engine.

Radio Equipment

To let you send the commands that control your Avistar 40's "flight path," you'll need a 4-channel aircraft radio system with four standard servos. Many 4-channel radios include just three servos. You may need to purchase the fourth separately. The servos and radio receiver will be mounted on-board your model and need to be cushioned from jolts and vibration. One-half inch thick foam rubber sheets are available for this purpose.

Getting Ready for Flight

Your Hobbico Avistar 40 trainer is ready for takeoff in as little as 15-20 hours. Your hobby dealer or flying instructor can help you decide what accessories you'll need for flight. Most are one-time only purchases—and your instructor will probably allow you to use his field box until you can outfit your own with a glow plug starter, fuel bulb or pump, and "chicken stick" or electric starter. You will need to provide your own fuel. Use glow fuel with a 10-15% nitro blend to keep your engine performing at its peak...and your Avistar 40 will have the power to make you an accomplished pilot!

Other General Items Required:

Epoxy Brushes	Masking Tape
T-Pins	Felt-Tip Marker
Clothes pins	String
Sandpaper	Paper Towels
Foam Rubber	Standard Screwdriver
Mixing Sticks	Thread Locking Compound
Epoxy Mixing Cups	Wing Seating Tape

Find A Flying Instructor

The best way to begin flying your Avistar 40 is with **an** experienced R/C pilot or flying instructor at your side. You'll learn faster, relax those in-flight jitters and avoid risking your model before you're truly ready to solo.

Where do you find an instructor? Ask at your local hobby shop. They'll have information about flying clubs in your area whose membership includes qualified instructors. You can also join the Academy of Model Aeronautics (AMA), a 165,000 member-strong national organization with 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 phone number below:

Academy of Model Aeronautics
5151 East Memorial Drive
Muncie, IN 47302
Toll Free: (800) 435-9262
Fax: (765) 741-0057
Web Site: http://www.modelaircraft.org

WARNING! THIS IS NOT A TOY!

Please follow these safety precautions:

Before you fly
1. Make sure that **no other flyers are using your** radio frequency.
2. Your radio transmitter must be the FIRST thing you turn ON, and the LAST thing you turn OFF.

Fuel storage and care
1. Do not smoke near your engine or fuel.
2. Store all engine fuel in a safe, cool, dry place, away from children and pets.
3. Always wear safety glasses.
4. Make certain that your glow plug clip is securely attached to the glow plug—and cannot pop off, possibly falling into the spinning propeller.
5. Use a "chicken stick" or electric starter to start the engine— NOT your fingers.
6. Make sure that the wires from your starter and glow plug clip cannot become tangled with the spinning propeller.
7. Do not stand at the side of the propeller when you start or run the engine. Even at idle speed, the spinning propeller will be nearly invisible.
8. If any engine adjustments are necessary, approach the engine only from behind the spinning propeller.

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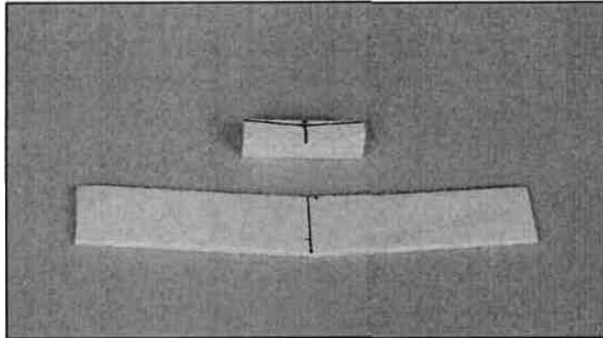
❏ Find the two 1/8" (3mm) die-cut plywood wing joiners. Draw a center line on both sides of the plywood wing joiners and balsa aileron servo tray mounting blocks. Use one plywood joiner as a template to mark the wing dihedral angle on both of the balsa 5/16" x5/16" x 1-1/2" (8mm x 8mm x 38mm) aileron servo tray mounting blocks. Put these mounting blocks aside for use later.
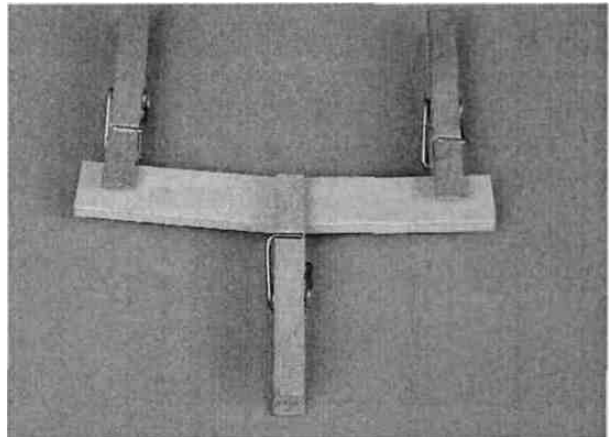
Orientation of the wing joiners
❏ Arrange the two "V-shaped plywood wing joiners in the same orientation as they will be glued together.

Gluing the wing joiner
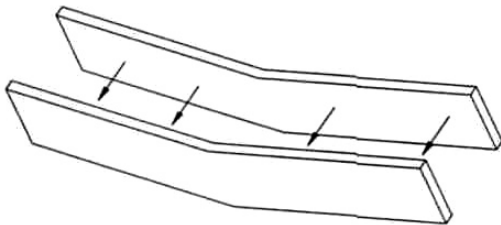
❏ Mix approximately l/4oz. (7.5ml) of 30-minute epoxy. Using a mixing stick or epoxy brush, apply an even coat of epoxy on one side of a wing joiner. Stack the other joiner on top of the epoxy.
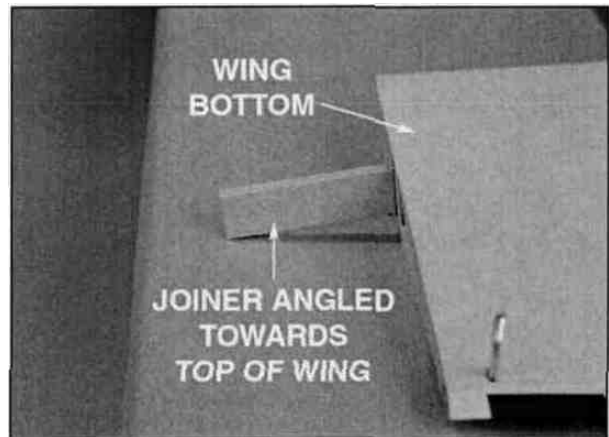
Clamping the wing joiner

❏ Use three clothes pins to clamp the wing joiners together firmly. The excess epoxy must be removed before it cures as described in the next step.

Removing the excess epoxy
❏ Excess epoxy will be squeezed out of the seams between the joiners and must be removed before the epoxy is allowed to cure. Use a paper towel and rubbing alcohol to remove the excess epoxy. Be careful not to disturb the alignment of the joiner pieces.

Test fit the wing joiner

WING BOTTOM

JOINER ANGLED TOWARDS TOP OF WING

❏ After the epoxy has cured and the clothes pins have been removed, test fit the wing joiner in both wings by sliding the joiner into the joiner cavity in the wing. The joiner should slide in with a little resistance up to the centerline drawn on the both sides of the joiner.

Sanding the joiner
❏ If the wing joiner will not Fit in the cavity, lightly sand the excess epoxy and uneven surface joints from the joiner edges and sides. Caution: A snug fit is desirable between the joiner and the wing cavity. Do not sand excessively.

Viewing the wing dihedral
❏ Pay close attention to the orientation of the wing joiner in relation to the dihedral of the wings.

Marking the wing cavity
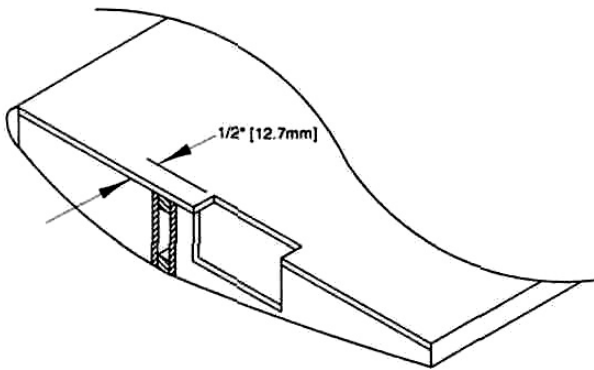
❏ Lay the wing halves on the work surface with the flat side facing up. Remove the precut balsa from the root rib. Using the measurements in the sketch, trim away the balsa sheeting from the bottom of the wing to allow for the installation of the aileron servo.

Gluing the joiner in the wing
❏ Mix 1/4oz. (7.5ml) of 30-minute epoxy to glue the joiner into one wing half. Use a mixing stick or epoxy brush to apply epoxy to all four sides of the joiner cavity wall. Insert the joiner into the cavity up to the centerline marked on the joiner plate. Be sure you are installing the joiner in the correct orientation to the wing. It should angle upwards when installed correctly. Clean the excess epoxy from the wing root rib. You must be sure all the excess glue is removed from the wing root or the wings will not fit together correctly. Allow enough time for the epoxy to fully cure before proceeding to the next step.

Applying the epoxy
❏ Mix 1/2oz. (14.5ml) of 30-minute epoxy and apply to the wing root rib and inside the joiner cavity of the second wing half.

Joining the wing halves

❏ Assemble the two wing halves with the tightest seam possible. No gaps should be showing between the two wing halves. Clean the excess epoxy from the outside of the wing using a paper towel and rubbing alcohol. Tape the wing halves together with masking tape. Set the wing aside to cure.

Cutting the mounting blocks
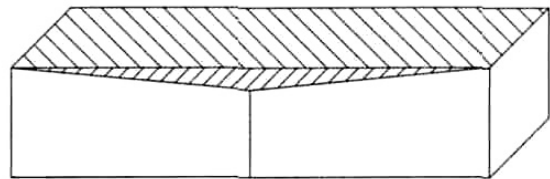
❏ Find the aileron servo tray and the two balsa servo tray mounting blocks and position them with the marked dihedral line up. Using a sharp hobby knife, cut the angle out of the block. This angle will be placed against the wing when the servo tray is installed.

Assembling the servo tray
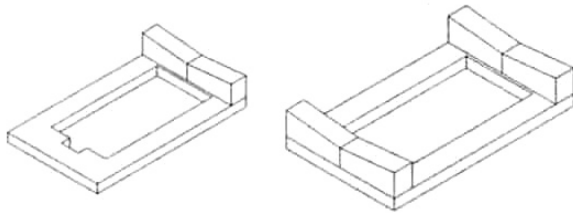
❏ Apply thick CA+ to the flat side of the balsa servo tray mounting block. Place the mounting block on the aileron servo tray next to the servo opening-not on the outer edge of the tray. Note the positioning of the dihedral angle in relation to the servo tray.

Test fitting the aileron servo
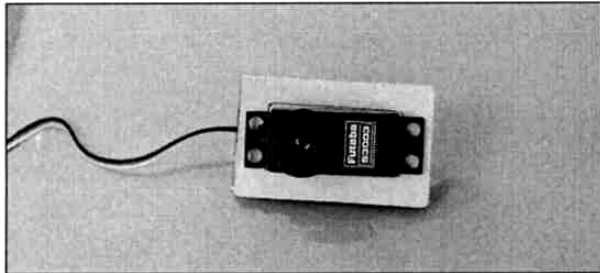
❏ Test fit the aileron servo into the servo tray and the hole cut in the bottom side of the wing. Enlarge either hole, if needed, with a hobby knife or a fine-toothed file until a proper fit is achieved.

Removing the covering
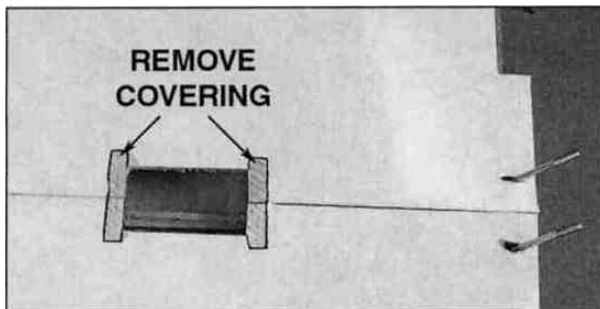
REMOVE COVERING

❏ Position the aileron servo tray so it is centered over the opening made in the wing. Using a felt-tip marker, trace the outside of the servo tray mounting block onto the wing. Use a sharp hobby knife to remove the covering for the mounting blocks. Use care not to cut into the underlying balsa of the wing, as this may weaken the wing.

Installing the servo tray
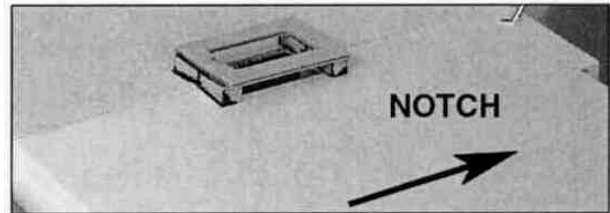
NOTCH

❏ Mix 1/8oz. (3.5ml) of 6-minute epoxy to glue the servo tray to the bottom side of the wing. Apply equal amounts of epoxy to the mounting blocks on both ends of the servo tray. Attach the servo tray on the bottom of the wing with the servo wire harness notch facing the trailing edge of the wing. The mounting blocks should be attached to the wing sheeting where the covering was removed and not to the plastic wing covering. Allow the epoxy to fully cure before proceeding to the next step.

Aileron installation
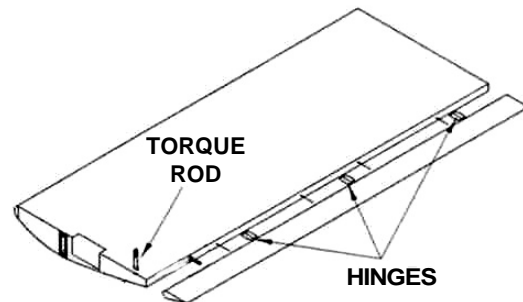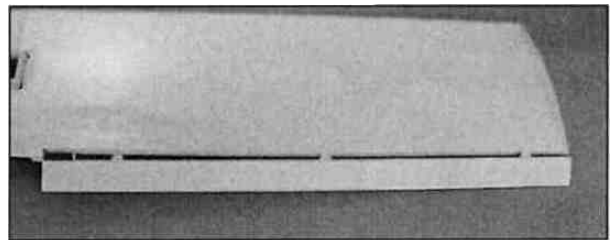
TORQUE ROD

HINGES

❏ Test fit the ailerons on the wing with the hinges installed. Check for free movement in both directions. There should be no binding. Use a toothpick to push 30-minute epoxy down the torque-rod holes in each aileron. Fit the aileron in place. There should Be virtually no gap when the aileron is fully seated. If the aileron will not fully seat, use a hobby knife to clean the hinge slots and try it again. Glue in the hinges by wicking 4 drops of thin CA into each side of the hinges.
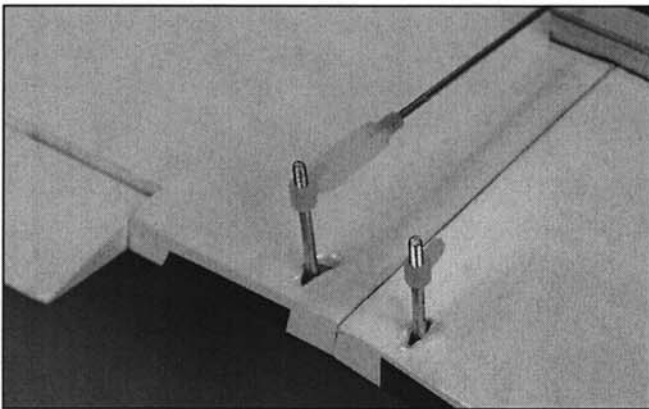
Installing the aileron control horns
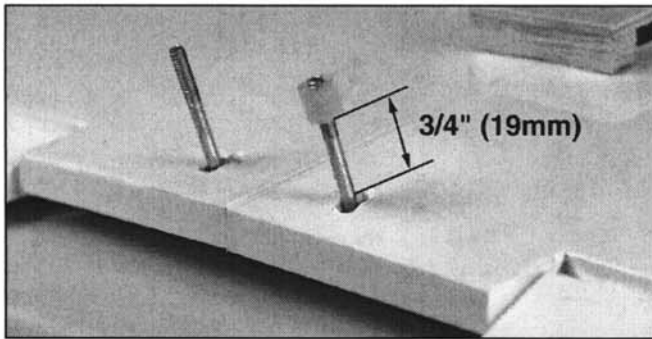
3/4" (19mm)

❑ Find the aileron control horns. Thread the control horns onto the torque rods until there is 3/4" (19mm) of torque rod between the wing and control horn.

Assembling the pushrods

❑ Locate the two plastic clevises and two 17-1/2" (444mm) threaded aileron control rods. Thread the clevises onto the pushrods in a clockwise motion until the rod starts to protrude from the inside of the clevis between the forks.

Attaching the pushrods

❑ Attach the aileron control rods to the aileron torque rods using the plastic clevises. Pry the fork of the clevis apart and insert the pin of the clevis through the hole in the aileron control horn. Press the forks of the clevis back together until they snap into place.

Aileron pushrods installed

❑ Cut two pieces of silicone fuel tubing (Not included) to a length of 1/4" (6.5mm). Slide one piece on each of the two control rod clevises to secure the connection between the clevis and the horn.

Fuselage Assembly

Servo tray support installation

FUSE
TAIL
←

❑ Locate the plywood servo tray support included in the kit. Mix 1/8oz. (3.5ml) of 30-minute epoxy to glue the servo tray mount into the fuselage. The servo tray mount will be positioned behind the pre-installed hardwood landing gear block on the side facing the tail of the aircraft. Apply epoxy to all the fuselage surfaces that will come in contact with the servo tray support. Install the servo tray support. Allow the epoxy to cure.

Test fitting the servos

❑ Test fit your servos into the plywood servo tray. Enlarge the servo tray opening, if needed, using a fine toothed file until a proper fit is achieved. The servo should fit loosely into the radio tray up to the servo mounts. After final installation the servos should float freely on the rubber grommets.

Installing the servo tray
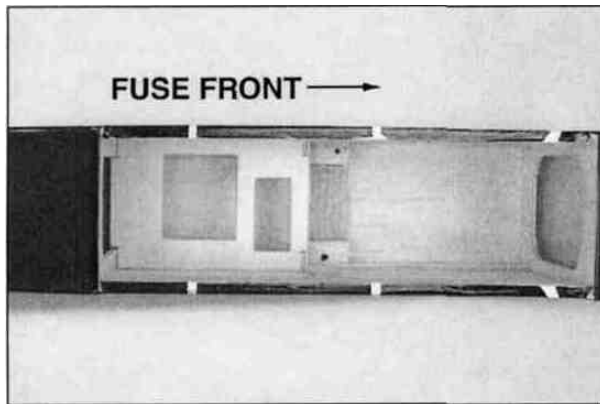
❏ Mix l/8oz. (3.5ml) of 6-minute epoxy to glue the servo tray into the fuselage. Apply epoxy to all fuselage parts that will come in contact with the servo tray.

Installing the wing dowels
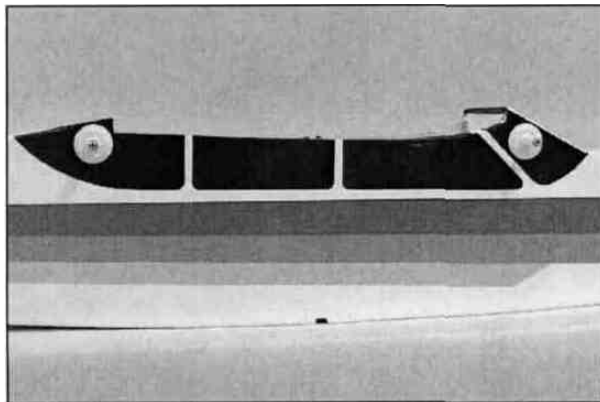
❏ The wing dowel holes are predrilled. Locate the four round holes (two on each side of the fuselage) and remove the covering over each hole. Insert the two wood dowels into the fuselage. The shorter dowel is installed towards the tail of the airplane. Install the dowel caps onto the dowels using four 2.5mm x 8mm sheet metal screws. You may need to hold one screw with a pliers while installing the other side.

Constructing the tail section
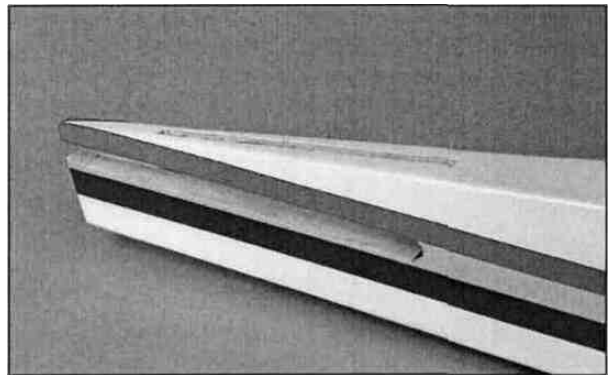
❏ Locate the horizontal stabilizer slot under the covering on the tail section of the fuselage by pressing lightly with your finger. The slot will be located on both sides of the tail. Using a hobby knife, carefully remove the covering exposing the slots. Note: Do not cut into the balsa wood sheeting around the slot.

Vertical stabilizer slot covering

❏ Using your finger, locate the vertical stabilizer slot on the top of the fuselage. Remove the covering with a hobby knife in the same manner as for the horizontal stabilizer slots. This will allow better viewing access when centering the horizontal stabilizer.

Finding the centerline
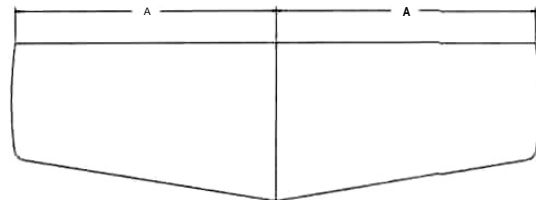
❏ Locate the horizontal stabilizer and draw a centerline on the side with the three color graphics. Insert the stabilizer into the tail section with the line showing through the vertical stabilizer slot.

9

## Preparing to install the stabilizer

EQUAL MEASUREMENTS
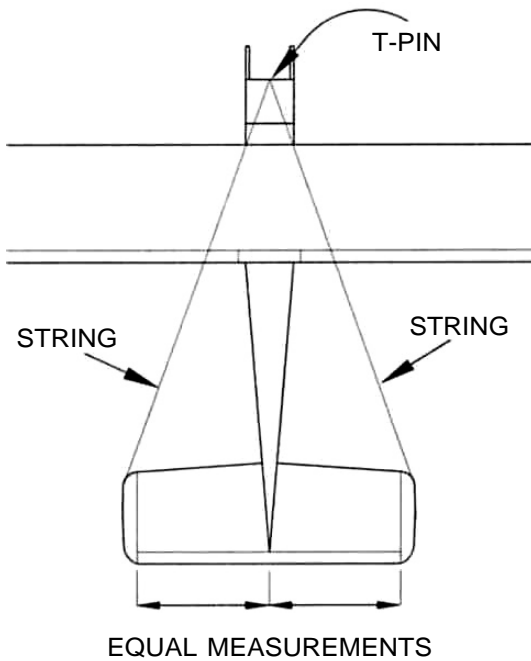
❏ Attach a piece of string with a pin to the center of the firewall as shown. The string should be a minimum of 31-1/2" (800mm) in length. Stretch the string to the corner of the horizontal stabilizer. The distance from the pin to the horizontal stabilizer must be the same on both sides. This method will adjust the horizontal stabilizer to a 90" angle to the centerline of the aircraft.

Tracing the fuselage outline
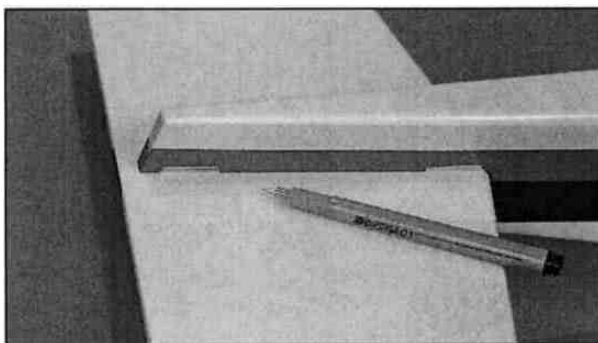
❏ Using a felt-tip pen, trace a line around the tail of the airplane on the top and bottom of the horizontal stabilizer.
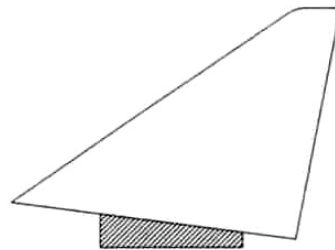
Removing the covering
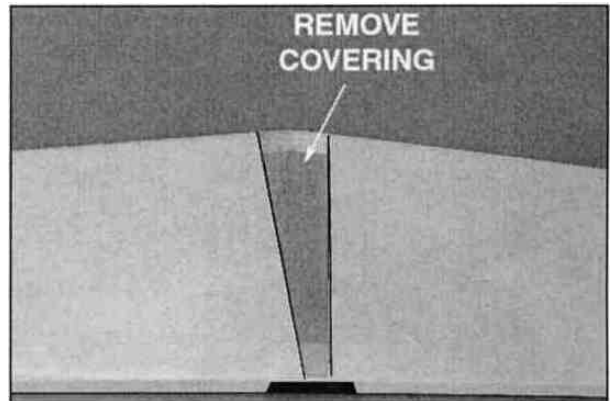
❏ Using a sharp hobby knife, cut 1/32" [1mm] inside the lines made with the felt-tip pen and remove the covering from the center of the horizontal stabilizer. Do not cut into the balsa sheeting on the horizontal stabilizer.

Installing the stabilizer

❏ Mix 1/4oz. (7.5ml) of 30-minute epoxy to install the horizontal stabilizer. Using a mixing stick, place glue inside the horizontal stabilizer slot on all sides including the horizontal stabilizer mount. Insert the horizontal stabilizer and clean off the excess epoxy that squeezes out of the joint with a paper towel and rubbing alcohol. Adjust alignment as shown in the previous step. Set the fuselage aside to cure.
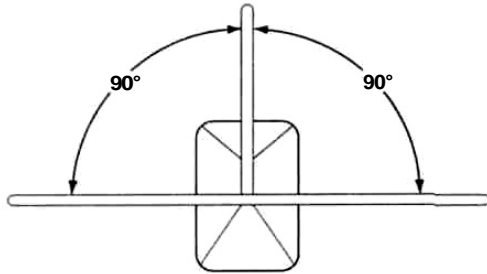
Preparing the vertical stabilizer

❏ Locate the vertical stabilizer. Draw a line on both sides even with the bottom of the fin as shown in the sketch. Cutting 1/32" (1mm) below the line and through the covering only, remove the covering from the base of the vertical fin.
Important: Do not cut into the balsa fin root.

Installing the vertical stabilizer

Fin Alignment 90° Sketch

❏ Mix 1/4oz. (7.5ml) of 30-minute epoxy to glue the vertical stabilizer in place. Using a mixing stick, apply epoxy to the top of the horizontal stabilizer through the vertical stabilizer slot. Apply epoxy to the sides and bottom surfaces of the fin base that have balsa wood exposed. Insert the vertical stabilizer into the slot, making sure the fin root is seated firmly on the horizontal stabilizer. Check for a perpendicular angle between the fin and the stabilizer when viewed from the back. It is critical that the fin remains perpendicular while the epoxy is curing. Masking tape may be required to hold the fin during this time.

Installing the rudder and elevator hinges

❏ Test fit the rudder and elevator on the fin and stabilizer with the hinges installed. Use the sketch in "Installing the Ailerons" as a guide. Check for free movement in both directions. There should be no binding. Glue in the hinges by wicking 4 drops of thin CA into each side of the hinges.

Locations of the control horns
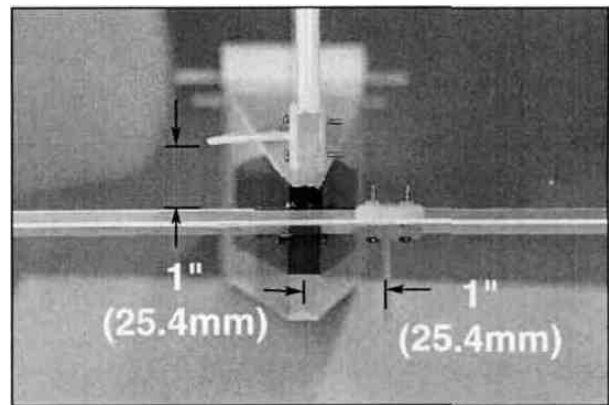
❏ Note the locations and alignment of the control horns in both the photo and the illustration before marking and drilling.

Control horn alignment

HINGE LINE

CORRECT   **INCORRECT**

11
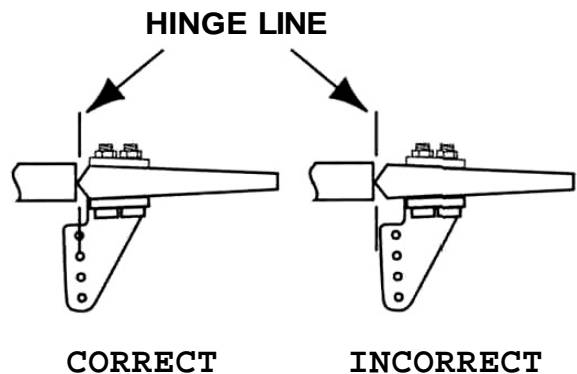
Attaching the elevator control horn

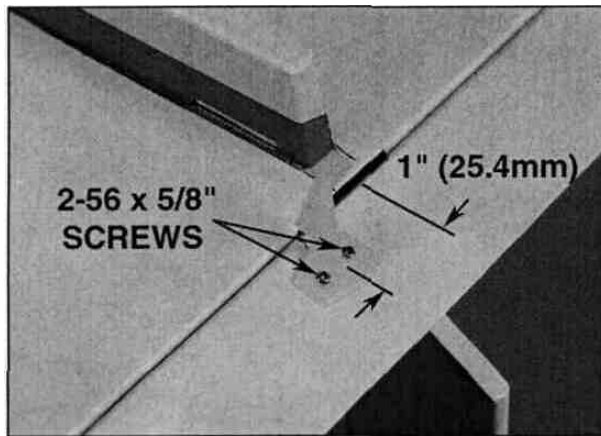❏ Locate a nylon control horn. Place the horn on the bottom of the elevator. Position it 1" (25.4mm) from center and aligned with the leading edge as shown in the sketch and photo. Mark the two holes with a felt-tip pen. The holes of the control horn should line-up with the gap between the rudder and the vertical stabilizer. Drill two 1/16" (1.5mm) holes through the balsa elevator. Insert two 2-56 x 5/8" machine screws through the control horn and elevator into the control horn back plate on the opposite side of the elevator. Tighten the screws but do not crush the balsa.

Installing the rudder horn

Locate the other nylon control horn. Place the control horn on the left side of the rudder, 1" (25mm) from the top of the hinged stabilizer as shown in the photo on the previous page. Mark the two holes with a felt-tip pen. Drill two 1/16" (1.5mm) holes through the rudder. Use two machine screws 2-56 x 5/8" to attach the control horn.

Locating the rudder exit hole
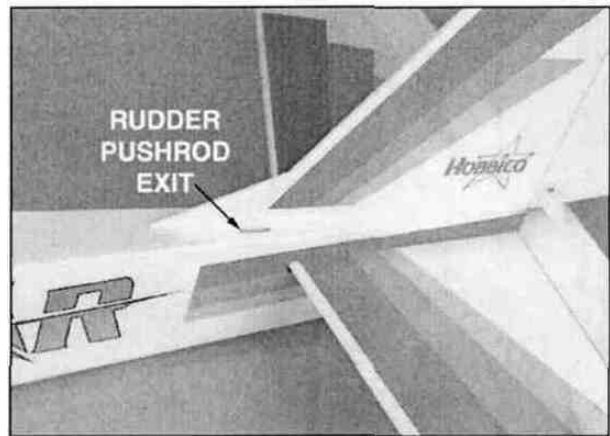
❏ The precut rudder pushrod exit hole is located on the same side as the rudder control horn, under the covering. Locate the exit hole by gently running your finger down the top of the fuselage. Using a hobby knife, remove the covering from the rudder pushrod exit hole. Do not remove the covering from the exit hole on the opposite side.

Cutting the elevator exit hole
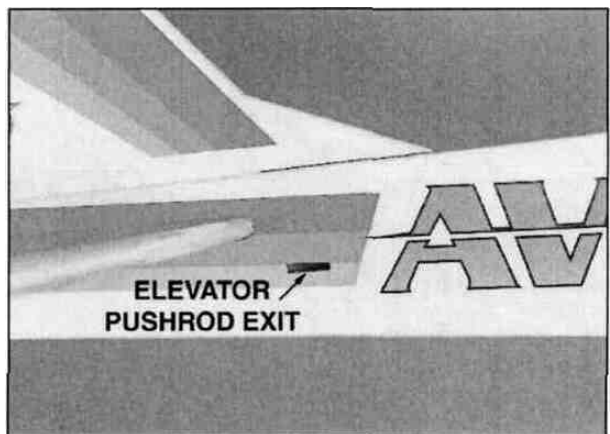
❏ The precut elevator pushrod exit hole is located on the same side of the fuselage as the elevator control horn, beneath the covering. Locate the exit hole by gently running your finger down the side of the fuselage over the covering. Using a hobby knife, remove the covering from the elevator pushrod exit hole. Do not remove the covering from the exit hole on the opposite side of the fuselage.

Installing the landing gear
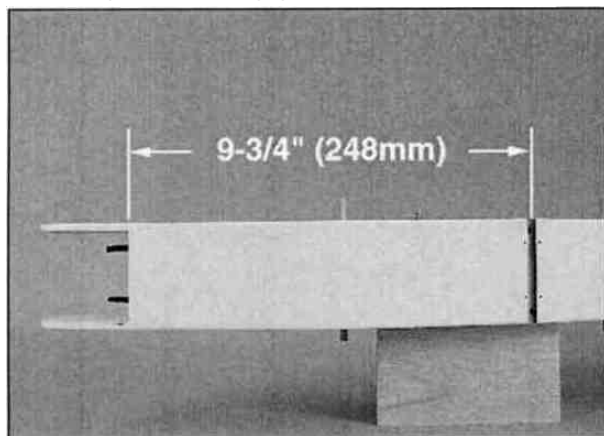
❏ On the bottom of the fuselage, 9-3/4" (248mm) from the engine compartment, there is a channel located under the covering. Locate this channel by running your finger over the covering on the bottom of the fuselage. Using a hobby knife remove the covering from this channel. To protect the channel from fuel damage, place several drops of thin CA along the channel and wipe with a paper towel.

Installing the struts
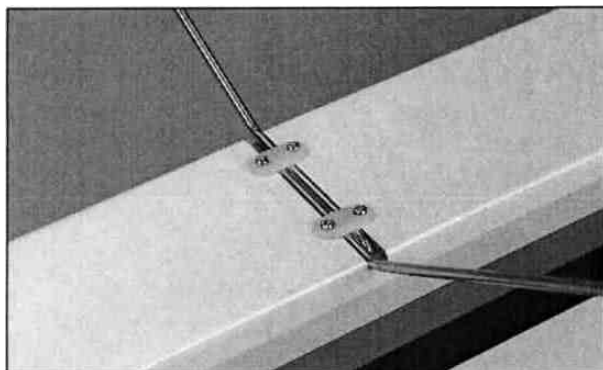
❏ Locate the two chromed landing struts and place them in the pre-drilled holes inside the channel on the bottom side of the fuselage. Place two nylon landing gear straps over the landing gear struts. Using a felt-tip pen, mark the location of the strap mounting holes onto the bottom of the fuselage. Drill the four holes using a 1/16" (1.5mm) drill bit. Mount the nylon landing gear straps using four #2x3/8" self-tapping screws to the bottom of the fuselage over the struts. The struts should be flush with the bottom of the fuselage.

Mounting the wheels
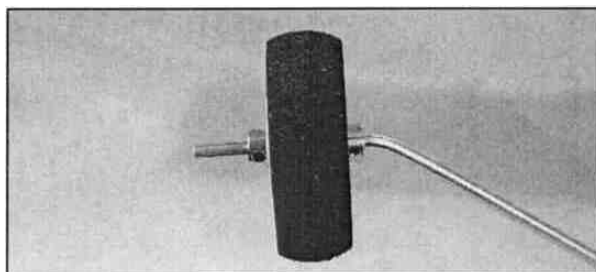
❏ Locate two foam wheels and four wheel collars. Place one wheel collar on each strut and secure its location using a 6-32 set screw. Place the wheel onto the strut, followed by another wheel collar. Secure the additional wheel collar with another 6-32 set screw. In total, you will have two wheel collars, two 6-32 set screws and one wheel on each strut.
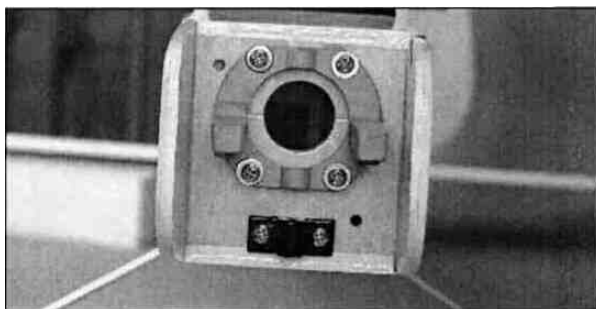
❏ Locate the aluminum engine mount and attach it to the firewall using four 6-32 x 3/4" machine screws and four #6 washers. The flat side of the engine mount will be towards the top of the fuselage as shown in the drawing and photo. Use thread locking compound on the screws to make sure they won't vibrate loose. Attach the nose gear mount to the firewall using two 6-32 x 3/4" machine screws.

Installing the nose gear
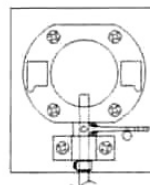
❏ Place a wheel collar onto the nose gear strut. Insert the nose gear stem into the plastic nose gear

holding bracket on the fuselage firewall. Press a 5/32" wheel collar into the nylon steering arm. Make sure the hole in the arm lines up with the hole in the wheel collar. Place the nylon steering arm between the plastic bracket and motor mount. Slide the nose gear stem into the motor mount. Lock the steering arm onto the flat spot of the nose gear by tightening the socket head screw on the front of the arm. Insert a 14-1/8" (359mm) pushrod tube through the hole into the fuselage. The pushrod tube must be flush with the firewall for the steering to work properly. Wick thin CA around the pushrod guide tube.
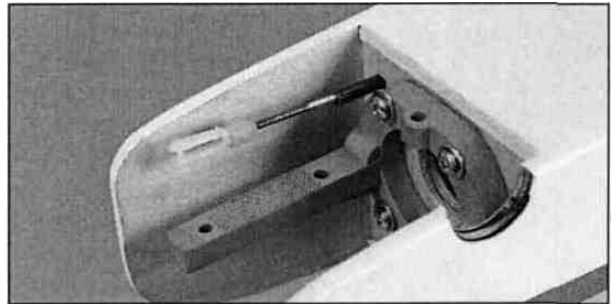
Installing the pushrod

❏ Locate the 17-1/2" (445mm) wire control rod (no threads) and make a 90-degree bend in one end 1/2" from the end. Remove the steering arm from the nose gear assembly. Insert the bend into the inside hole of the steering control horn from the bottom. Slide the pushrod wire into the guide tube and reassemble the nose gear assembly. Trim the remaining arm to allow for maximum steering.

Throttle control guide

❏ Insert the remaining plastic pushrod guide tube into the predrilled hole in the engine compartment firewall. Leaving 1/4" (6mm) of the tube showing, glue the throttle control tube into the firewall using thin CA.

Insert the control rod

❏ Install a 14-1/8" (360mm) pushrod tube into the firewall for the throttle pushrod. Leave 1" (25mm) of the pushrod tube to extend forward of the firewall. Secure the pushrod tube using thin CA. Thread a clevis onto the 17-1/2" (440mm) pushrod using the same technique as the aileron pushrods. Insert the pushrod into the tube as shown in the photo.
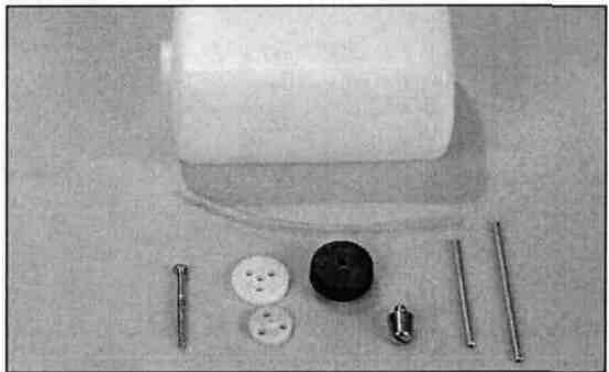
❏ Locate the two aluminum tubes that are used in the fuel tank.

Bending the pressure line
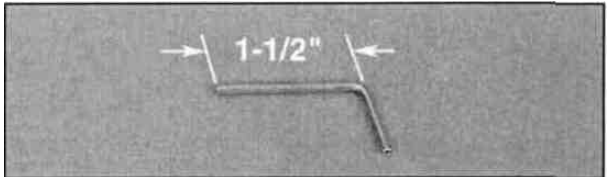
❏ Being careful not to kink the tube, bend one end of the longer tube to a 70 degree angle. It may be helpful to find a rigid object that can be used as a form to bend the tube around. Leave 1-1/2" (38mm) of straight tube at one end so it can easily be inserted through the tank plug.

Assembling the tank plug
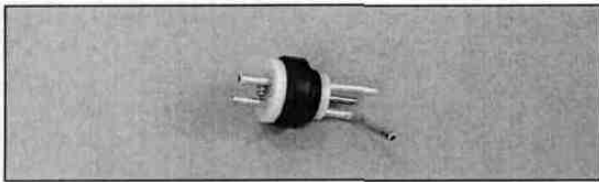
❏ Locate the two stopper plates. *Push* the aluminum tubes through the smaller stopper disc and the back of the rubber plug. Place the larger stopper disc on the opposite side and insert the 3 x 20mm machine screw through the larger disc, the rubber plug and then into the smaller disc. Do not tighten the screw at this time.

Final fuel tank assembly

❏ Locate the metal fuel pick-up weight (often referred to as the "clunk weight") and the medium silicone fuel tubing. Insert the fuel pick-up weight onto the fuel tubing. Compare the length of the fuel tank to the length of the fuel tubing and cut the tubing so that the fuel pick-up weight on the end of the fuel tubing will not touch the end of the fuel tank. The plug assembly can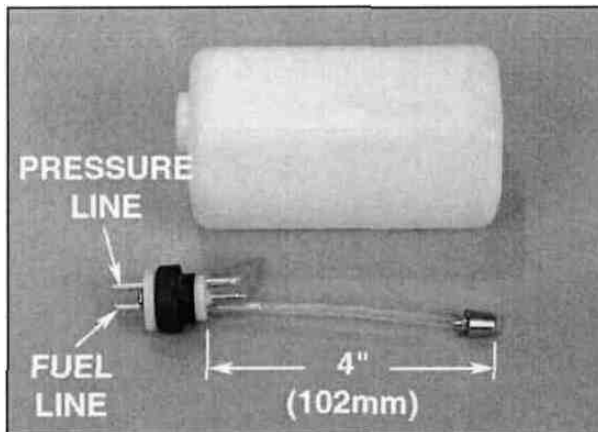 now be inserted into the tank. The pressure tube should be adjusted so the tube is pointed straight up just under the top of the tank.

Caution: The pressure tube should be close but not touching the top of the tank because the flow of fuel may be interrupted and cause the engine to quit. The stopper discs on the rubber plug can be tightened by turning the screw. Do not over tighten the stopper plates or damage to the tank may occur.

Installing the tank
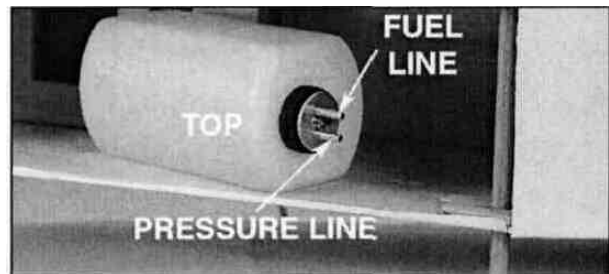
❏ Insert the fuel tank into the fuselage as shown in the photo.

Orientation of the fuel ports
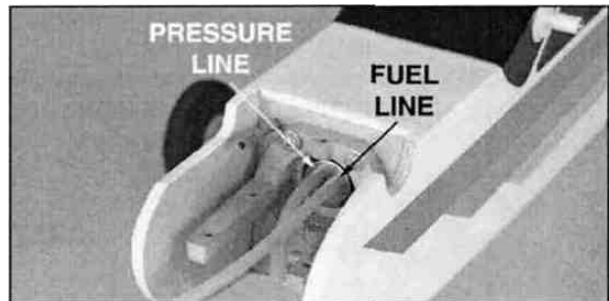
❏ Note the locations of the fuel tubes. Cut two fuel line lengths, pressure line 4-1/2" (114mm) and fuel line 4" (101mm), from medium silicone fuel line (not included). Place the cut fuel lines over the correct tubes.

Engine Installation

Mounting the engine
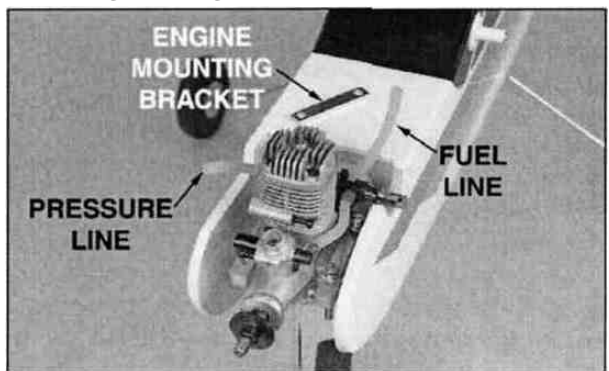
❏ The photo shows an O.S. 40 LA engine mounted. Secure the engine by using two engine mounting

brackets, four 4 x 15mm screws, four 4mm lock washers and four 4mm nuts. The engine centerline must be in line with the fuselage centerline. Place the engine on the mount and secure the engine with the engine brackets. The lock washers should be located on top of the bracket under the head of the screw. The screws are secured by four 4mm nuts. Note: Thread locking compound is recommended for use on the engine mounting screws. Attach the clevis to the throttle arm in the hole closest to the center of the arm.

Attaching the muffler

❏ Locate the muffler and mount it to the engine by using the screws included with the engine. The exhaust outlet should be pointing down and away from the fuselage. Use the instructions included with the engine to make this adjustment.

Running the fuel line
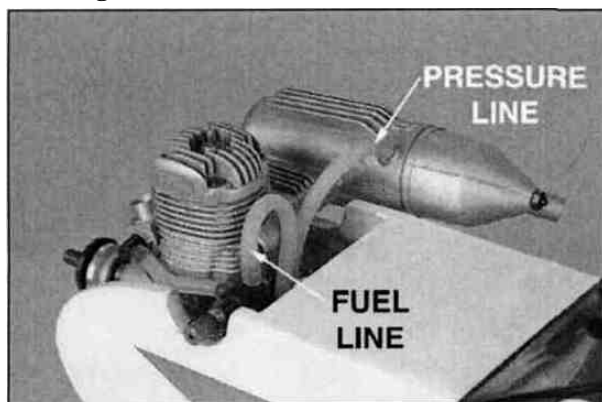
❏ Run the fuel lines to the proper locations on the engine (fuel line to the fuel inlet, pressure line to the muffler).

Mounting the propeller and spinner

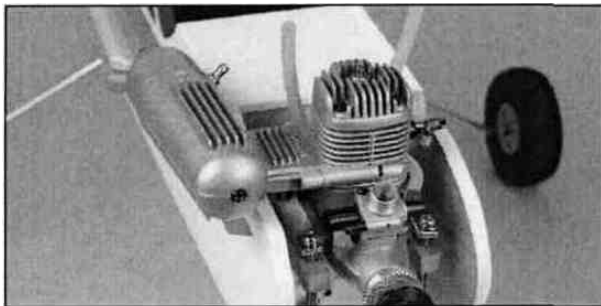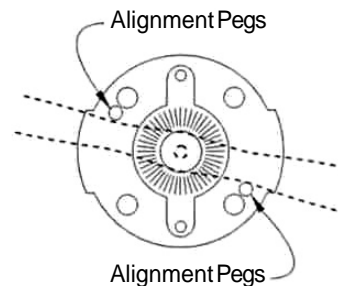❏ Slide the spinner backplate onto the crankshaft of the engine. Align the propeller with the two alignment pegs on the backplate. Secure the propeller and backplate to the engine using the washer and nut included with the engine. Use a wrench to tighten the nut. If the nut is even slightly loose, the propeller could come off and become a hazard.

Final spinner assembly

❏ Place the spinner cone onto the backplate until they snap together. They must be aligned correctly for a proper fit. The spinner cone must not come in contact with the prop or fatigue and fracture of the prop may occur over a period of time. Insert both 2 x 12mm self-tapping screws into the spinner and tighten firmly,

Radio Installation

Installing the receiver and battery
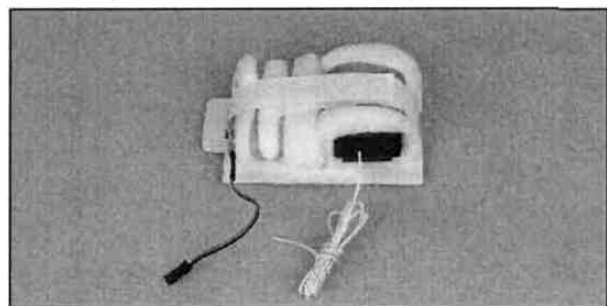
❏ Wrap both the receiver and battery pack in foam rubber (not included). Using the supplied hook and loop material, attach the receiver and battery pack to the radio gear tray using the photo as a guide.

16

Installing the switch

❏ Cut a rectangular switch hole in the side of the fuselage opposite the exhaust using a hobby knife. Locate the receiver switch harness in the radio system and remove the face plate. Place the switch into the hole with the switch facing outward. Put the face plate over the switch and mark the screw holes with a felt-tip marker using the plate as a template. Drill the screw mounting holes using a 1/16" (1.5mm) drill bit. Install the switch from the inside of the fuselage with the "on" position toward the rear of the plane. If the switch should get hit while the plane is moving forward, it would not turn the receiver off. Secure the switch using the two screws supplied with the switch.

Preparing the servos

❏ Remove the servo arms and wheels from the three servos. Install the rubber grommets that came with the radio system onto the servos, following the instructions included with your radio system.

Servo installation
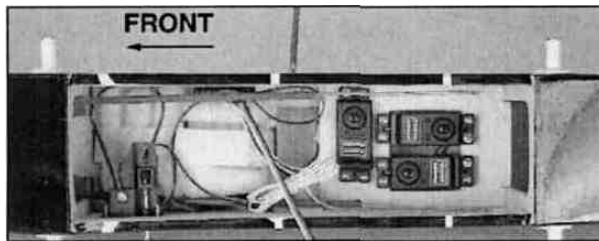
❏ Install the three servos from your radio system as shown in the photo. Refer to the radio manufacturer's manual for more detailed instructions. Notice the location and orientation of each servo as well as the switch location.

Antenna Routing
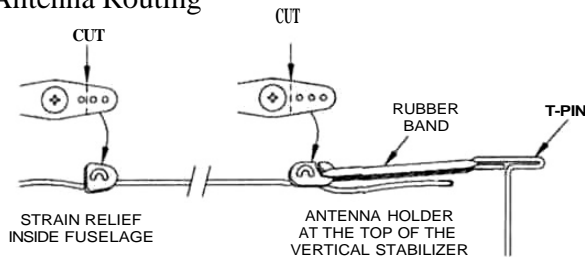
❏ Drill a 1/16" (1.5mm) exit hole in the center of the rear window 1" (25.4mm) down from the edge of the radio compartment. Route the antenna under the plywood servo tray and up through the exit hole. Do not cut the antenna wire. The receiver is tuned to a specific length of antenna. Use a medium T-pin to attach a rubber band to the top portion of the vertical stabilizer. Tie the antenna to the rubber band using tension to keep the antenna tight. Use caution not to damage the antenna. A servo horn can be cut and used to hold the antenna in place at both ends with less likelihood of damage to the antenna wire.
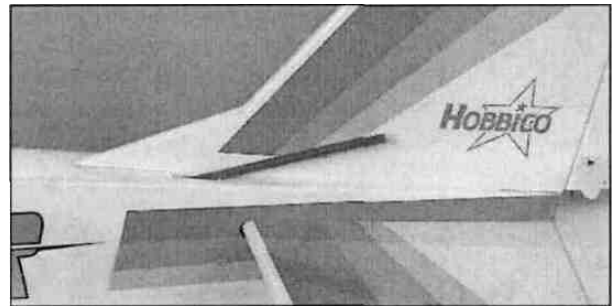
❏ Locate the two 21-3/4" (555mm) outer pushrod tubes. Slide the tubes into the fuselage from the elevator and rudder pushrod exits. Enlarge the exits to allow the tubes to slide in easily. Don't glue the tubes at this time.
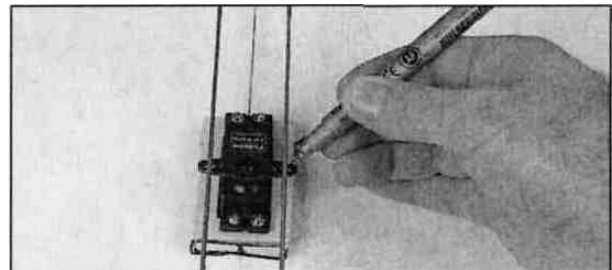
❏ Center the ailerons, then mark the pushrods at the point where they meet the holes in the servo arm. Make a 90 degree bend down in the wires at this mark.

17
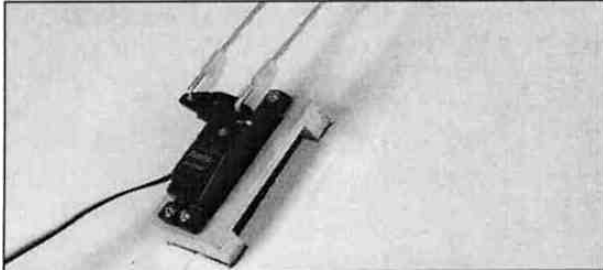
❏ Cut off the excess wire 3/8" (9.5mm) above the bend. Enlarge the servo horn holes with a 5/64" (2mm) drill bit. Insert the bent wire pushrods into the servo horn from the upper side, then secure them with Nylon FasLink Pushrod Keepers.

❏ Thread clevises onto the 26-3/4" (680mm) pushrods using the same technique as the aileron pushrods. Insert the pushrods into the rudder and elevator pushrod tubes as shown in the photo. Attach the clevises for both the elevator and rudder to the control horns as shown. (Both clevises are attached in the same locations.)
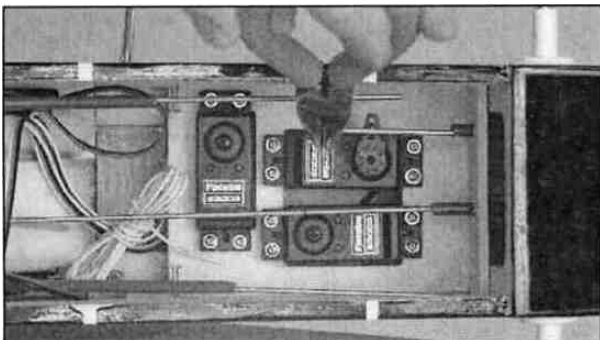
❏ Center the elevator, then mark the pushrod where it crosses the servo horn hole. Enlarge the servo horn hole with a 5/64" (2mm) drill bit. Make

a 90 degree bend in the pushrod at the mark (you may want to disconnect the clevis from the elevator control horn to pull the pushrod wire out of the fuselage to make it easier to bend). Cut off the excess wire 3/8" (9.5mm) above the bend. Insert the bent wire through the enlarged hole in the servo horn. Secure it in place with a nylon FasLink.
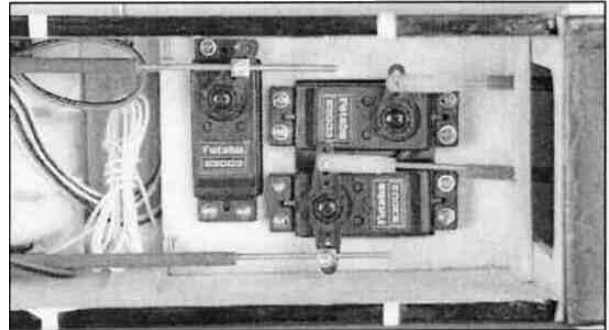
❏ Repeat the above step for the rudder pushrod.

1-1 Adjust the height of the pushrod support so the pushrods can move freely without binding. Glue the brace into position using medium CA. Slide the pushrod tubes so 1/8" (3mm) extends forward of the pushrod support. Glue the pushrod tubes to the brace using thin CA. Be very careful not to get CA into the tubes and accidentally glue the pushrod wires to the tubes. Glue the pushrod tubes to the fuselage using medium CA.

❏ With the radio on, move the throttle trim lever and control stick to the closed position, by pulling them back (or downward) all the way. Manually close the throttle on the carburetor completely. Tighten the set screw on the pushrod connector. Check throttle operation with the radio and make adjustments to the linkage as necessary for smooth operation from fully closed to fully open. Use the appropriate holes in the servo horn and throttle arm to provide the correct amount of throttle movement and to prevent the servo from binding at its end points.

❏ Install the nose wheel using the same technique as the main wheels. Center the nose wheel and tighten the screw on the pushrod connector for the nose wheel steering.

NOTE: This section is VERY important and must NOT be omitted! A model that is not properly balanced will be unstable and possibly unflyable.
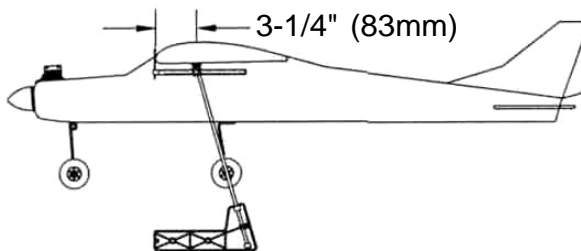
3-1/4" (83mm)

❏ Use a felt tip pen or a narrow strip of tape to accurately mark the balance point on the bottom of the wing near both sides of the fuselage. The balance point (CG) on the Avistar 40 is located 3-1/4" (83mm) back from the leading edge. This is the point at which your model should balance for your first flights. Later, you may experiment by shifting the balance up to 5/16" (8mm) forward or back to change the flying characteristics. Moving the balance forward may improve the smoothness and arrow-like tracking, but it may require more speed for takeoff and make it more difficult to slow down for landing. Moving the balance aft makes the model more agile with a lighter and snappier feel. Please start at the location we recommend and do not at any time balance your model outside the recommended range.

Plug the aileron servo into the receiver. Mount the wing to the fuselage with #64 rubber bands. The engine, muffler, propeller and fuel tank should also be mounted for the C.G. check.

With the fuel tank empty and the wing attached to the fuselage, lift the model with your finger tips at the balance point. If the tail drops when you lift, the model is "tail heavy" and you must move the battery and/or the receiver toward the nose to achieve balance. If the nose drops, it's "nose heavy" and you must move the battery and/or receiver toward the tail to achieve balance. The C.G. is always determined with the fuel tank empty.

Balance the model by shifting the receiver battery and receiver, then test again. When balance is obtained note the position of the of the receiver, and the battery pack. If the balance cannot be achieved by positioning the battery and receiver, you may add stick-on lead weight to the tail or nose if required.

Confirm that the battery and receiver are securely wrapped in foam and secured so they cannot shift during flight or a rough landing.

IMPORTANT: After the model is 100% complete, recheck the balance.

IMPORTANT: Go back and check your installation. Be sure that all servo screws, horns and other components are secure. Confirm that you have installed the retainers on the screw lock connectors.

Apply a strip of 1/16" (1.5mm) thick foam **wing-seating tape (not included)** to the wing saddle. This tape provides a seal against dirt and exhaust oil and cushions the wing from vibration.

4-CHANNEL RADIO SETUP
(STANDARD MODE 2)

ELEVATOR MOVES UP

RIGHT AILERON MOVES UP
LEFT AILERON MOVES DOWN

RUDDER MOVES RIGHT

CARBURETOR WIDE OPEN
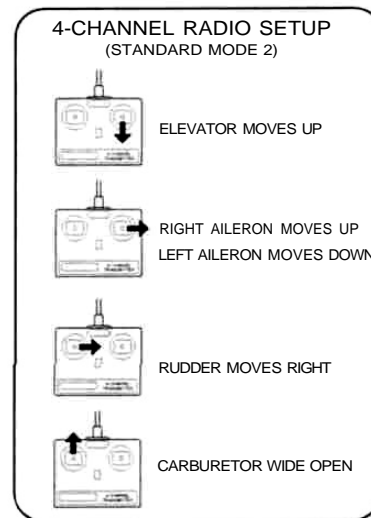
❏ Check the direction of all control functions. They must all move in the direction shown in the sketch. If not, change the position of the reversing switches on your transmitter.

Control Surface Throws

We recommend the following throws:

NOTE: Control throw (movement) is measured at the **trailing edge** of the elevator, rudder and ailerons. Hold a ruler vertically on your workbench or block it up on books to make these measurements.

ELEVATOR: 3/8" up 3/8" down

RUDDER: 3/4" right 3/4" left

AILERONS: 5/16" up 5/16" down

NOTE: The balance and control throws for the Avistar 40 have been thoroughly tested and represent the settings at which the Avistar 40 flies best. Please set up your Avistar 40 to the specifications listed. If, after a few flights, you would like to adjust the throws to suit your taste, that's fine. Remember, *"more is not better."*

Note: If your radio system does not feature Adjustable Travel Volume (ATV's), you will have to mechanically adjust control surface throw.

❏ **Control throw adjustment:** If you move the clevis at the control horn on the control surface **toward the outermost hole,** you will **decrease** the amount of throw. If you move the clevis to a hole **nearer the control surface** you will **increase** the amount of throw. If these adjustments do not provide the desired throws, you may need to work with a combination of adjustments by repositioning the pushrod at the servo. If you move the pushrod toward the splined shaft on the servo arm, it will decrease the control surface throw - outward will increase it.

Ground Stance

| NOSE TOO LOW | NOSE TOO HIGH | LEVEL |

❏ "Eyeball" the side of the fuselage from 6 - 10 feet away. If necessary adjust the height of the nose by raising or lowering the nose gear wire so that your model will sit pretty much level, as shown in the sketches.

Once the correct ground stance is established, tighten the screws on both the steering arm and wheel collar on the flat spot of the nose gear wire to lock the nose gear strut in position. Use thread lock on both screws.

It is a good practice to periodically check the ground stance of your Avistar 40 - especially after a hard landing. The wire landing gear is designed to absorb shock from rough landings but occasionally may need to be bent back into position.

Charge the Batteries

Follow the battery charging procedures in your radio instruction manual. 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.

Balance the Propeller

Balance your propellers carefully before flying. An unbalanced prop is the single most significant cause of vibration. Not only will engine mounting screws and bolts vibrate out, possibly with disastrous effect, but vibration will also damage your radio receiver and battery. Vibration will cause your fuel to foam, which will, in turn, cause your engine to run lean or quit.
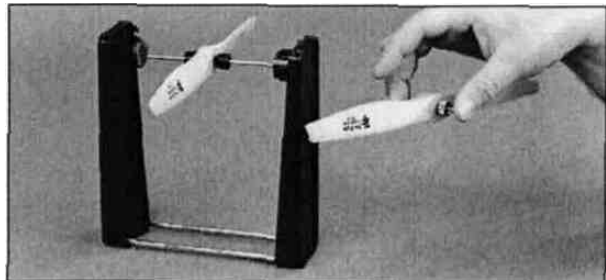
We use a Top Flite' Precision Magnetic Prop Balancer'" (#TOPQ5700) in the workshop and keep a Great Planes Fingertip Balancer" (#GPMQ5000) in our flight box.

Find a Safe Place to Fly

The best place to fly your R/C model is an AMA (Academy of Model Aeronautics) chartered club field. Ask your hobby shop dealer if there is such a club in your area and join. Club fields are set up for R/C flying and that makes your outing safer and more enjoyable. The AMA also can tell you the name of a club in your area. We recommend that you join 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 is listed on page 3 of this instruction book).

If a club and its flying site are not available, you need to find a large, grassy area at least 6 miles away from any other R/C radio operation like R/C boats and R/C cars and away from houses, buildings and streets. A schoolyard may look inviting but it is too close to people, power lines and possible radio interference.

Ground Check the Model

If you are not thoroughly familiar with the operation of R/C models, ask an experienced modeler to check that you have installed the radio correctly and all the control surfaces do what they are supposed to. The engine operation also must be checked and the engine "broken-in" on the ground by running the engine for at least two tanks of fuel. **Follow the engine manufacturer's recommendations for break-in.** Check to make sure all screws remain tight, that the hinges are secure and that the prop is on tight.

Range Check Your Radio

Whenever you go to the flying field, you need to check the operational range of the radio before the first flight of the day. First, make sure no one else is on your frequency (channel). With your 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 a friend 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 a helper holding the model. If the control surfaces are not always acting correctly, do not fly! Find and correct the problem first. Look for loose servo connections or corrosion, loose bolts that may cause vibration, a defective on/off switch, low battery voltage or a defective cell, a damaged receiver antenna, or a receiver crystal that may have been damaged from a previous crash.

Engine Safety Precautions

NOTE: 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 the engine exhaust gives off a great deal of deadly carbon monoxide. **Do not run the engine in a closed room or garage.**

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

Use safety glasses when starting or running engines and make all engine adjustments from **behind** the rotating propeller.

Do not run the engine 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 engine.

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

Use a "chicken stick" device or electric starter; follow instructions supplied with the starter or stick. Make certain the glow plug clip or connector is secure so that it will not pop off or otherwise get into the running propeller.

The engine gets hot! Do not touch it during or after operation. Make sure fuel lines are in good condition so fuel will not leak onto a hot engine causing a fire.

To stop the engine, cut off the fuel supply by closing off the fuel line or follow the engine manufacturer's recommendations. Do not use hands, fingers or any body part to try to stop the engine. Do not throw anything into the prop of a running engine.

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 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 to, and avoid flying in the proximity of full scale aircraft. Where necessary an observer shall be used 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.

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

5. 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. I will perform my initial turn after takeoff away from the pit or spectator areas and I will not thereafter fly over pit or spectator areas, unless beyond my control.

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

FLYING
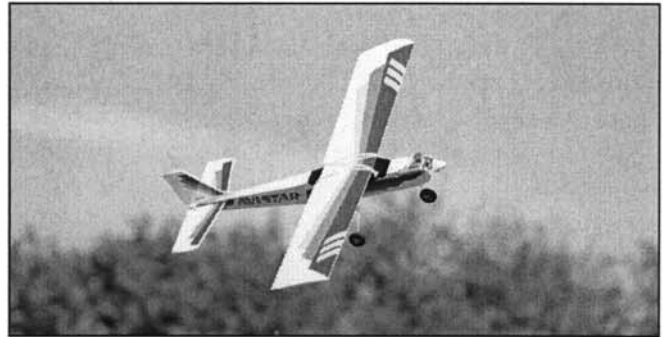
The moment of truth has finally arrived. You've put a lot of effort into building your Avistar 40 and it looks great! Protect your investment by following a few simple tips:

If possible, have an experienced modeler look over your work before you head out to your flying field. It's easier to fix problems in the workshop than on the flight line.

Become familiar with starting your engine and break it in before going for your first flight. **Be sure the engine will stop when the trim lever is pulled all the way back.**

Assemble a simple flight kit (a shoe box is fine to start with) which should include a starting battery and glo-plug clip (or ni-starter), "chicken stick" for flipping the prop, fuel and a means of filling the tank, a couple of small screwdrivers, #64 rubber bands (or wing bolts), spare prop and glo-plug, 6" adjustable wrench and a pair of needle nose pliers. In addition to tools, you should also take along some paper towels and spray window cleaner to remove residue after each flight.

When you load up to go to the flying field be sure that the batteries have charged for at least 14 hours, and that you have your fuselage, wing, transmitter and flight box. And, most important, that you have your AMA license. Range check the radio!

Pro-Tip
USING RUBBER BANDS
Since you are using rubber bands to attach your wing, the rule of thumb is to use two #64 rubber bands per pound of model weight. If your model tipped the scales at 7 pounds, you need 14 rubber bands. It doesn't matter too much how many you run straight across the wing or how many are cris-crossed, so long as the last two are cris-crossed. This trick stops the other bands from popping off. Do not use oily rubber bands for more than a few flying sessions. Check each rubber band before using it. Watch out for cracks. Rubber bands can be conditioned by storing the oily ones in a zip-top storage bag partially filled with talcum powder or corn starch. Both products will absorb the oil.

Taxiing
Start the engine and set the throttle trim for a slow, steady idle. Have your instructor or a helper hold the plane while you work the controls. Upon release advance the throttle slightly to start rolling, then back-off the power to prevent going too fast and possibly taking off. Stand behind the plane as it taxies away from you and note the direction it turns as you move the rudder control. One thing to keep in mind with R/C models (whether it be cars, boats, or planes) is that the steering controls may seem to "reverse" when the model is moving toward you. For example, if you are flying toward yourself and you give a **right** control input (ailerons or rudder), the model will move off to **your left**. The fact of the matter is that the controls are not reversed and the aircraft did actually enter a right turn. The plane does move off to your left from your vantage point, but if you imagined yourself in the cockpit you would realize the plane turned to the right as commanded. All it takes is a little practice to maintain proper orientation of your aircraft, but that's why we recommend finding an instructor.

When you feel comfortable, advance the throttle a little while standing behind the plane to get the feel of a takeoff roll, but pull back on the power before the Avistar 40 lifts off. Try this several times, adding a little more power each time. If the plane starts to veer off, immediately cut the power to prevent a mishap.

Although many R/C pilots have taught themselves to fly, we strongly recommend that you find an instructor to help get you started. Although the Avistar 40 series of trainers offer the greatest opportunity of success for the self-taught, there is a high probability that you will crash your airplane on the first flight. Protect your investment of time and money–obtain the assistance of an experienced R/C pilot.

Takeoff
Your first flights should be made in little or no wind. Taxi into position, pointing directly into the wind. Although this model has good low speed characteristics, you should always build up as much speed as your runway will permit before lifting off, as this will give you a safety margin in case of a "flame-out." Advance the throttle smoothly to the wide open setting. When the plane has sufficient flying speed (you won't know until you try), lift off by smoothly applying a little up elevator (don't "force" it off to a steep climb!) and climb out gradually, trying to keep it straight and the wings level. The Avistar 40 will climb at a 20 or 30 degree angle under full throttle. Climb to about 100 feet before starting a VERY gentle turn by moving the aileron stick. Apply a little more back pressure on the elevator stick as the Avistar 40 turns. Stop the turn by moving the aileron stick in the opposite direction until the wings are level, then return the stick to the neutral position. Pull the power back to 1/3 throttle.

Flying
We recommend that you take it easy with your Avistar 40 for the first several flights and gradually "get acquainted" with this great plane as your engine becomes fully broken-in. The Avistar 40 is designed to fly level with neutral elevator trim at approximately 1/4 to 1/3 throttle – this is the best speed for learning to fly. On later flights, if you want the Avistar 40 to maintain level flight at full throttle, you will need to give it a little down trim.

Your first flights should consist of mostly straight and level flight with gentle turns to keep the model over the field. These flights will give you practice at coordinating your control inputs and maintaining the proper orientation of the airplane. As mentioned earlier, turns are accomplished by banking the aircraft with the ailerons, then gently adding some back stick (up elevator). Enough back stick should be held in to keep the aircraft at a constant altitude. To stop turning, apply opposite aileron (or rudder) to level the wings, then release the sticks. There is a memory aid that may help keep you out of trouble when the plane is flying toward you - "put the stick under the low wing." In other words, move the stick in the direction of the low wing to raise that wing. When you are comfortable flying the aircraft, you can practice using the rudder along with the ailerons to "coordinate" the turns - usually, a small amount of rudder applied in the direction of the turn will keep the tail following in the exact same track as the nose.

The most common mistake when learning to fly is "over control." Think of *pressure* instead of large movements of the control sticks. Remember all Avistar 40's will recover from almost any over control situation within 50 - 100 feet if you simply let go of the sticks.

Add and practice one maneuver at a time, learning how your Avistar 40 behaves in each maneuver. After you have several flights on your Avistar 40, it's time to reward yourself with your first acrobatic maneuver - a loop. Climb to a safe altitude and turn into the wind. Apply full throttle, level the wings, then slowly pull back on the elevator stick to about 1/2 to 3/4 up elevator (depending on your throws) and hold this control input. After you *go over the top* and start down the back side of the loop, pull the throttle back to about half. This will keep the stresses on the airplane low and the airspeed relatively constant. Keep holding "up" elevator until the plane is level, then slowly release the sticks. You're done! It's really that easy!

CAUTION (THIS APPLIES TO ALL R/C AIRPLANES): If, while flying, you notice any unusual sounds, such as a low-pitched "buzz", this may indicate control surface "flutter". Because flutter can quickly destroy components of your airplane, any time you detect flutter you must immediately cut the throttle and land the airplane! Check all servo grommets for deterioration (this will indicate which surface fluttered) and make sure all pushrod linkages are slop-free. If it fluttered once, it will probably flutter again under similar circumstances unless you can eliminate the slop or flexing in the linkages. Here are some things which can result in flutter: Excessive hinge gap; Not mounting control horns solidly; Sloppy fit of clevis pin in horn; Elasticity present in flexible plastic pushrods; Side-play of pushrod in guide tube caused by tight bends; Sloppy fit of Z-bend in servo arm; Insufficient glue used when gluing in the elevator joiner wire or aileron torque rod; Excessive flexing of aileron, caused by using too soft balsa aileron; Excessive "play" or "backlash" in servo gears; and Insecure servo mounting.

Landing
❏ When it's time to land, fly a normal landing pattern and approach as follows: Reduce the power to about 1/4 and fly a downwind leg far enough out from the runway to allow you to make a gentle 180 degree turn. As you make the turn into the wind for your final approach, pull the throttle back to idle. The Avistar 40 has a lot of lift so you will need a slow, reliable idle in order to achieve a nice, slow landing. Allow the plane to keep descending on a gradual *glide slope* until you are about 3 feet off the runway. Gradually apply a little up elevator to *flare* for landing. You should apply just enough up elevator to hold the plane just off the runway while the excess speed bleeds off. The Avistar 40 should settle onto the runway for a slow, slightly nose-high landing.

Good luck and have fun flying your Avistar 40, but always stay in control and fly in a safe manner.