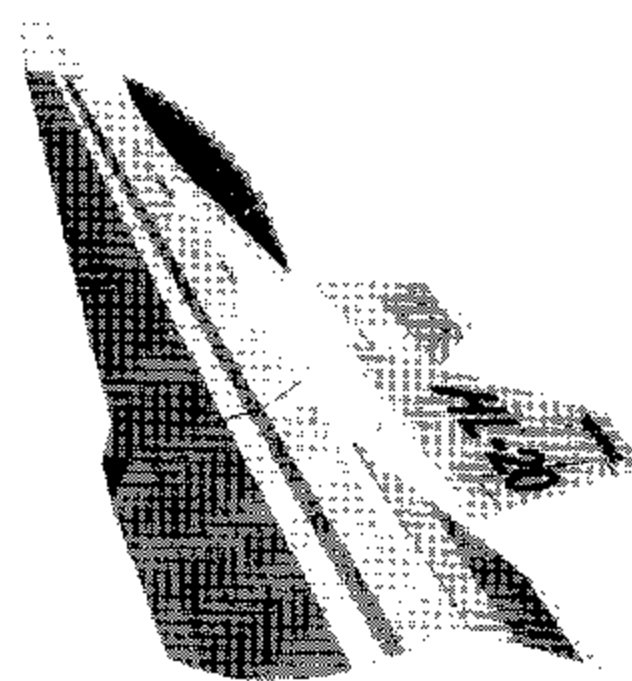


Started 11-20-93 Finished 11-23-96

HL-20 LIFTING BODY™ ASSEMBLY INSTRUCTIONS



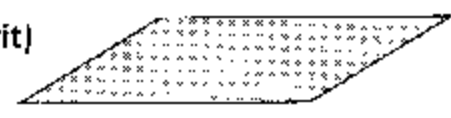
Prod. No. 2008
Skill Level Two



Things You'll Need To Assemble this Kit:
Hobby Knife, Pencil



Sandpaper (220 or 320 Grit)



White Glue

Aliphatic Resin glues work best such as TITEBOND or ELMER'S CARPENTER'S WOOD GLUE - ELMER'S WHITE SCHOOL GLUE also works but dries slower.

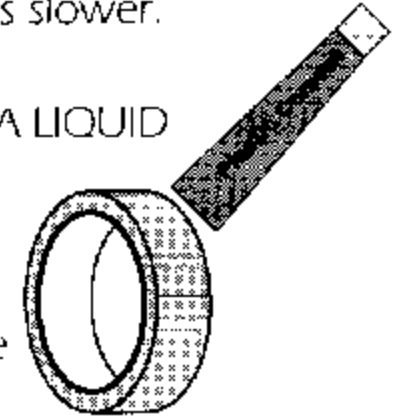


Plastic Cement

Use TESTORS TUBE Plastic Cement, PACTRA LIQUID CEMENT or other comparable brands. DO NOT use cyanoacrylate glue.

Tape

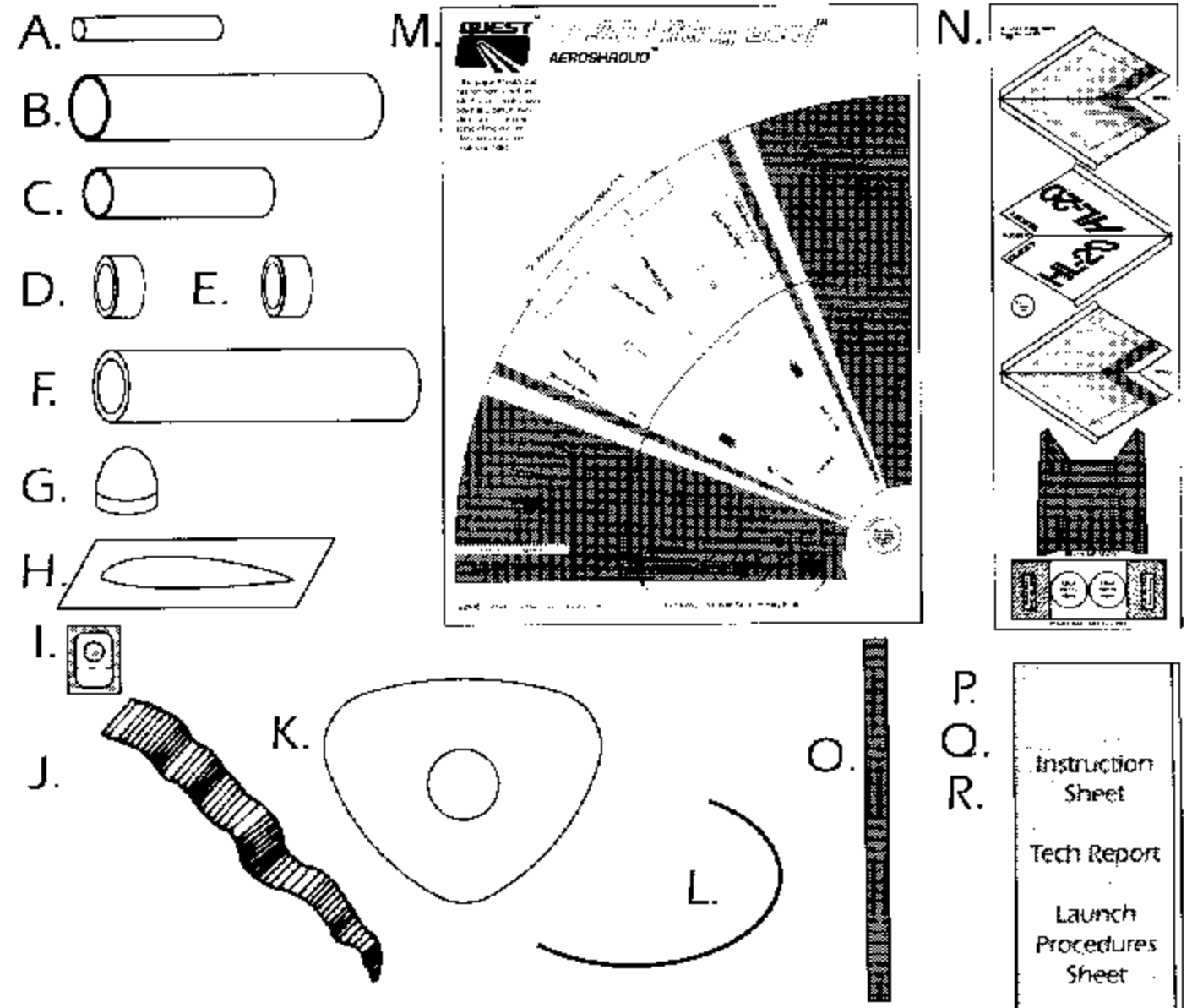
Scotch Magic Tape or Paper Masking Tape



BEFORE STARTING ASSEMBLY READ THROUGH THESE INSTRUCTIONS. IT IS BEST TO TEST FIT ALL PARTS BEFORE APPLYING ANY GLUE. READ AND FOLLOW THE NAR MODEL ROCKET SAFETY CODE.

PARTS LIST

- A. 10001 2 Inch Launch Lug
- B. 10305 Yellow Motor Mount Tube
- C. 11001 White Recovery System Tube
- D. 14000 Blue Thrust Ring
- E. 14001 Green Centering Ring
- F. 10912 Empty Motor Casing
- G. 20050 Plastic Nose Cone
- H. 21600 Vac Form Canopy
- I. 28000 GRIPPER Tab
- J. 28152 12 Inch Plastic Streamer
- K. 33017 Die-Cut Former Plate
- L. 50050 12 Inch Yellow Kevlar
- M. 92306 Paper Aeroshroud
- N. 92307 Paper Parts Set
- O. 94017 7 Inch Double Faced Tape
- P. 96016 Instruction Sheet
- Q. 96116 Tech Report
- R. 90960 Launch Procedure Sheet



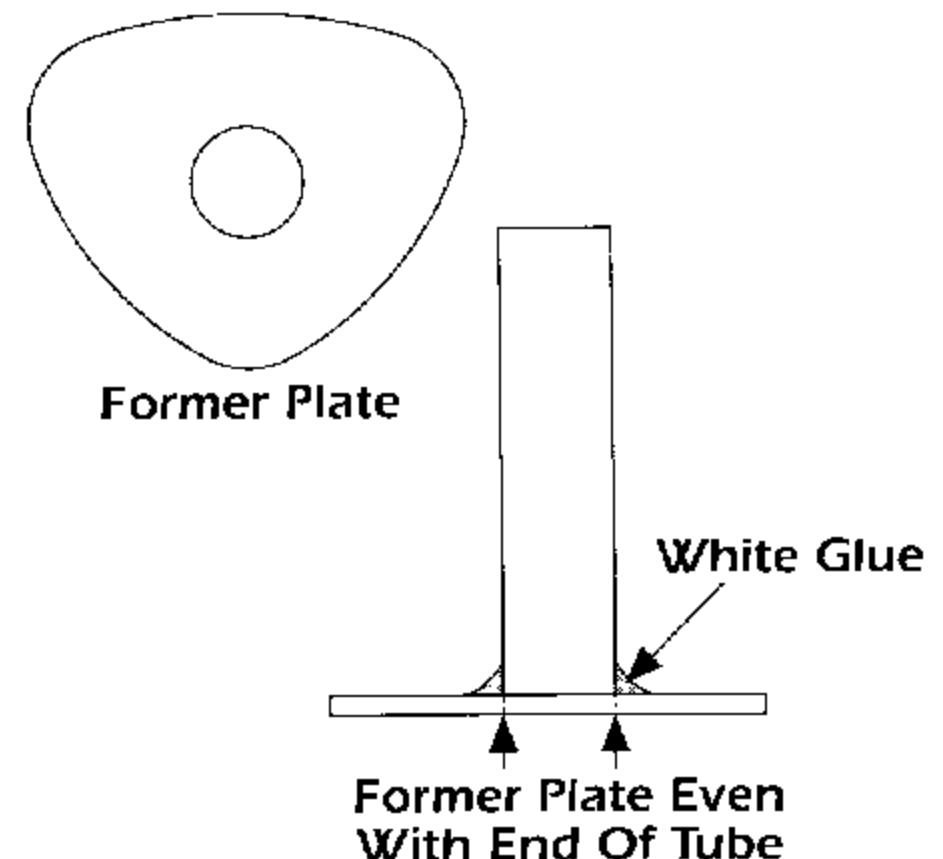
* Kevlar is a registered trademark of Dupont

PARTS NOT TO SCALE

STEP 1

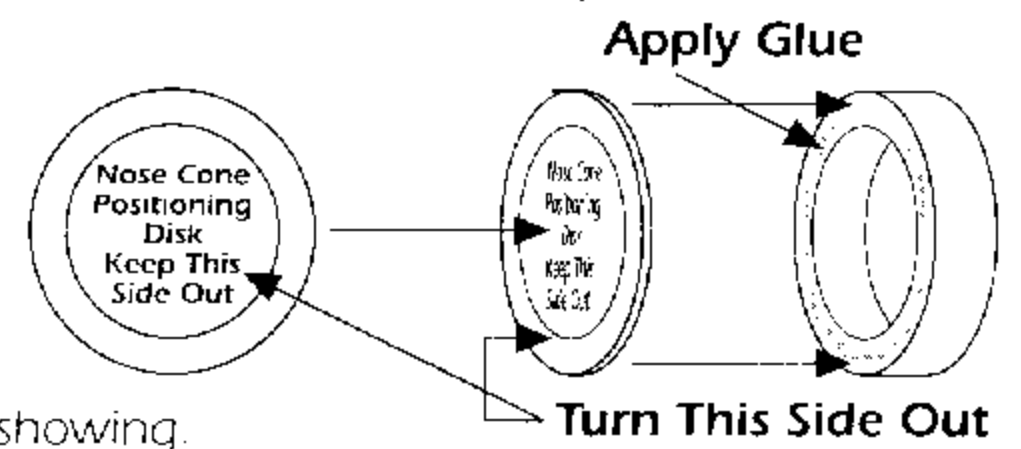
- A.** Slip the die-cut Former Plate onto the Yellow Motor Mount Tube.
- B.** Stand the Former Plate/Yellow Tube upright on a table top and push the Former Plate down so that it is even with the end of the Yellow Tube.
- C.** Apply a bead of white glue all the way around the Former Plate/Yellow Tube joint. Smooth out the glue with your finger. Wipe any excess glue off your finger onto a paper towel or tissue.

NOTE: Stand the assembly upright on a table to dry.



STEP 2

- Use a sharp hobby knife to cut out the nose cone positioning disk from the Aeroshroud sheet.
- Apply a bead of white glue around one end of the Green Centering Ring. Place the nose cone positioning disk into the bead of glue making sure the Green Ring is centered on the disk and the nose cone positioning target is showing.

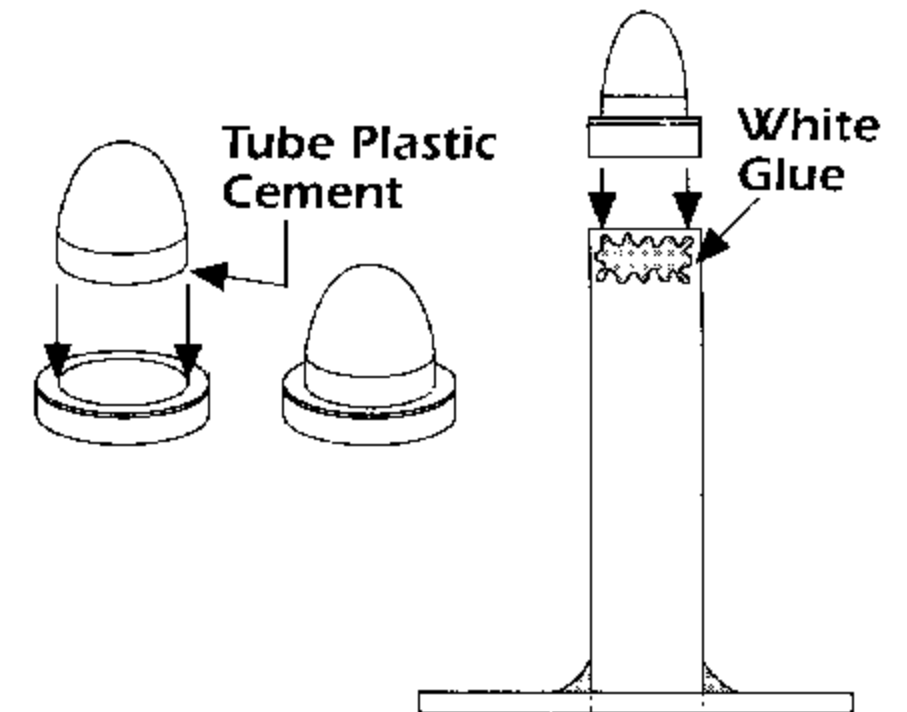


STEP 3

- Apply a bead of tube type plastic cement around the base of the plastic nose cone. Position the Plastic Nose Cone onto the target area on the Nose Cone Positioning Disk.

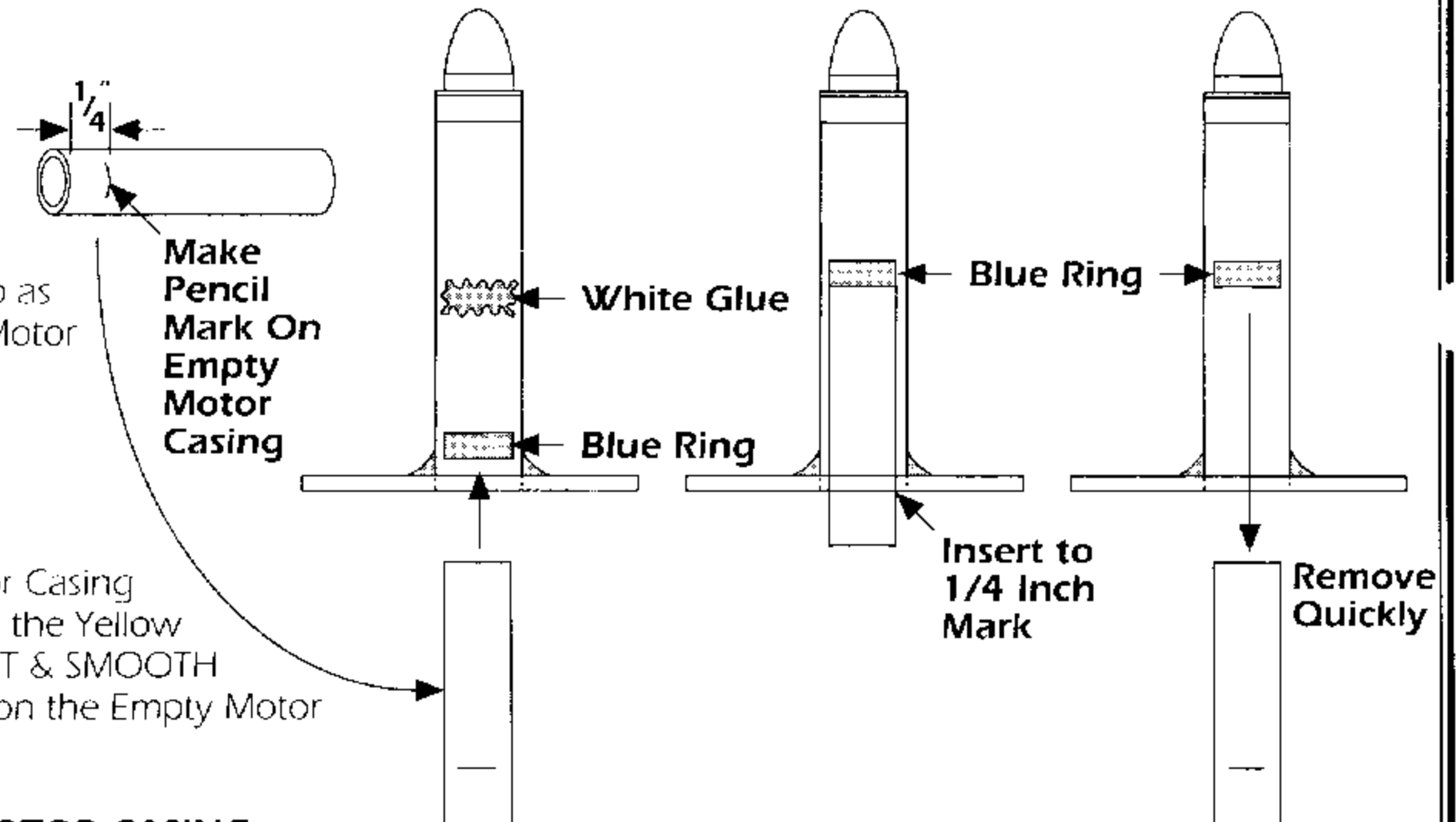
Check to be sure Plastic Nose Cone is Centered on Disk.

- Apply a bead of white glue around inside edge of the Yellow Motor Mount Tube as shown.
- Insert the Green Ring/Nose Cone assembly into the Yellow Motor Mount tube so it is even with the end of the Yellow Tube.



STEP 4

- Make a pencil mark 1/4 inch (.635cm) from one end of the Empty Motor Casing.
- Place a bead of white glue as deep as possible around inside of Yellow Motor Mount Tube as shown.
- Insert the Blue Thrust Ring into Yellow Tube.
- Immediately insert the Empty Motor Casing and push the Blue Thrust Ring into the Yellow Motor Mount Tube WITH ONE FAST & SMOOTH MOTION up to the 1/4 inch mark on the Empty Motor Casing you made in part A. shown.



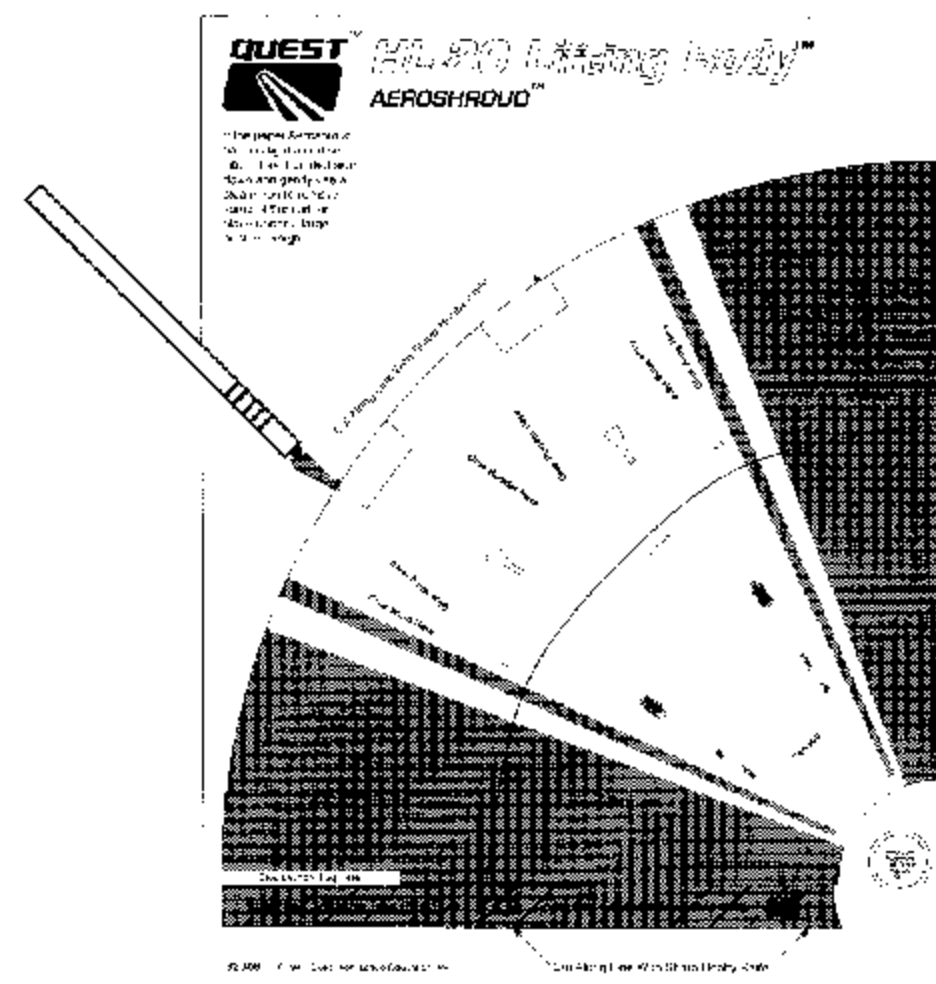
IMMEDIATELY REMOVE EMPTY MOTOR CASING

STEP 5

- Unroll the paper Aeroshroud and lay it printed side up on a flat surface
- Using a sharp hobby knife, cut right on the printed outline of the Aeroshroud to remove it from the sheet.

Note: Scissors are not recommended for this step. Use a sharp hobby knife for best accuracy.

If the paper Aeroshroud has too tight a curl set into it, lay it printed side down and gently use a steam iron to remove some of the curl.



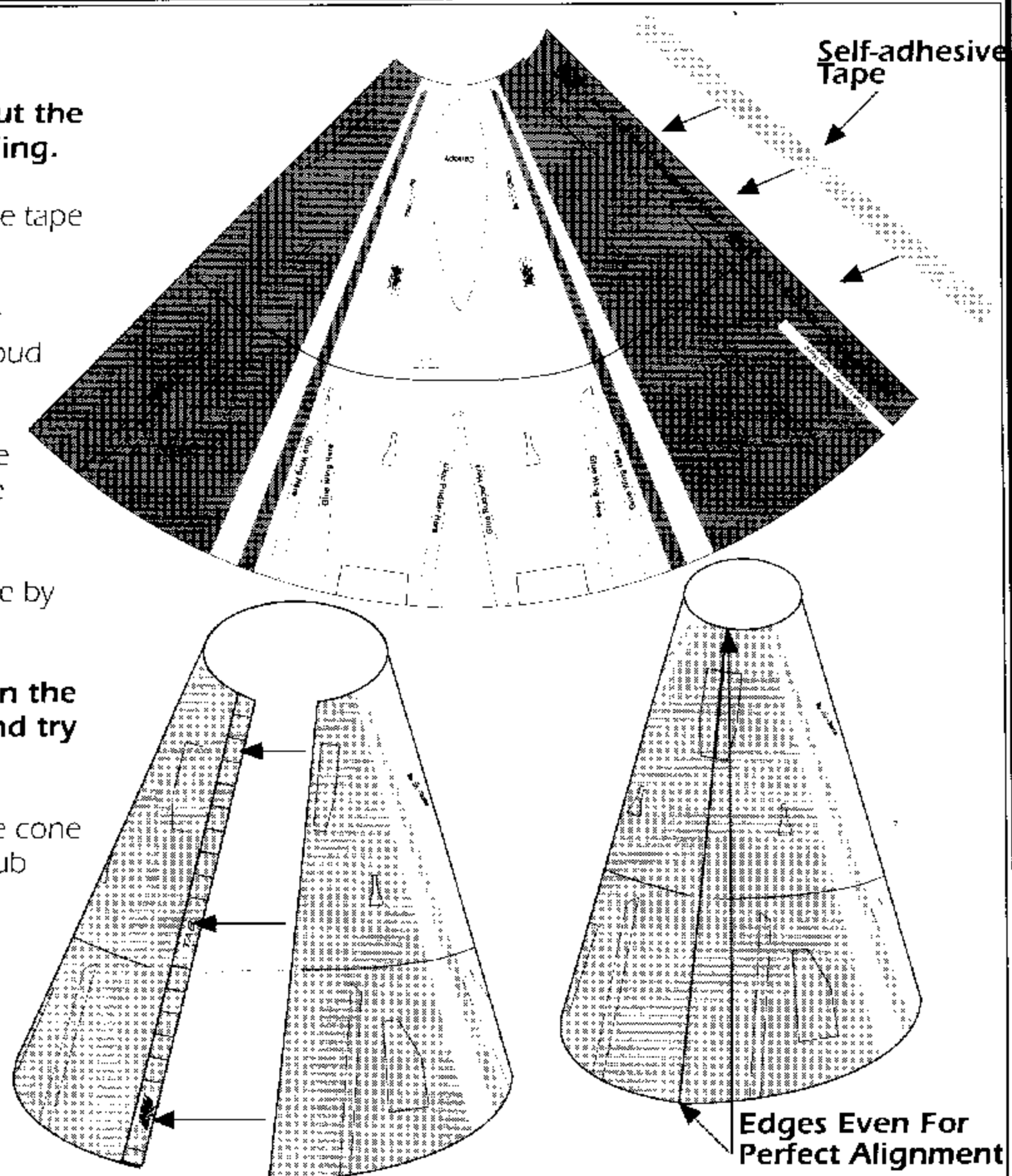
STEP 6

Note: Practice forming the Aeroshroud without the self-adhesive strip a few times before proceeding.

- Remove the white backing from the self-adhesive tape strip.
- Place the tape strip along the edge of the paper Aeroshroud. Burnish the tape onto the Aeroshroud with your finger.
- Remove the brown paper backing from the tape strip leaving behind the adhesive strip along the edge of the Aeroshroud.
- Carefully form the Aeroshroud into a cone shape by aligning the two edges of the shroud together.

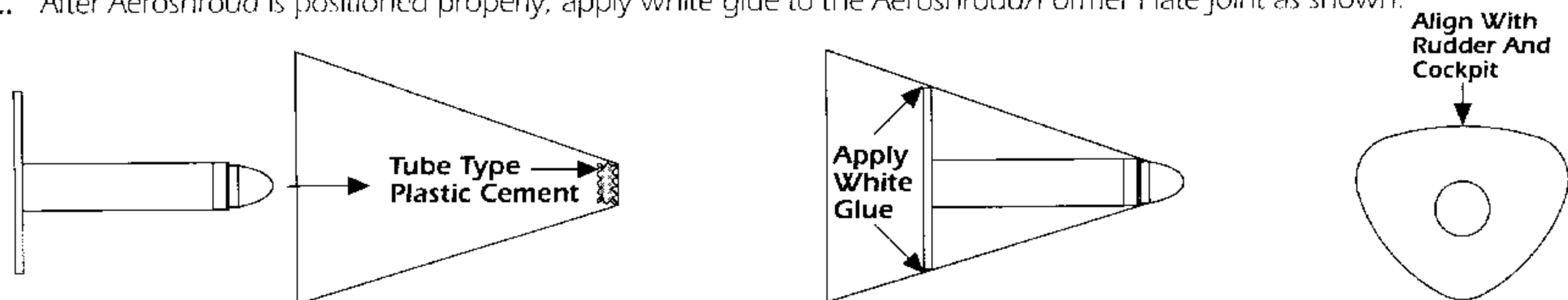
Note: If you do not get a perfect alignment on the first try, gently peel the two surfaces apart and try again.

After you have aligned the shroud correctly, lay the cone on a flat surface with the seam facing down and rub your finger back and forth along the seam.



STEP 7

- Important: Test fit the Aeroshroud before applying any glue.** Apply a small bead of tube type plastic cement around the inside front edge of the Aeroshroud.
- Slide the Aeroshroud onto the Yellow Motor Mount Tube assembly. Carefully position the shroud on the Former Plate so the Rudder and Cockpit will be aligned as shown.
- After Aeroshroud is positioned properly, apply white glue to the Aeroshroud/Former Plate joint as shown.



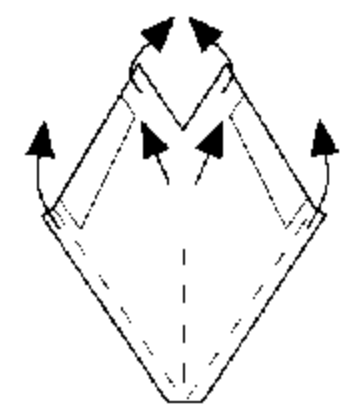
STEP 8

- Use a sharp hobby knife to cut out the Rudder and Wings.

HOW TO GET "CRISP & SHARP" FOLDS: Very gently "scribe" along the fold line by carefully running a sharp hobby knife along the line. **DO NOT APPLY PRESSURE TO THE KNIFE.** The object is to just break the surface of the paper - not to cut through it.

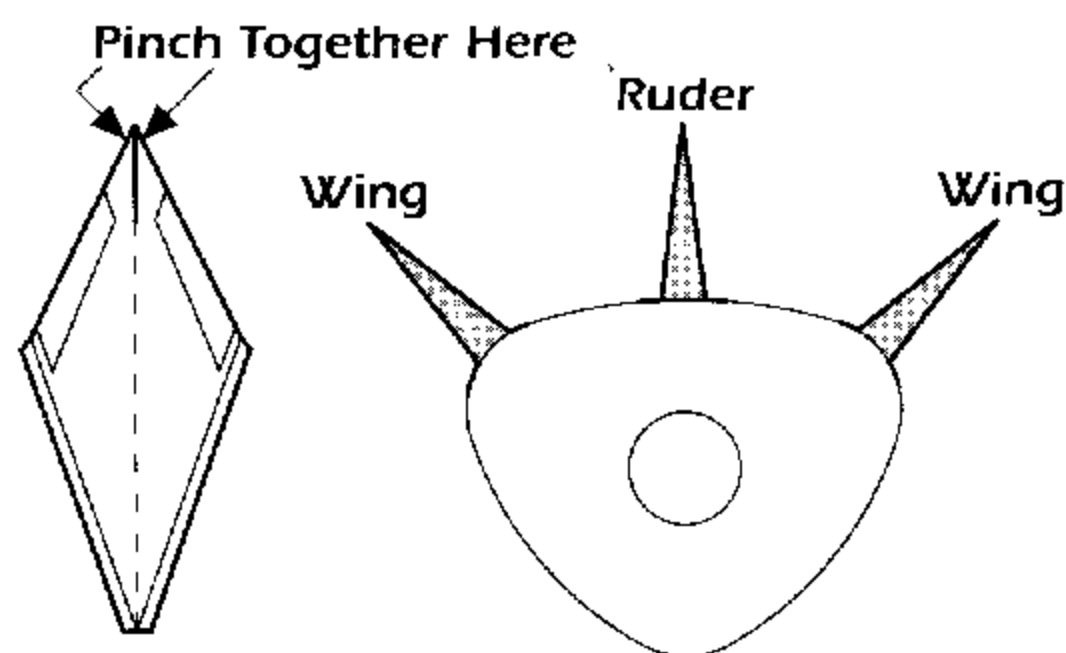
Based on the direction of the fold needed, you may need to make your knife scribe on the back (unprinted) side of the paper.

- Fold each Wing and Rudder as shown.



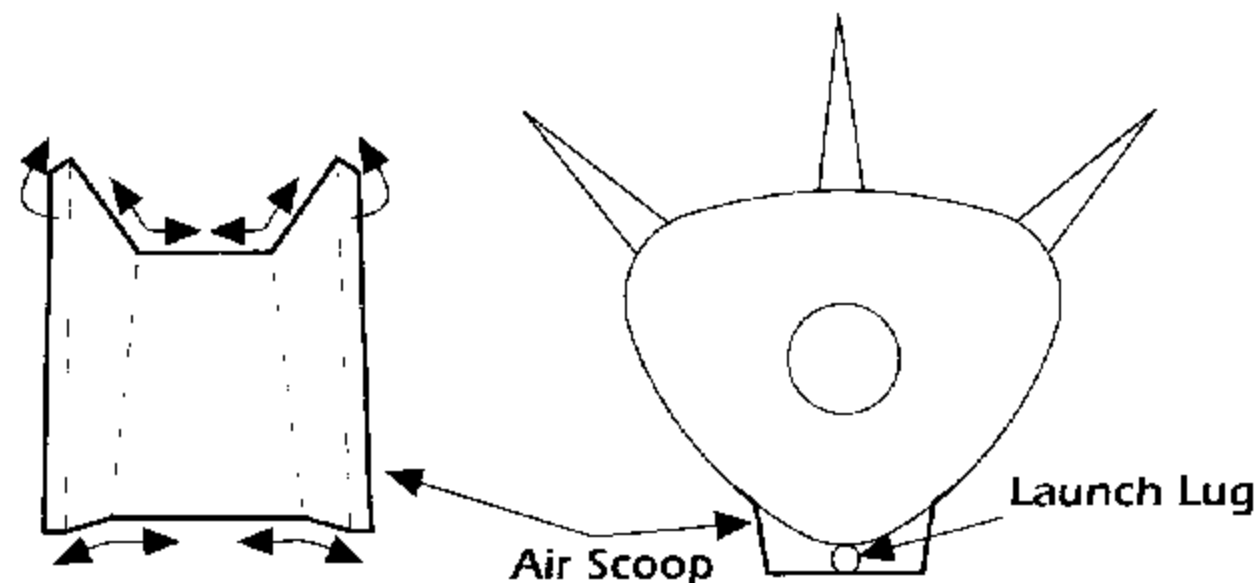
STEP 9

- Apply a small amount of white glue to the inside tip of each Wing and Rudder. Pinch the tip together and hold until the glue holds.
- Apply white glue to the glue tabs on one Wing. Position the Wing along the target area marked on the Aeroshroud.
- Check alignment and hold in place until the glue holds.
- Repeat procedure for remaining Wing and Rudder



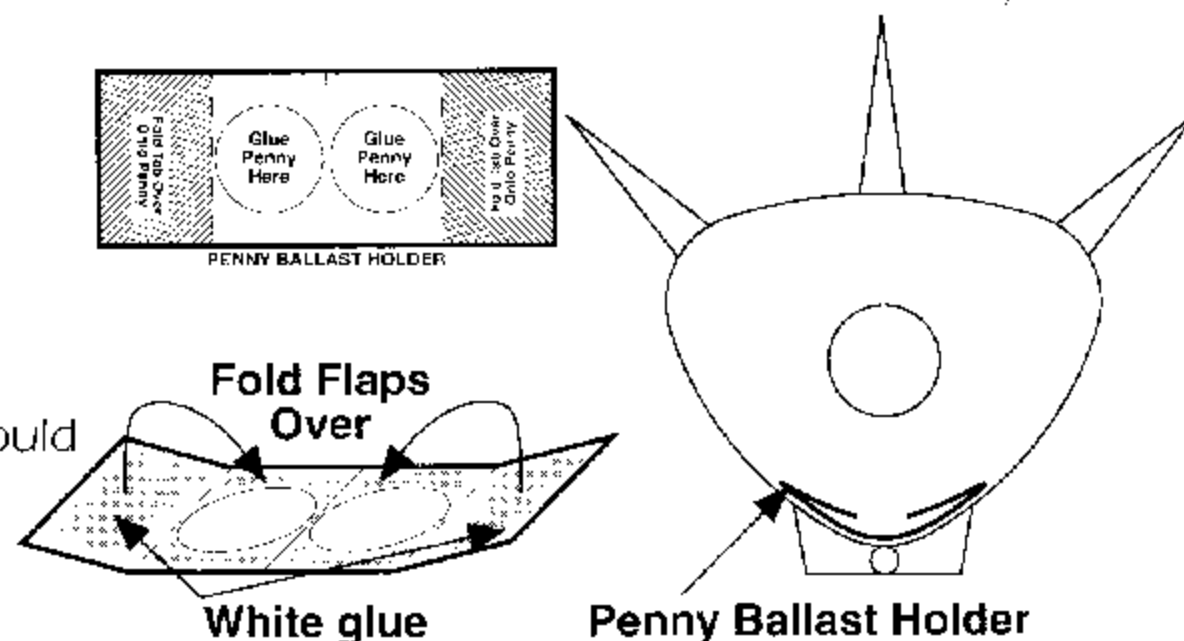
STEP 10

- Apply white glue to the launch lug and place it along the target area on the bottom of the Aeroshroud.
- Use a sharp hobby knife to cut out the belly air scoop. Fold as shown.
- Apply white glue to the glue tabs and position on belly of Aeroshroud as shown.



STEP 11

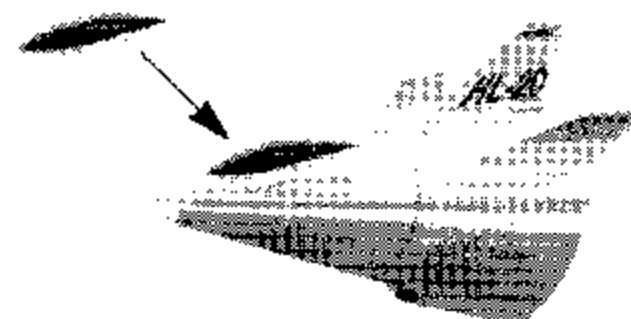
- Use a sharp hobby knife to cut out the Penny Ballast Holder.
- Fold as shown.
- Apply a generous amount of white glue to the penny targets. Position one penny (not supplied) in each target. Each penny should be completely surrounded with glue.
- Fold retaining flaps over pennies.
- Apply white glue to the assembly and place it along the inside bottom edge of the Aeroshroud as shown.



TIP: Hold assembly to Aeroshroud while drying with two clothespins.

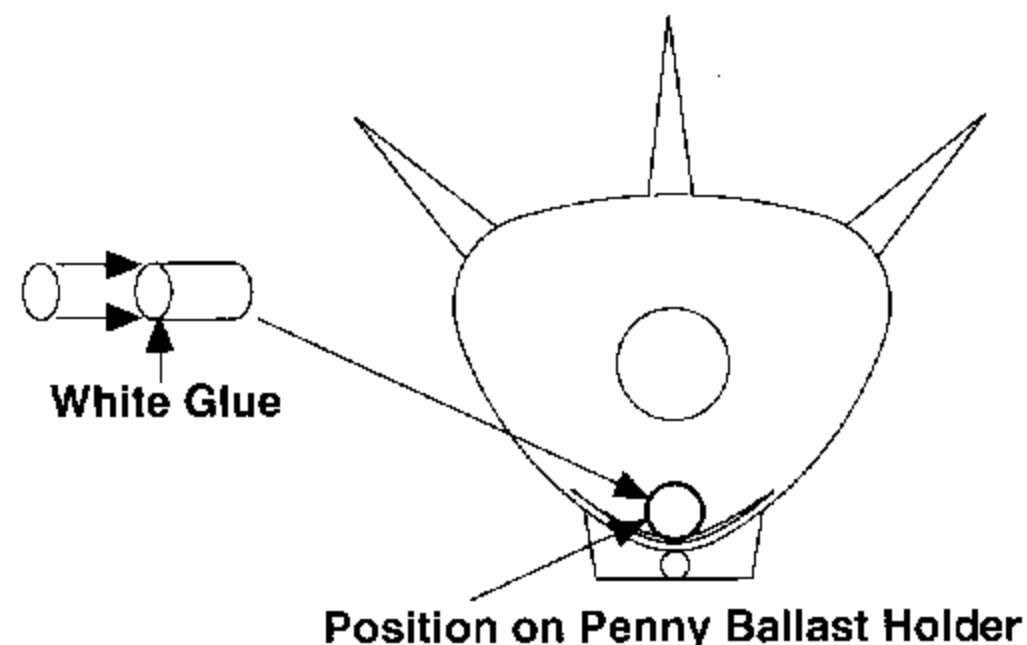
STEP 12

- Use a sharp hobby knife to cut out the Vac-form plastic canopy.
- Tip: MAKE SEVERAL LIGHTSCRIBES WITH YOUR KNIFE. DO NOT TRY TO CUT ALL THE WAY THROUGH THE PLASTIC AT ONE TIME.**
- Lightly sand the edges of the canopy to remove any rough edges.
 - Apply a bead of tube type plastic cement to the inside edge of the canopy.
 - Position the canopy on the target area on the Aeroshroud. Allow to dry.



STEP 13

- Cut out the Recovery System Disk from the flat parts set.
- Apply a bead of white glue around one end of the White Recovery System Tube.
- Apply a bead of white glue down one side of the Tube / Disk assembly. Position the Tube on the center of the Penny Ballast Holder on the rear inside edge of the Aeroshroud.



FLYING YOUR HL-20 LIFTING BODY™

WHAT ELSE YOU WILL NEED:

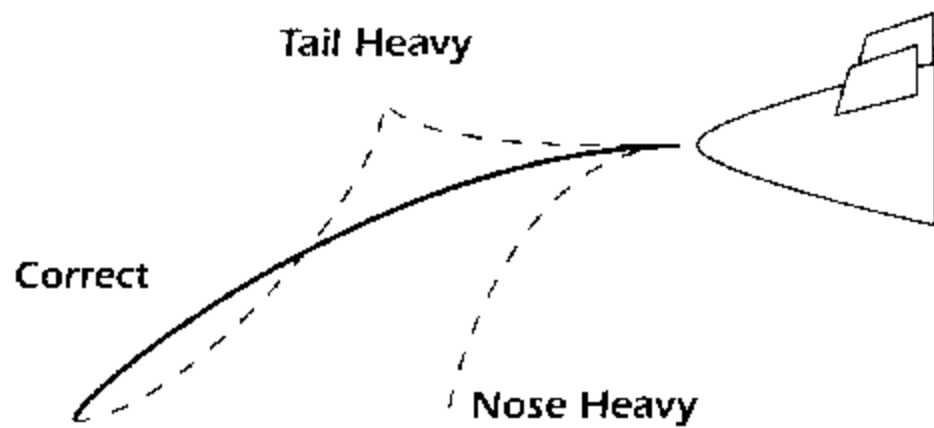
To successfully fly your rocket you will need the following items:

- QUEST Launch Pad (No. 7600)
- QUEST Launch Controller (No. 7500)
- QUEST Rocket Motors, Type B6-2, C6-3.
- Use B6-2 for your first flights.

TRIMMING GLIDE OF HL-20 BEFORE FLIGHT

NOTE: Trim the HL-20 **without** a motor installed.

- Hand launch the glider by grasping it between your fingers just behind the nose cone. Toss it gently with an overhand motion into a flight path slightly below horizontal. Do this several times because you may not toss it properly.
- If the model dives into the ground every time you toss it, it is nose heavy. Add a small amount of modeling clay to the rear on top of the penny ballast holder.
- If the model pulls up into a stall, it is tail heavy. Add a pinch of modeling clay to the nose.



PREPING YOUR HL-20 FOR FLIGHT

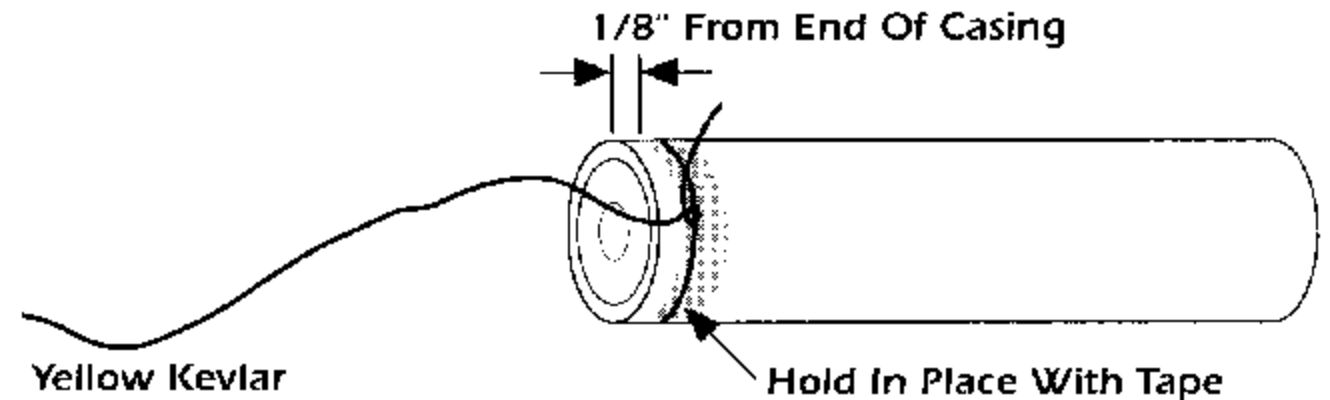
Your HL-20 is designed to completely eject the motor casing at apogee. Always use the included streamer recovery system for the motor casing to avoid any possible injury from the falling motor casing.

STEP 1

- Peel the backing off the GRIPPER tab and attach it to one end of the plastic streamer. Firmly squeeze the GRIPPER tab and streamer between your fingers.
- Make two overhand knots to tie the loose end of the short Yellow Kevlar Cord through the hole in the GRIPPER tab.

STEP 2

- Tightly wrap the loose end of the Yellow Kevlar around the nozzle end of your rocket motor approximately 1/8 inch from the end of the motor casing.
- Wrap a piece of paper masking tape over the Kevlar to fasten the Kevlar Cord securely to the outside of the motor casing.



STEP 3

- Install a TigerTail igniter into the rocket motor before installing the rocket motor into your HL-20.
- Install the rocket motor into the HL-20. Motor should fit into motor mount so it will not fall out when the HL-20 is slid down the launch rod. If needed, apply only enough paper masking tape to the outside of the motor to prevent it from slipping out.
DO NOT APPLY EXCESS TAPE.

STEP 4

- Grab the plastic streamer at its center and fold it in half. Continue to fold the streamer in half until it is small enough to fit into the recovery system tube at the rear of the HL-20.
- Pack the streamer into the recovery system tube so that any extra length of Yellow Kevlar is also packed into the recovery system tube.

READ AND FOLLOW THE ENCLOSED LAUNCHING PROCEDURE SHEET

READ AND FOLLOW THE N.A.R. SAFETY CODE DURING ALL YOUR MODEL ROCKETRY ACTIVITIES.



IRONCLAD GUARANTEE

If for any reason, you are not totally satisfied with our product, QUEST will provide whatever you think is fair, from refund to replacement.



Manufactured by:
QUEST AEROSPACE
EDUCATION, INC.
Distributed Exclusively by:
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1610 INTERSTATE DRIVE
CHAMPAIGN, IL 61821