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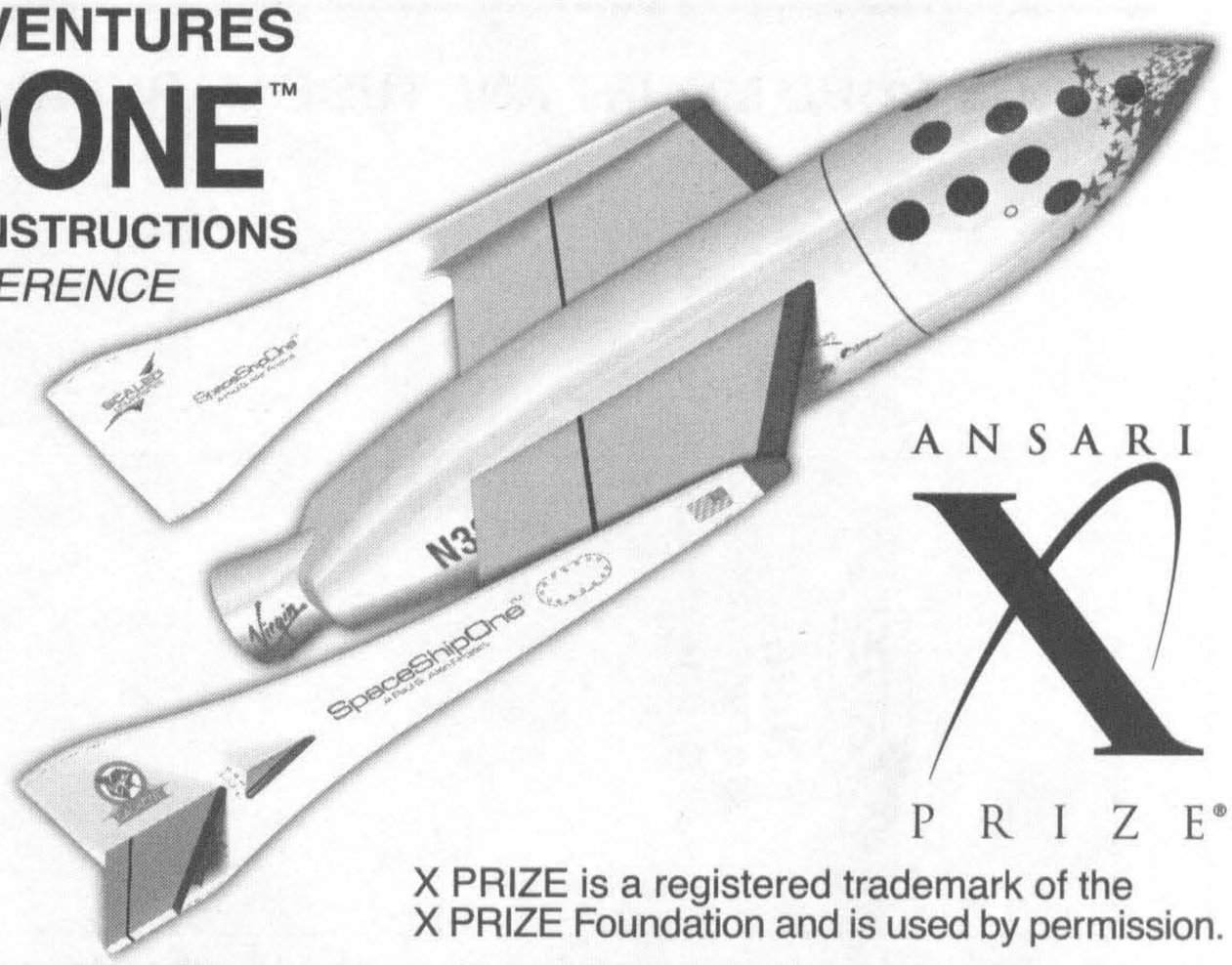
ESTES INDUSTRIES
1295 H Street
Penrose, CO 81240

PRINTED IN CHINA

MOJAVE AEROSPACE VENTURES
SPACESHIPONE™
FLYING MODEL ROCKET KIT INSTRUCTIONS

KEEP FOR FUTURE REFERENCE

#2191

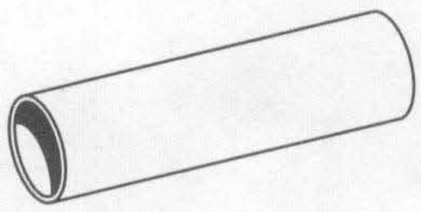


ASSEMBLY TIP: Read all instructions before beginning work on your model. Make sure you have all parts and supplies.

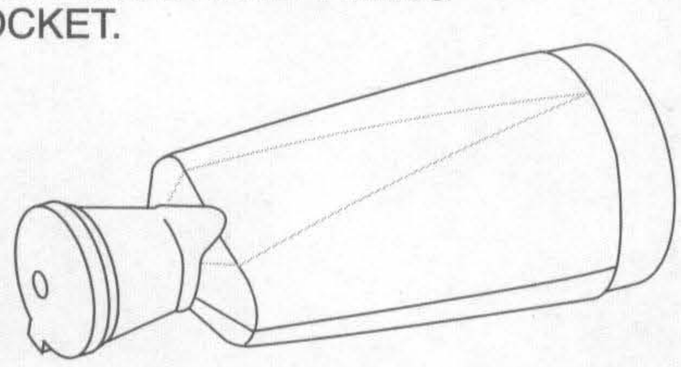
TEST FIT ALL PARTS TOGETHER BEFORE APPLYING ANY GLUE! If any parts don't fit properly, sand as required for precision assembly.

PARTS

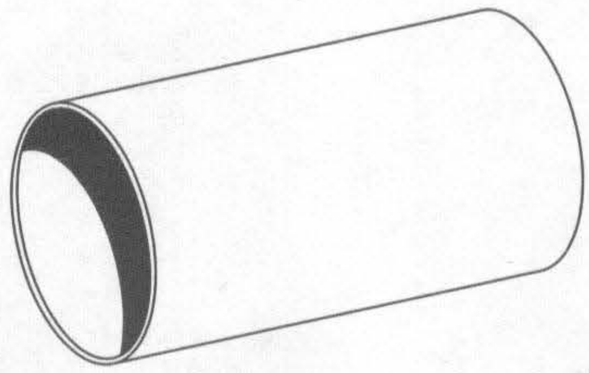
Locate the parts shown below and lay them out on the table in front of you. DO NOT USE THIS DRAWING TO ASSEMBLE YOUR ROCKET.



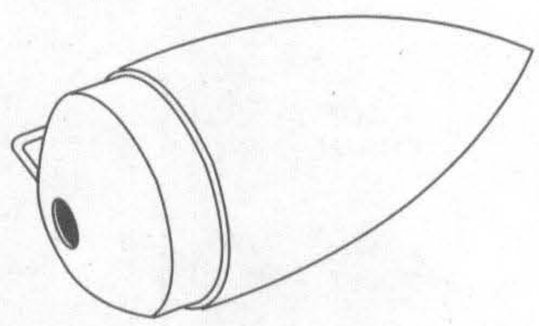
White Engine Mount Tube BT-20J (1) (30408)



Plastic Tail Cone TC-200S1 (1) (60885)

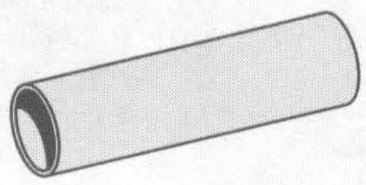


Body Tube BT-200 (1) (30469)

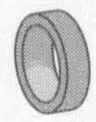


Plastic Nose Cone PNC-200S1 (1) (60884)

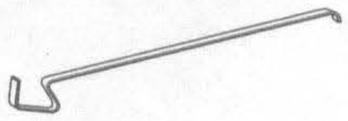
Mylar Retainer Ring (1) (30168)



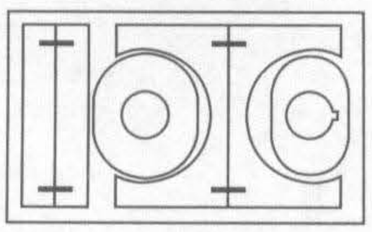
Yellow Spacer Tool ET-2 (1) (35003)



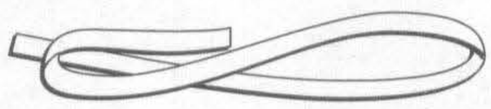
Green Engine Block AR520 (1) (30162-2)



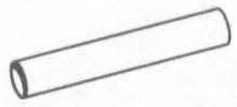
Engine Hook EH-2 (1) (35021)



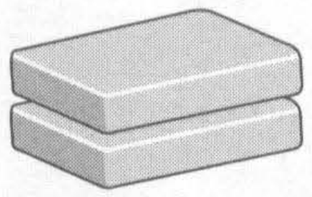
Die Cut Centering Ring and Wing Assembly Fixture (1) (32439)



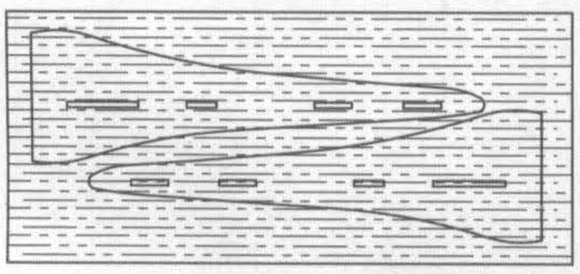
Rubber Shock Cord 1/4" x 18" (1) (38368)



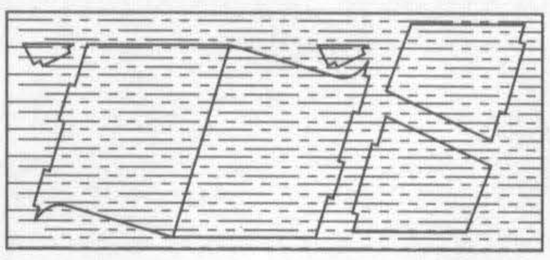
Launch Lug 1/8" x 2 3/8" LL-2B (1) (38178)



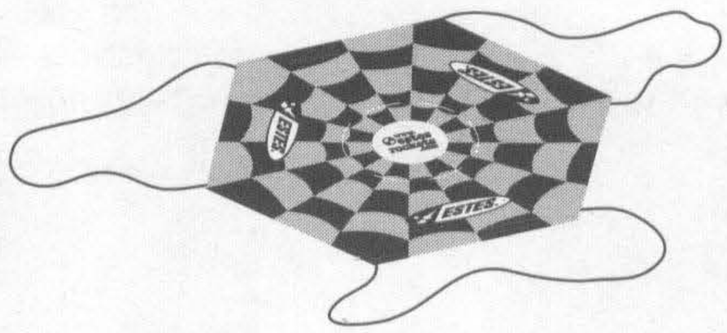
Clay Weight (2) (85705)



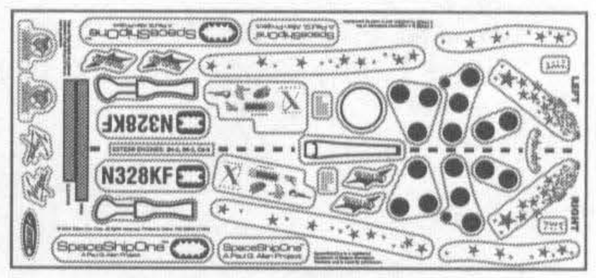
Laser Cut Balsa Sheet A (1) (32226)



Laser Cut Balsa Sheet B (1) (32227)



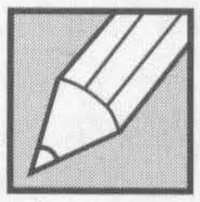
Assembled Parachute 12" (30 cm) (1) (35801)



Decal Sheet (1) (60846)

SUPPLIES In addition to the parts included in the kit you will also need:

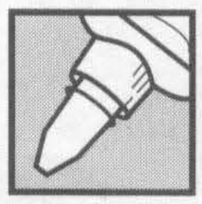
SCISSORS



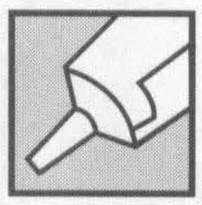
PENCIL

RULER

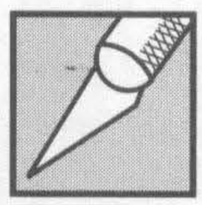
FINE SAND PAPER (#400-600 Grit)



CARPENTER'S GLUE



TUBE-TYPE PLASTIC CEMENT



MODELING KNIFE

RAZOR SAW

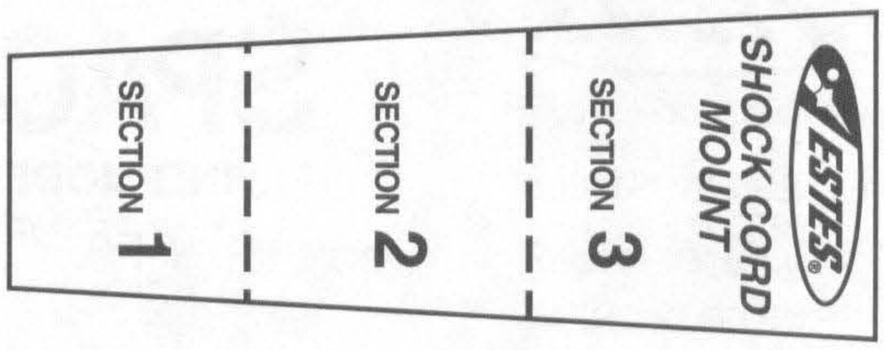
MASKING TAPE

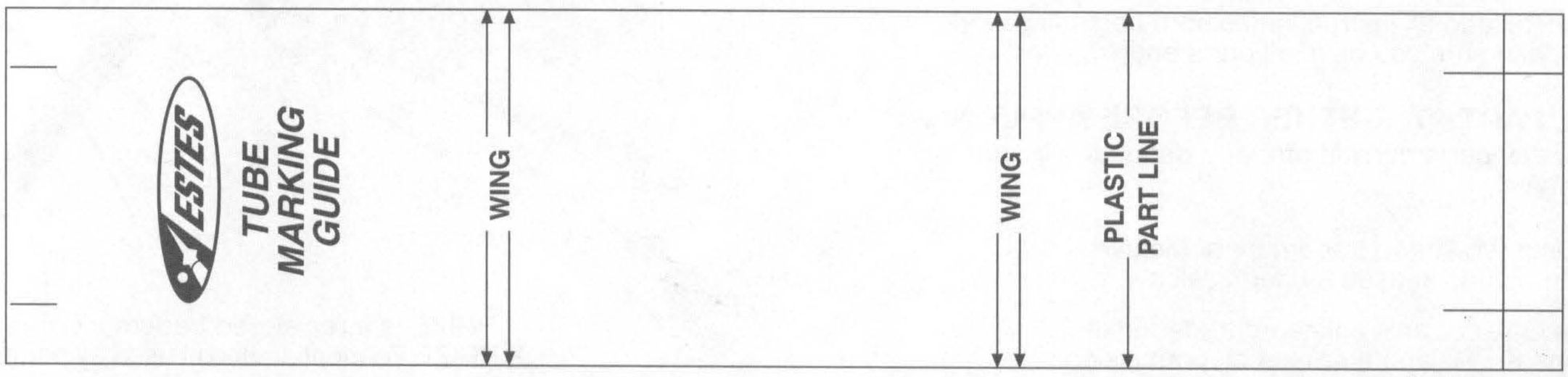
SPRAY PRIMER (WHITE)

SPRAY PAINT (WHITE & RED)

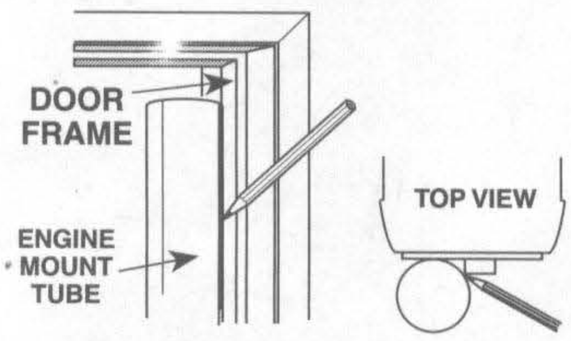
SPRAY GLOSS COAT (OPTIONAL)

SHOCK CORD MOUNT AND TUBE MARKING GUIDE

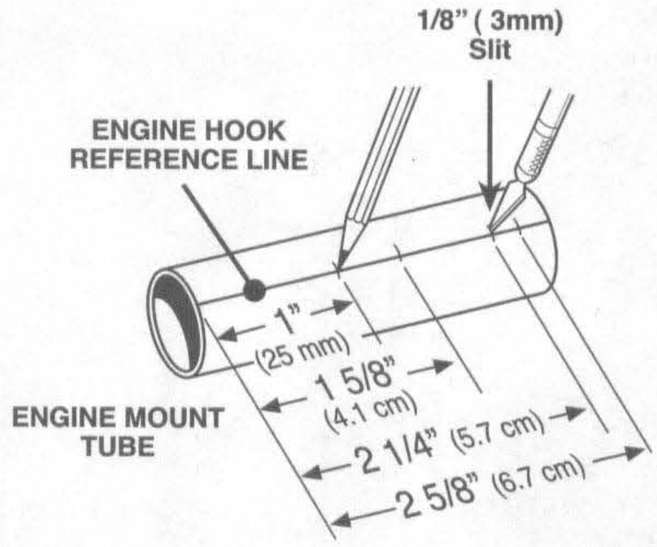




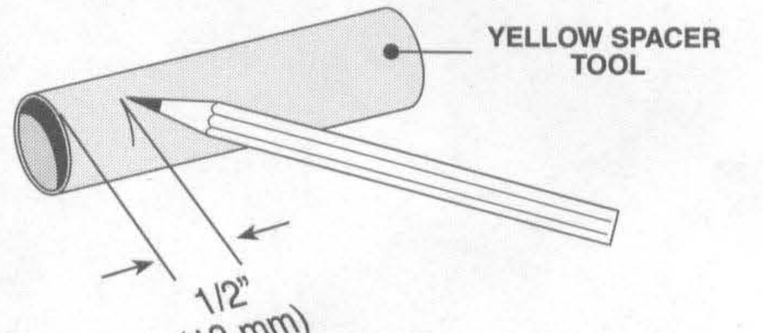
1. ASSEMBLE ENGINE MOUNT



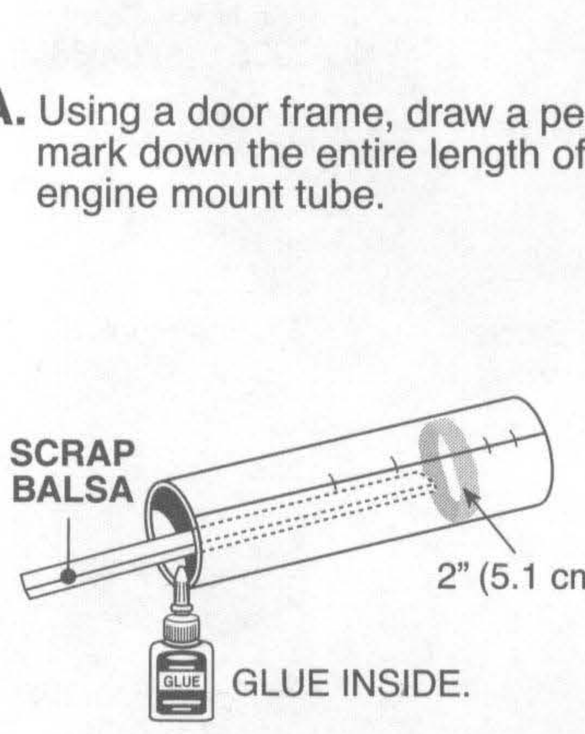
A. Using a door frame, draw a pencil mark down the entire length of the engine mount tube.



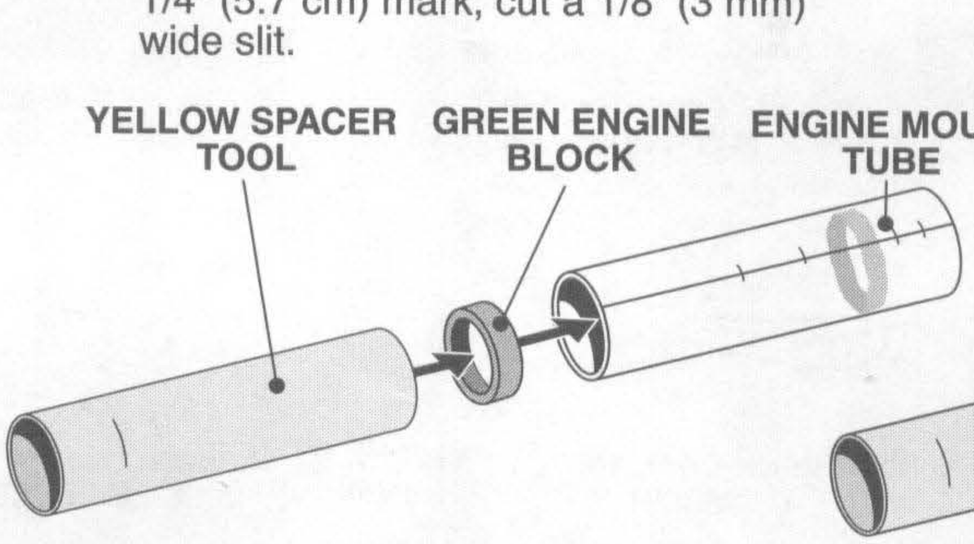
B. Mark engine tube on the reference line at 1" (25 mm), 1 5/8" (4.1 cm), 2 1/4" (5.7 cm) and 2 5/8" (6.7 cm). At the 2 1/4" (5.7 cm) mark, cut a 1/8" (3 mm) wide slit.



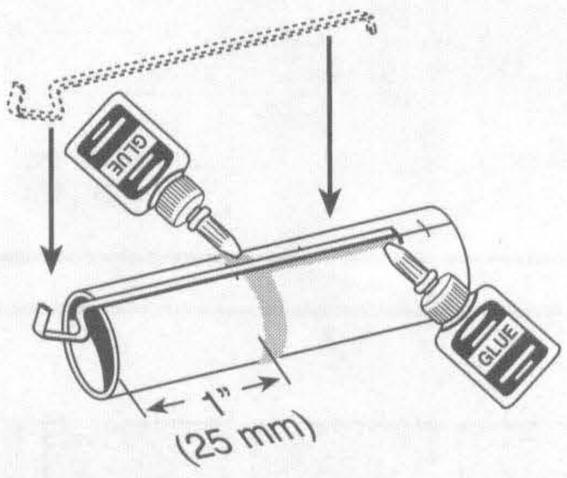
C. Mark yellow spacer tool 1/2" (13 mm) from end.



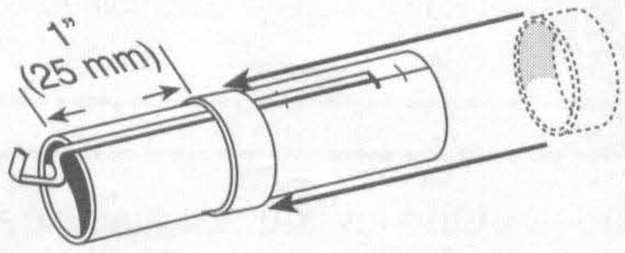
D. Use scrap balsa to smear glue 2" (5.1 cm) inside engine mount tube.



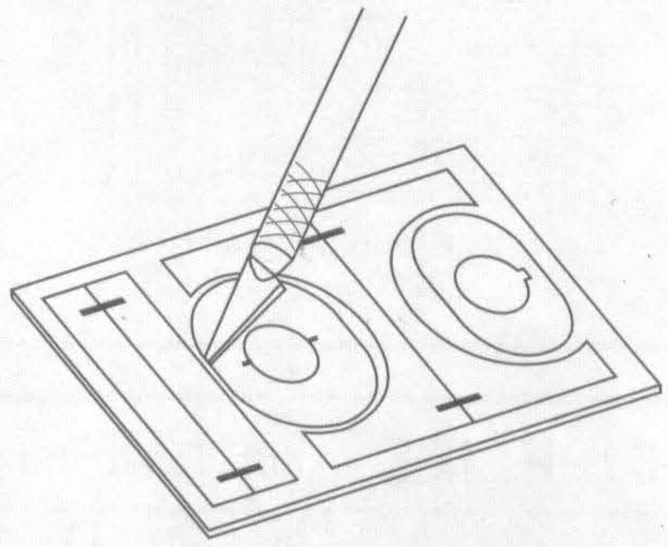
E. Push engine block into engine mount tube with spacer tool up to 1/2" (13 mm) mark. **Remove spacer tool immediately.**



F. Apply glue on reference line from slit to 1" (25 mm) mark. Apply glue around tube just ahead of 1" (25 mm) mark. Position engine hook.

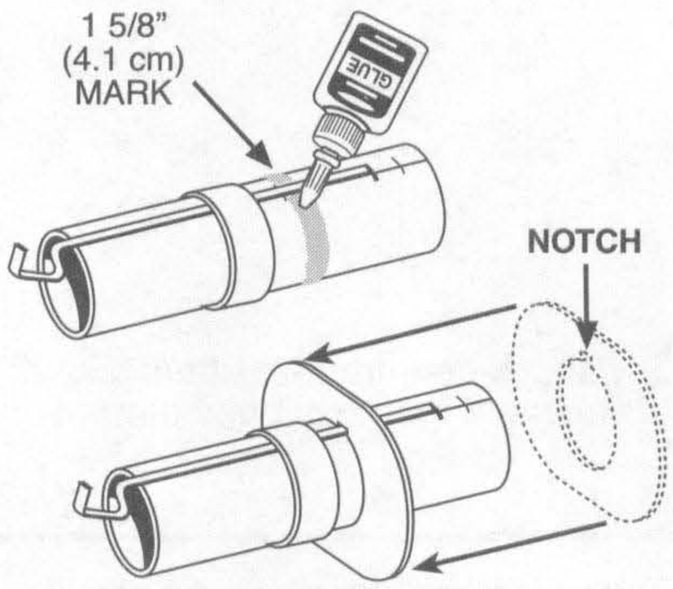


G. Slide mylar retainer ring onto engine mount tube up to 1" (25 mm) mark. Let dry completely.

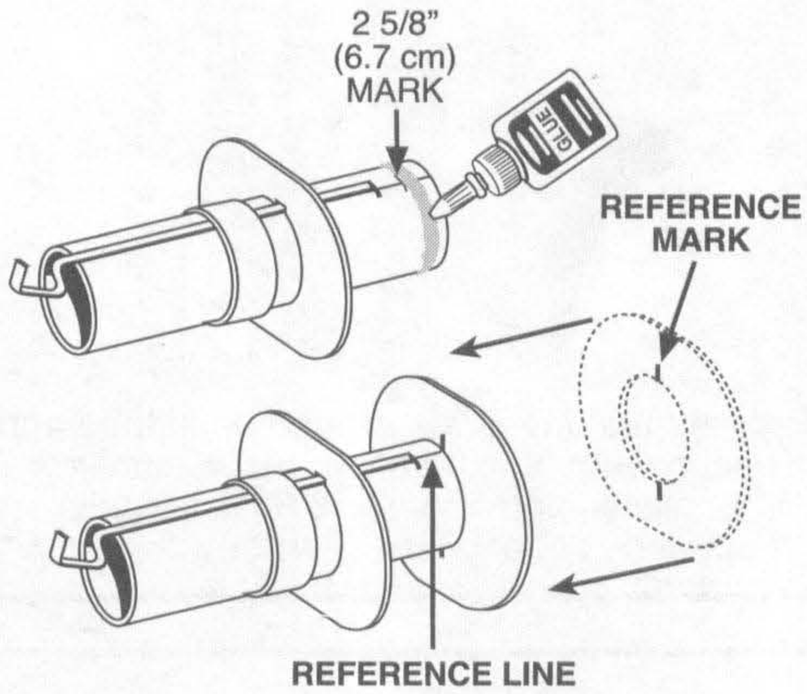


H. Using a modeling knife, carefully remove the die cut rings from card.

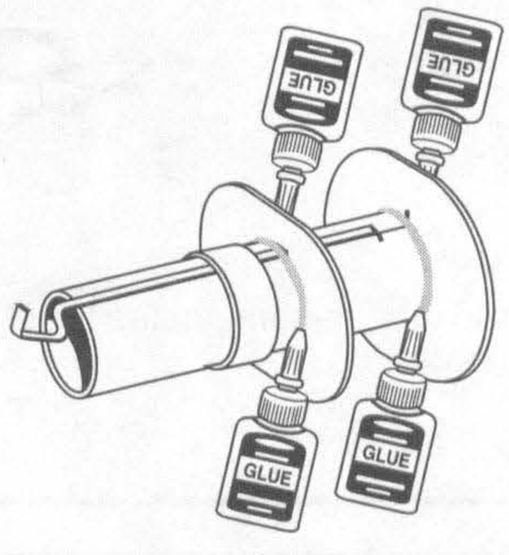
1. ASSEMBLE ENGINE MOUNT (CONT.)



I. Apply a ring of glue around tube at the 1 5/8" (4.1 cm) mark. Slide notched ring onto tube up to the 1 5/8" (4.1 cm) mark.

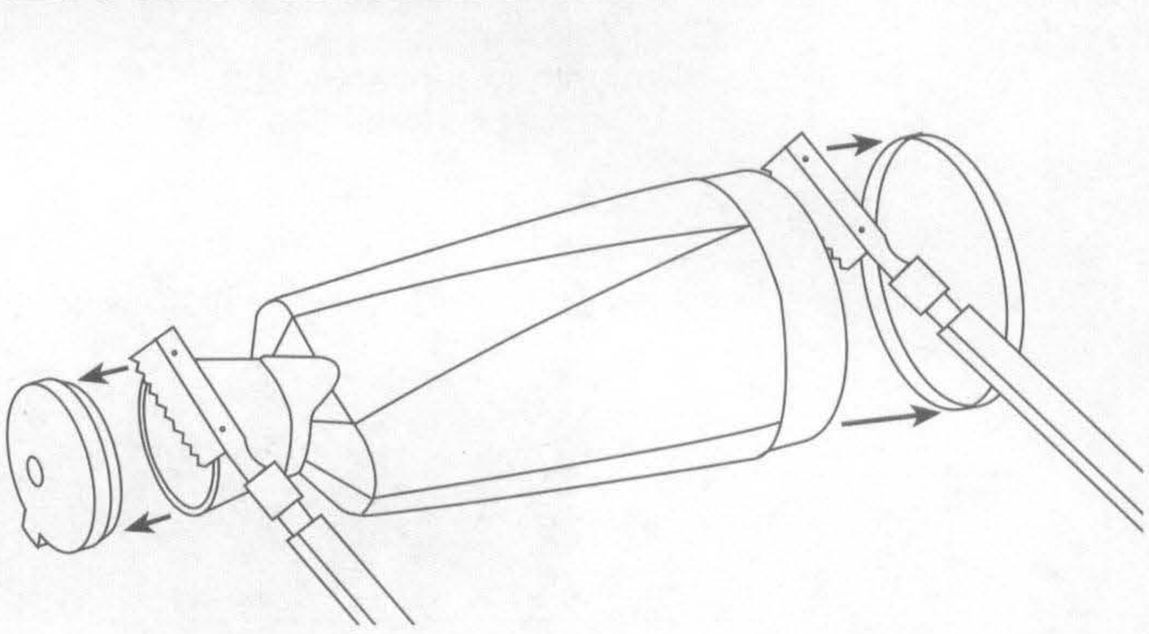


J. Apply a ring of glue around tube at the 2 5/8" (6.7 cm) mark. Slide ring onto tube, line up reference mark on ring with reference line and slide to the 2 5/8" (6.7 cm) mark. Let dry completely.

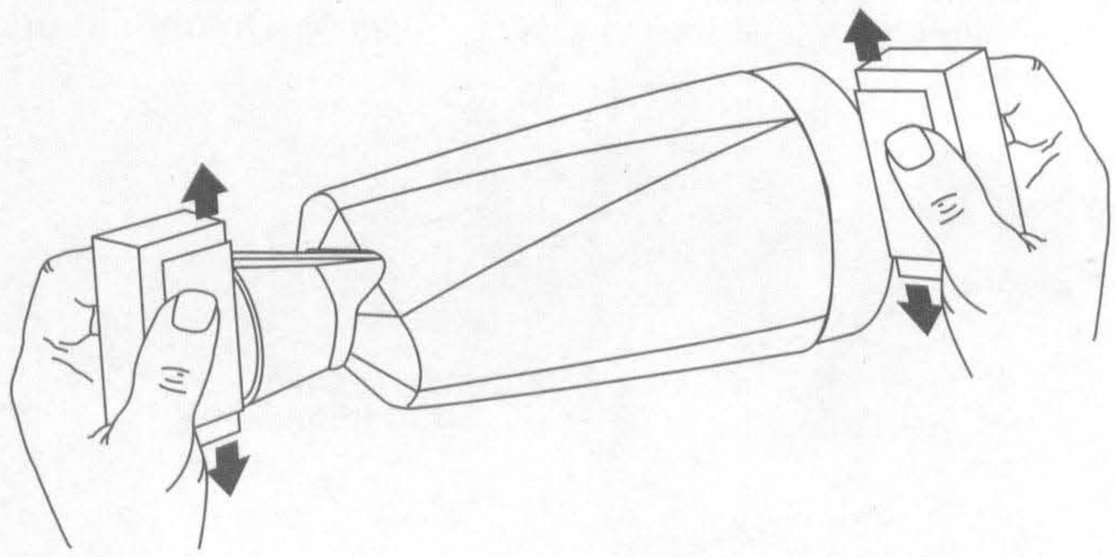


K. Apply a glue fillet on both sides of each ring. Let dry completely.

2. PREPARE TAIL CONE

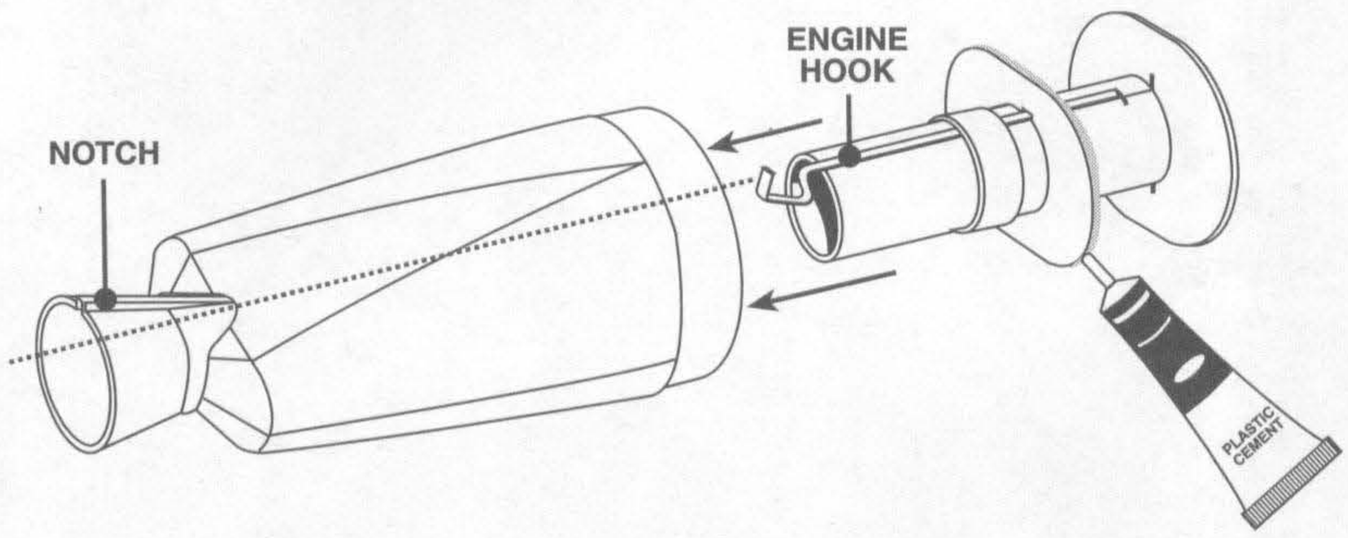


A. Using a razor saw, carefully remove both ends of the the tail cone.

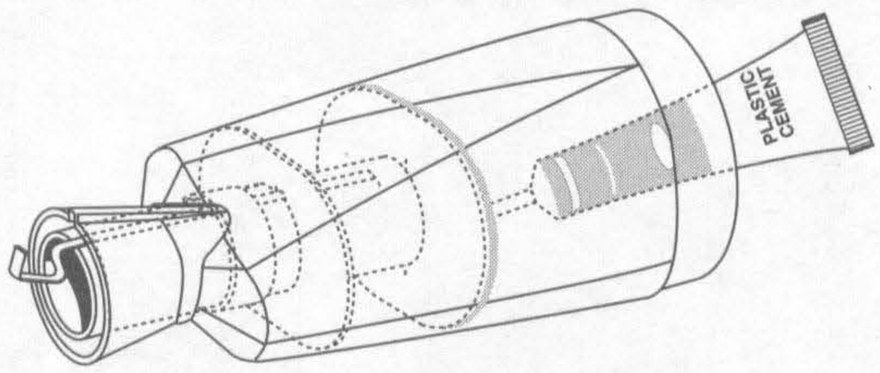


B. Using a sanding block, carefully sand excess plastic from tail cone.

3. INSERT ENGINE MOUNT

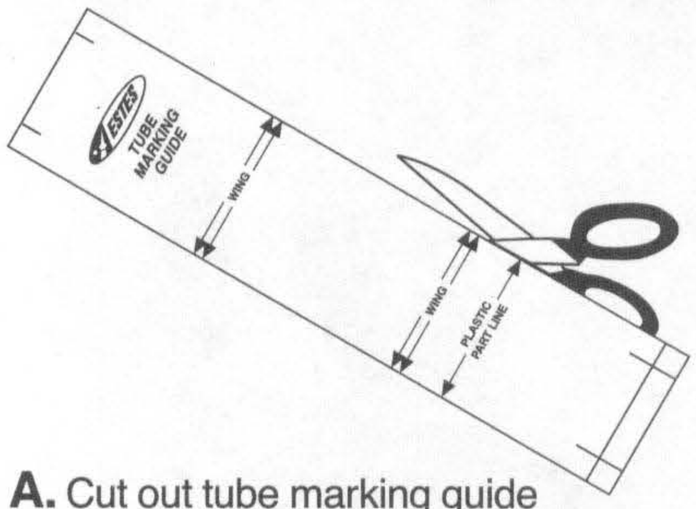


A. Line up engine hook with notch in tail cone. Apply plastic cement around front edge of rear centering ring. Insert engine mount into tail cone until it stops.

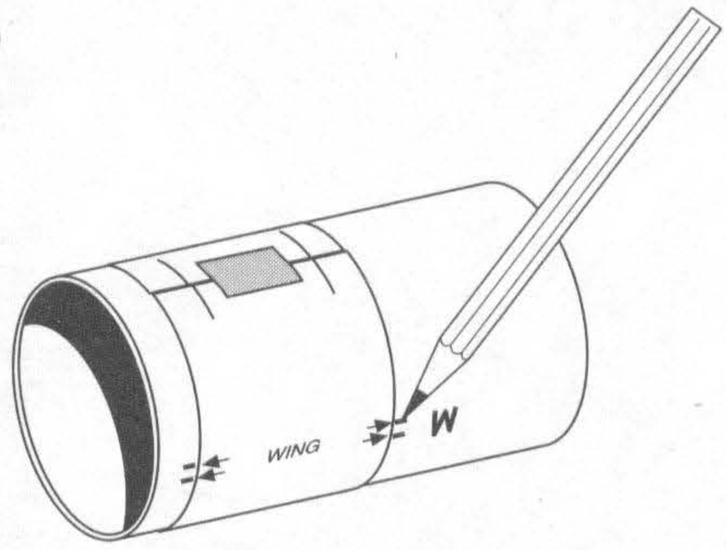


B. Apply a plastic cement fillet around inside ring/tube joint. Let cement dry completely.

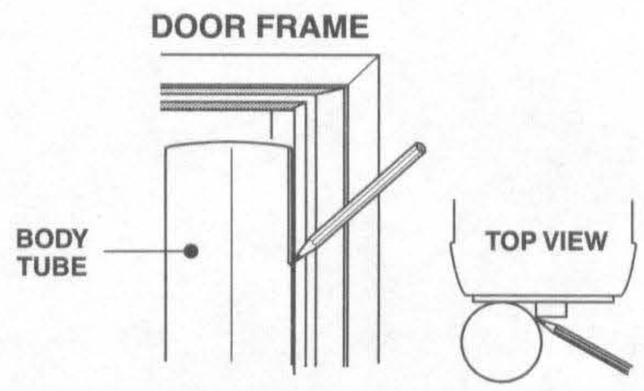
4. MARKING BODY TUBE LINES



A. Cut out tube marking guide from page 2.

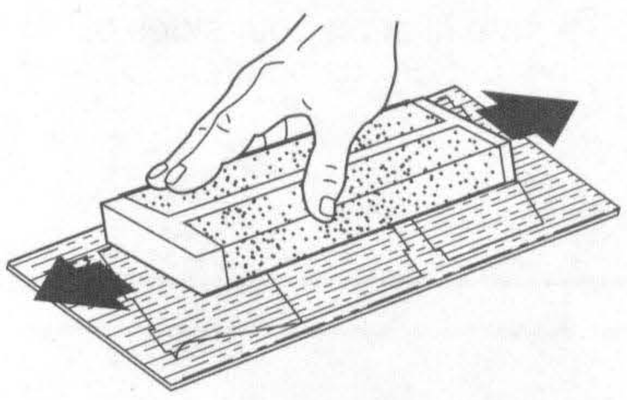


B. Wrap marking guide around body tube and secure with tape. Mark at arrows for wing and plastic part line. Mark "P" for plastic part line, and "W" for wings. Remove guide.

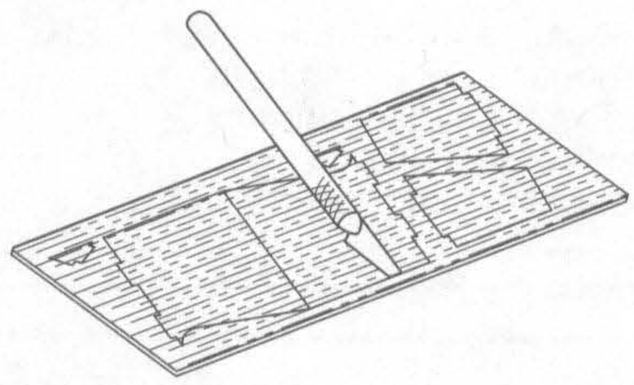


C. Using a door frame, extend all marks the entire length of body tube.

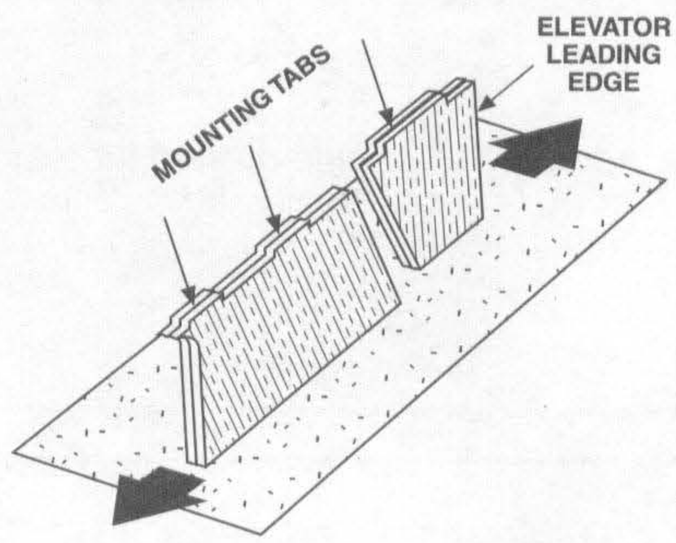
5. PREPARE WINGS



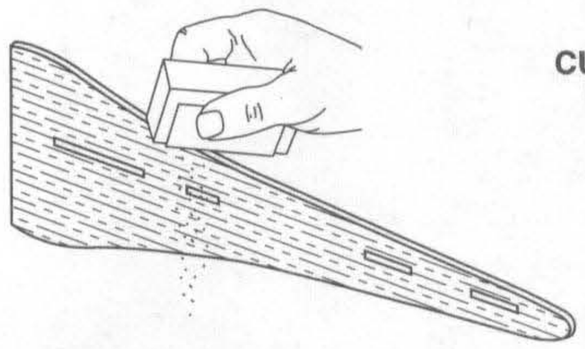
A. Fine sand balsa sheets, both sides.



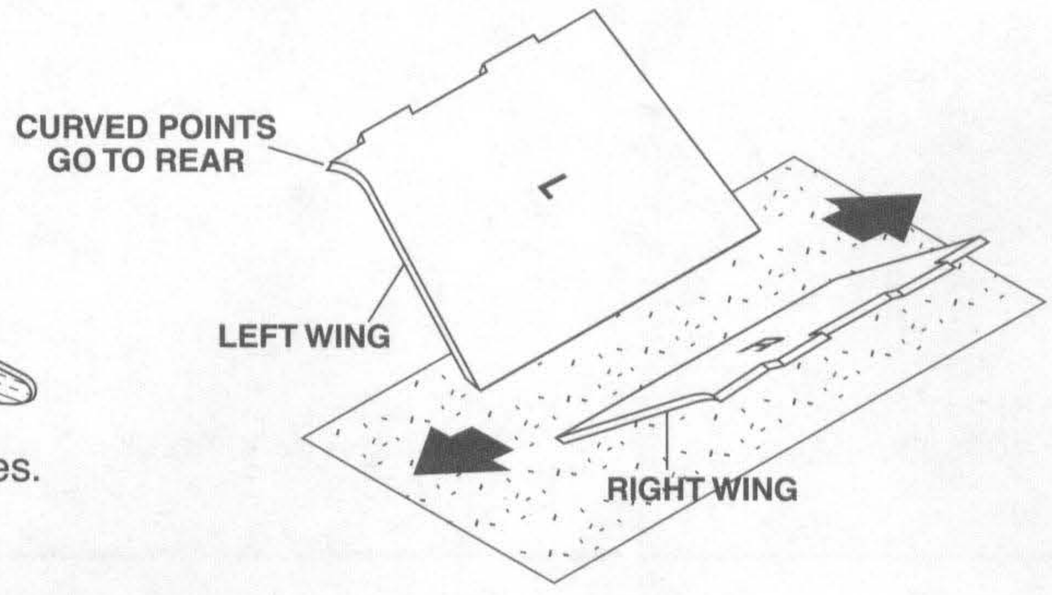
B. Using a modeling knife, carefully remove wings. **Do not cut off mounting tabs.**

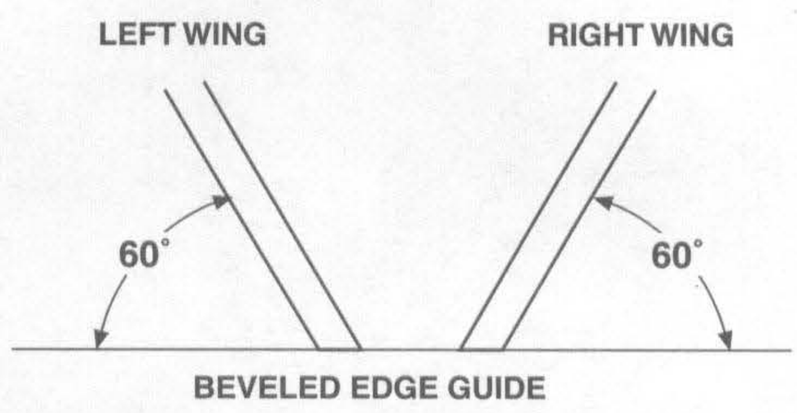


C. Lightly sand all edges smooth except as noted. Do not sand mounting tabs.



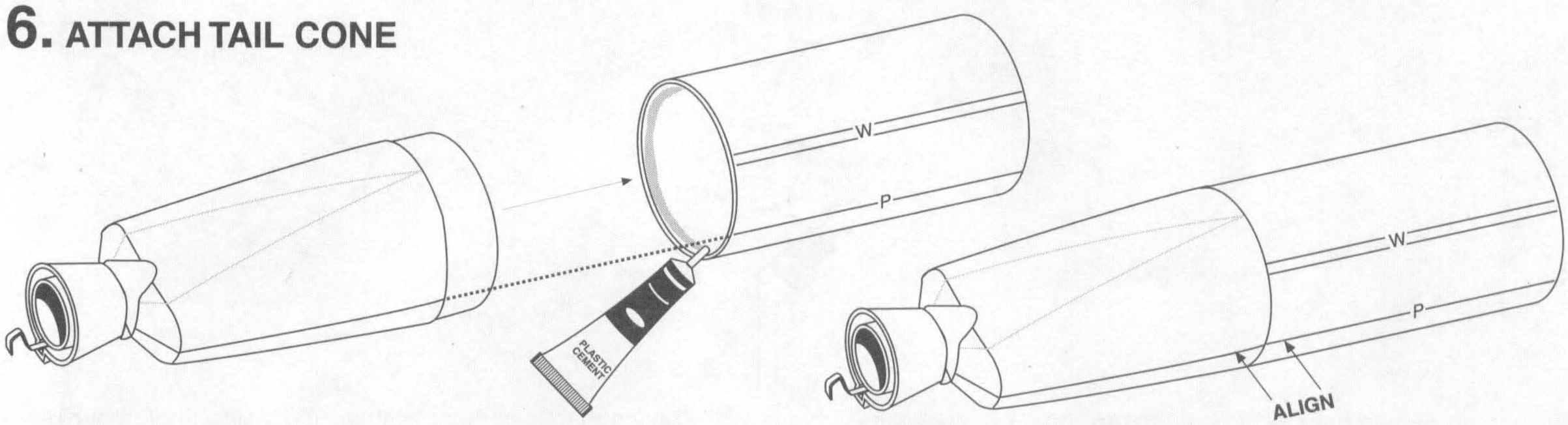
D. Carefully sand contour edges.





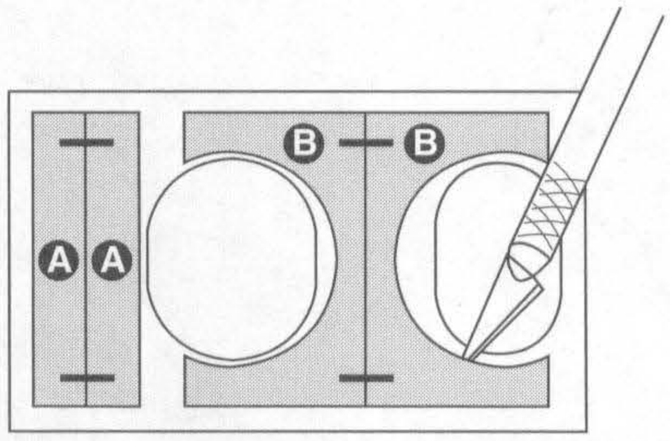
E. Position wings as shown. Mark top of one wing "L" and the other "R". Carefully sand a 60° bevel along the entire length of wing. Check angles using BEVELED EDGE GUIDE. Do not remove too much material.

6. ATTACH TAIL CONE

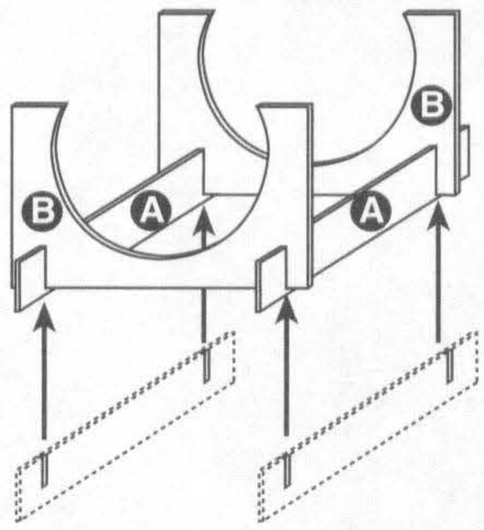


A. Apply a ring of plastic cement just inside the end of the body tube. Push tail cone into place. Align plastic parts line on body tube with seam on side of tail cone. Let dry completely.

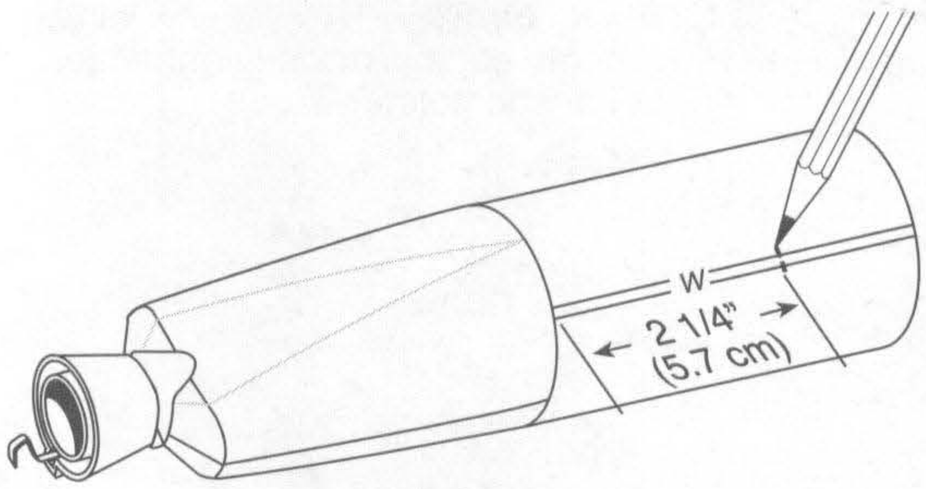
7. ASSEMBLE WING ASSEMBLY FIXTURE



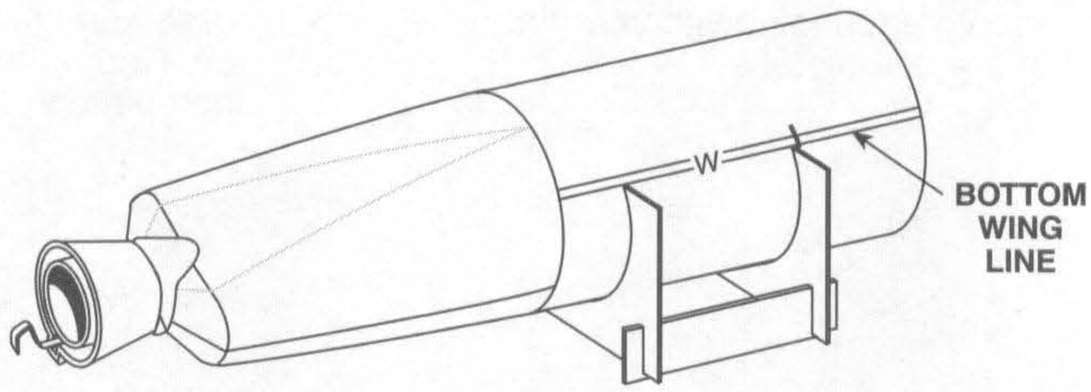
A. Using a modeling knife, carefully remove die cut wing assembly parts, as shown.



B. Assemble wing assembly fixture, as shown.

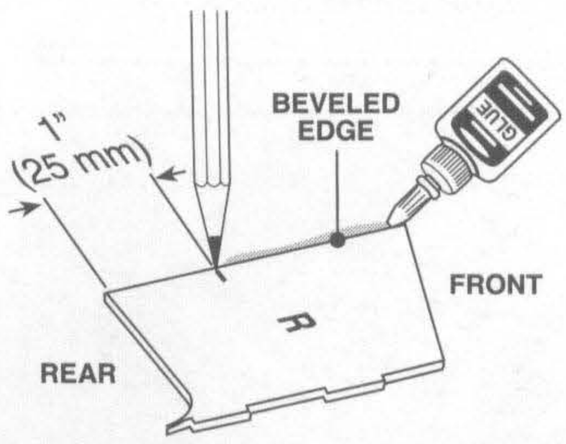


C. Place a mark at 2 1/4" (5.7 cm) from rear of body tube on both sets of wing lines.

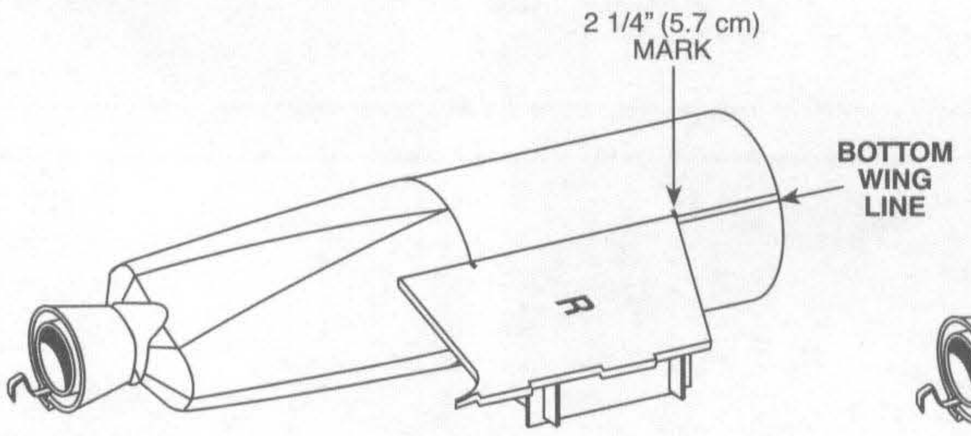


D. Slide body tube onto wing assembly fixture. Bottom wing line should be even with top of fixture. Place support under tail cone if necessary.

8. ATTACH WINGS

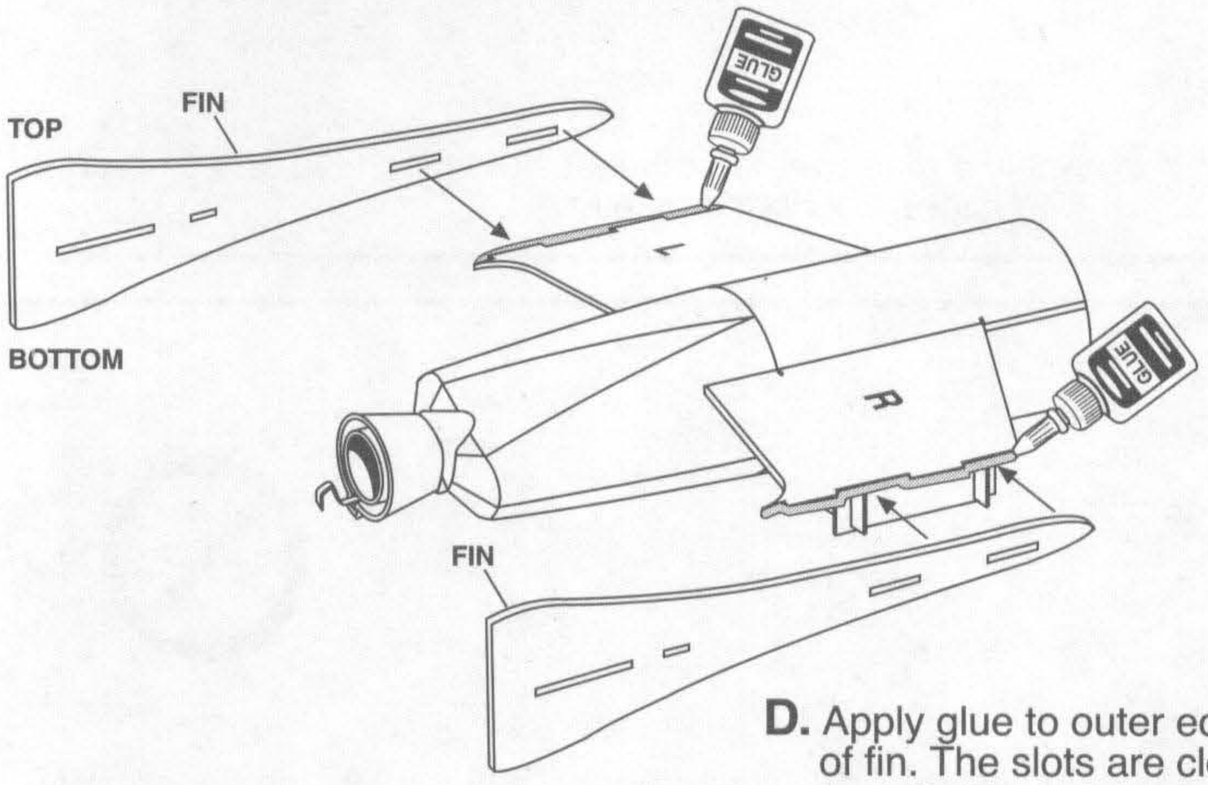


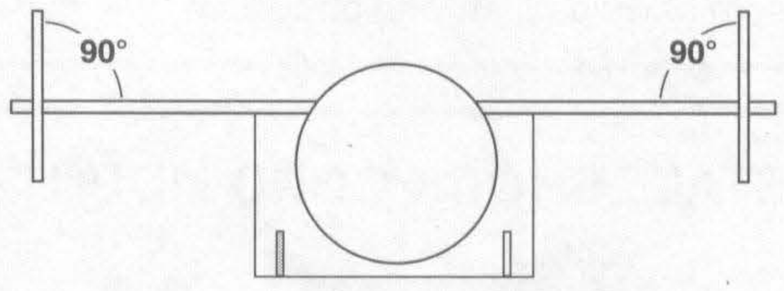
A. Mark right wing 1" (25 mm) from rear. Apply glue to beveled edge starting at the 1" (25 mm) mark forward.



B. Place wing on fixture and position wing on body tube between marks. Front of wing should be positioned at the 2 1/4" (5.7 cm) mark. Let dry completely. Repeat for left wing.

C. Apply glue fillets along wing/body tube joints. Smooth each joint with your finger. Let dry completely.

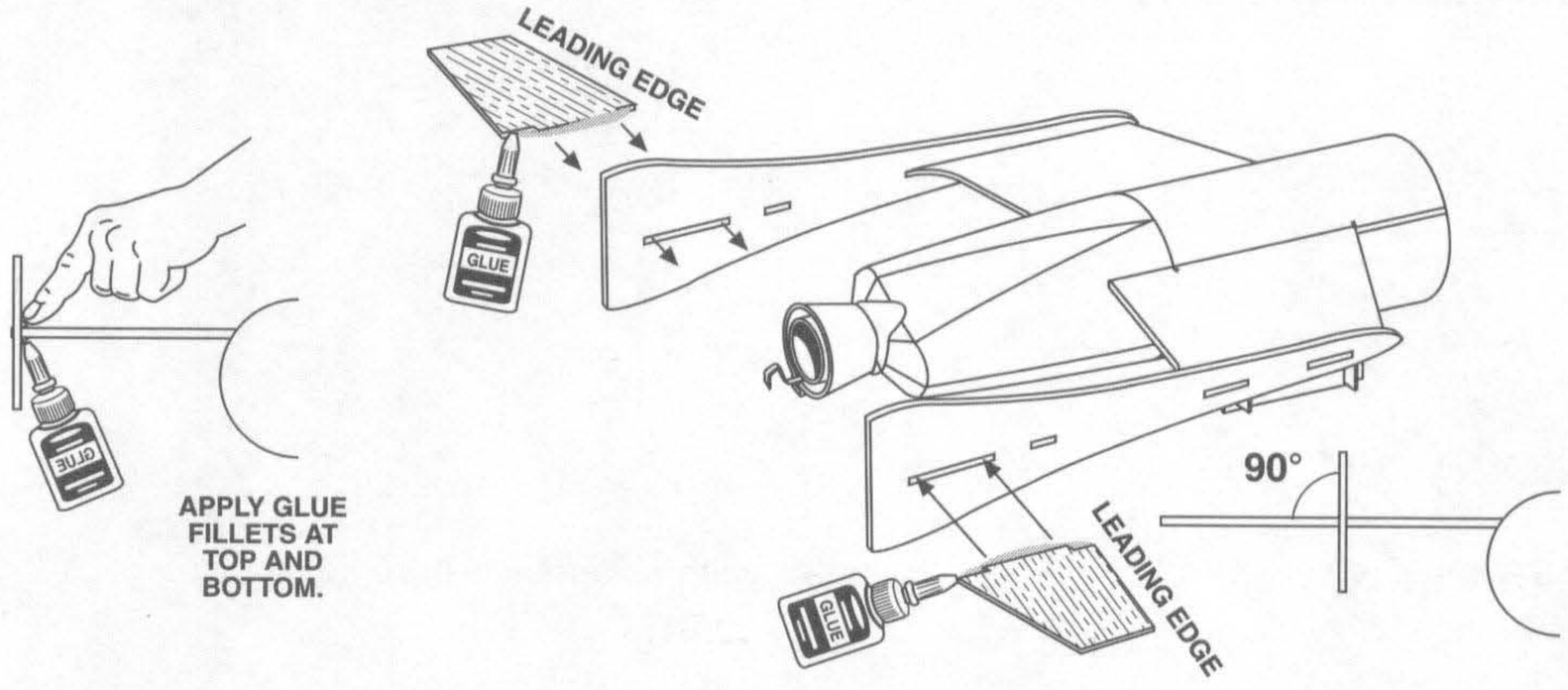




NOTE: WINGS AND FINS MUST BE ATTACHED CORRECTLY FOR STABLE FLIGHT.

D. Apply glue to outer edge of right wing. Pay careful attention to TOP and BOTTOM of fin. The slots are closer to the bottom edge of the wing. Attach fin to wing. Repeat for left side. Let dry.

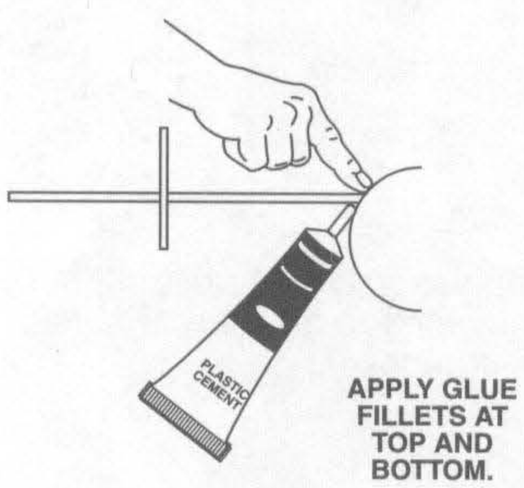
8. ATTACH WINGS (CONT.)

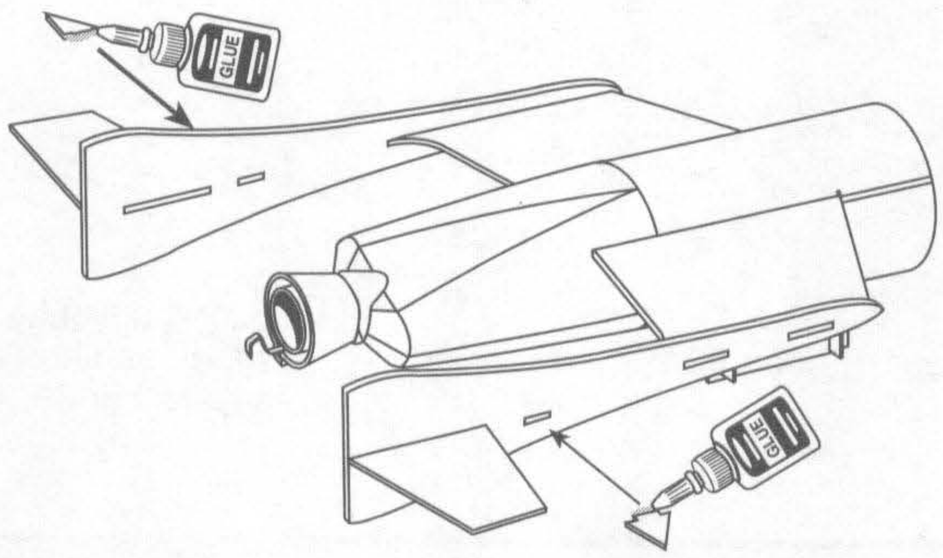


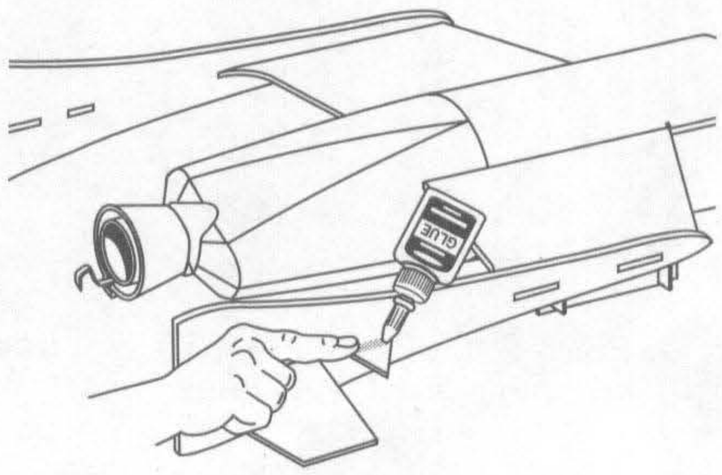
E. Apply glue fillets to fin/wing joints. Smooth each joint with your finger. Let dry completely.

F. Apply glue to edge of elevator, note grain direction and insert into slot of fin. Repeat for other side. Let dry completely.

G. Apply glue fillets to elevator/fin joints. Smooth each joint with your finger. Let dry completely.





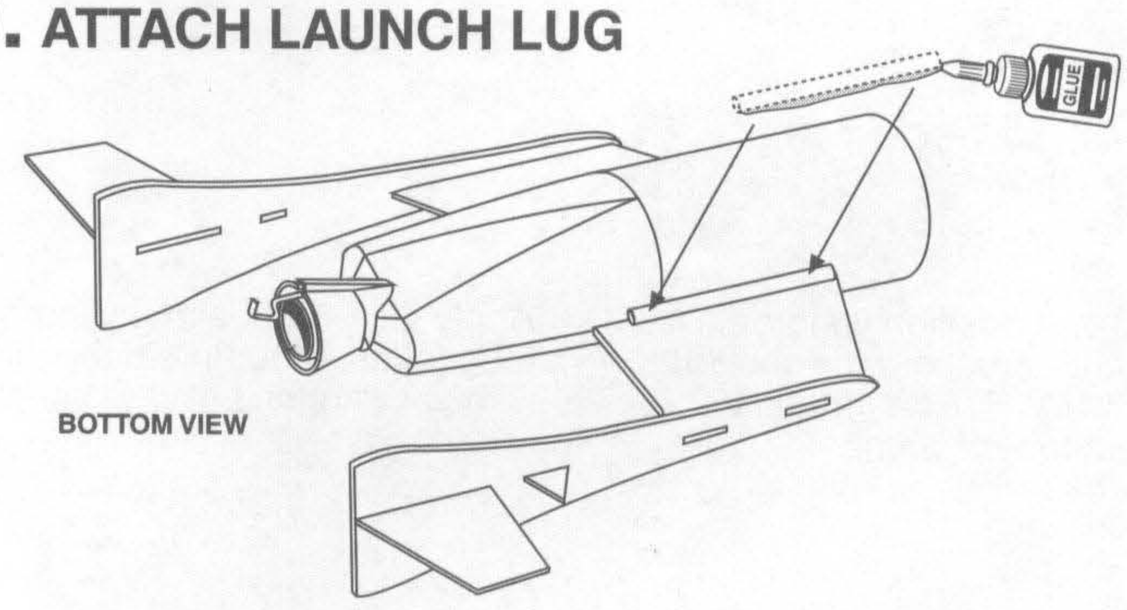


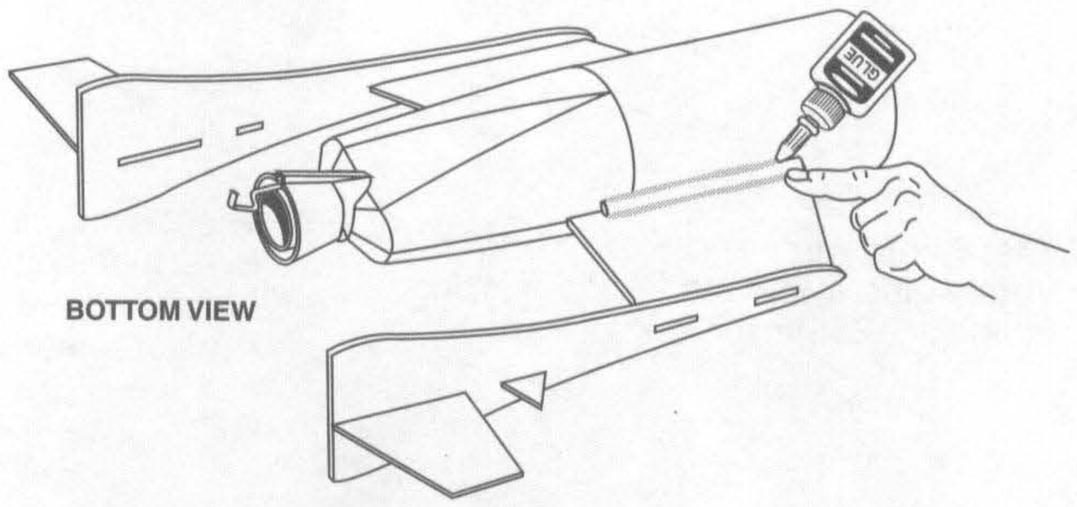
H. Apply a fillet of plastic cement between the wing/tail cone joints at the 1" (25mm) mark, refer to Step 8B. Smooth each joint with your finger. Let dry completely.

I. Apply glue to edge of strake, note position and insert into slot of fin. Repeat for other side. Let dry completely.

J. Apply glue fillets to strake/fin joints. Smooth each joint with your finger. Let dry completely. Remove wing assembly fixture.

9. ATTACH LAUNCH LUG

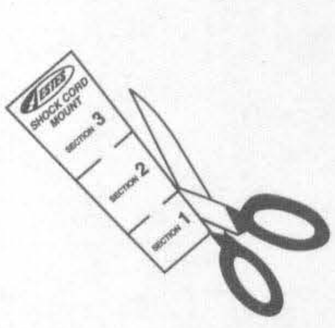




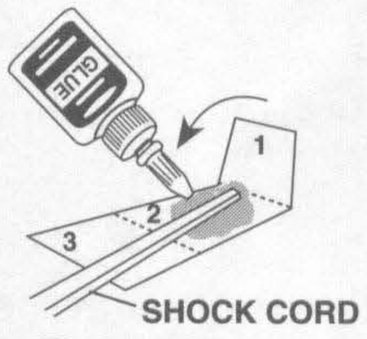
A. Turn rocket over. Apply glue to launch lug and attach to bottom of wing, flush with body tube.

B. Apply a glue fillet to both sides of launch lug and smooth with finger. Let dry completely.

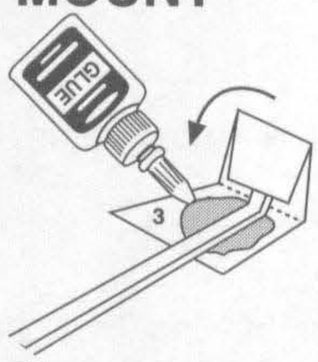
10. INSTALL SHOCK CORD MOUNT



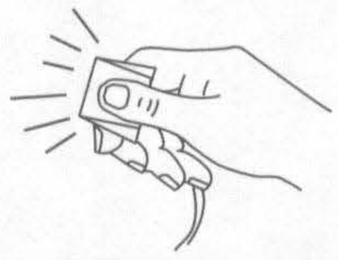
A. Cut out shock cord mount from page 2.



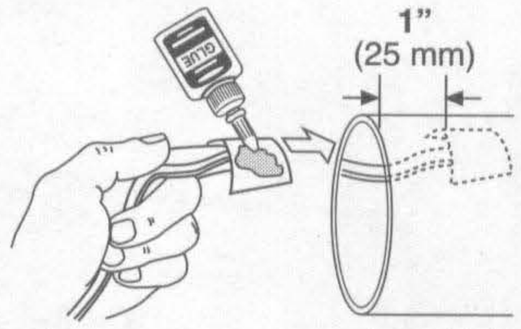
B. Apply glue. Fold forward.



C. Apply glue. Fold forward.

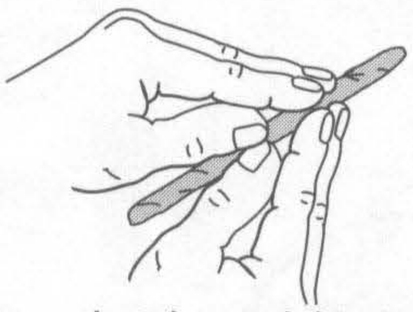


D. Squeeze tightly and hold for one minute.

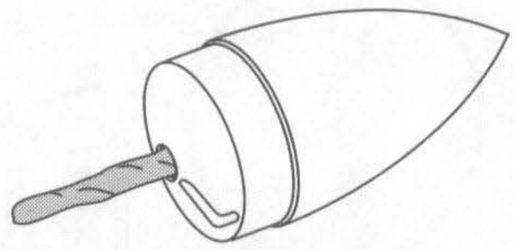


E. Glue mount 1" (25 mm) inside upper body tube. Hold until glue sets. Let dry completely.

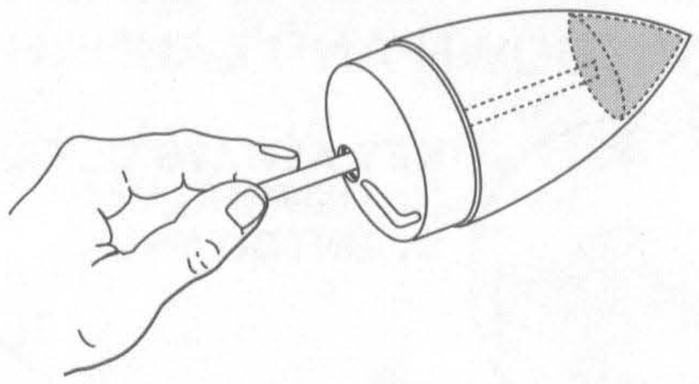
11. INSTALL NOSE WEIGHT



A. Form the clay weights into thin "snakes".

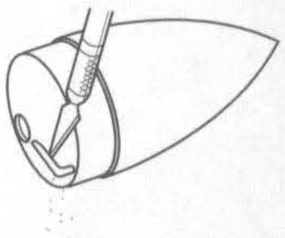


B. Insert clay "snakes" into nose cone.

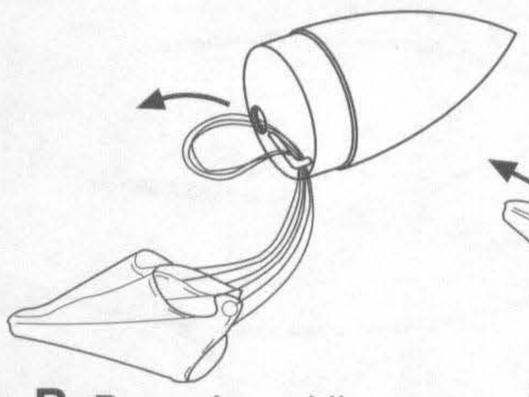


C. Pack clay "snakes" tightly into tip of nose cone using the eraser end of a pencil. Use **ALL** of the clay.

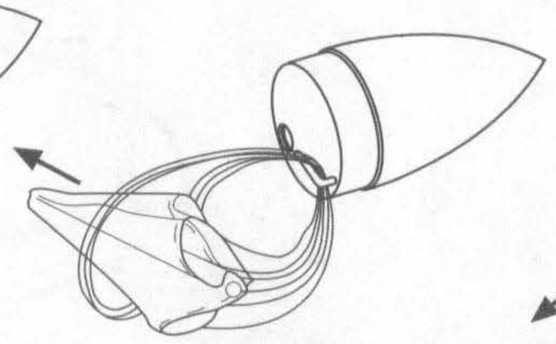
12. ATTACH PARACHUTE AND SHOCK CORD



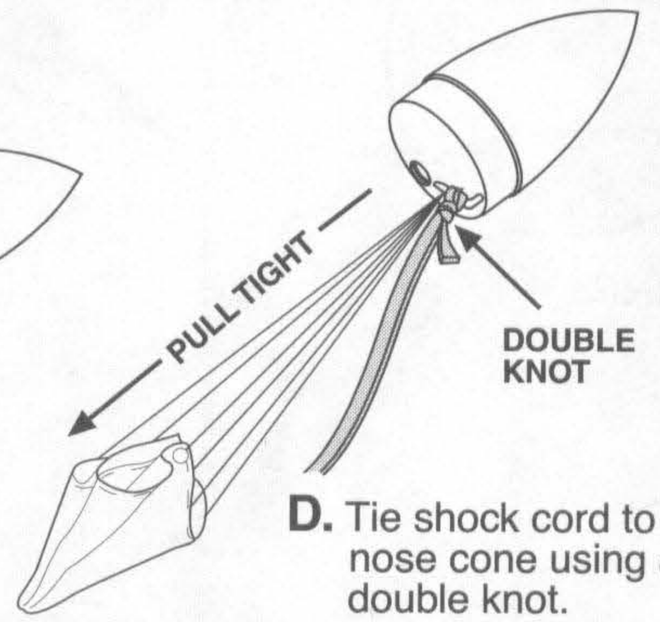
A. Remove excess flash and clean eyelet of the nose cone. Caution: Do not cut off eyelet.



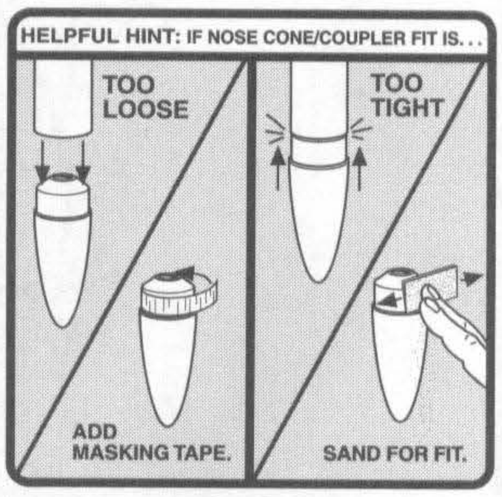
B. Pass shroud lines through eyelet.



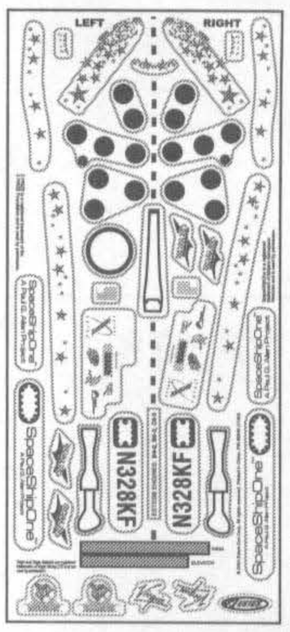
C. Pass parachute through loop.



D. Tie shock cord to nose cone using a double knot.



FINISHING YOUR ROCKET

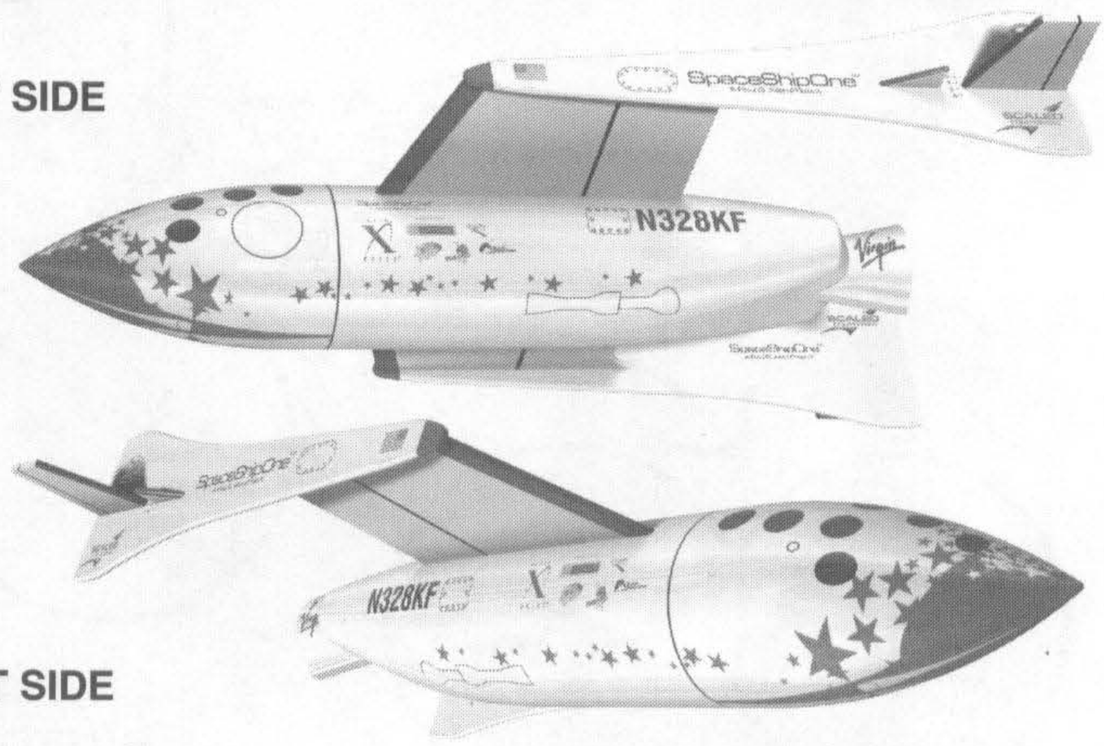


A. First spray rocket with white primer. Let dry and sand. Repeat until rocket is smooth. FOLLOW THE PAINT SCHEME ON THE PACKAGE.

B. When paint is dry, peel decals one at a time from backing sheet and apply where shown. Rub down to remove bubbles.

OPTIONAL: Spray a clear gloss coat on entire rocket after paint dries and after decal placement.

LEFT SIDE

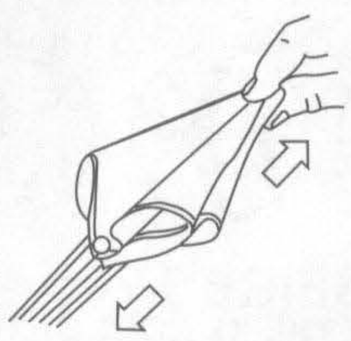


RIGHT SIDE

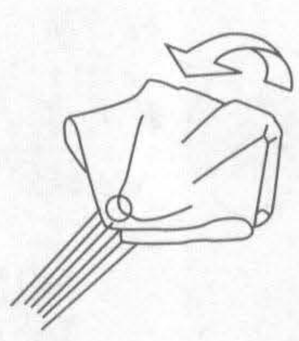
PREPARE PARACHUTE FOR FLIGHT

NOTE: Only Estes Wadding (#302274) Recommended.

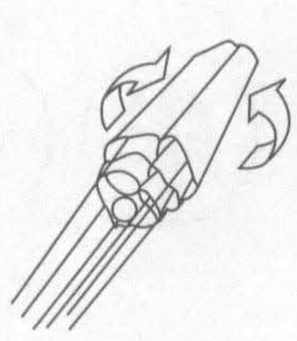
A. Insert 4-5 squares of loosely crumpled recovery wadding into rocket.



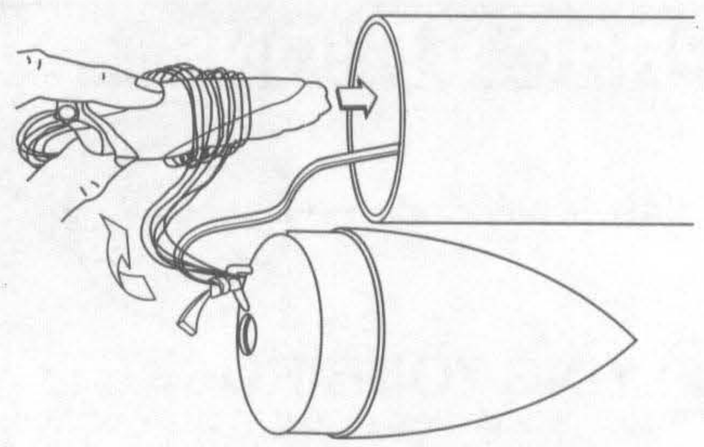
B. Spike parachute.



C. Fold.



D. Roll.

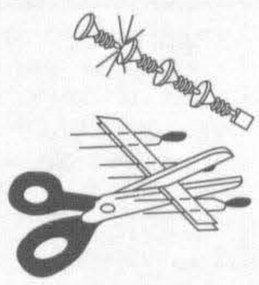


E. Wrap lines loosely. Insert parachute, shock cord and nose cone into body tube.

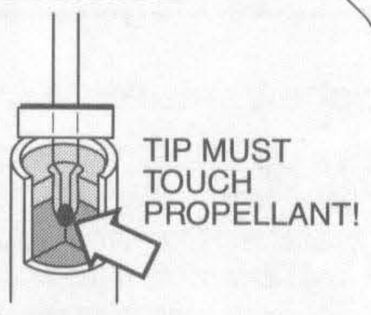
⚠ WARNING: FLAMMABLE

To avoid serious injury, read instructions & NAR Safety Code included with engines.
PREPARE YOUR ENGINE ONLY WHEN YOU ARE OUTSIDE AT THE LAUNCH SITE PREPARING TO LAUNCH!
If you do not use your prepared engine, remove the igniter before storing your engine.

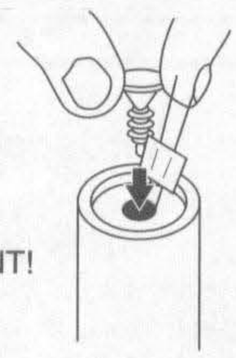
PREPARE ENGINE



A. Separate igniter and plug.

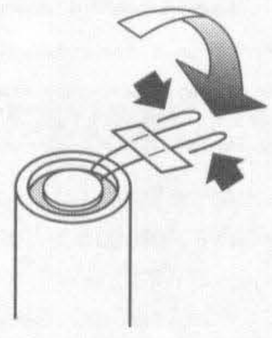


B. Insert igniter.

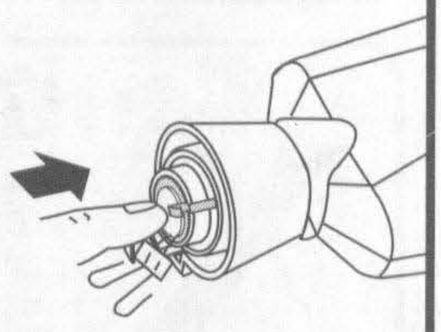


C. Insert plug.

D. Push down.

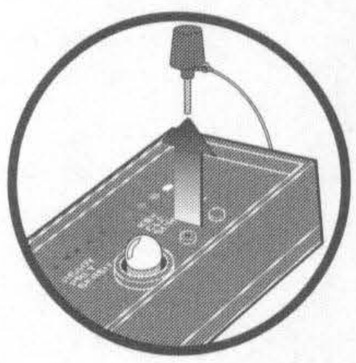


E. Bend igniter wires back as shown.



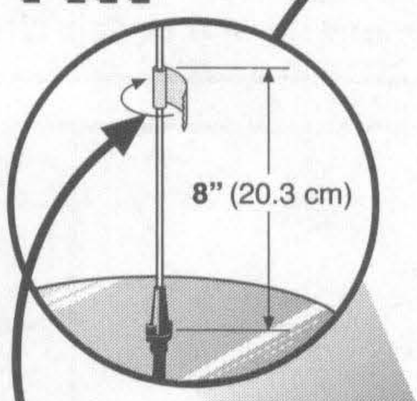
F. Insert engine.

COUNTDOWN AND LAUNCH



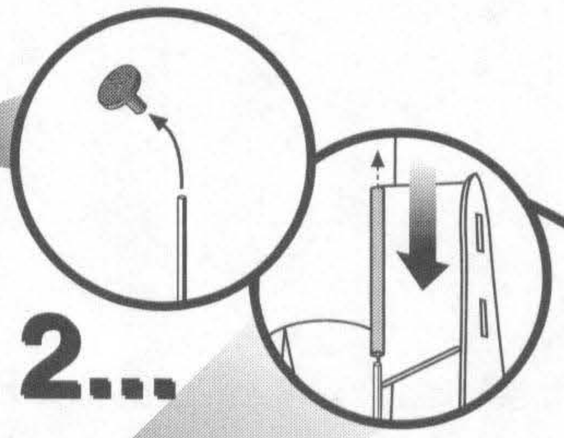
KEY ALWAYS OUT UNTIL FINAL COUNTDOWN!

1...

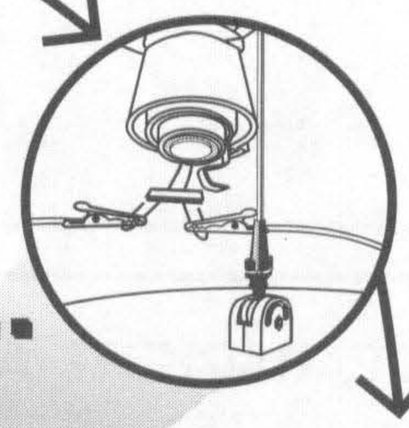


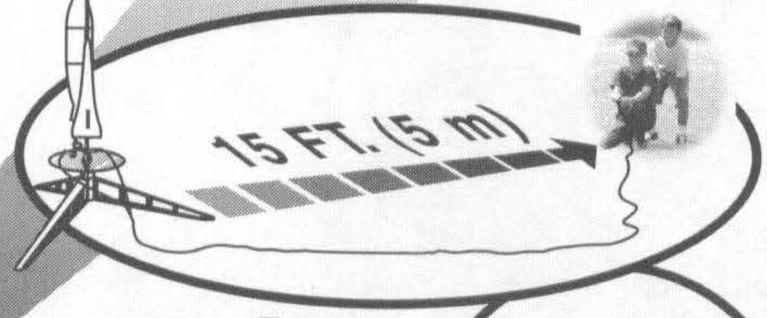
MASKING TAPE

2...

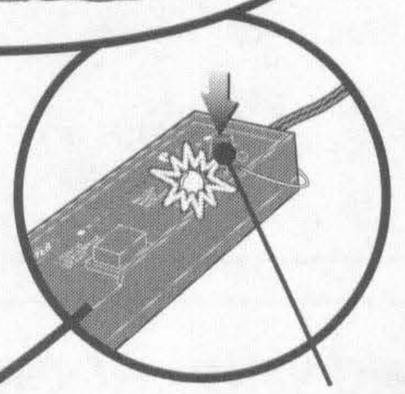


3...





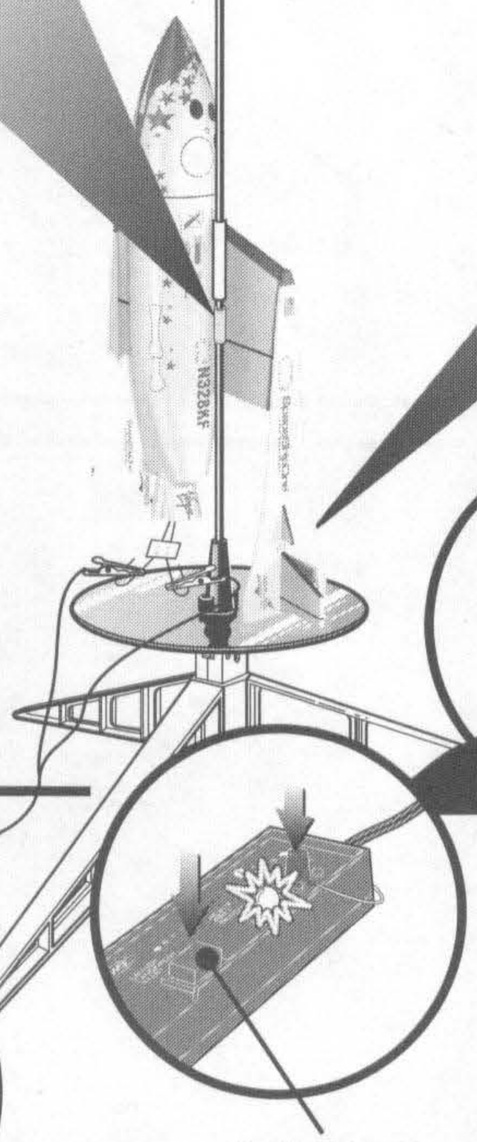
4...

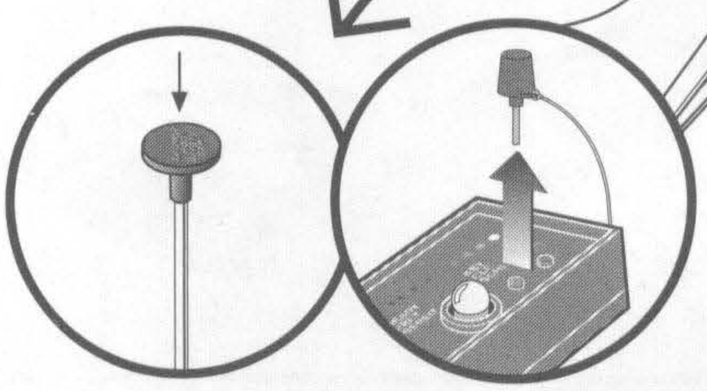


INSERT KEY. PUSH DOWN AND **HOLD**.

KEY

5...
4... 3... 2... 1...





HOLD KEY DOWN AND PRESS LAUNCH BUTTON UNTIL **LIFT-OFF!**

LAUNCH BUTTON

ESTES LAUNCH SUPPLIES

(Sold Separately)

- Porta Pad® II Launch Pad
- Electron Beam® Launch Controller
- Recovery Wadding
- Igniters (with engines)
- Igniter Plugs (with engines)
- Recommended Engines: B4-2, B6-2, C6-3

PRECAUTIONS

NAR Safety Code

NO DRY GRASS OR WEEDS

FLYING YOUR ROCKET

Choose a large field (500 ft. [152 m] square) free of dry weeds and brown grass. The larger the launch area, the better the chance of recovering your rocket. Football fields and playgrounds are great. Launch only with little or no wind and good visibility.

Always follow the National Association of Rocketry (**NAR**) Safety Code.

MISFIRES

TAKE THE KEY OUT OF THE CONTROLLER. WAIT ONE MINUTE BEFORE GOING NEAR THE ROCKET! Disconnect the igniter clips and remove the engine. Take the plug and igniter out of the engine. If the igniter has burned, it worked but did not ignite the engine because it was not touching the propellant inside the engine. Put a new igniter all the way inside the engine without bending it. Push the plug in place. Repeat the steps under Countdown and Launch.

ANSARI X PRIZE®

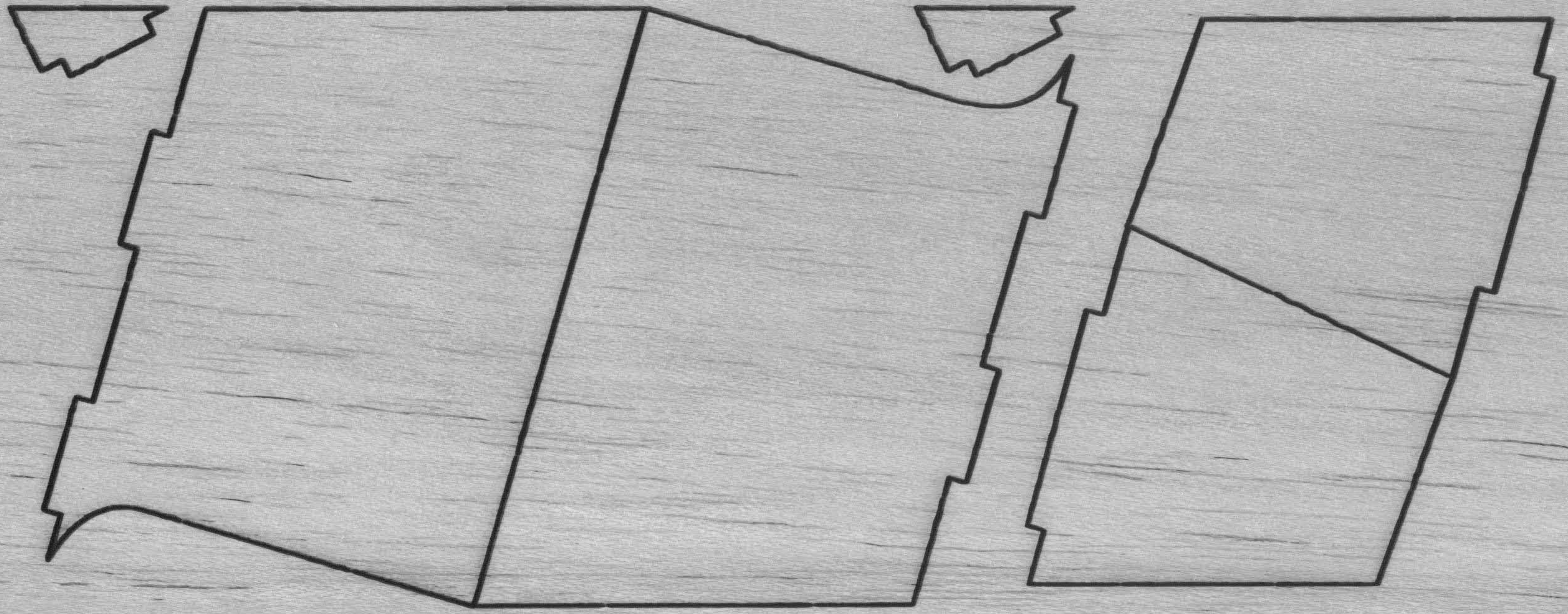
TEAM OVERVIEW Mojave Aerospace Ventures, LLC

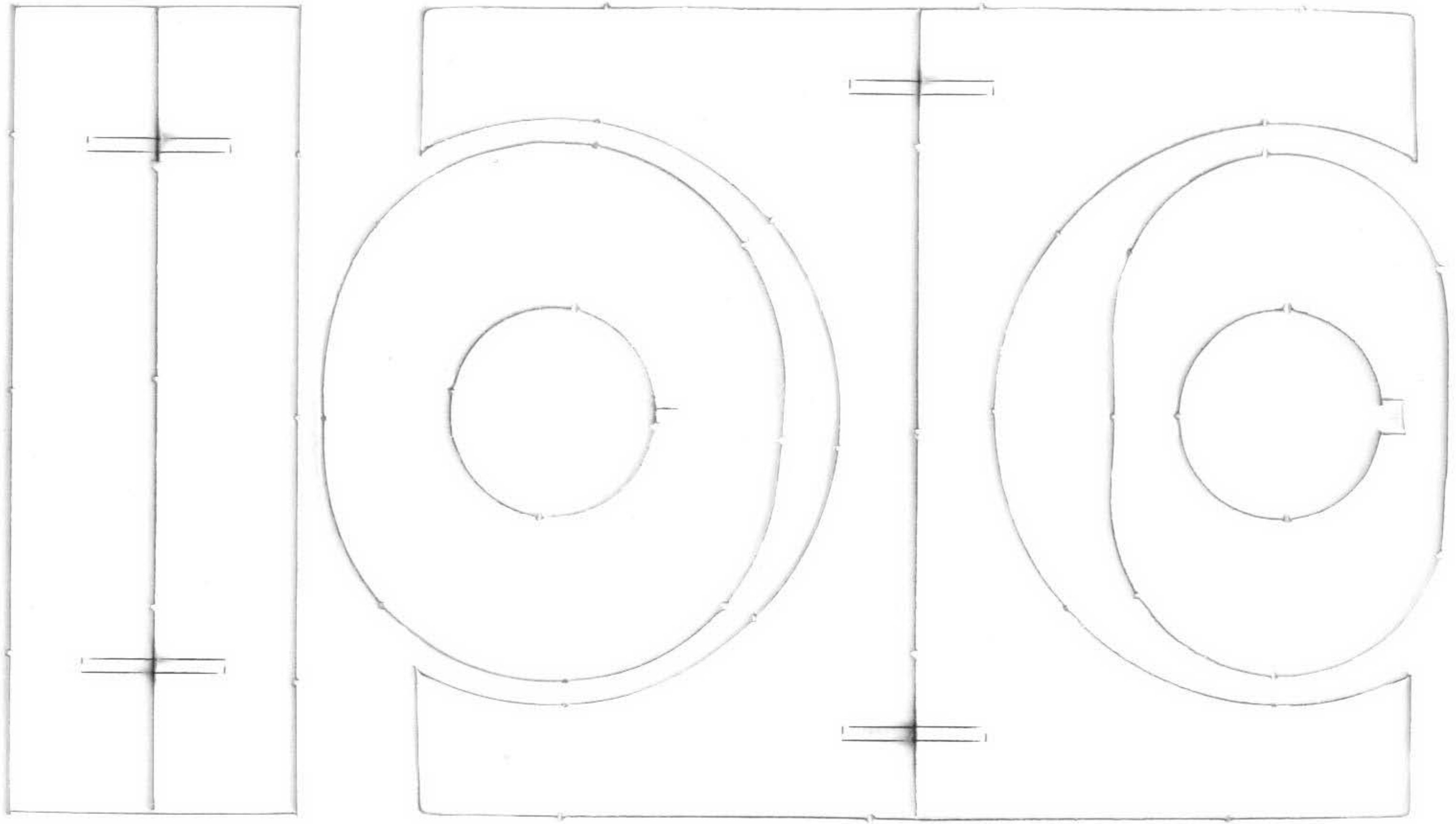
A joint venture between investor and philanthropist Paul G. Allen and Burt Rutan's Scaled Composites LLC, Mojave Aerospace Ventures was formed to investigate the possibility of commercially viable sub-orbital space flight. Allen, who is the co-founder of Microsoft® and the founder and chairman of Vulcan Inc., has been named one of the top 10 philanthropists in America. Scaled Composites is the world's most productive aerospace prototype development company. Scaled is currently developing new composite manufacturing processes for application to general and military aviation, and new space launch vehicles. The company currently employs 95 people at the Mojave, California airport.

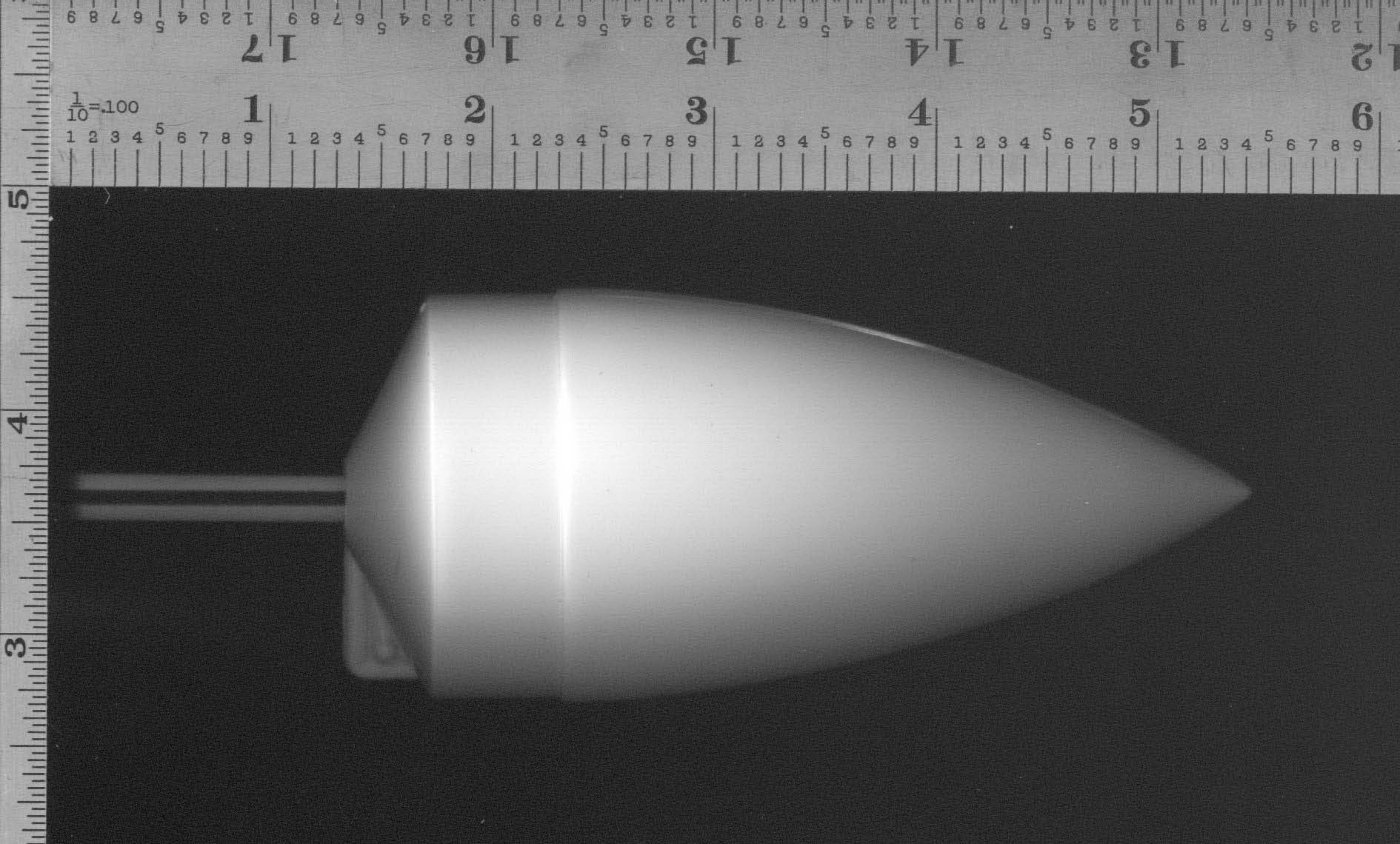
TEAM SPECIFICATIONS:
Name: Mojave Aerospace Ventures. Website: www.vulcan.com or www.scaled.com
Country of Origin: Mojave, California, USA

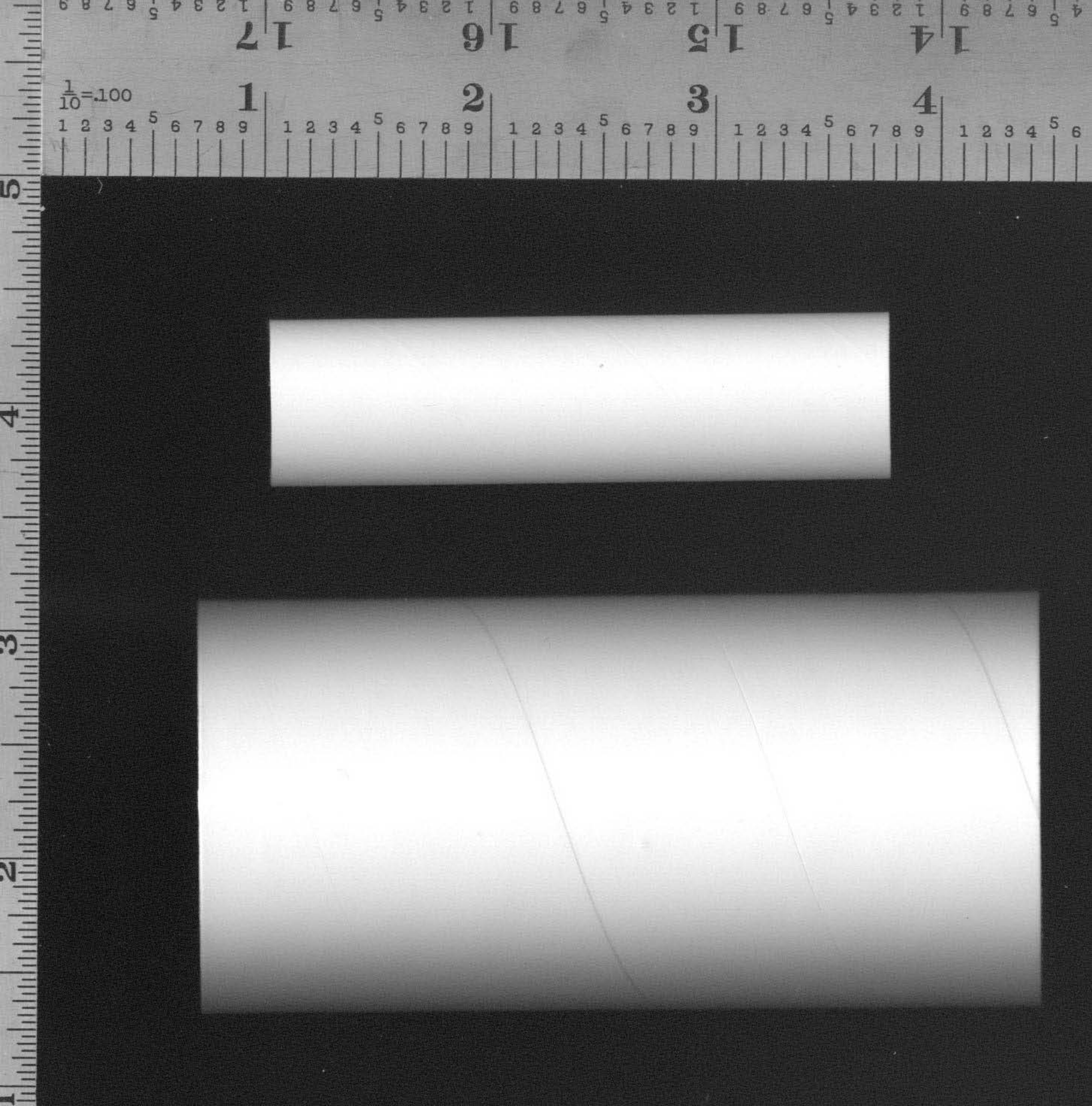
VEHICLE SPECIFICATIONS:
Name: SpaceShipOne™
Wingspan: 16.4 feet (5 m) Diameter: 5.4 feet. GTOW: undisclosed. Dry Weight: undisclosed. Engines: One hybrid rocket engine. Total Thrust: undisclosed. Payload Capacity: 3 crew members.
Crew Environment: Short-sleeved, pressurized cabin.

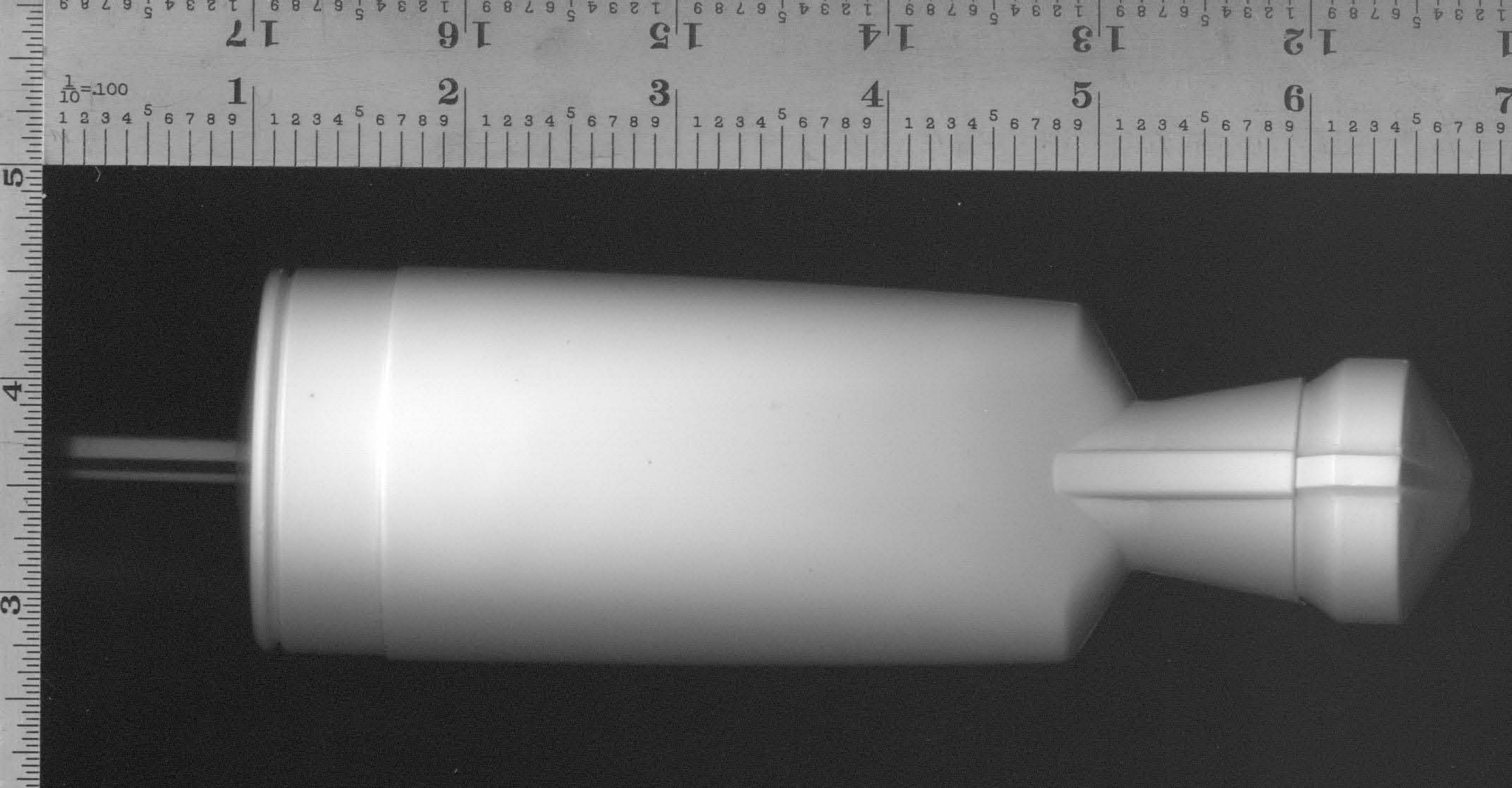
MISSION SPECIFICATIONS:
Launch Method: Carrier aircraft (White Knight™). Max Accel. Force on Ascent: 3-4 Gs. Max Speed: Mach 3.5 (240 knots). Max. Altitude: 62 miles (100 km). Time in Weightless Conditions: 210 seconds. Landing Method: Unpowered horizontal. Total Flight Duration: 90 minutes.







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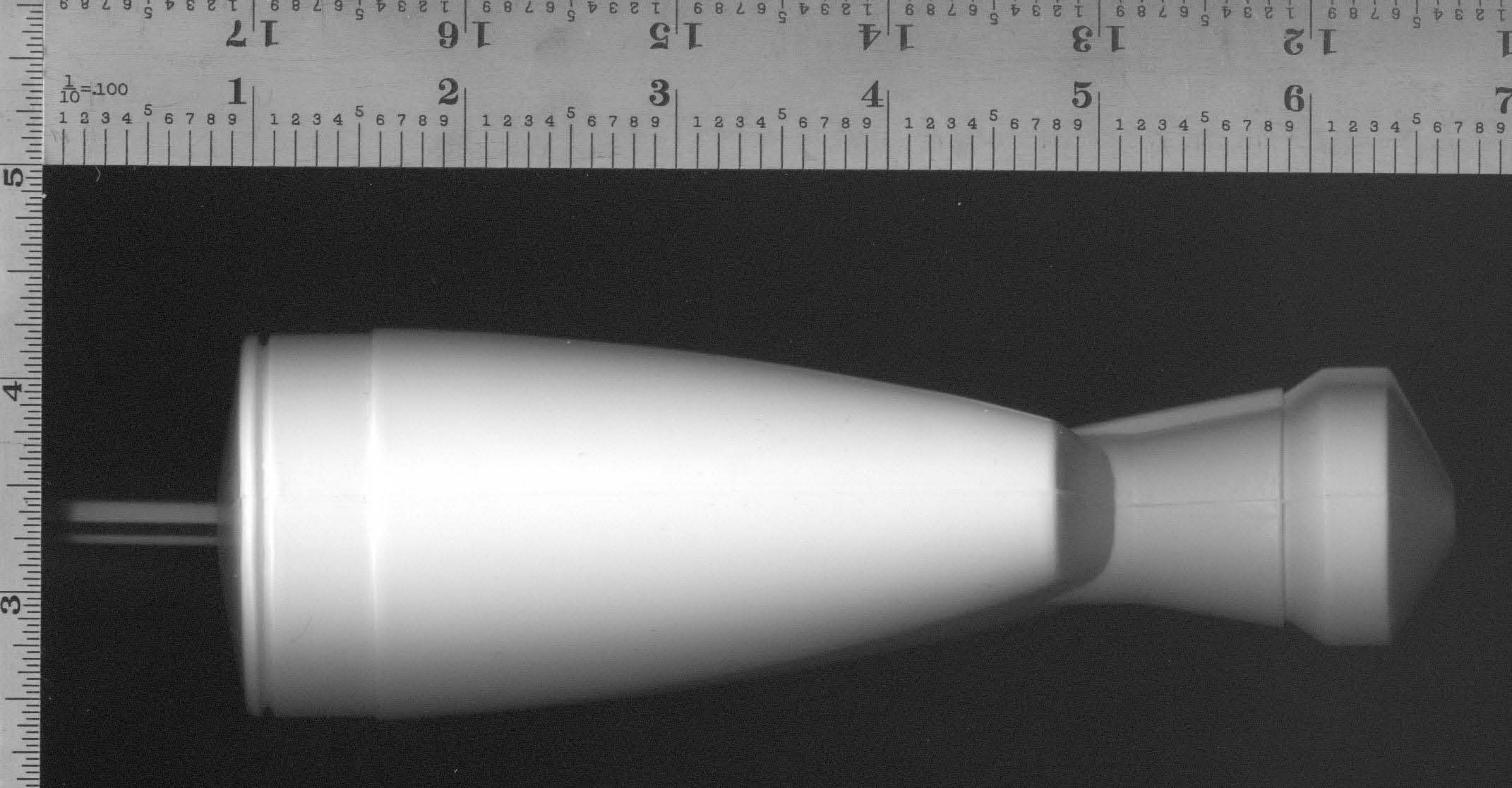

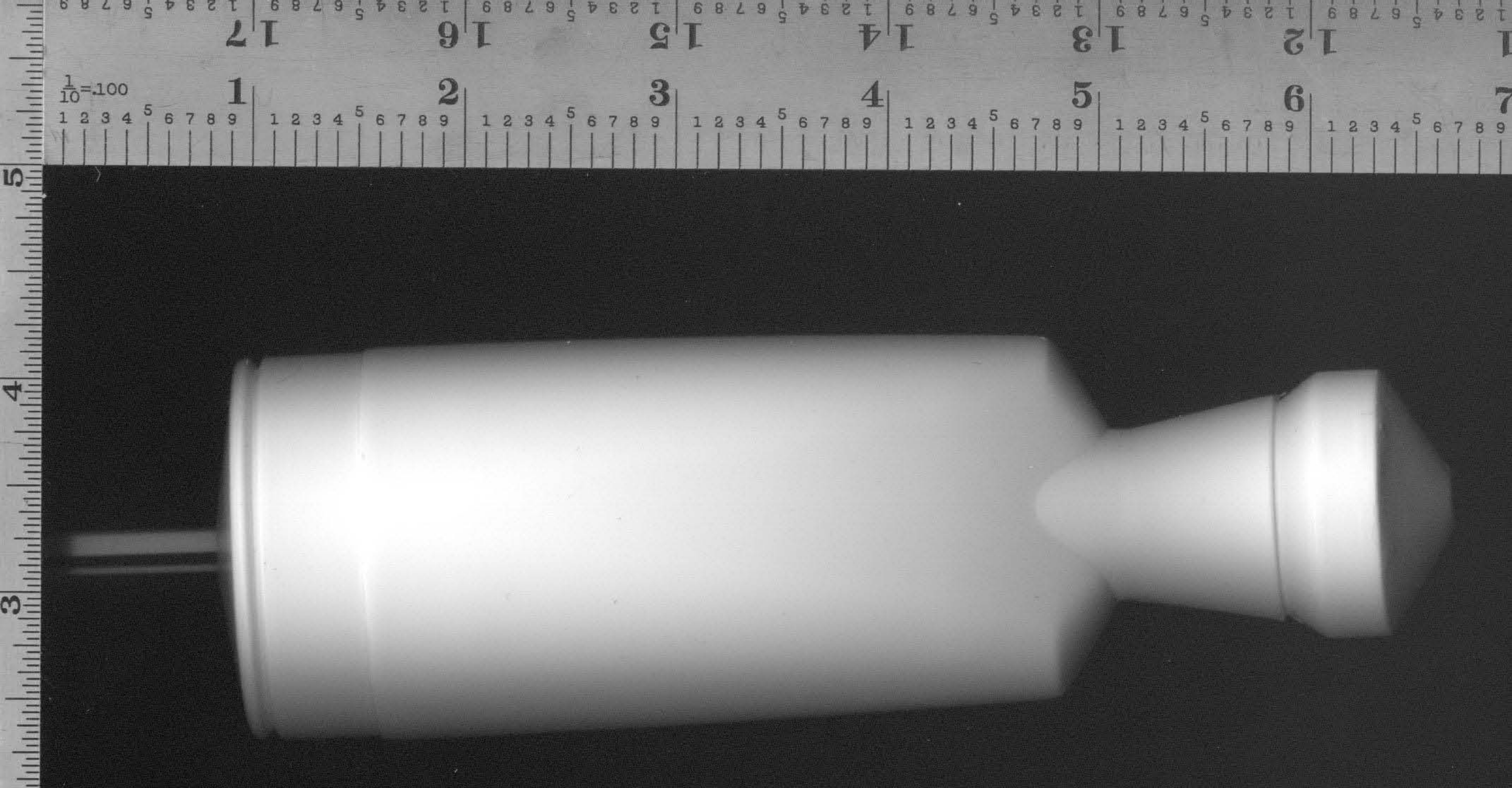
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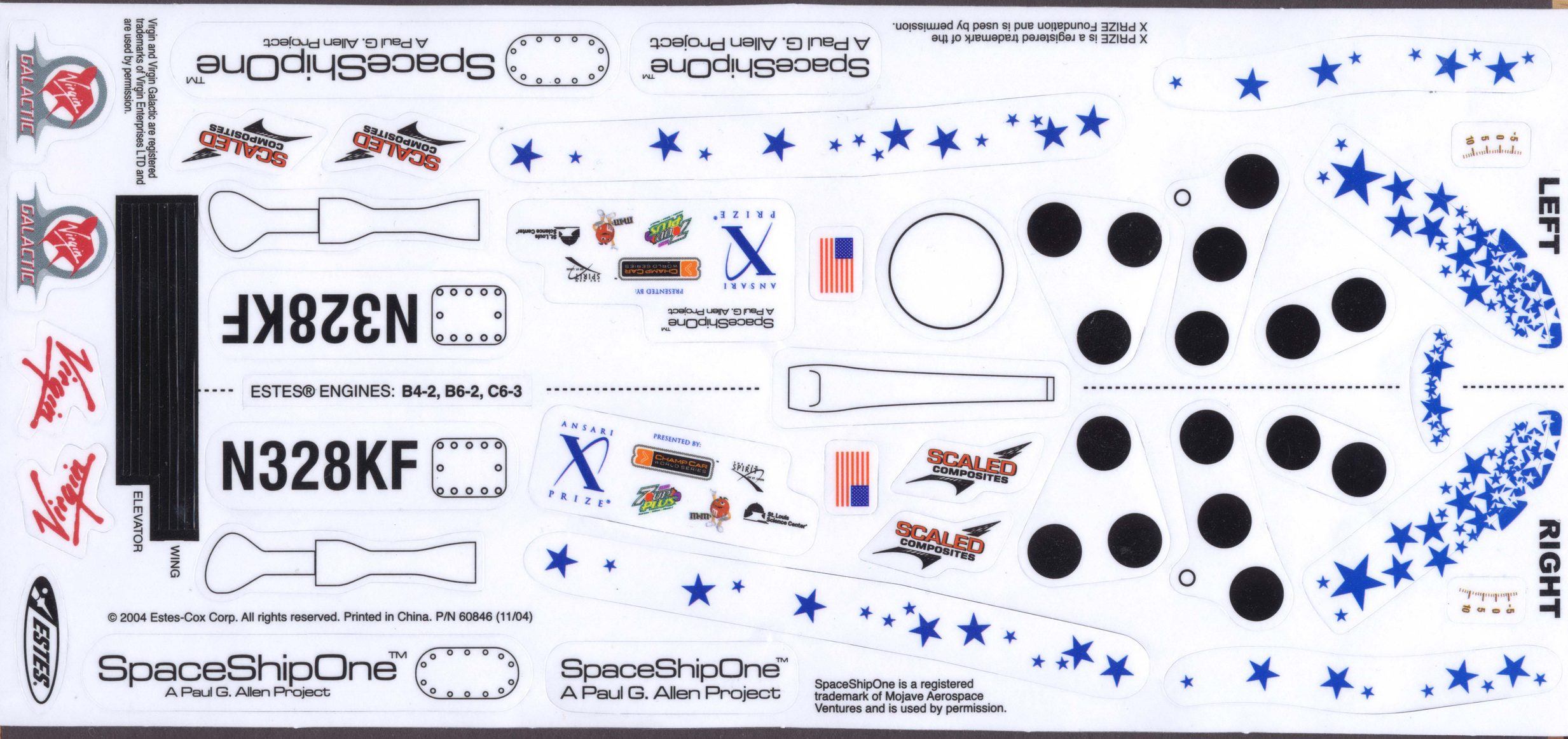

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