

## About Semroc Astronautics Corporation

Semroc Astronautics Corporation was started by Carl McLawhorn in his college dorm at North Carolina State University in November, 1967. Convincing a small group of investors in his home town of Ayden, North Carolina to invest in a small corporation, the company was re-incorporated as Semroc Astronautics Corporation on December 31, 1969.

Semroc produced a full line of model rocket kits and engines. At its peak, Semroc had twenty-five full time employees working at two facilities. One was for research and development, printing, shipping, and administration. The other was outside town and handled all production and model rocket engine manufacturing. For several years, Semroc was successful selling model rocket kits, supplies, and engines by mail-order and in hobby shops. In early 1971, Semroc became insolvent and had to close its doors.

After 31 years of dreams and preparations, Semroc Astronautics Corporation was reincorporated on April 2, 2002 with a strong commitment to helping put the fun back into model rocketry.

## About the MX-774™

The MX-774 started as the American version of the German, but took the original design much further. Three innovations made the MX-774 Hiroc (high-altitude rocket) a major historical landmark in American long range rocketry. The first was the unique thin-walled propellant tanks that used the pressure of the propellants to provide strength. This was used on most of the later large rockets. The second was using engines that were gimballed under gyroscopic guidance control. The MX-774 was the largest rocket to use that concept that was tested by Robert Goddard years earlier. The third was the separable nose cone that would be used later as a method to deploy warheads (and astronauts.)

The first flight was on July 13, 1948 from White Sands. It was only moderately successful, but proved the concepts. There were only two more flights of the MX-774, but it marked the beginning of the highly successful Atlas program that would boost the first American into orbit.

December 17, 2012

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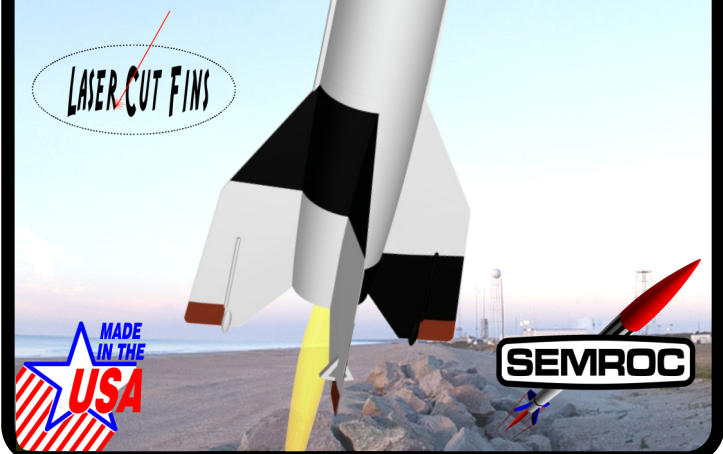
# MX-774™

**1:20 SCALE MODEL**

**HISTORIC MODEL**

**BALSA FINS,  
NOSE CONE &  
TAIL CONE**

**FLYING MODEL  
ROCKET KIT**



Made in the U.S.A by Semroc Astronautics Corporation - Knightdale, N.C. 27545

## MX-774™ Kit No. KS-12

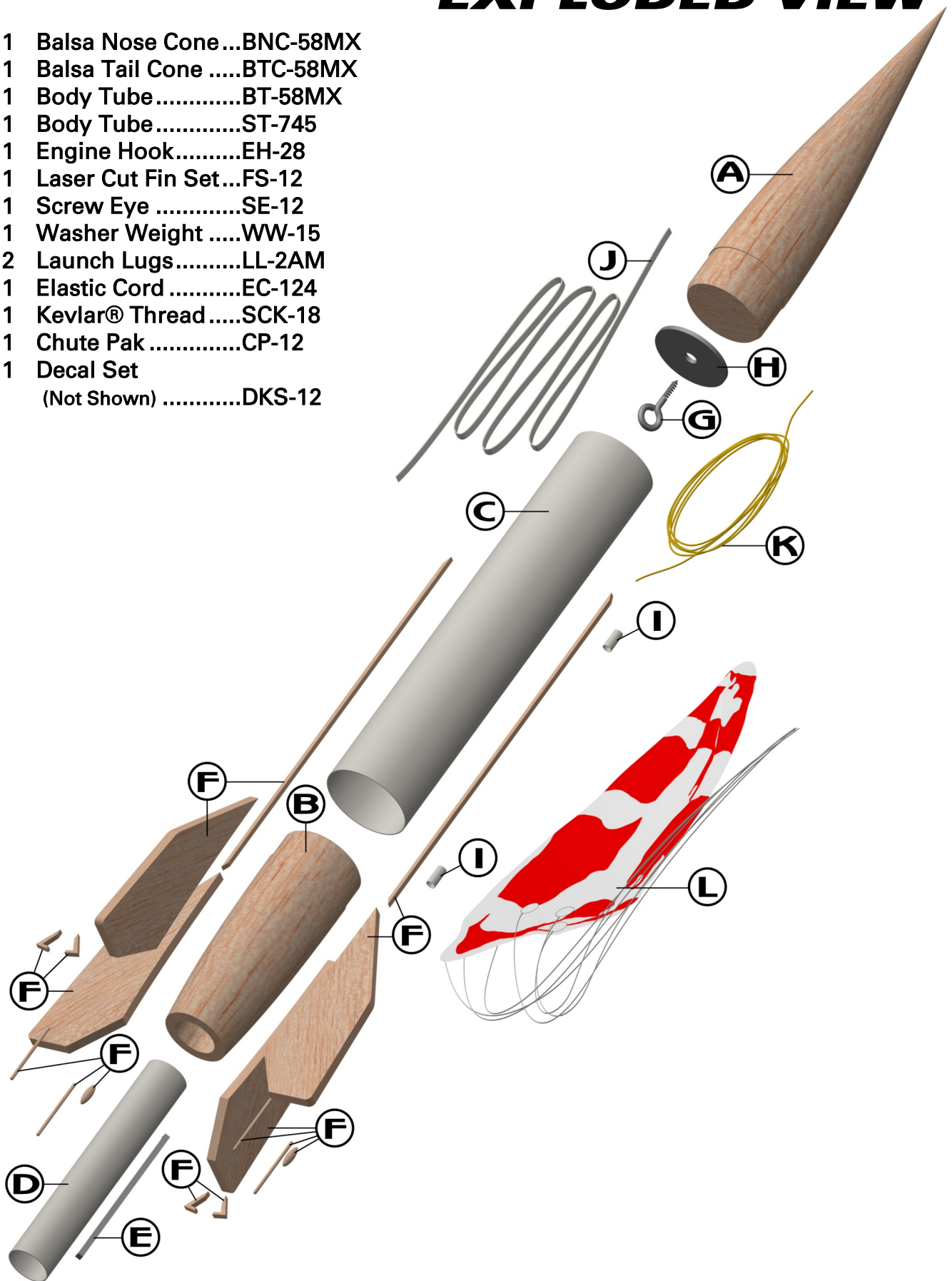
Specifications	Engine	Approx. Altitude
Body Diameter 1.54" (3.9 cm)	A8-3	125'
Length 19.4" (49.3 cm)	B6-4	350'
Fin Span 4.6" (11.7 cm)	C6-5	850'
Net Weight 1.9 oz. (53.9 g)		

**PARACHUTE RECOVERY**

# Parts List

# EXPLODED VIEW

- A 1 Balsa Nose Cone...BNC-58MX
- B 1 Balsa Tail Cone .....BTC-58MX
- C 1 Body Tube.....BT-58MX
- D 1 Body Tube.....ST-745
- E 1 Engine Hook.....EH-28
- F 1 Laser Cut Fin Set...FS-12
- G 1 Screw Eye .....SE-12
- H 1 Washer Weight .....WW-15
- I 2 Launch Lugs.....LL-2AM
- J 1 Elastic Cord .....EC-124
- K 1 Kevlar® Thread.....SCK-18
- L 1 Chute Pak .....CP-12
- M 1 Decal Set  
(Not Shown) .....DKS-12



## BEFORE YOU START!

Make sure you have all the parts included in this kit that are listed in the Parts List in these instructions. In addition to the parts included in this kit, you will also need the tools and materials listed below. Read the entire instructions before beginning to assemble your rocket. When you are thoroughly familiar with these instructions, begin construction. Read each step and study the accompanying drawings. Check off each step as it is completed. In each step, test-fit the parts together before applying any glue. It is sometimes necessary to sand lightly or build-up some parts to obtain a precision fit. If you are uncertain of the location of some parts, refer to the exploded view to the left. It is important that you always ensure that you have adequate glue joints.

## TOOLS

In addition to the parts supplied, you will need the following tools to assemble and finish this kit.



**NOTE:** This kit is designed for Round 1 or Round 2 of the MX-774 flights. To make the longer version of the Round 3 flight, you will need a BT-58MY body tube (1.75" long) and a JT-58C coupler to provide the additional scale length.

## ASSEMBLY

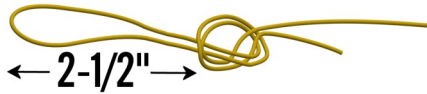
1. These instructions are presented in a logical order to help you put your MX-774™ together quickly and efficiently. Check off each step as you complete it and we hope you enjoy putting this kit together.

## ENGINE MOUNT

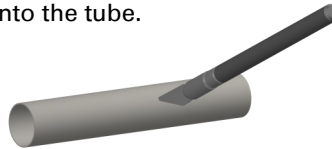
2. Bend the engine hook (EH-28) slightly so it forms a slight bow in the direction shown.



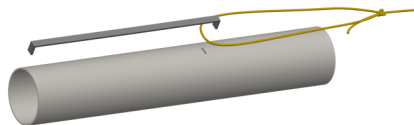
3. Tie a loop in one end of the yellow Kevlar® cord (SCK-18) leaving 2-1/2" between the loop and the knot. Pull knot tight.



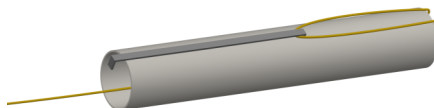
4. Place a small mark 2" from the top of the engine tube (ST-745). Using the hobby knife, punch a small slit into the tube.



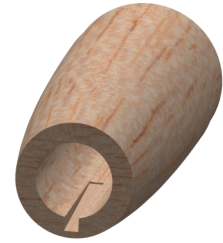
5. Insert the top end of the engine hook through the loop in the Kevlar cord and into the engine tube at the punched slit.



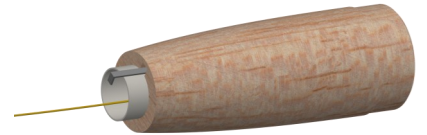
6. Pull the top end of the Kevlar cord through the engine tube until it is tight.



7. Using the hobby knife, cut a groove in the small end of the tail cone (BTC-58MX). It should be about 1/8" x 1/8" at the end and taper back for about an inch, maintaining 1/8" width. This is the groove that the engine hook will reside.

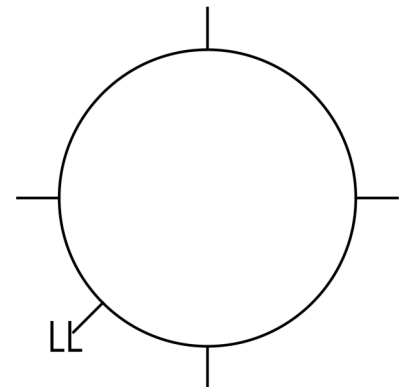


8. Apply a bead of glue inside the tail cone, keeping glue at least 1/4" away from the groove. Align the engine hook with the groove and while holding the Kevlar cord tight, insert the engine mount assembly into the tail cone until the top of the engine tube is even with the top of the tail cone. Run a bead of glue around the top of the tail cone at the joint with the engine tube.



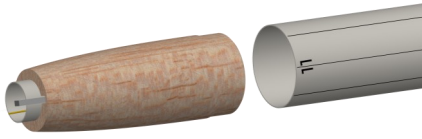
## MARK TUBE

9. Stand the body tube (BT-58MX) on the fin guide below and make the fin position marks and launch lug (LL) mark on the sides of the tube. Find a convenient channel or groove such as a partially open drawer, a door jamb or a piece of molding. Using the channel, extend the marks the full length of the tube to provide lines for aligning the fins. Mark the LL line for later.





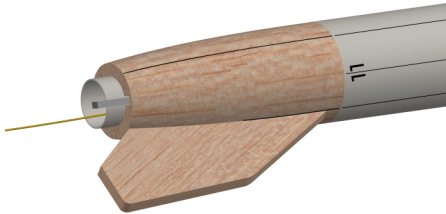
- ❑ 10. Apply a bead of glue just inside the main tube and insert the tail cone with the engine hook aligned with the LL line. Allow to dry.



## FIN PREPARATION

- ❑ 11. Lightly sand each side of the two laser-cut fin sheets (FS-12). Carefully push the large laser-cut fins from their sheet. Start at one point on each fin and slowly and gently work around the fin. Since the fin sheet is 3/16" thick, a hobby knife may be needed to cut around some of the fins.

- ❑ 12. Use one of the large fins to place alignment marks on the tail cone. Align the top edge of the fin in line with one of the fin lines drawn on the main body tube. Extend the line along the length of the fin on the tail cone. Sight from the bottom to make sure it is parallel with the line on the body tube. Extend the other three fin lines.

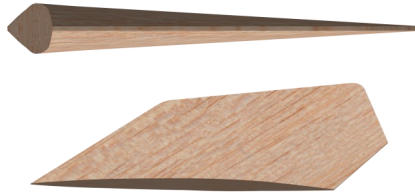


- ❑ 13. The fins are the most difficult task of this assembly. Patience and careful sanding will provide a good scale shape for the fins. Begin by marking the centerline around all the fins. Use a sharp felt-tip pen or sharp, soft pencil to place a mark around the edge of each fin at the halfway point. This will be used while sanding to keep the sides symmetrical.



- ❑ 14. Sand the top and bottom of each fin with a bevel from the root edge to the tip edge. Leave the root edge at its nominal size and sand so the tip is about .05" thick. Use the marks around the fins to get the sides even. After the bevel is com-

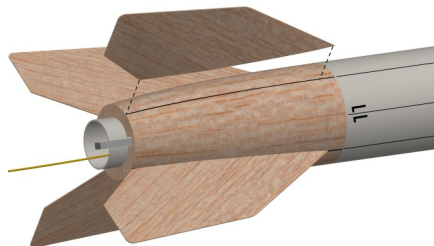
pleted, sand a convex shape on each side leaving the chord (middle of the fin from root to tip) of each side alone. Refer to the drawings below. Use the centerline drawn as a guide. Fill the thin edges with cyanoacrylate (CA) glue for more strength.



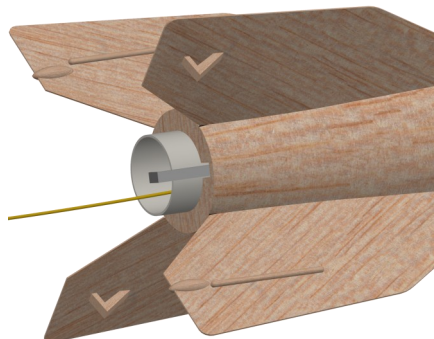
- ❑ 15. Remove the two long conduits from the other sheet and sand to a half round cross section.

## ATTACH FINS

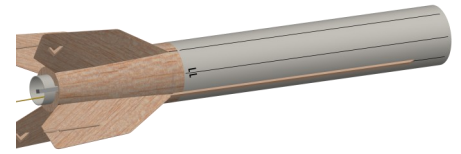
- ❑ 16. Apply glue to the root edge of one of the fins and position it along one of the lines drawn on the side of the tail cone and even with the end of the tail cone. Remove, allow to almost dry, apply additional glue, and reposition. Repeat for the other three fins. Allow to dry in an upright position, checking frequently to make sure they remain aligned.



- ❑ 17. Remove the small pieces from the second balsa sheet. There are a few extra pieces in case some break before they are glued. Use the photo below for placement. It is not necessary to add these parts, but the extra time and care will make a more "scale-like" model.

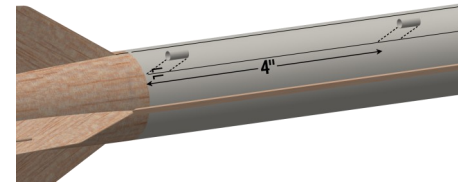


- ❑ 18. Apply glue to the root edge of one of the conduits and position it along one of the lines drawn on the side of the body tube touching the leading edge of the fin with the long actuators. Allow to dry in an upright position, checking frequently to make sure it remains aligned. Repeat on the opposite side using the other balsa conduit.



## LAUNCH LUGS

- ❑ 19. Glue one of the launch lugs (LL-2AM) on the line marked LL and even with the bottom of the tube. Glue the second launch lug about 4" from the bottom of the tube and in line with the first launch lug on the line marked LL. Sight down the tube to make sure they are aligned.



## APPLY FILLETS

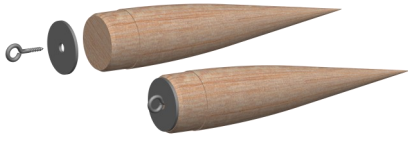
- ❑ 20. After the fins and launch lugs are completely dry, run a small bead of glue along both sides of each fin-body tube joint. Using your forefinger, smooth the glue into fillets. Apply a fillet of glue on each side of the launch lugs. Allow this assembly to dry in a vertical position.

## NOSE CONE

- ❑ 21. Insert the nose cone (BNC-58MX) in the top of the body tube and check for proper fit. The nose cone should be snug to hold itself in alignment. If it is too loose, add some masking tape. If it is too tight, sand the shoulder slightly.

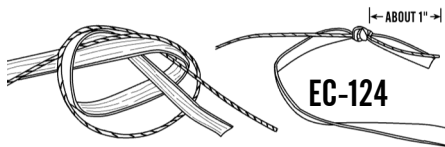
- ❑ 22. Twist the screw eye (SE-12) into the center of the base of the nose cone. Remove it and squirt a drop of glue into the hole. Reinsert the screw eye through the washer

weight (WW-15) and into the nose cone until the eye and weight are flush with the base of the nose cone.



## FINAL ASSEMBLY

❑ **23.** Tie the free end of the Kevlar® cord to one end of the elastic cord (EC-124) using an overhand knot. Pull the elastic cord and Kevlar cord back through the tail cone and main body tube and out the top of the tube.

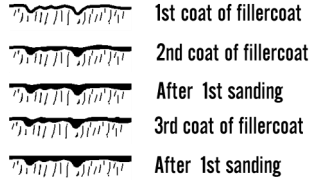


❑ **24.** Assemble the chute (CP-12) using instructions provided with it. Pull the lines tight on the chute and make sure they are all of equal length. Attach the chute by tying them to the screw eye. Put a drop of glue on the joint to keep the lines from moving. Attach the free end of the elastic cord to the screw eye. Put a drop of glue on that joint as well.



## FINISHING

❑ **25.** When the fillets have dried, prepare balsa surfaces for a smooth professional looking finish. Fill the wood grain with balsa fillercoat or sanding sealer. When dry, sand with fine sandpaper. Repeat until smooth.



❑ **26.** After all balsa surfaces have been prepared, wipe off all balsa dust with a dry cloth. First spray the model with an enamel primer. Choose high visibility colors like white and black for the final colors.

❑ **27.** Spray painting your model with a fast-drying enamel will produce the best results. PATIENCE...is the most important ingredient. Use several thin coats, allowing each coat to completely dry before the next coat. Start each spray a few inches above the model and end a few inches below the model. Keep the can about 12" away and use quick light coats. The final coat can be a little heavier to give the model a glossy wet-looking finish.

❑ **28.** After the paint has dried, decals should be applied. The decals supplied with the MX-774 are water-slide decals. They are not scale, since the original MX-774 almost no markings. They may be used to identify your model if it is built as a semi-scale. Each decal should be cut separately from the sheet. Think about where you want to apply each decal and check for fit before wetting the decal. Dip each decal in a small dish of water that has a drop of detergent. It will take about 30 seconds before the decal is loose enough to apply.

❑ **29.** Slide the decal in place and use the paper backing to work the bubbles out. Repeat for all the decals.

## FLIGHT PREPPING

❑ **30.** Mounting the engine: Insert the engine and make sure the engine hook keeps the engine snugly. The hook may be slightly bent to make sure the engine is retained.

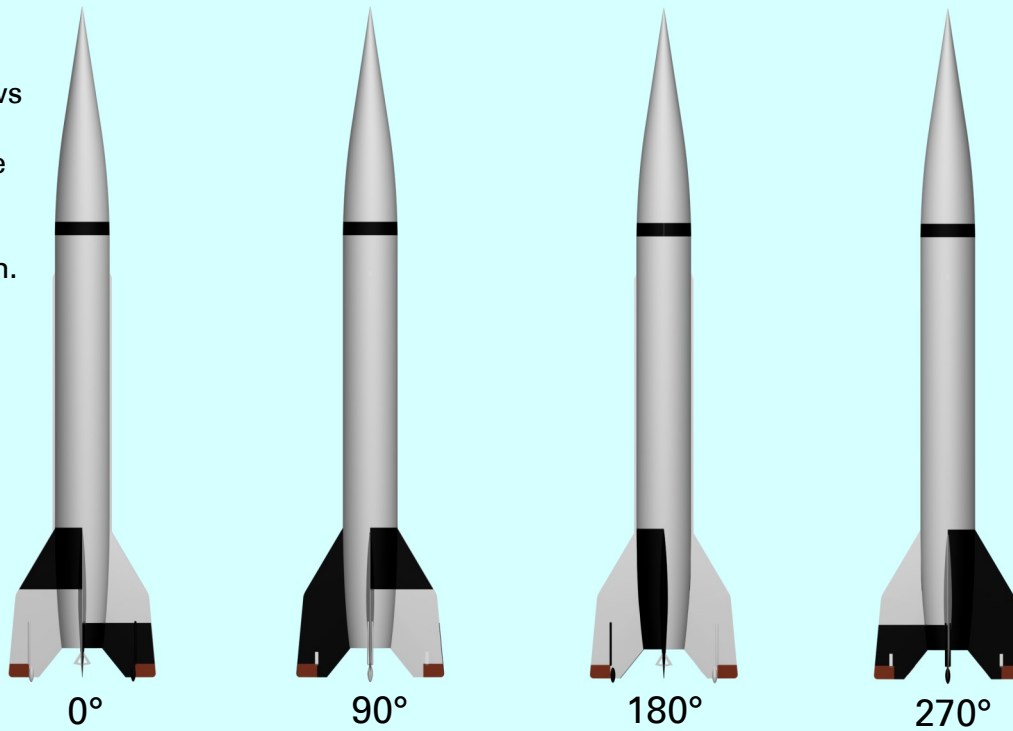
❑ **31.** Apply a few sheets of recovery wadding in the top of the sustainer body tube. Fold the parachute and pack it and the shock cord on top of the recovery wadding. Slide the nose cone into place, making sure it does not pinch the shock cord or parachute.

❑ **32.** Refer to the model rocket engine manufacturer's instructions to complete the engine prepping. Different engines have different igniters and methods of hooking them up to the launch controllers.

❑ **33.** Carefully check all parts of your rocket before each flight as a part of your pre-flight checklist. Launch the MX-774™ from a 1/8" diameter by 36" long launch rod.

❑ **34.** After each flight, promptly remove the spent engine casing and dispose of properly.

Paint views  
90° apart.  
Colors are  
white,  
black and  
red-brown.



Close-up photo of actuators, tabs, and other parts for more detailed finishing.

