

## 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 Nike-Tomahawk™

The Nike-Tomahawk was designed by the Sandia Corporation to launch 100 pound payloads for the Atomic Energy Commission to altitudes of 200 miles. The first flight was from Tonopah, Nevada on July 25, 1963. Marrying the reliable Nike booster, which was used as the lower stage for many different configurations, and the Sandia Tomahawk, the Nike-Tomahawk has had a successful life, performing a wealth of experiments at high altitudes. Over 300 launches have occurred, of which over 220 were conducted by NASA.

## About Deci-Scale™

Semroc's new line of Deci-Scale™ models includes 1/10 (deci) scale kits of many of the early sounding rockets. The Deci-Scale™ kits are intended to be fun to build, providing the beginning average modeler with all the parts needed to build a reasonably close scale model. An advanced scale modeler will find the included parts are very close to the exact scale that are needed for much closer models.

The Deci-scale™ line was inspired by G. Harry Stine who said, "the best beginner's scale model I've ever found is the Thiokol-NASA I.Q.S.Y Tomahawk." He designed a 1/10 scale model for Centuri Engineering Company that was very popular and sold for many years. As he and others have found, 1/10 scale is almost perfect for many of the favorite rockets and missiles of the early days of space flight.

December 16, 2012

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Box 1271 Knightdale, NC 27545 (919) 266-1977

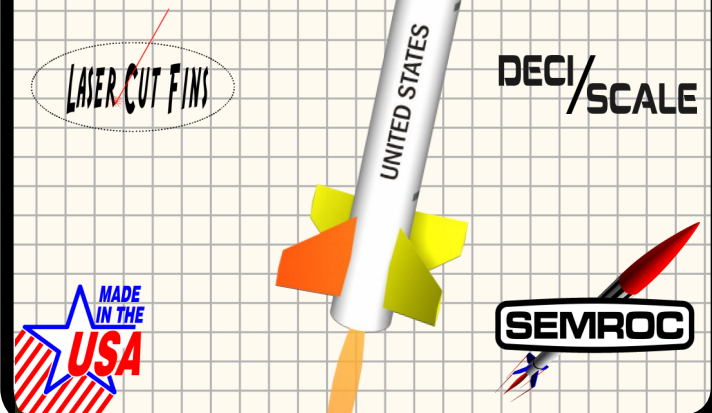
# NIKE- TOMAHAWK™

**1/10 SEMI-SCALE  
MODEL**

**OVER 3 FEET  
TALL**

**EASY TO BUILD  
& FUN TO FLY**

FLYING MODEL  
ROCKET KIT



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

## Nike-Tomahawk™ Kit No. KD-7

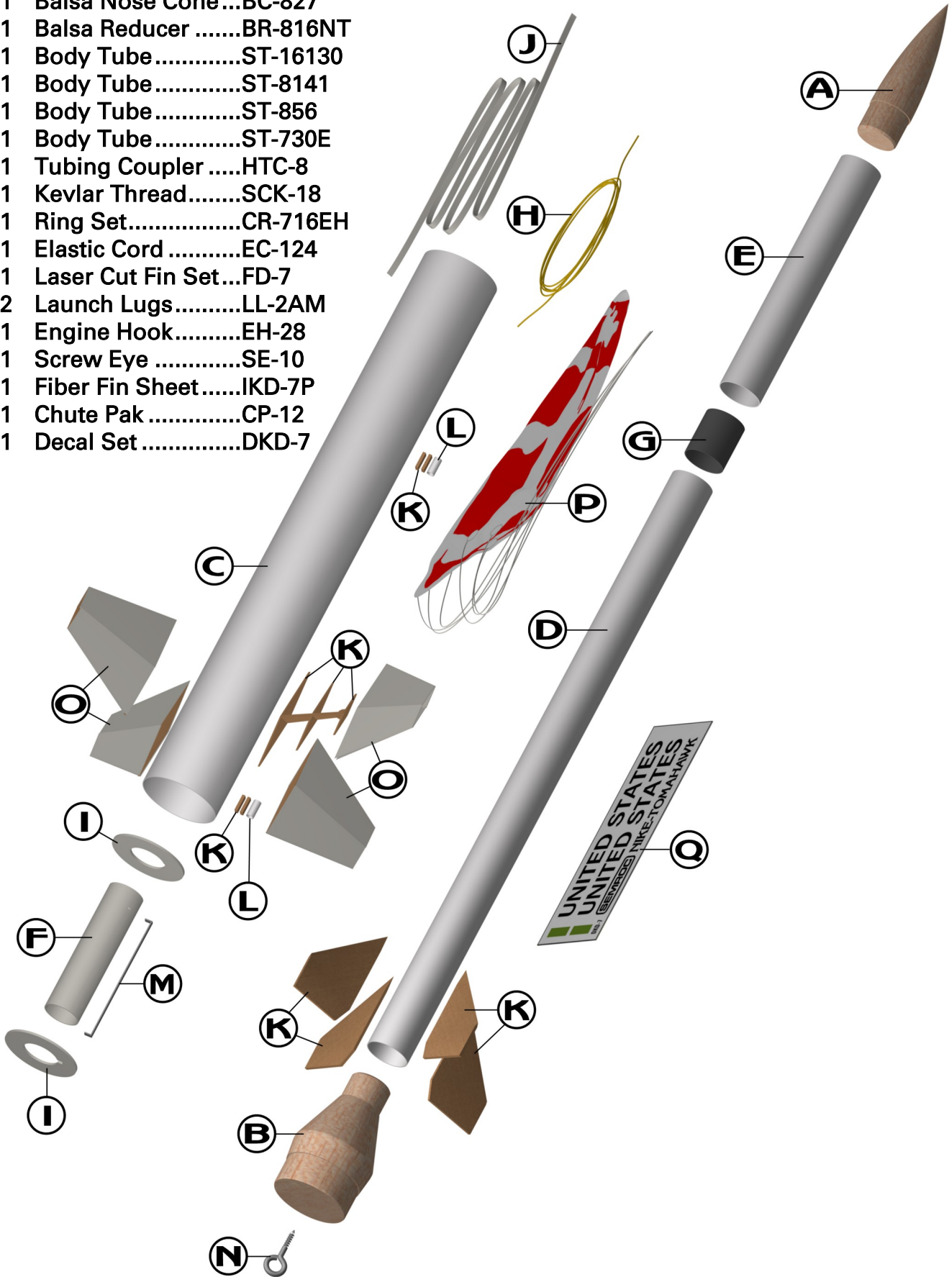
Specifications	Engine	Approx. Altitude
Body Diameter 1.64" (4.2 cm)	A8-3	100'
Length 37.1" (94.2 cm)	B6-4	250'
Fin Span 6.3" (16.0 cm)	C6-5	600'
Net Weight 2.3 oz. (65.3 g)		

**PARACHUTE RECOVERY**

# Parts List

# EXPLODED VIEW

- A 1 Balsa Nose Cone...BC-827
- B 1 Balsa Reducer .....BR-816NT
- C 1 Body Tube.....ST-16130
- D 1 Body Tube.....ST-8141
- E 1 Body Tube.....ST-856
- F 1 Body Tube.....ST-730E
- G 1 Tubing Coupler .....HTC-8
- H 1 Kevlar Thread.....SCK-18
- I 1 Ring Set.....CR-716EH
- J 1 Elastic Cord .....EC-124
- K 1 Laser Cut Fin Set...FD-7
- L 2 Launch Lugs.....LL-2AM
- M 1 Engine Hook.....EH-28
- N 1 Screw Eye .....SE-10
- O 1 Fiber Fin Sheet.....IKD-7P
- P 1 Chute Pak .....CP-12
- Q 1 Decal Set .....DKD-7



## 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.



## ASSEMBLY

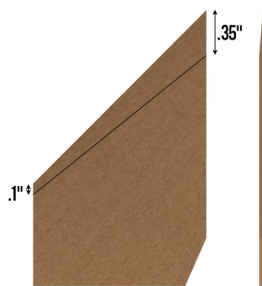
1. These instructions are presented in a logical order to help you put your Nike-Tomahawk™ together quickly and efficiently. Check off each step as you complete it and we hope you enjoy putting this kit together.

## FIN PREPARATION

2. Lightly sand each side of the laser-cut fin sheet (FD-7). Carefully push the four laser-cut fins from the sheet. Start at one point on each fin and slowly and gently work around the fin. Leave the smaller parts in place for now.

3. Stack the fins and line them up squarely and sand the fins back and forth over some fine sandpaper to get rid of the hold-in tabs.

4. Using the photo below, mark a line on both sides of each fin as shown. Sand a bevel on both sides from the leading edge to the line.



5. Use care in removing one set of the small parts from the fin sheet. Until glued, they are easy to break. Lay out the set as shown below. Punch out the two small square holes with a pen.



6. Select the tip rib (smallest) and its brace. Glue the brace to the tip rib using the marked outline on the rib as a guide. Allow to dry.



7. Carefully insert the center rib into the brace until the small tabs are against the tip rib. Make sure it is at a right angle to the brace and glue in place. Keep glue off the outer surfaces so they do not interfere with the fin covers later. Allow to dry.



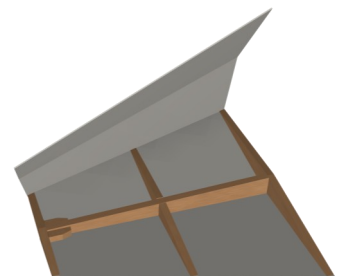
8. Glue the center rib into the root rib. Make sure it forms a right angle with the root rib. Allow to dry.



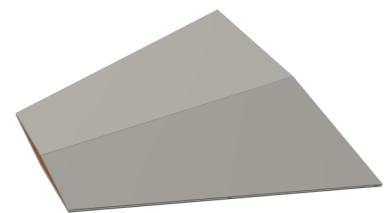
9. Attach the two mid ribs into the center brace. Make sure they are seated against the center brace. The ends of the mid ribs should be off the work surface the same amount on each side. Make sure both ribs form right angles with the center brace. Allow to dry.



10. Cut out one of the fin covers on the solid lines. Using a straight-edge as a guide, mark a crease along the dotted lines with a ball point pen. Bend a very sharp fold along the center crease and a gentle fold along the other two creases. Lay the fin rib assembly on the fin cover on the dull, printed side. Fold the center crease and check for fit.



11. Using CA glue or white glue (NOT yellow glue), apply a bead of glue along all the ribs and braces on one side and lay the assembly on the fin cover. Make sure the ends are even with the tip and root rib. Fold the center crease and glue the opposite side, sealing the trailing edge with glue to complete the assembly. Allow to dry. Repeat the process with other three booster fins.



## ENGINE MOUNT

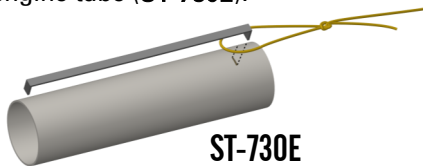
- ❑ 12. Bend the engine hook (EH-28) slightly so it forms a slight bow in the direction shown.



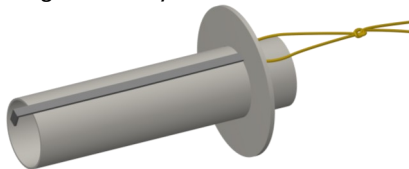
- ❑ 13. Tie a loop in one end of the yellow Kevlar® cord (SCK-18). Pull knot tight.



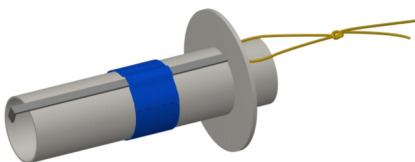
- ❑ 14. Insert one end of the engine hook (EH-28) through the loop in the Kevlar cord and into the pre-punched engine tube (ST-730E).



- ❑ 15. Carefully remove the two centering rings from the laser-cut sheet (CR-7-16EH). Select the one with the smallest notch and align the notch over the engine hook. Slide it from the bottom of the engine tube until it is against the end of the engine hook and against the yellow Kevlar® cord.

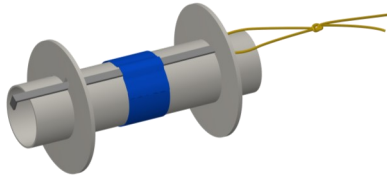


- ❑ 16. Wrap masking tape around the center of the engine tube to hold the engine hook in place and centered along its length. Run a bead of glue over the masking tape and along the engine hook between the tape and the ring. Allow to dry.



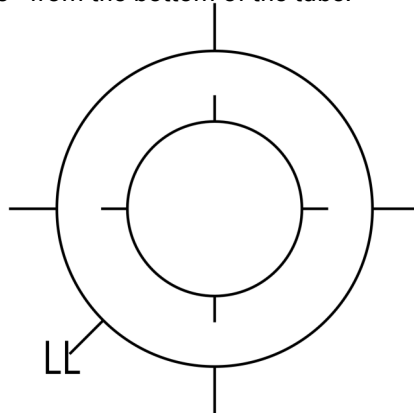
- ❑ 17. Select the remaining centering ring and align the notch over the engine hook and slide it from the bottom of the engine tube until it is 1/2" from the bottom of the engine tube. Apply a bead of glue around both sides of both centering rings and against the engine tube. Keep glue away from the outer edges of both rings and from the notch in the lower

ring. Make sure the engine hook moves freely. Allow to dry in an upright position.



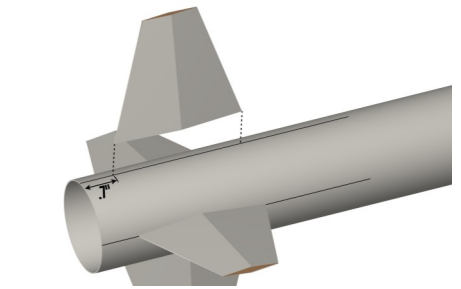
## MARK TUBES

- ❑ 18. Stand the largest body tube (ST-16130) on the large circle on the fin guide below and make the fin position marks on the sides of the tube. Place a mark at the LL (launch lug) line and designate it with "LL". 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 4" from the bottom of the tube. Extend the LL line 8" from the bottom. Stand the long body tube (ST-8141) on the smaller circle on the fin guide below and make the fin position marks on the sides of the tube. Using the same channel, extend the marks 3" from the bottom of the tube.

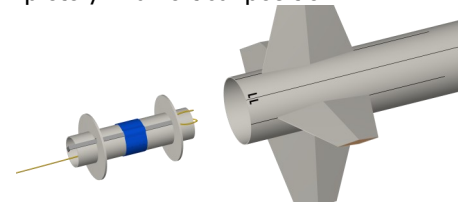


## BOOSTER

- ❑ 19. Place a mark .7" from the bottom of the booster tube (ST-16130) on one of the fin marks. Apply glue to the root edge of one of the large (booster) fins made earlier and position it along this line with the bottom edge of the fin even with the mark. Remove the fin, set it aside and allow it to almost dry, apply additional glue, and reposition. Repeat for the other three fins. If you follow these instructions, the fins will not require much additional work to keep them aligned. Allow the fins to completely dry, checking carefully to make sure they are parallel with the main body tube.

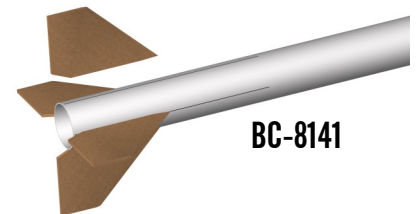


- ❑ 20. Apply a thick bead of glue inside the bottom end of the booster body tube. Insert the engine mount assembly into the booster body tube with the engine hook aligned with the LL line. Do not stop until it is in the correct place. Allow to dry completely in a vertical position.

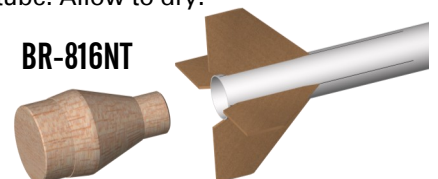


## SUSTAINER

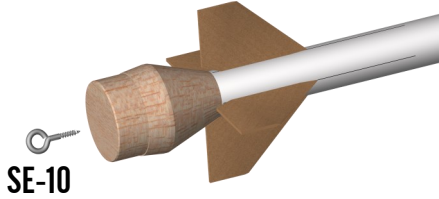
- ❑ 21. Place a mark .2" from the bottom of the sustainer tube (ST-8141) on one of the fin marks. Apply glue to the root edge of one of the sustainer fins and position it along this line with the bottom of the root edge of the fin even with the mark. Remove the fin, set it aside and allow it to almost dry, apply additional glue, and reposition. Repeat for the other three fins. Allow the fins to completely dry, checking carefully to make sure they are parallel with the main body tube.



- ❑ 22. Check the balsa reducer (BR-816NT) for fit in the sustainer tube and the top of the booster body tube. A small amount of sanding may be necessary. Apply a thin bead of glue just inside one end of the sustainer tube. Insert the balsa reducer until its shoulder is flush with the sustainer tube. Allow to dry.



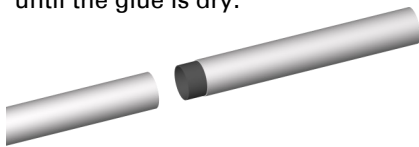
❑ 23. Twist the screw eye (SE-10) into the center of the balsa reducer. Unscrew it and squirt glue into the hole. Reinstall the screw eye and wipe off any excess glue.



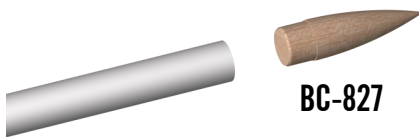
❑ 24. Place a mark on the middle of the coupler (HTC-8). Apply a bead of glue inside one end of the short body tube (ST-856) and insert the coupler in the body tube until the mark is even with the end of the tube. Do not allow to dry yet.



❑ 25. Apply a bead of glue inside the end of the sustainer body tube and insert the coupler in the body tube until it is flush with the other body tube. Overhang the fins and roll the tube assembly on a flat surface until the glue is dry.

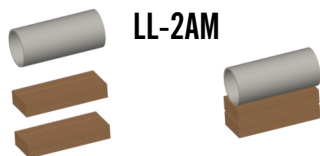


❑ 26. Insert the nose cone (BC-827) into the top of the sustainer and check for fit. A small amount of sanding may be necessary. Glue into place and allow to dry.

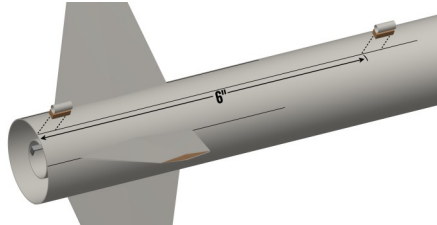


## LAUNCH LUGS

❑ 27. Glue two of the standoffs from the fins sheet together. Then glue one of the launch lugs (LL-2AM) to the top of the standoff assembly as shown. Allow to dry. Repeat for the other launch lug and standoffs.



❑ 28. Apply a bead of glue to one of the launch lug assemblies opposite the lug and apply it to the booster body tube centered on the LL line and even with the bottom of the tube. Attach the second launch lug assembly about 6" from the bottom assembly and parallel with it on the LL line. Sight from one end to make sure they are parallel with the body tube and aligned with each other. Allow to dry.

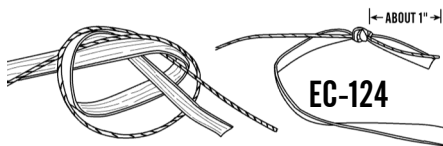


## APPLY FILLETS

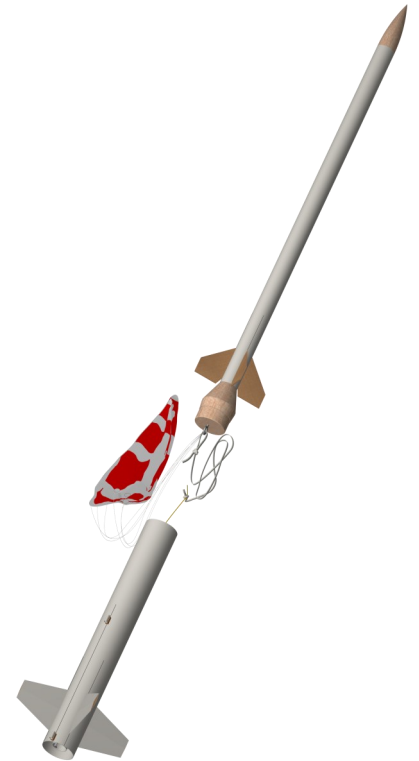
❑ 29. After the fins and launch lug standoffs are completely dry, run a small bead of glue along both sides of each fin-body tube joint and standoff. Using your forefinger, smooth the glue into fillets. Apply a fillet of glue on each side of the launch lugs. Allow this assembly to dry in a vertical position.

## FINAL ASSEMBLY

❑ 30. 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 booster body tube and out the top of the tube.

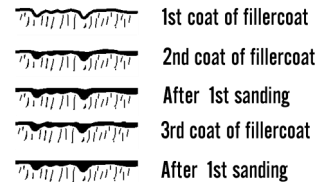


❑ 31. Assemble the chute (CP-12) using instructions provided with it. Pull the lines tight on the chute and make sure they are all of equal length. Attach the chute by tying them to screw eye. Put a drop of glue on the joint to keep the lines from moving. Attach the free end of the elastic cord to the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



## FINISHING

❑ 32. 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.



❑ 33. 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 for the final color. Refer to the photo for suggested scale colors.

❑ 34. 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.

**35.** After the paint has dried, decals should be applied. The decals supplied with the Nike-Tomahawk™ are waterslide decals. 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. Use the cover photo for suggested placement. 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.

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

## ***FLIGHT PREPPING***

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

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

**39.** 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.

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

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