

## 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.

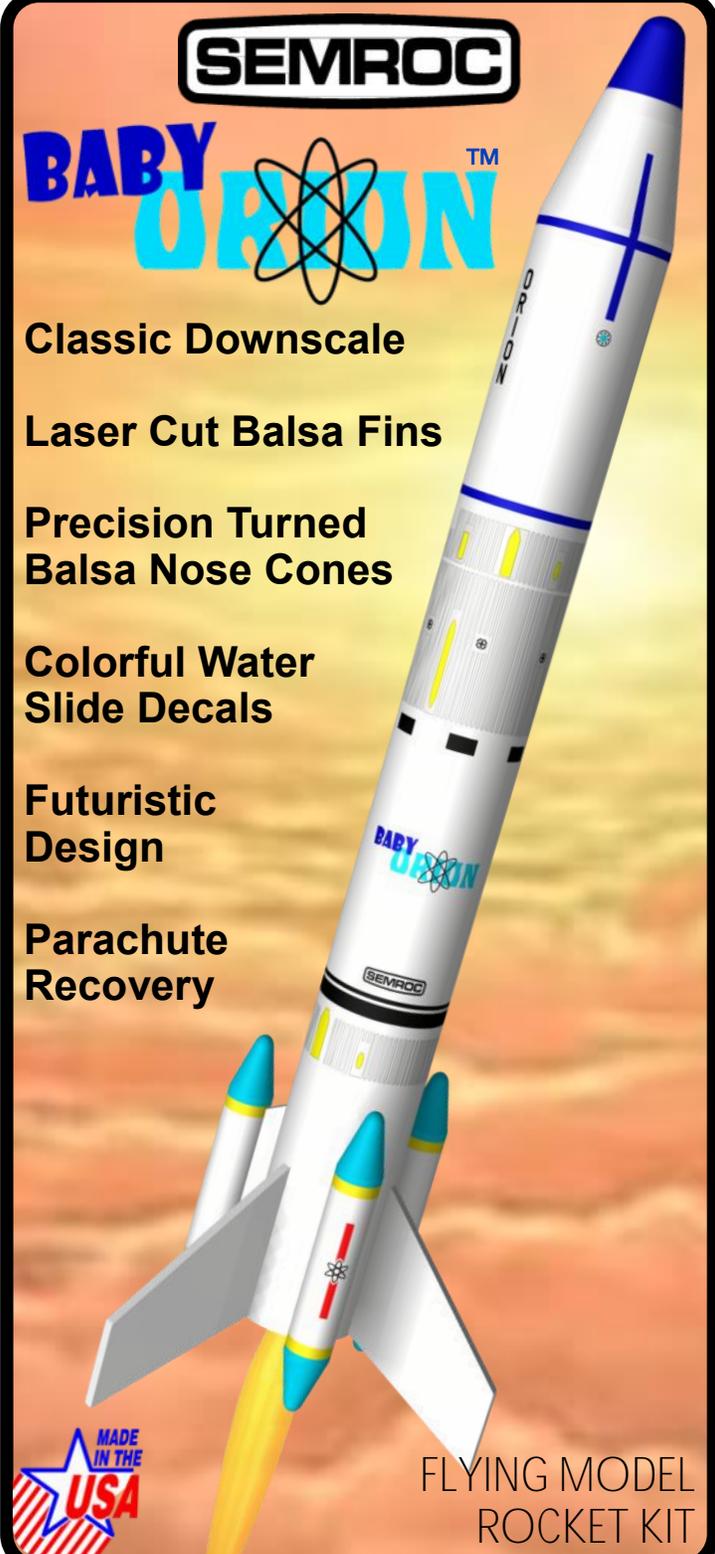
## About the Baby Orion™

The Semroc Baby Orion™ is a 1/2 scale model of the original Centuri Orion which was released in the 1971 Centuri Catalog. The original Orion was a big and highly detailed single engine demonstration rocket. It was designed by Larry Brown while he was at Centuri Engineering and was based on a futuristic model that his father had built years before. The original Orion was one of Centuri's most popular demo rockets.

The Baby Orion™ is designed for small fields using the mini engines. It has all balsa nose cones and fins and detailed waterslide decals. It is a perfect companion to the Semroc Centuri Orion™.

July 6, 2011, December 11, 2015

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**SEMROC**

**BABY ORION™**

**Classic Downscale**

**Laser Cut Balsa Fins**

**Precision Turned Balsa Nose Cones**

**Colorful Water Slide Decals**

**Futuristic Design**

**Parachute Recovery**

**MADE IN THE USA**

**FLYING MODEL ROCKET KIT**

Made in the U.S.A by Semroc - Dayton, Ohio

## BABY ORION™ Kit No. KA-31

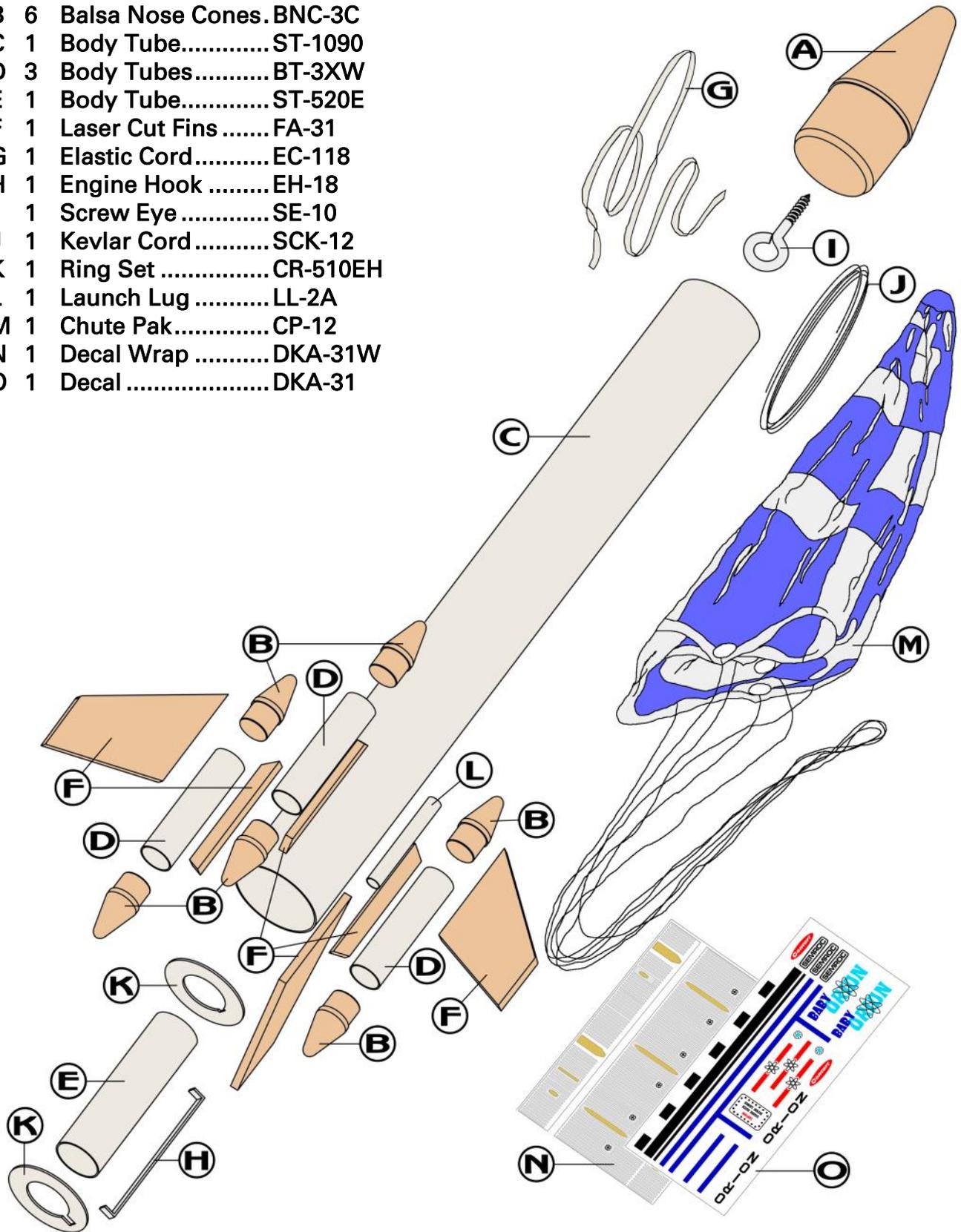
Specifications	Engine	Approx. Altitude
Body Diameter 1.04" (2.6 cm)	1/2A3-4T	200'
Length 11.3" (28.7 cm)	A3-4T	450'
Fin Span 3.7" (9.4 cm)		
Net Weight 0.6 oz. (17.3 g)		

**Skill Level 2**

# Parts List

# EXPLODED VIEW

- A 1 Balsa Nose Cone... BC-1016C
- B 6 Balsa Nose Cones. BNC-3C
- C 1 Body Tube..... ST-1090
- D 3 Body Tubes..... BT-3XW
- E 1 Body Tube..... ST-520E
- F 1 Laser Cut Fins ..... FA-31
- G 1 Elastic Cord..... EC-118
- H 1 Engine Hook ..... EH-18
- I 1 Screw Eye ..... SE-10
- J 1 Kevlar Cord ..... SCK-12
- K 1 Ring Set ..... CR-510EH
- L 1 Launch Lug ..... LL-2A
- M 1 Chute Pak..... CP-12
- N 1 Decal Wrap ..... DKA-31W
- O 1 Decal ..... DKA-31



## BEFORE YOU START!

Make sure you have all the parts included in this kit that are listed in the Parts List to the left. 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. Masking tape is also needed.

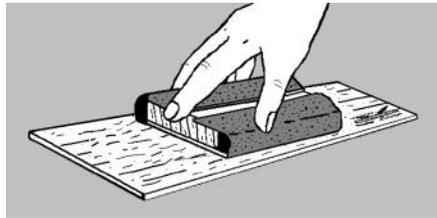


## ASSEMBLY

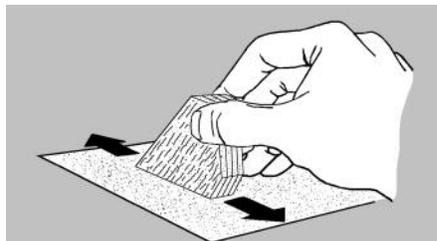
1. These instructions are presented in a logical order to help you put your Baby Orion™ together quickly and efficiently. Check off each step as you complete it and we hope you enjoy putting this kit together.

## FIN PREPARATION

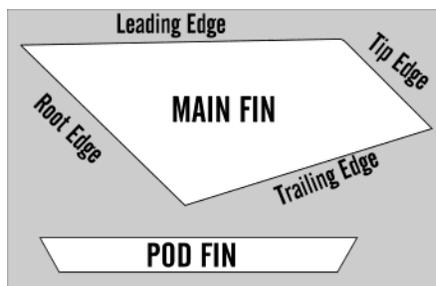
2. Lightly sand each side of the laser-cut fin sheet (FA-31). Carefully push the laser-cut fins from the sheet. Start at one point on each fin and slowly and gently work around the fin.



3. Stack all the main fins in a group and all the pod fins in a separate group. Line each group up squarely and sand the fins back and forth over some fine sandpaper to get rid of the hold-in tabs as shown below.

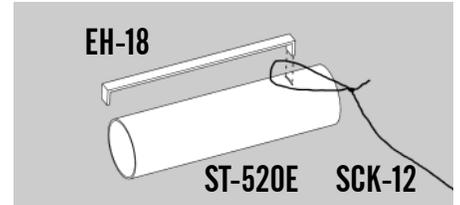


4. Round each leading edge and trailing edge of the main fins and the ends of the pod fins. Leave all the tip and root edges flat.

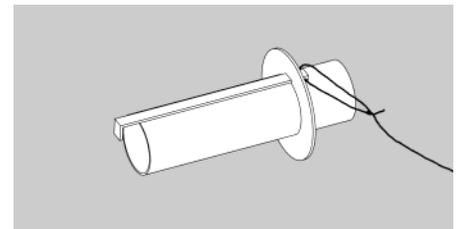


## ENGINE MOUNT

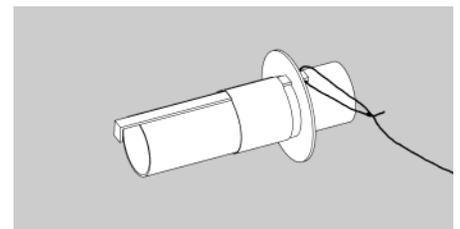
5. Tie a loop in one end of the yellow Kevlar® cord (SCK-12). Insert one end of the engine hook (EH-18) through the loop and into the pre-punched engine tube (ST-520E).



6. Slide the centering ring with the small notch (CR-510EH) over the engine tube until it is against the Kevlar cord. Apply a bead of glue around each end of the joint between the ring and engine tube, keeping the glue off the outside surface of the centering ring. Allow to dry.

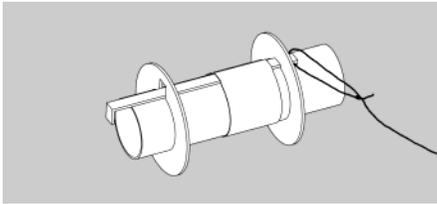


7. Add one wrap of masking tape around the center of the assembly to hold the engine hook in place. Apply a bead of glue over the masking tape and along the edges of the engine hook between the tape and the centering ring. Keep glue off the free end of the engine hook.



8. Slide the centering ring with the long slot (CR-510EH) over the end of the engine tube. Space it about 1/4" from the bottom of the engine tube. Apply a

bead of glue around both sides of the centering ring, keeping glue away from the engine hook and the notch.



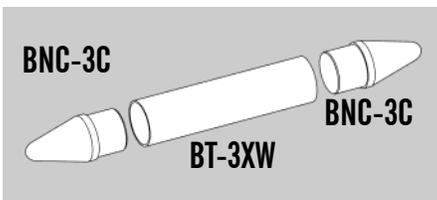
## MARK TUBE

❑ 9. Stand the body tube (ST-1090) on the fin guide below. Place six marks on the tube at the positions indicated. Find a convenient channel or groove such as a partially open drawer, a door jamb (as shown) or a piece of molding. Using the channel, extend the six marks about 3" from the bottom of the tube to provide lines for aligning the fins.

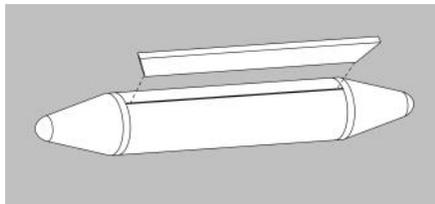


## TANK ASSEMBLY

❑ 10. Apply a bead of glue inside each end of one of the small body tubes (BT-3XW). Insert a small nose cone (BNC-3C) in each end. Allow the assembly to dry. Repeat for the other two tank assemblies. Lay them aside to completely dry.

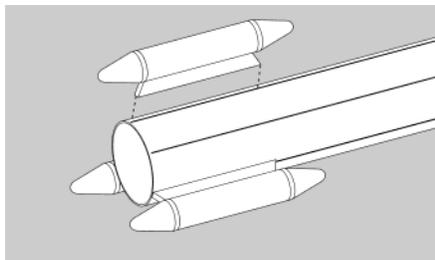


❑ 11. Place a mark along the side of a tank assembly using a channel or drawer slide. Apply glue to the shorter of the two long sides of one of the pod fins and position it along the line. Remove the fin, set it aside and allow it to almost dry, apply additional glue, and reposition. Repeat for the other two tank assemblies. 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 body tube.

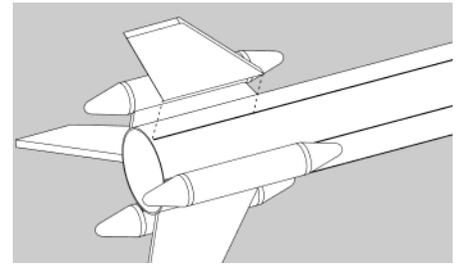


## ATTACH FINS

❑ 12. Apply glue to the longest edge of one of the tank assemblies and position it along one of the lines as shown. Remove it, allow to almost dry, re-glue and reposition it. Allow this tank assembly to dry before proceeding, checking for perpendicular positioning with the main body tube. Repeat for the other two tank assemblies, skipping every other line.

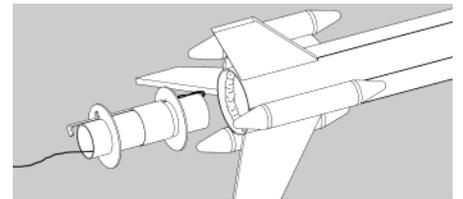


❑ 13. Apply glue to one of the main fins and position it along one of the remaining lines. Remove it, allow it to almost dry, re-apply glue and reposition it. Allow this fin to dry before proceeding, checking for perpendicular positioning with the main body tube. Repeat for the other two fins.

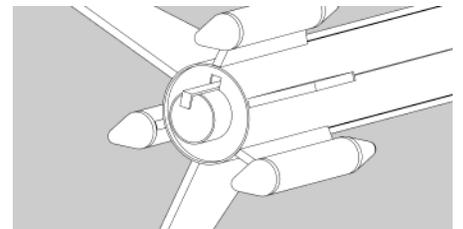


## INSERT MOUNT

❑ 14. Pull the Kevlar cord back through the engine mount and out the back end. Check the engine mount for fit in the main body tube. If it has rough edges or excessive glue, sand lightly until it fits into the body tube. Apply a heavy bead of glue around the inside of the body tube.

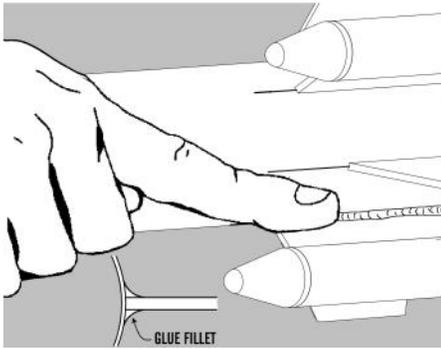


❑ 15. Quickly and smoothly push the engine mount into the body tube until the centering ring is recessed about 1/16". Do not stop once you start inserting the mount or it might freeze in place too soon. Allow to dry, then run a thin bead of glue around the edge of the centering ring where it contacts the main body tube, keeping glue away from the engine hook notch.



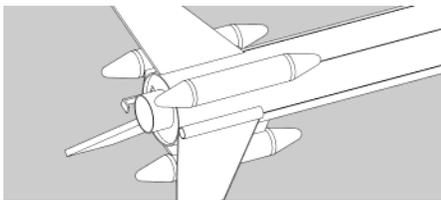
## APPLY FILLETS

❑ 16. After the fin assembly is 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. Allow this assembly to dry in a vertical position.



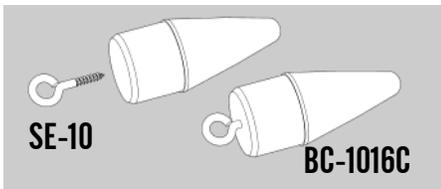
## LAUNCH LUG

❑ 17. Glue the launch lug (LL-2A) against the root edge of one of the main fins and even with the bottom of the main body tube.



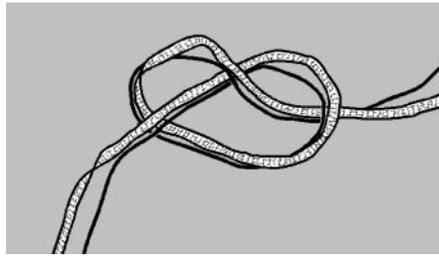
## NOSE CONE

❑ 18. Insert the nose cone (BC-1016C) in the top of the body tube and check for proper fit. Twist the screw eye (SE-10) 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 and run a bead of glue around the shaft against the nose cone.



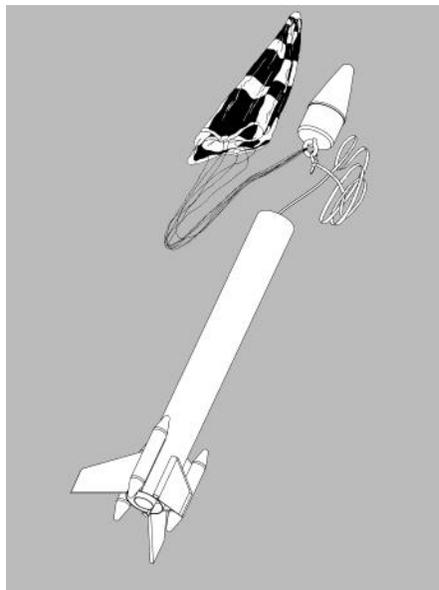
## SHOCK CORD

❑ 19. Prepare the shock cord as follows. Line up one end of the elastic shock cord (EC-118) with the free end of the Kevlar cord (SCK-12) and tie an overhand knot at the end of the two cords. Pull the knot tight and place a small drop of white glue on the knot to prevent it from loosening.



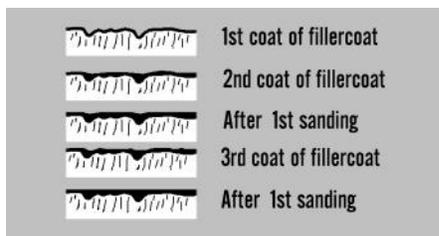
## FINAL ASSEMBLY

❑ 20. Assemble the chute (CP-12BW) using the instructions that come with the Chute Pak. 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.



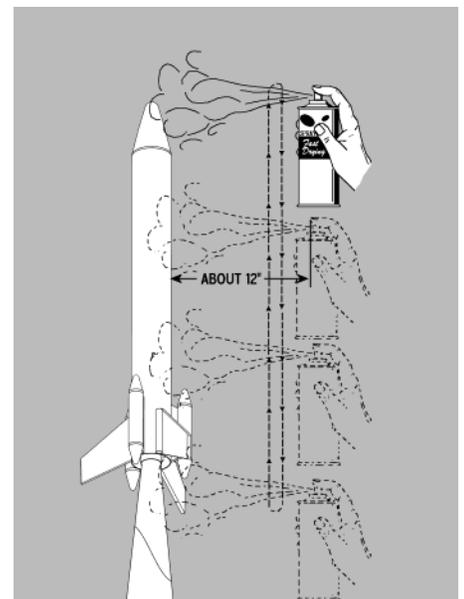
## FINISHING

❑ 21. 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.



❑ 22. 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 a high visibility color like white for the final color. Refer to the front for suggested painting.

❑ 23. 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.

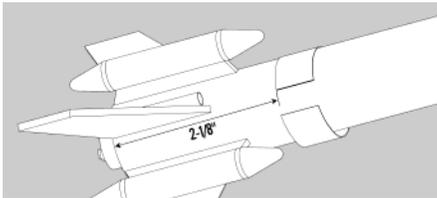


❑ 24. After the paint has dried, decals should be applied. The decals supplied with the Baby Orion™ are waterslide decals. Each decal should be cut separately from the sheet. Think about where you want to apply each decal and check for fit before wetting the decal. Use the cover photo for suggested placement. Dip each decal in a small

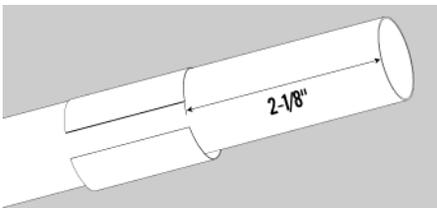
dish of water that has a drop of detergent. It will take about 30 seconds before the decal is loose enough to apply.



**25.** The two simulated wraps are also waterslide decals on a white background. They should be cut out just inside the solid black line around each decal. Wet them enough that they easily slide from the backing paper. Start the small wrap 2-1/8" from the bottom of the main body tube and directly above the fin with the launch lug attached. Be careful not to pull it too tight. Wetting the tube first will help slide it into place.



**26.** Apply the large wrap 2-1/8" from the top of the main body tube with the starting edge directly above the small wrap's edge.



**27.** The original Orion had small parts attached to the wrap but were too small to provide with this kit at one-half scale. The yellow indicators on the wrap can be covered with small detail parts of your own design, if desired, or left as printed details.

## **FLIGHT PREPPING**

**28.** 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.

**29.** Apply a few sheets of recovery wadding in the top of the 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.

**30.** 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.

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

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