

# SKY-TORPEDO

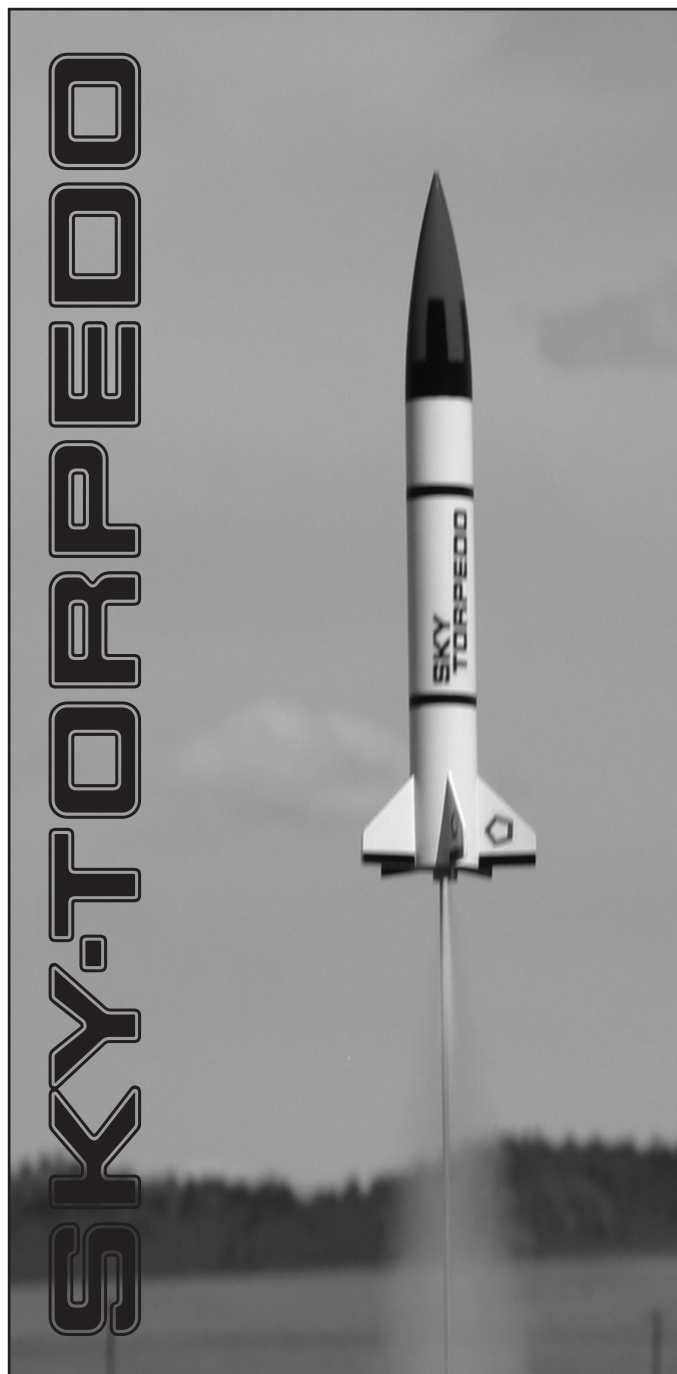


## SKY-TORPEDO Parts List

P/N	Description	Qty
10091	Engine Mount Tube (AT-24/3.75)	1
10197	Airframe Tube (AT-66/18)	1
13031	Centering Ring (CR18-24)	1
13035	Centering Ring (24-29)	2
13056	Launch Lug (1/4" X 3")	1
15027	Cardstock Ring Set CR24-66	1
15544	Basswood Fin Sheet	1
19480	Plastic Nose Cone PNC-66A	1
24043	Regular 'D' Engine Hook	1
24044	'E' Engine Hook	1
29101	32"/24" Plastic Parachute Pack	1
29520	300# Test Kevlar® Shock Cord (8 ft)	1
31068	SKY-TORPEDO Instruction Sheet A	1
31069	SKY-TORPEDO Instruction Sheet B	1
37027	SKY-TORPEDO Tube Marking Guide	1
41030	SKY-TORPEDO Decal Sheet	1

## Other Tools and Materials Needed

Scissors  
 Hobby Knife  
 Pencil  
 Carpenter's Wood Glue (or White Glue)  
 CyA Adhesive (medium viscosity)  
 3/4-inch Wide Cellophane Tape  
 Masking Tape  
 Sandpaper (200 and 400 grit) & Sanding Block  
 Aluminum "Angle" to draw lines on the tube  
 Ruler  
 Wood filler or sanding sealer to smooth balsa fins  
 Paint Brush  
 Spray Paint  
 24mm Spent Engine casing to insert engine block.  
 Long wood dowel to spread glue deep inside tubes.



## Skill Level 2 – Previous Experience Suggested

The Sky Torpedo is a rugged workhorse of a rocket that uses a big 2.6-inch diameter (BT-80 size) body tube for its main airframe. With five fins, the Sky Torpedo has plenty of stability, and flies straight and true every time it is launched. Plus it has a bold and beautiful 32-inch diameter parachute that fills the sky with color.

The Sky Torpedo uses readily available 24mm diameter "C", "D", and "E"-power rocket motors. What will really get you noticed at the next launch is the eye-catching paint scheme which is capped by some awesome patterns on the nose cone!

While this is a big rocket, it is easy to build: it is only ranked as a skill level two in difficulty. It can be assembled by anyone that has built any other model rocket kit.

**DYNA  
STAR** Mid-Power  
Model  
Rockets

Colorado Springs, CO USA

web site: [www.DynaStar-Rockets.com](http://www.DynaStar-Rockets.com)

## Sky-Torpedo Rocket Assembly

☐ 1. Using 400 grit sandpaper, fine sand the laser cut wooden sheets before removing the fins. Carefully remove all the pieces from the sheet by freeing the edges with a sharp hobby knife.

☐ 2. Group the five fins together, and gently sand the edges as shown in the illustration.

☐ 3. You can apply sanding sealer to the surfaces of the fins to smooth out the wood. Coat both sides at the same time to minimize the chances of the fins warping. Do not allow the sanding sealer to get on the root edge of the fin. This could prevent the fin from bonding well to the body tube when it is glued on later in step 14. Set them aside to dry completely. When they are dry, sand the sealer smooth until you get a desirable surface finish. You may need to repeat this step several times depending on the level of quality you wish to achieve.

☐ 4. Install your preferred engine hook:

**D Engine Hook:** Mark the body tube 2-1/4" (57mm) from one end as shown.

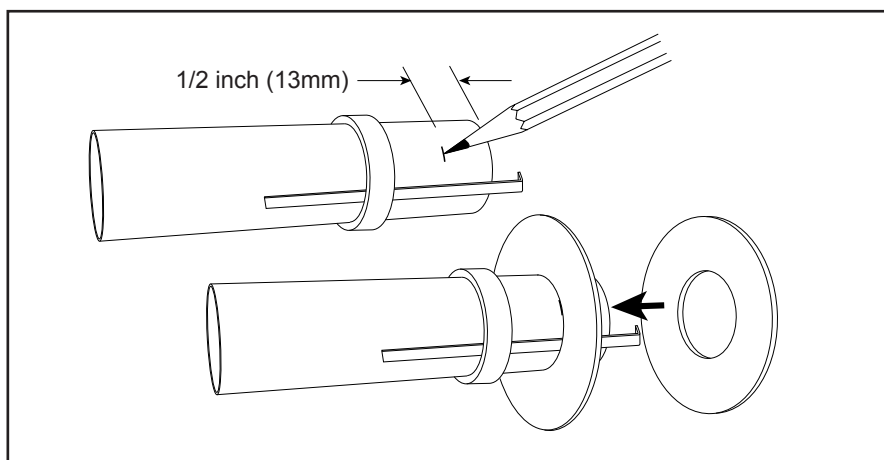
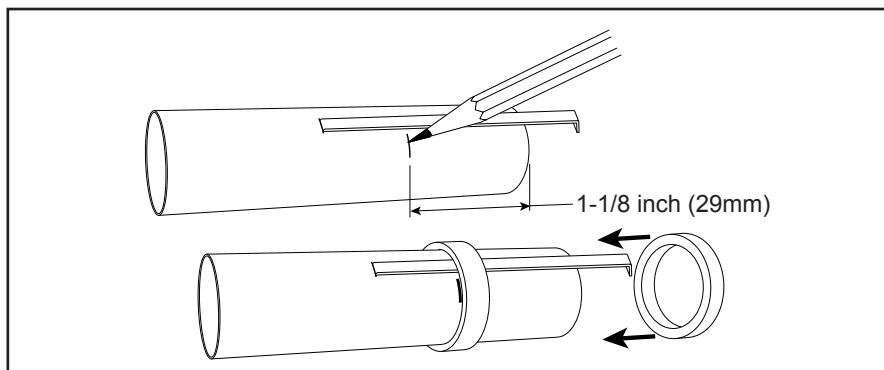
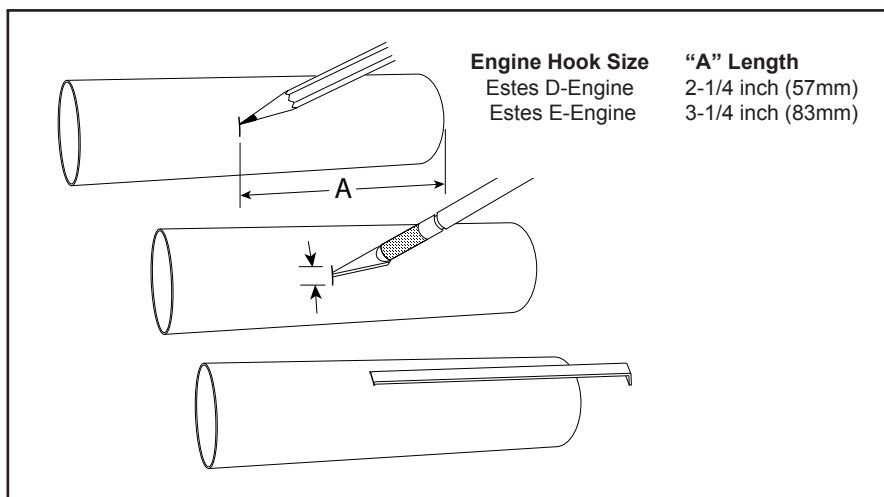
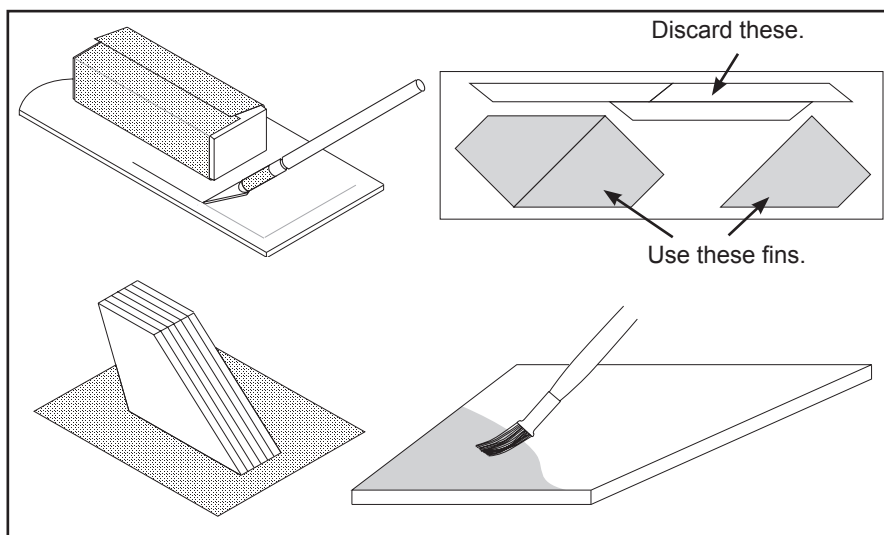
**E Engine Hook:** Mark the body tube 3-1/4" (83mm) from one end.

This will be the aft end of the rocket. Make the lines about 1/8" (3mm) long as the picture shows.

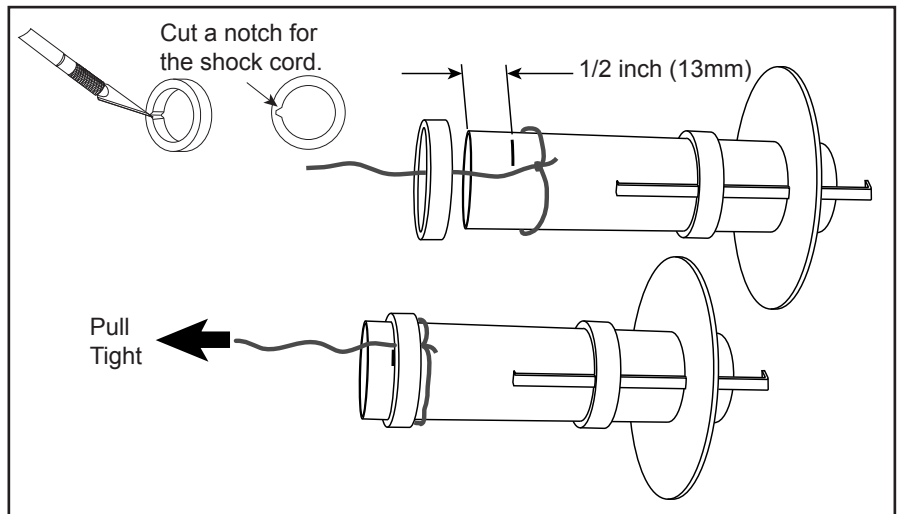
Take a hobby knife and cut a 1/8" (3mm) long slit in the engine tube along the line at the 2 1/4" (57mm) or 3-1/4" (83mm) position. Insert one end of the motor hook into this slit.

☐ 5. Make a mark 1-1/8" (29mm) from the aft of the engine tube. Find one of the large green rings that fits over the 24mm diameter engine mount tube. Make a thin layer of glue around the engine tube behind the mark you made. Take the green ring, slide it onto the engine hook, and then onto the engine tube until it it up against the mark. (Be sure that the engine hook remains perpendicular to the engine tube)

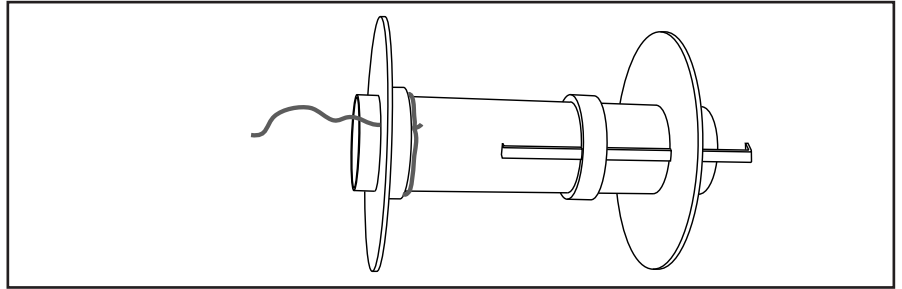
☐ 6. Remove one of the three large centering rings from the cardstock sheet. Apply a bead of wood glue around the engine mount tube 1/2 inch (13mm) from the aft end. Slide one of the cardboard rings onto the engine tube over the engine hook and into the bead of glue. Check to be sure the ring is aligned straight as shown. Allow the glue to dry.



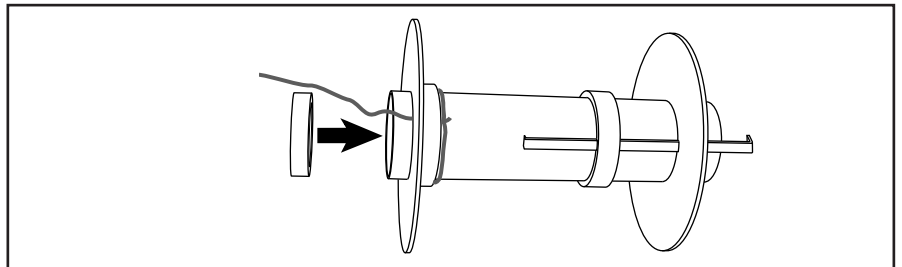
□ 7. Make a mark 1/2" (13mm) from the front of the engine tube. Find the other large green ring that fits over the 24mm diameter engine mount tube. Cut a notch on the inside of the ring with a hobby knife. Tie the yellow Kevlar® shock cord around the front end of the engine mount tube. Apply a thin layer of glue in front of the mark on the tube. Slide the green ring over the shock cord and onto the tube, into the glue, and up against the mark. The shock cord should fit tightly up against the ring.



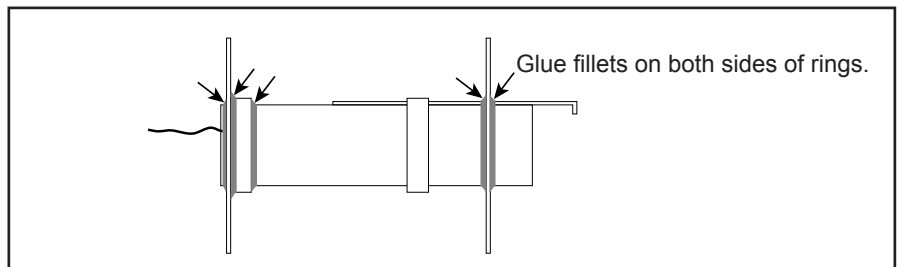
□ 8. Remove a second large centering ring from the cardstock sheet. Apply a bead of wood glue around the front end of the engine mount tube. Slide the cardboard rings onto the engine tube and up against the green ring. Check to be sure the ring is aligned straight as shown.



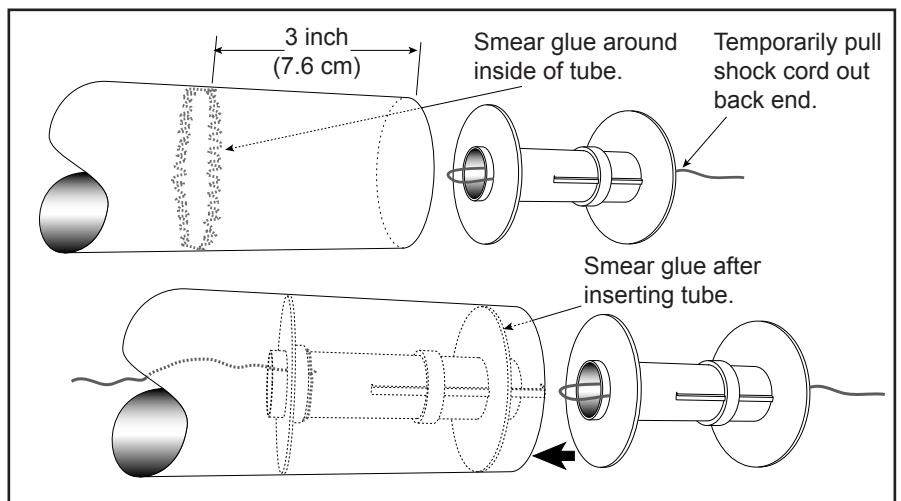
□ 9. Engine block installation: Using wood glue, glue the small green ring into the forward end of the engine mount tube. Push it in until it rests against the top of the engine hook. Once it is in place and dry, add a fillet of glue around the front edge of the green ring (engine block) using a long wood dowel.



□ 10. After the glue on the engine mount is dry, put a fillet of glue on each side of all of the centering rings. These rings take a lot of stress at engine ejection, and you must make sure to have a good glue bond (Note: it is not necessary to use epoxy. Wood glue is plenty strong for this application). Allow the glue to dry completely before proceeding to step 11.

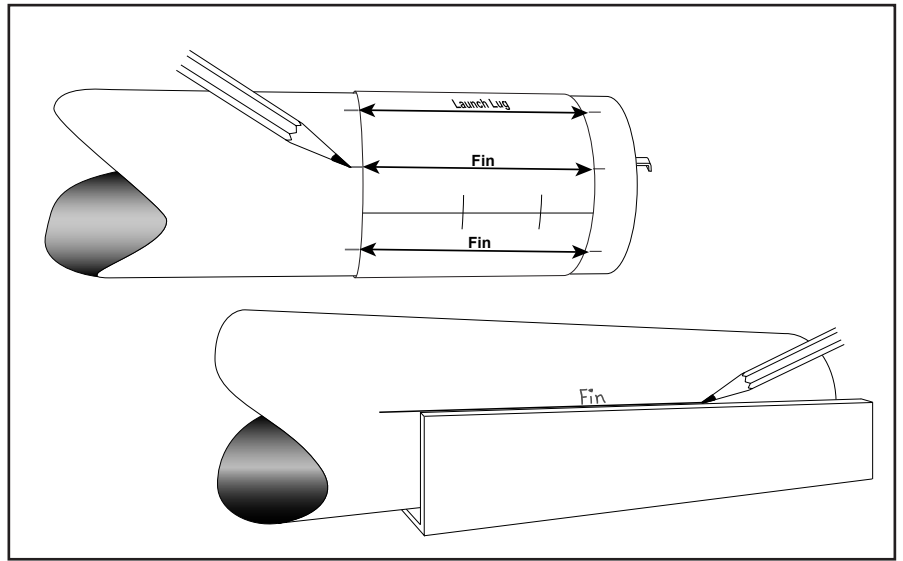


□ 11. Test fit the engine tube assembly into the big body tube. If it is too tight, sand the centering rings slightly. Apply wood glue 3" (7.6 cm) in from the aft end of the body tube. Insert the engine mount and push with one motion until the middle centering ring makes it about 3" (76mm) past the aft end of the body tube. Quickly apply wood glue inside the body tube 1/2" (13mm) from the rear end. Immediately push the motor tube in until the aft end is flush with the body tube. Apply additional wood glue to the exposed centering ring/body tube, making another fillet. Stand tube upright with engine hook hanging over the edge of table until the glue is dry. This prevents excess glue from dripping forward in the tube.

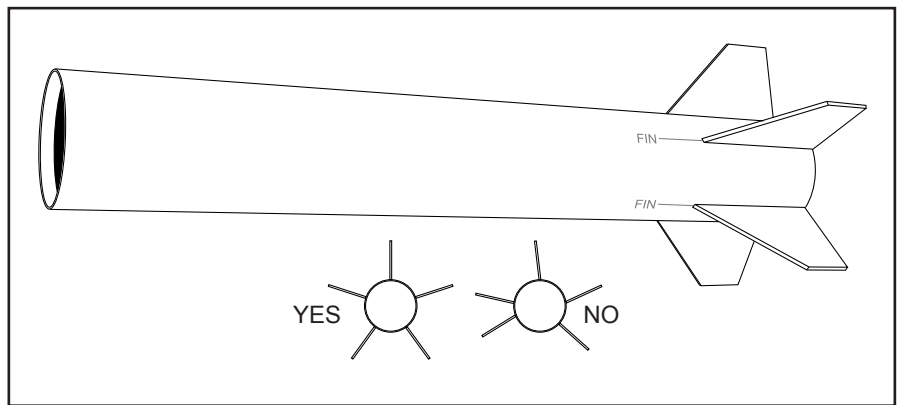


☐ 12. Cut out the tube marking guide from page 9. Wrap the guide around the aft end of the white body tube and tape the ends together. Mark a small line at each of the arrow points. Remove the marking guide.

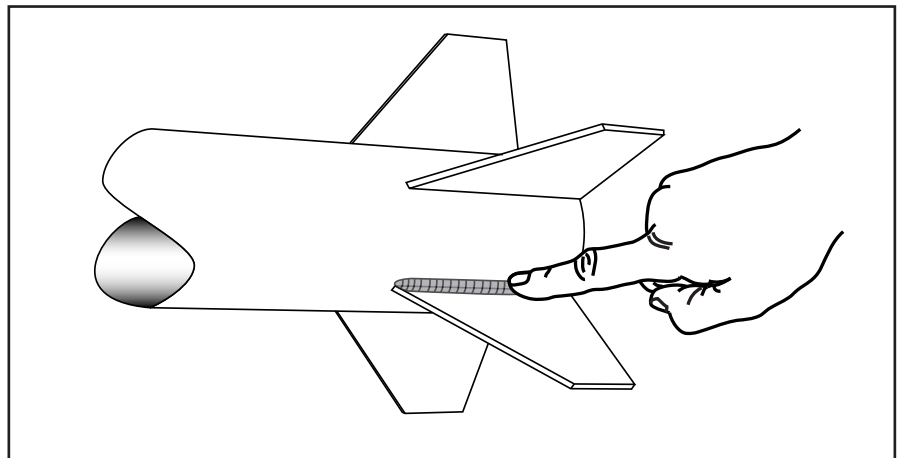
☐ 13. Using a your metal angle tool (a door frame will work, but it is not recommended on large diameter tubes), draw a pencil line down the outside of the body tube at each pencil mark. Label the launch lug line so you don't glue a fin in the wrong position.



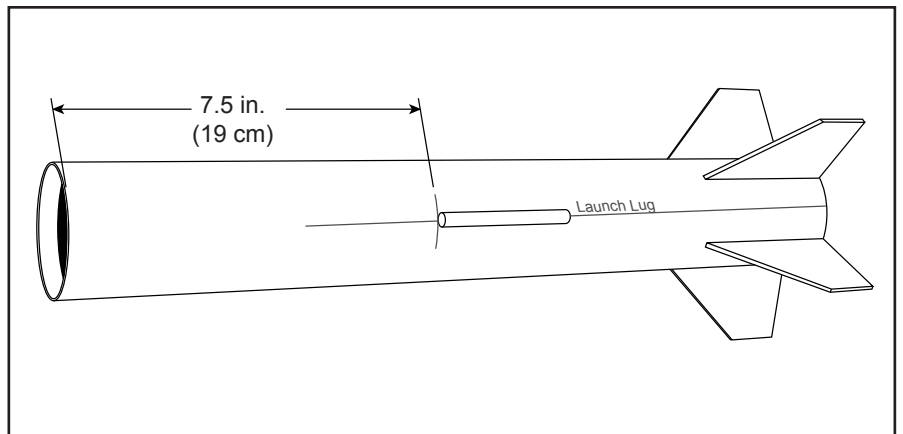
☐ 14. Lightly sand the area along which the fins will be attached; just enough to take the "sheen" off the tube. Apply a very thin layer of glue to the root edge of one of the fins. Allow the glue to dry slightly for five minutes, and then attach it along one of the lines on the body tube, as shown in the illustration. Each fin is attached so that it is flush with the end of the tube. Make sure the fin is straight along the tube. Allow the fin to dry before proceeding with the next fin. Repeat this step four more times as you attach the other four fins.



☐ 15. Apply a bead of wood glue to both sides of each fin-body tube joint. Pull your finger along the joint to smooth out and remove the excess glue. Lay the tube horizontally while the glue dries.



☐ 16. Using wood glue, attach the launch lug to the tube on the pencil line; position it so that it's front edge is 7.5" (19cm) from the front end of the tube. Allow the glue to dry. Apply a bead of wood glue to both sides of each launch-lug/body tube joint. Pull your finger along the joint to smooth out and remove the excess glue. Lay the tube horizontally while the glue dries.



## Painting Instructions

☐ 17. After all the glue has completely dried, you may now paint your Sky-Torpedo model rocket (Note: you can temporarily put the nose cone on the white body tube while you paint the rocket).

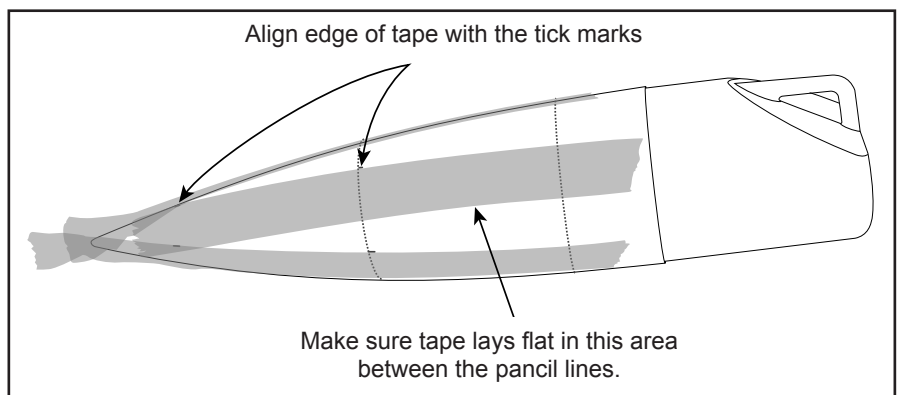
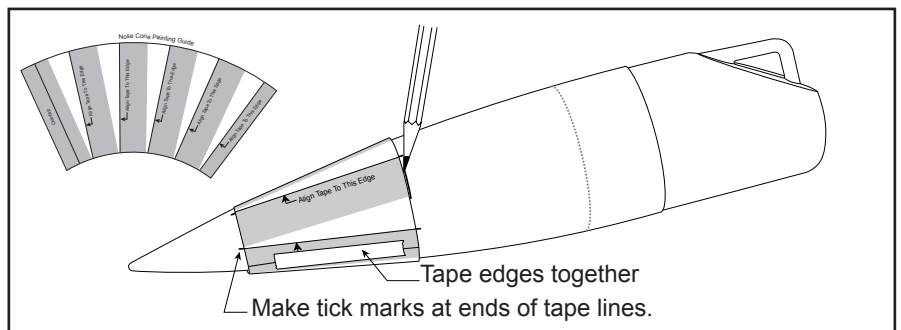
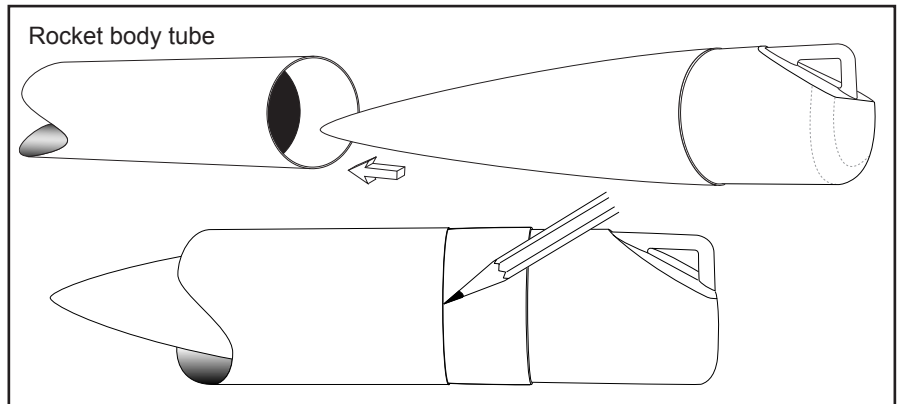
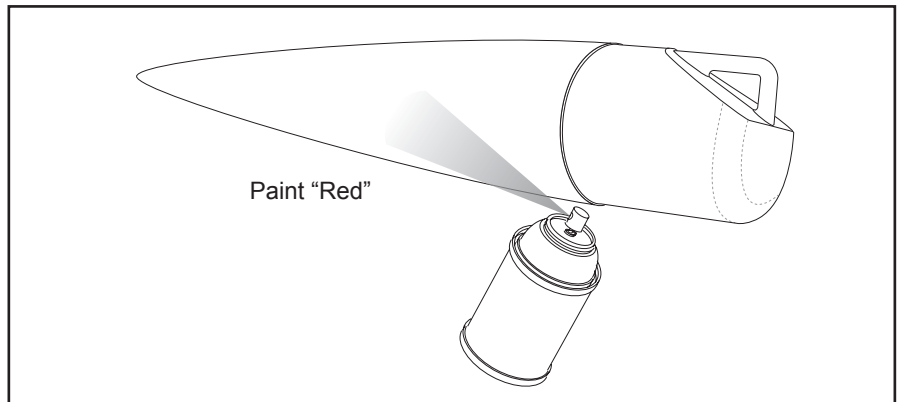
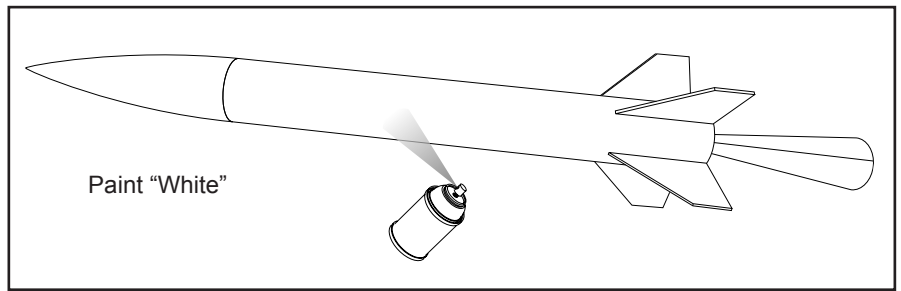
Roll a piece of paper and insert it into the aft end of the body tube so you can hold the model while painting it. For best results, paint the model with primer before using the final paint color, which is white. Follow the directions on the paint can, and always paint outdoors with the wind against your back. Let the paint harden at least 24 hours before proceeding.

☐ 18. After the white paint has dried, paint the exposed portion of the nose cone "red." Allow this paint to harden at least 24 hours before proceeding. If the paint is not fully hard, you'll ruin the surface in the next step of marking the nose cone paint pattern.

☐ 19. Insert the nose cone "backward" into the front-end of the body tube. Make sure it is centered, and then make a pencil line around the perimeter as shown. Remove the nose cone from the tube.

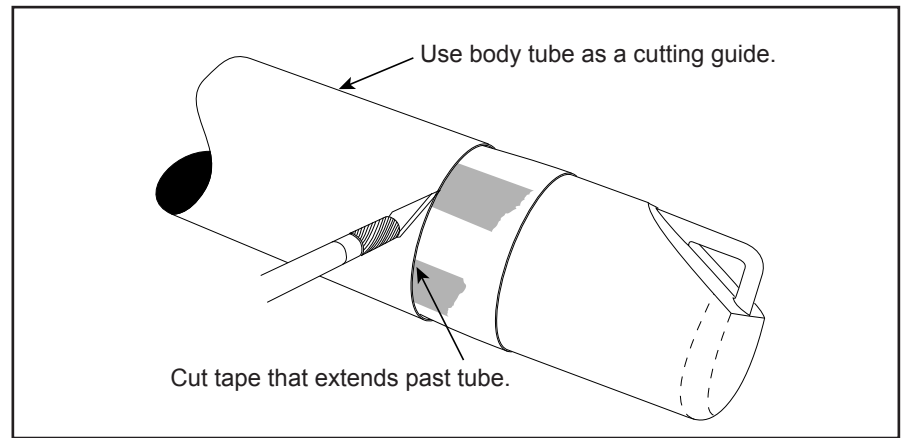
☐ 20. Masking off the nose cone: Carefully cut out the "Nose Cone Painting Guide" from page 9. Pre-curl it, and wrap it around the front of the nose cone. Line up the edges, and tape the edges together. Slide it up as far as it will go on the nose cone, and hold it in place. Make a pencil line around the back of the pattern as shown. Also make a small pencil tick-mark at each end of the solid tape lines. Remove the pattern sheet.

☐ 21. Use 3/4 inch (19.05mm) wide cellophane tape to mask off the edges of the pattern on the nose cone. Align the edge of the tape with the tick marks made in the previous step. Repeat this four more times. This will give the correct spacing for the gear-teeth paint pattern. Make sure the tape lays flat in the area between the two perimeter lines.



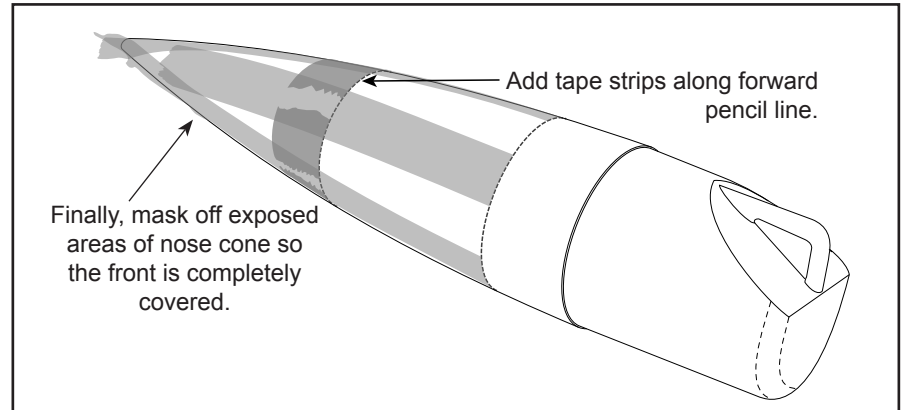


☐ 22. Reinsert the nose cone into the body tube in a backward orientation. Make sure it is centered on the pencil line you drew in step 19. **Carefully** cut off the cellophane tape that extends past the end of the tube. Use the edge of the tube as a guide to hold the knife straight. Remove the excess tape that extends past the edge of the perimeter line.

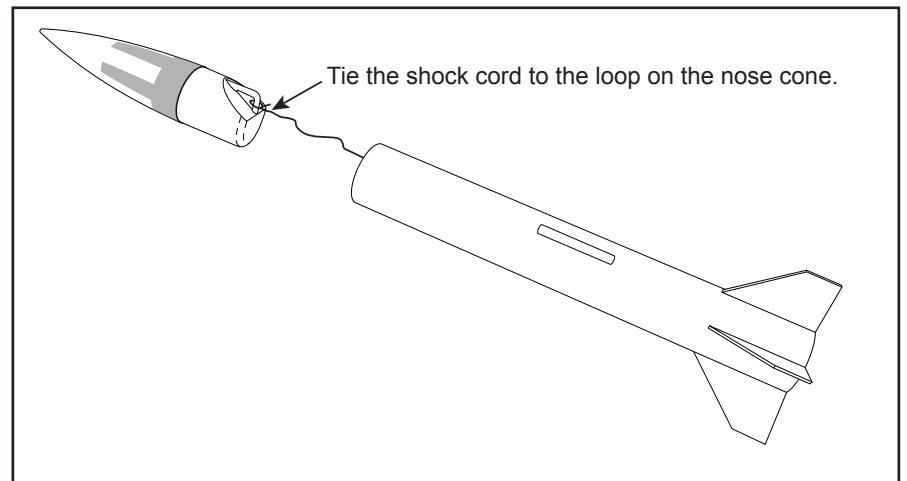


☐ 23. Add tape strips to the forward end of the nose cone along the forward pencil line. Finally, mask off the remainder of the exposed areas of the nose cone. When finished, paint the aft end "BLACK."

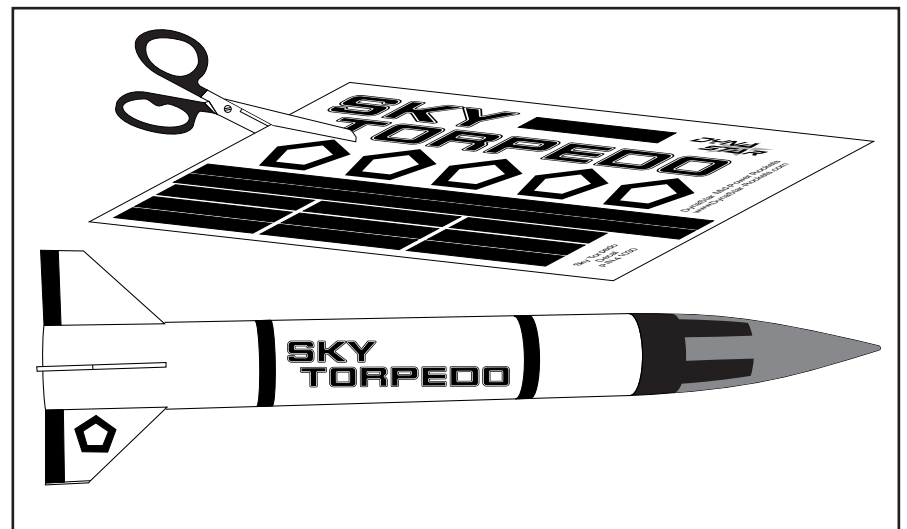
After the black paint has dried, remove the masking. The forward pencil line can be removed using a pencil eraser.



☐ 24. Tie the loose end of the shock cord to the loop on the base of the nose cone using two overhand knots. Apply a little bit of the wood glue onto the knot to keep it from coming untied.

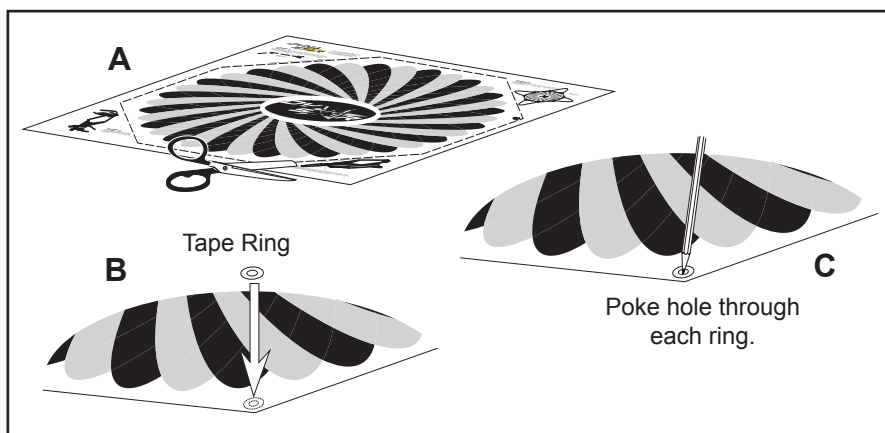


☐ 25. Cut around the perimeter of the decals with a pair of scissors or a knife. Peel off the paper backing, and affix the decal in place on the model. Use this picture for decal placement.



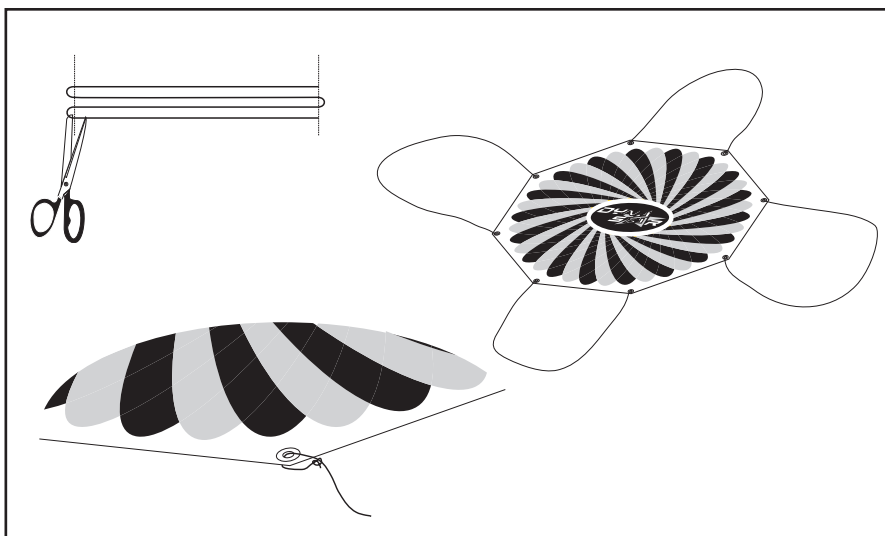
## Parachute Assembly

☐ 26. Carefully cut out the parachute canopy along the 32" dashed lines. Place one reinforcement ring on each of the marked corners. Take a sharp pencil or knife and poke a hole through the plastic in the center of each ring.



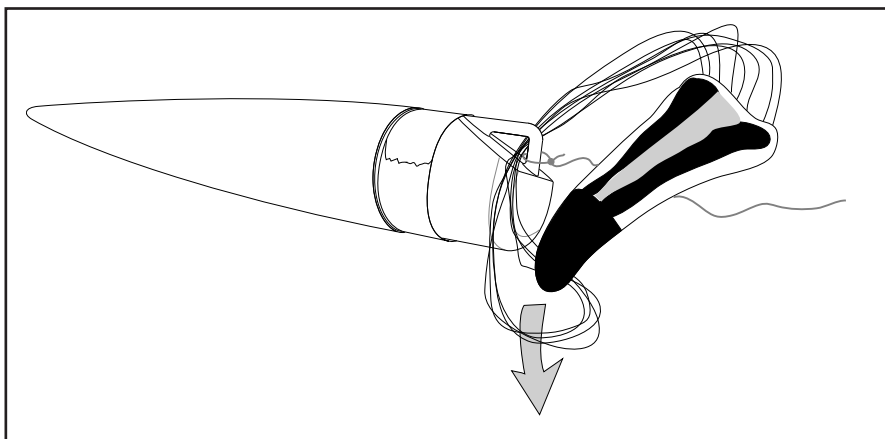
☐ 27. Fold the shroud line in half, and cut at the fold to make equal lengths; cut each piece in half again to make a total of four lines of equal length.

☐ 28. Pull each parachute line end through a parachute reinforcement ring and tie using two overhand knots. Repeat for all the corners as shown.



☐ 29. Holding the parachute at the center of its top, pull the lines together to even up the ends. Thread the four looped lines through the loop at the base of the nose cone. Take the top of the parachute and pull it through all four string loops at the same time and then pull to tighten the knot. This securely attaches the parachute to the rocket.

☐ 30. Congratulations! Your SKY TORPEDO is now complete.



## Launching the SKY TORPEDO

The motor matrix shown here was developed using the RockSim software ([www.RockSim.com](http://www.RockSim.com)). Initial conditions: slightly breezy (3-7mph wind), straight up launch angle. You can use RockSim to find other motor combinations that will work well in the SKY TORPEDO rocket kit. Download the RockSim file for this kit and a free trial-version of RockSim at: [www.ApogeeRockets.com/Sky-Torpedo.asp](http://www.ApogeeRockets.com/Sky-Torpedo.asp)

**Motor Matrix: How High Will The SKY TORPEDO Fly?**

Motor Type	Produced by:	Estimated Altitude (feet)	Estimated Altitude (meters)
C11-3	Estes	185.9 ft	56.6 m
D12-5	Estes	514.3 ft	156.75 m
D22-4	Quest	625 ft	190.5 m
E12-4	Estes	886 ft	270 m
E30-7	Aerotech	1371.0 ft	417.9 m
E18-4 RMS	Aerotech	1294.2 ft	394.5 m
E28-4 RMS	Aerotech	1236.8 ft	377.0 m
F12-5 RMS	Aerotech	1446.3 ft	440.8 m
F24-7 RMS	Aerotech	1587.1 ft	483.8 m
F39-9 RMS	Aerotech	1628.3 ft	496.3 m

## Launch Supplies Needed

To launch your rocket you will need the following supplies:

- ◆ A model rocket launching system.
- ◆ Flame resistant recovery wadding.
- ◆ Recommended 24mm Diameter Rocket Engines — see the motor matrix on the previous page.

## Rocket Preflight

- ☐ A. Loosely crumple and insert 8 sheets of recovery wadding into the body tube.
- ☐ B. Carefully fold the parachute and insert it into the tube with the shock cord.
- ☐ C. Insert the motor into the motor tube until the motor hook holds it in place.
- ☐ D. Insert and secure the engine igniter as directed on the package the engines came with.

## Countdown and Launch Procedure

Fly your rocket on a large field that isn't near any power lines, trees, or low flying aircraft. The larger the field, the greater your chances of recovering your rocket. The launch area around the pad must be free of dry weeds and brown grass. Launch only during calm weather with very little or no wind and good visibility. Always use a launch pad that includes a blast deflector.

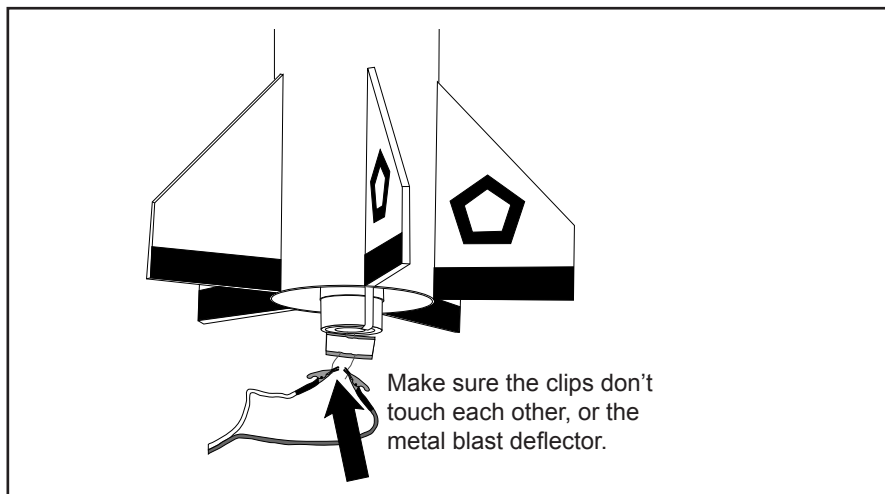
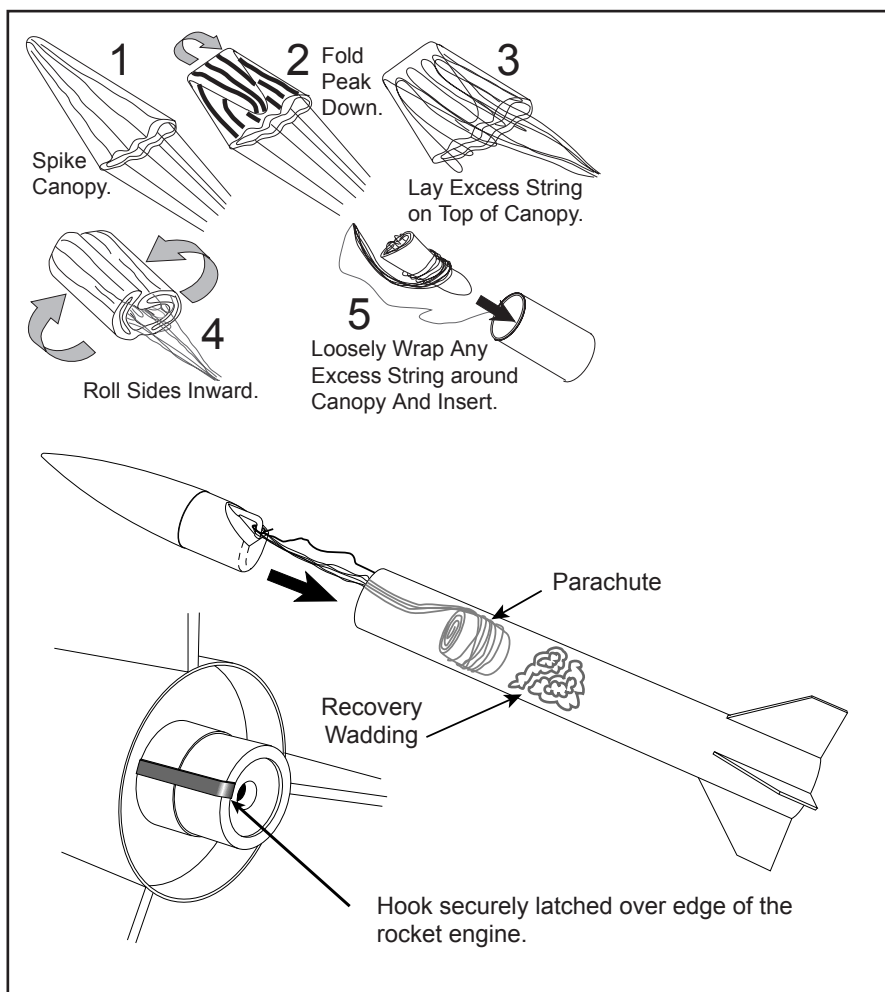
10. Remove the safety key from the launch controller
9. Slide the launch lugs over the launch rod to place the rocket on the pad. The rocket should slide freely over the rod.
8. Attach the micro-clips to the igniter. The clips must not touch the other or the metal blast deflector.
7. Stand back from your rocket as far as the launch wire allows (at least 5 meters - 15 feet).
6. Insert the safety key to arm the launch system. The light (or buzzer) on the controller should come on.

Give a loud countdown 5 ... 4 ... 3 ... 2 ... 1 ... LAUNCH!

Push and hold the button until the engine ignites. Then remove the safety key and place the safety cap on the launch rod.

## Misfire Procedure

Occasionally the igniter will burn, but the mo-



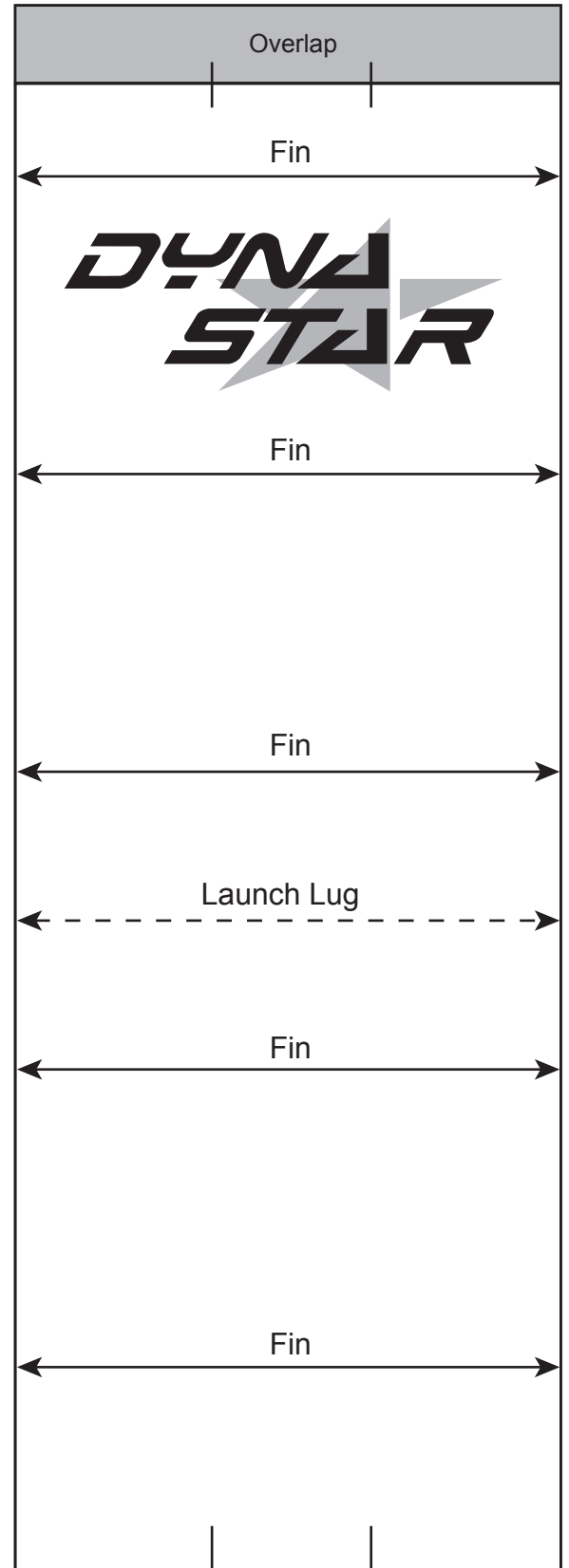
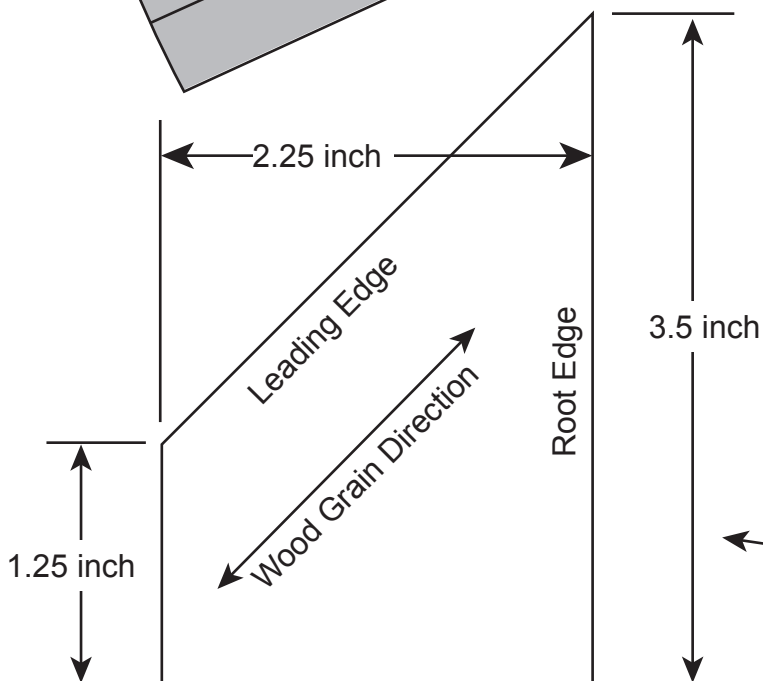
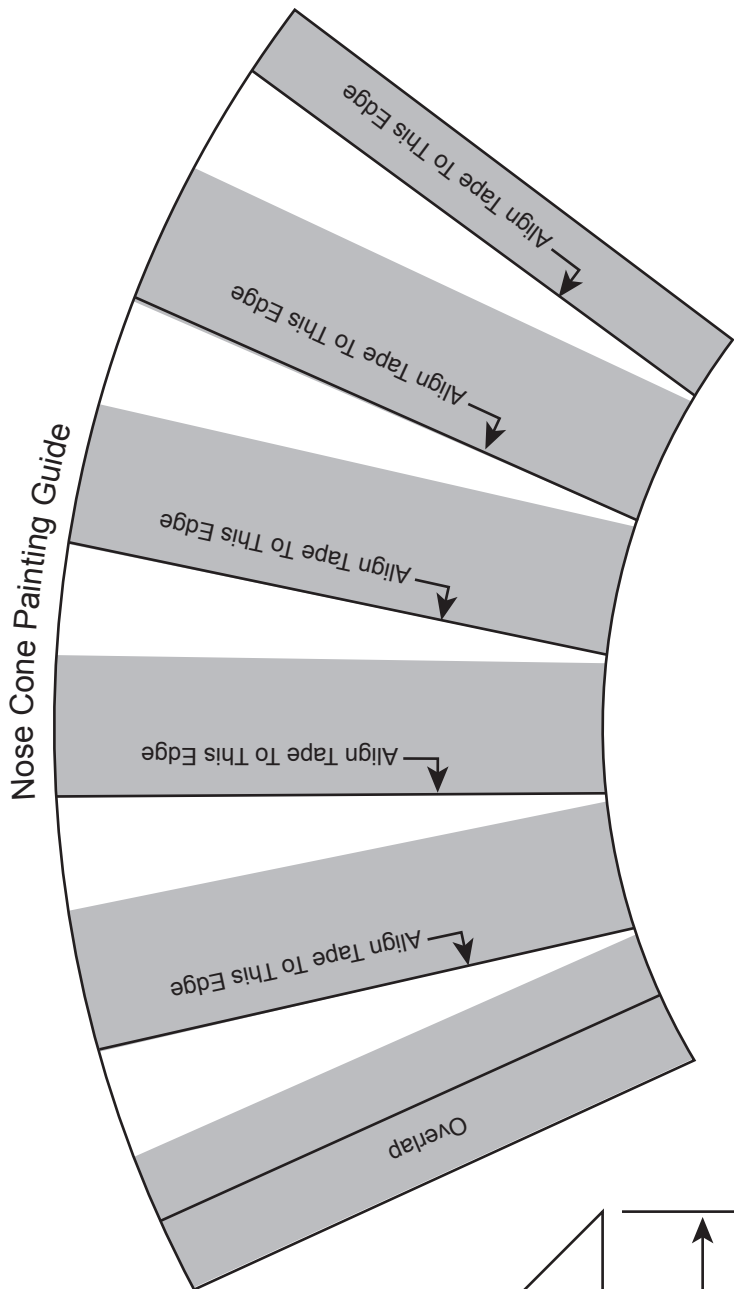
tor will fail to ignite. If this happens, the cause is that the pyrogen on the igniter was not in contact with the engines propellant. When an ignition failure occurs, remove the safety key from the launch controller and wait 60 seconds before approaching the rocket. Remove the old igniter from the engine and install a new one. Make sure that the igniter is insert fully into the engine and touches the propellant. Secure the igniter as directed on the engine package and repeat the countdown and launch procedure.

Always follow the NAR\* Model Rocket Safety Code when launching model rockets.

\*National Association of Rocketry

\*\*Kevlar® is a brand name of E.I. DuPont for their selection of aramid fibers. Only DuPont makes Kevlar®





### ← Sky Torpedo Fin Template

Use these templates to make replacement fins, in case you break one off.  
Use 1/8" (3mm) thick wood sheet.