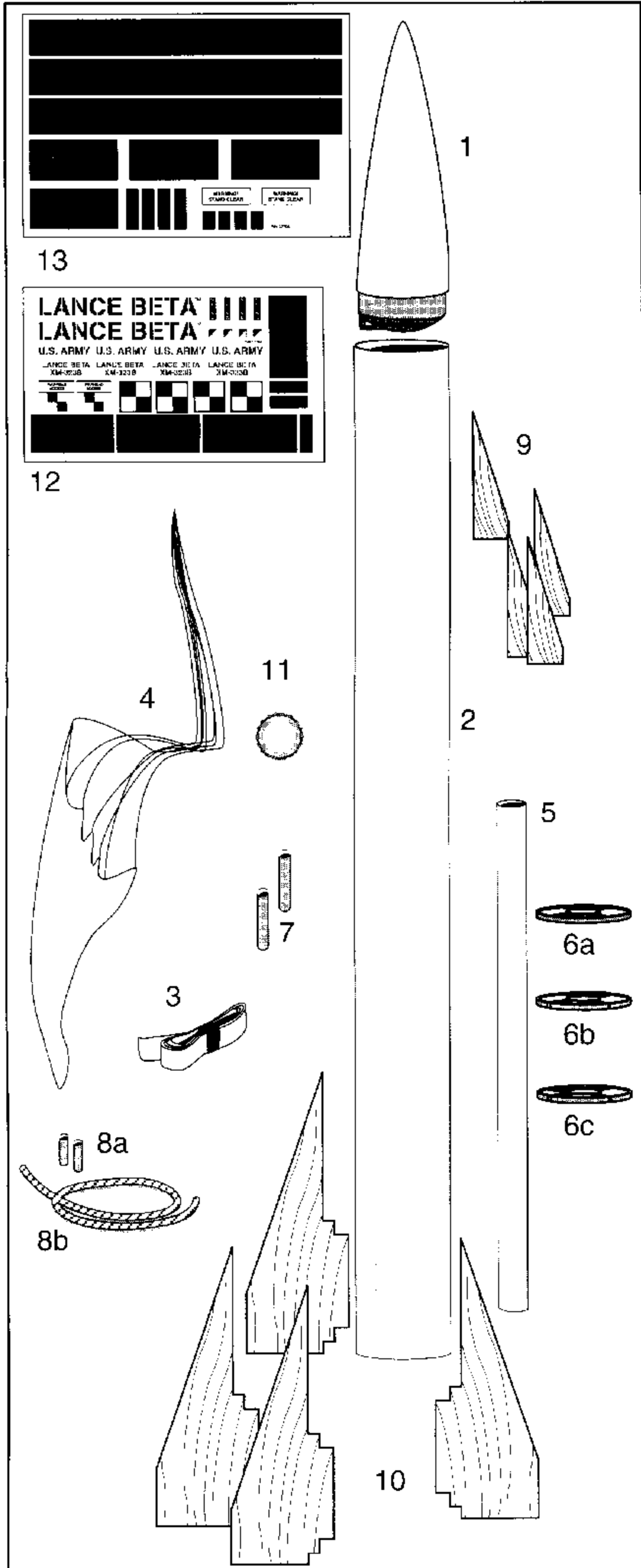


North Coast Rocketry™  
BY ESTES

# Lance Beta™

Flying Model Rocket Instructions #3506

Designed by Matt Steele



## BEFORE YOU START:

Thank you for purchasing a North Coast Rocketry™ model kit. We hope that you will spend many enjoyable hours constructing and flying your **LANCE BETA™**. We have carefully designed and tested these kits to be reliable, realistic, challenging, and extremely high flying. Only the highest quality materials go into a North Coast Rocketry™ kit, assuring high performance results. Please read these directions over once to become familiar with them before starting construction.

First, check the kit for completeness. The kit should contain the following parts:

- 1) NC-30P2 Nose Cone ..... #72695
- 2) BT-30-34SL Airframe Tube ..... #31755
- 3) SC 1/2-72 Shock Cord ..... #87255
- 4) PARA 24 Parachute ..... #35814
- 5) MT-11-17 Motor Tube ..... #30137
- 6) CR-3-11 Centering Rings (3) ..... #37936 A, B, C
- 7) LL 1/4-1 Launch Lugs (2)..... #38179
- 8) GOR-1 Gorilla™ Shock Cord Mount Kit..... #87254
  - a) Loop/Sleeve Connector (2) ..... #38394
  - b) Steel Cable..... #38395
- 9) Plywood Top Fins (4) ..... #32183
- 10) Plywood Bottom Fins (4)..... #32182
- 11) Motor Retainer..... #37936D
- 12) **LANCE BETA™** Decal Sheet (Black) ..... #37704
- 13) **LANCE BETA™** Decal Sheet (Orange)..... #37705

The following materials are necessary for construction: five minute epoxy, 15 or 30 minute epoxy (optional), medium cyanoacrylate adhesive, balsa fillercoat or finishing epoxy, 3/4" (19 mm) wide masking tape, a 24" (61 cm) long dowel or wood strip, a cloth rag or paper towel, spray primer, spray paint and trim as desired.

The following tools will be needed for construction: modeling knife or razor blade, ruler, pliers or crimping tool, sanding block, and sandpaper, grades: #100, #180, #220, #320 & #400.

These kits are recommended for adults (18 and older) only. Launch systems, motors, launch supplies, adhesives, batteries, paint, tools, and finishing supplies are not included.

Please be extremely careful using cyanoacrylate adhesive and epoxy; avoid getting in your eyes or on your skin. Safety glasses are recommended. Use adhesives and paint only in areas with adequate ventilation.

Study the instructions and sequence of assembly before beginning to build. The sequence is important.

Do not modify the design of the rocket! Changes to the design of the rocket may affect the stability, and hence the safety, of the rocket.

# VEHICLE DATA SHEET

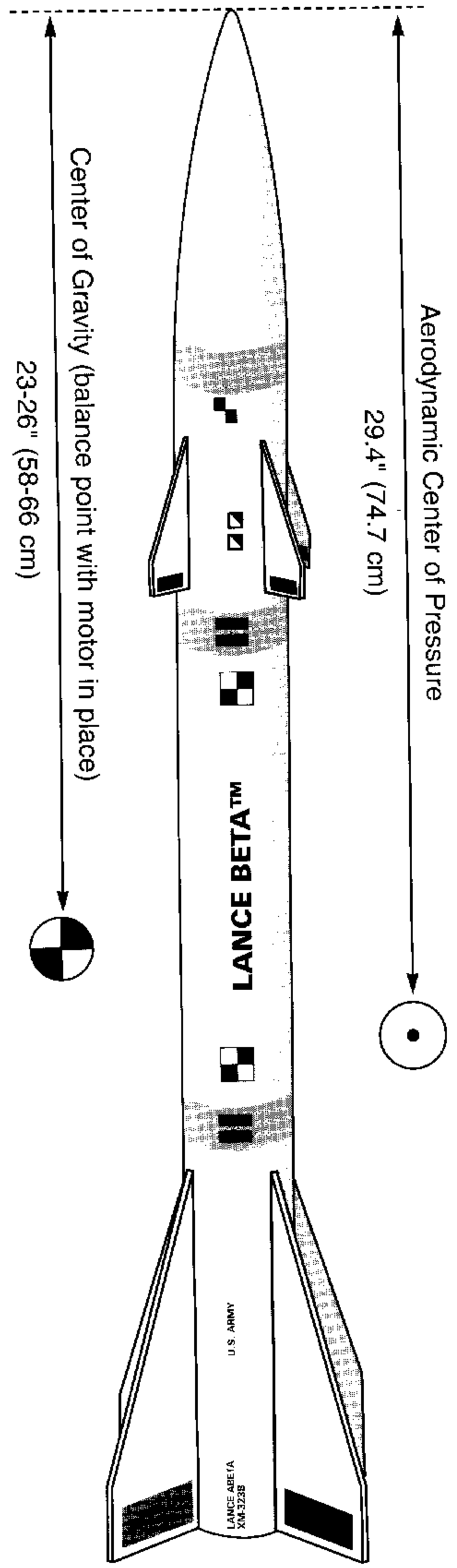
## PHYSICAL DATA

Length: 43" (109 cm)  
 Diameter: 3.00" (7.6 cm)  
 Projected Weight (w/o motor): 20 oz. (567 grams)  
 Number of Fins: 8  
 Nose Cone: 3:1 Ogive  
 Recovery System: 24" (61 cm) Parachute

## PREDICTED ALTITUDE

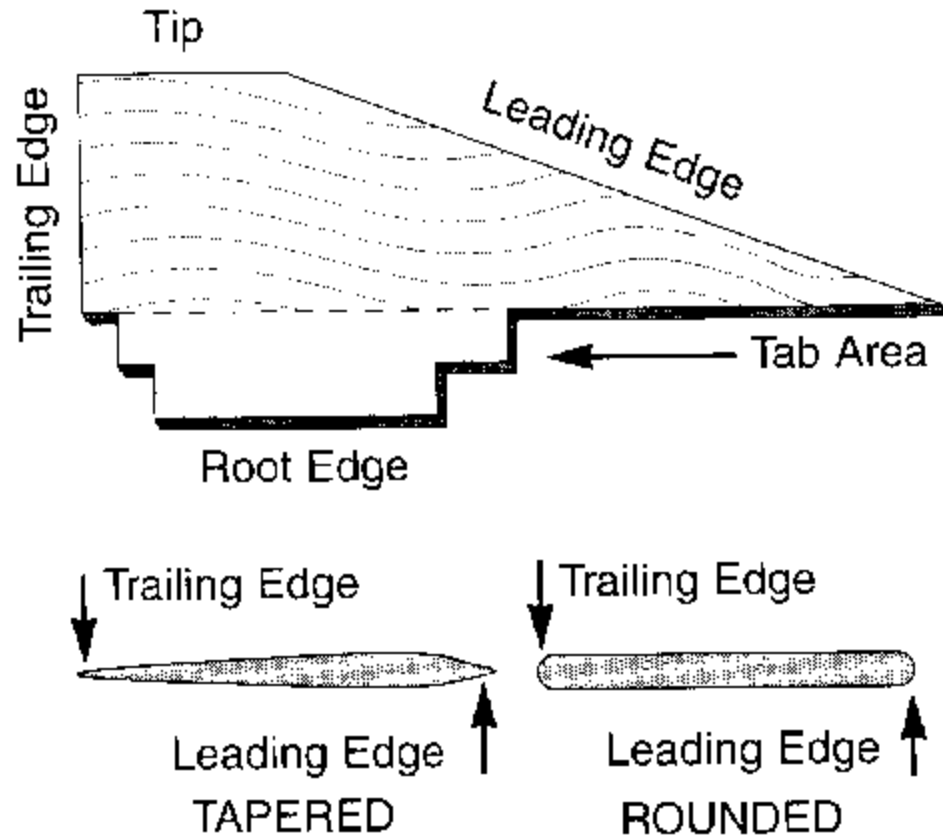
Estimated Drag Coefficient: 0.75

Motor	Max Altitude		Coast Time (sec.)
	(ft.)	(m)	
F62-6	930	284	5.8
G70-7	1250	381	6.4



# ASSEMBLY INSTRUCTIONS

- Round the leading edge of all fins with coarse #100 grit sandpaper. The trailing edges of the fins can be either rounded (easier, but higher drag) or tapered (low drag, but harder to sand), depending on the performance desired. Fine sand the fins with #180, #220, #320 and #400 grit paper for a glass-like finish. Leave the root edges flat. Plywood is a natural wood product; as such we cannot control factors such as warping once the kit leaves the factory. If your fins are warped, place them under a stack of books for 24-48 hours to flatten them.



- It is a good idea to sand and seal the fins prior to attaching them to the airframe. Cover the fin tabs with masking tape to prevent any sealer from seeping onto the tabs. The fins can be best sealed using finishing epoxy, balsa fillercoat, or primer paint. Apply a coat of filler, allow to dry, and sand smooth with #220, #320 and #400 grit paper. Repeat until all of the grain is filled. Usually, only two applications are required to get a smooth, glass-like finish.

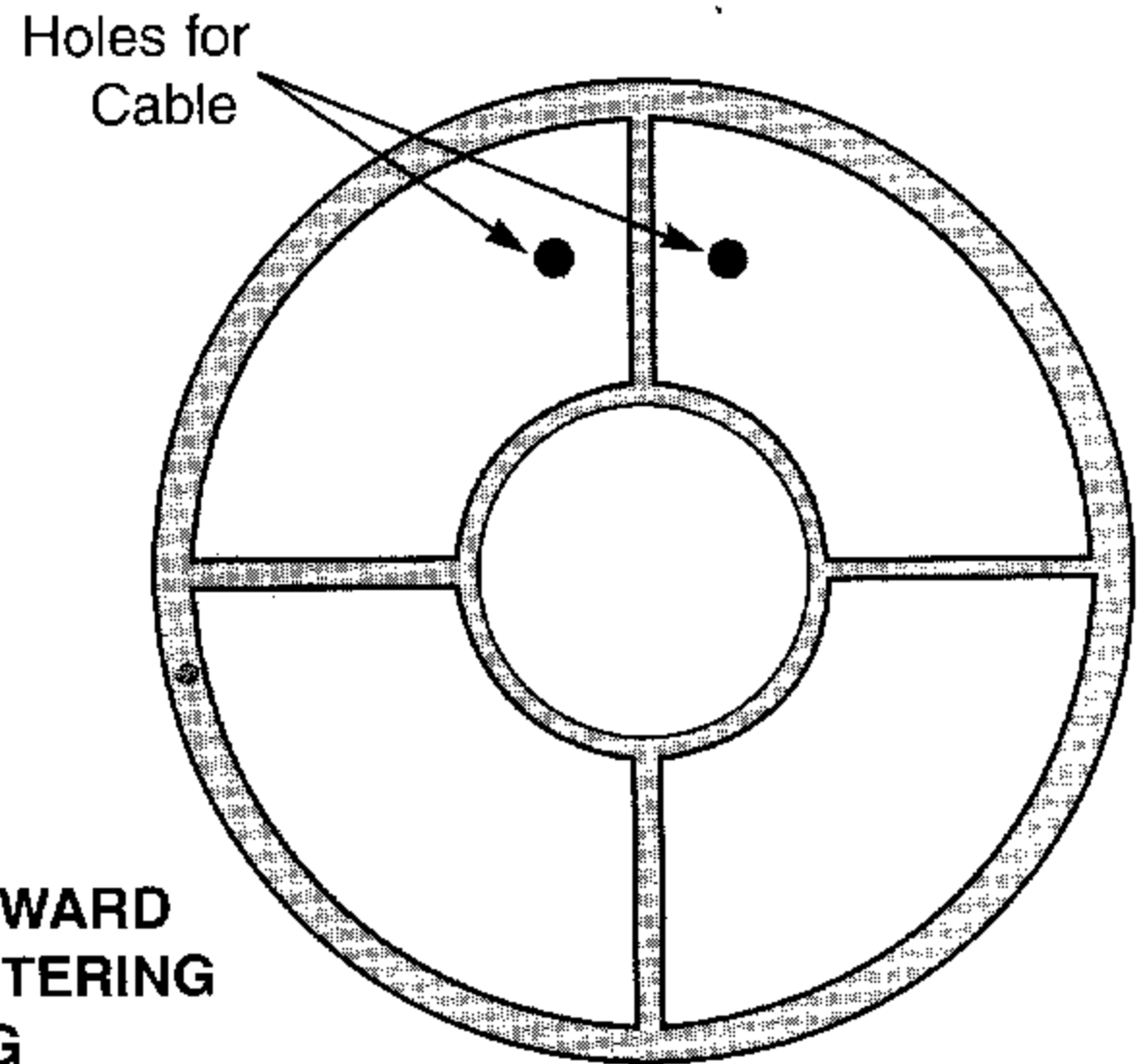
- Mark the motor tube with a line 6" (15.2 cm) long. This is where the fin/centering rings will be aligned.

- Locate the three centering rings. Test fit the rings on the motor tube and in the airframe tube to ensure they fit properly. Trim away any flash or excess plastic that may interfere with the fit of the rings. Using some #100 grit sandpaper, rough the inside and outside diameters of the ring to allow for better bonding. Then wash the parts with soap and water to remove dust and mold release.

- Locate the centering ring marked "REAR". Slide it onto the motor tube, flush with one end. Carefully align the arrow at the base of the fin notch marked "A" with the line on the motor tube. With the flat side facing forward, epoxy the rear ring in place. Do not fillet joint.

- Locate the centering ring marked "MIDDLE". Place it on the motor tube approximately 3" (7.6 cm) forward of the rear ring. Carefully align the arrow at the base of the fin notch marked "A" with the line on the motor tube. Insert one of the fins into the notches on the rear centering ring. Mark the exact location for the middle ring. Ensure that the fin root is in line with the line on the tube (otherwise, there may be some twist in the two rings, which means they won't line up with the slots in the airframe tube). With the flat side facing forward, epoxy the middle ring in place. Fillet only the forward end of the joint. Filletting the aft end of the joint will interfere with the fin tabs.

- Locate the centering ring marked "FORWARD". Using a small drill or a knife, remove any flashing from the two holes in the forward centering ring.

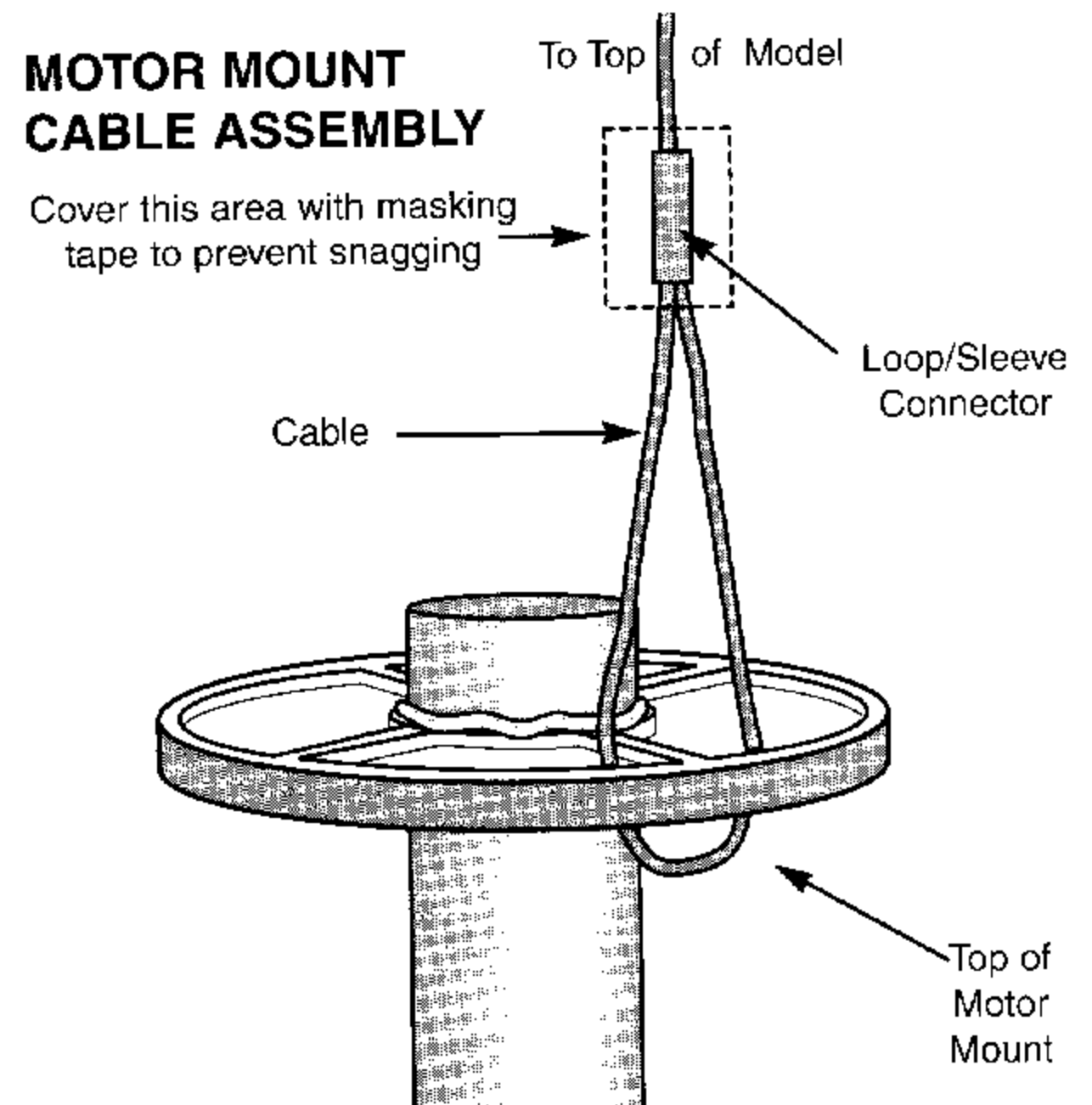


## FORWARD CENTERING RING

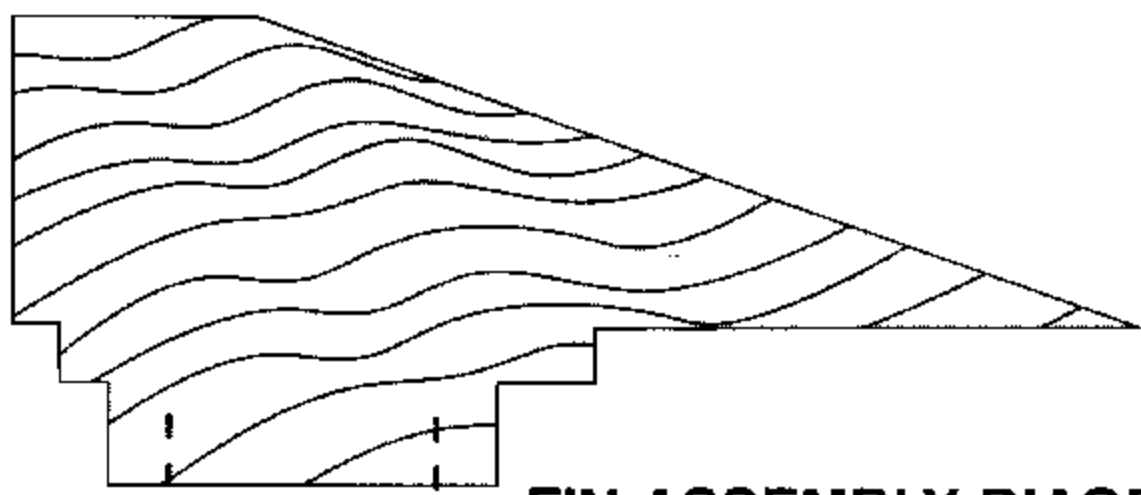
- Mark the motor tube 1/2" (13 mm) from the end without the centering rings. With the flat side facing forward, epoxy the forward centering ring in place on this mark. After the epoxy has cured, fillet both sides of this joint heavily.

- Locate the cable in the Gorilla™ shock cord mount kit. Thread one of the loop/sleeve connectors onto the cable. Then thread the cable down through the top of one hole of the centering ring. Pull it back up through the other hole and thread the end of the cable back through the loop/sleeve connector. Pull out the slack. Then crimp the loop/sleeve connector, using a crimping tool or a pair of pliers. Apply a drop of cyanoacrylate to the joint. The final assembly should look similar to the diagram.

## MOTOR MOUNT CABLE ASSEMBLY

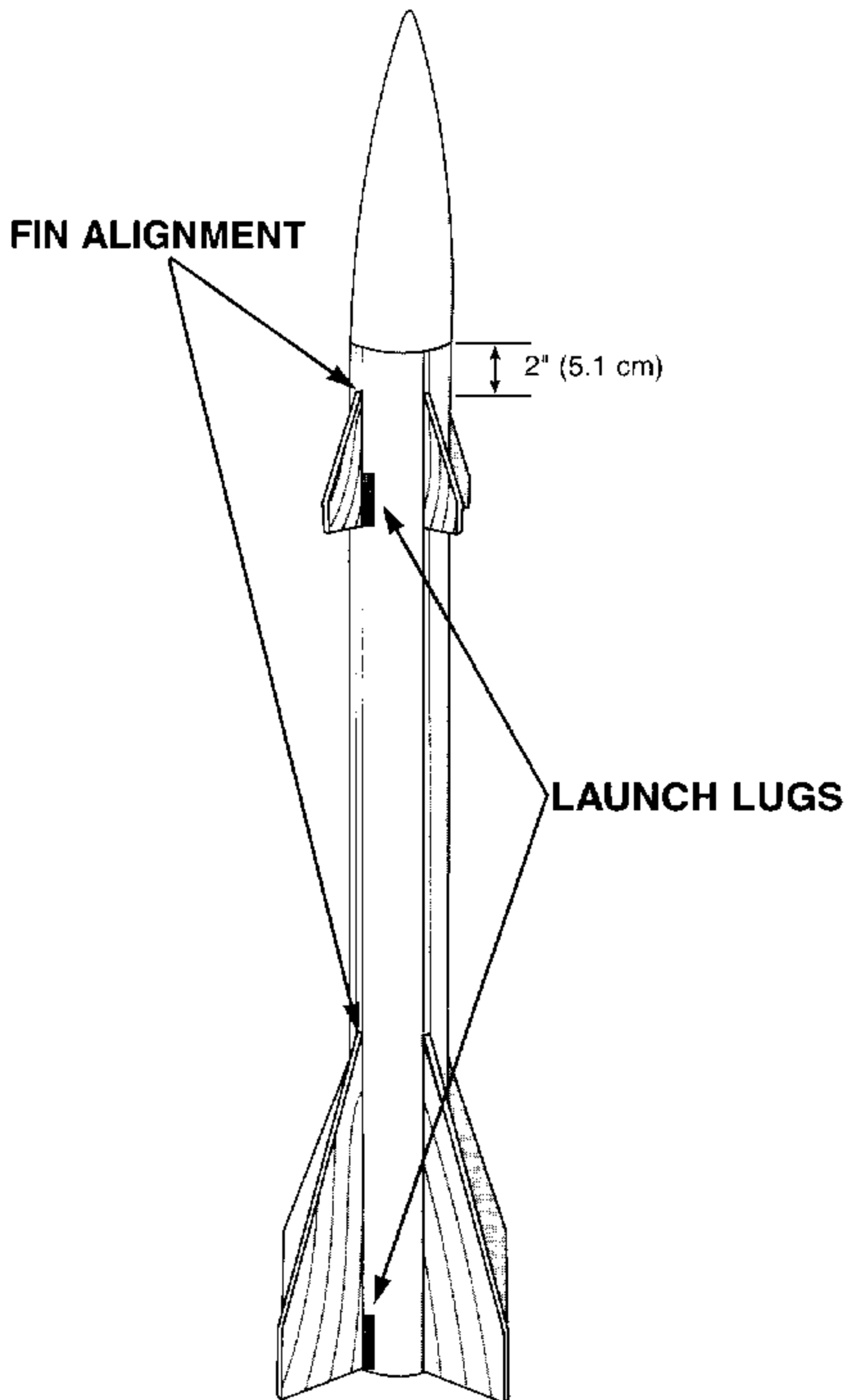
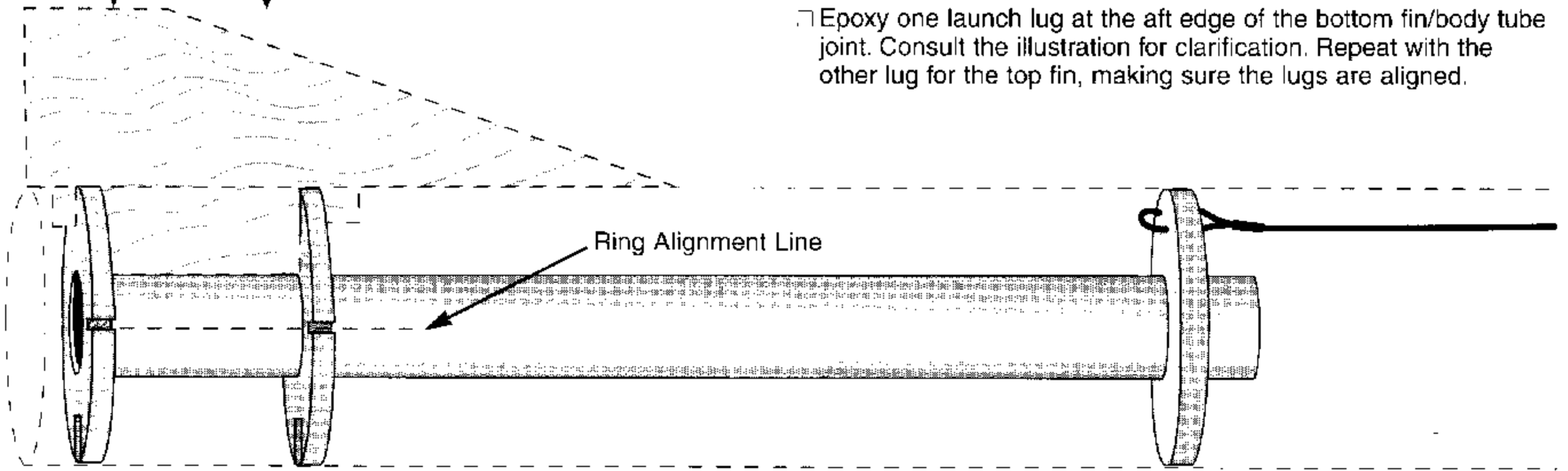


- Place the other loop/sleeve connector on the free end of the cable, make a 1" - 1 1/2" (2.5-3.8 cm) loop in the cable, and thread the free end back through the loop/sleeve connector. Crimp the loop/sleeve connector, and add a drop of CA. Cover both connectors with masking tape to prevent the recovery system from snagging. Tie the shock cord to the loop at the top of the Gorilla™ mount. Using tape or a rubber band, coil up the shock cord to keep it out of the way.



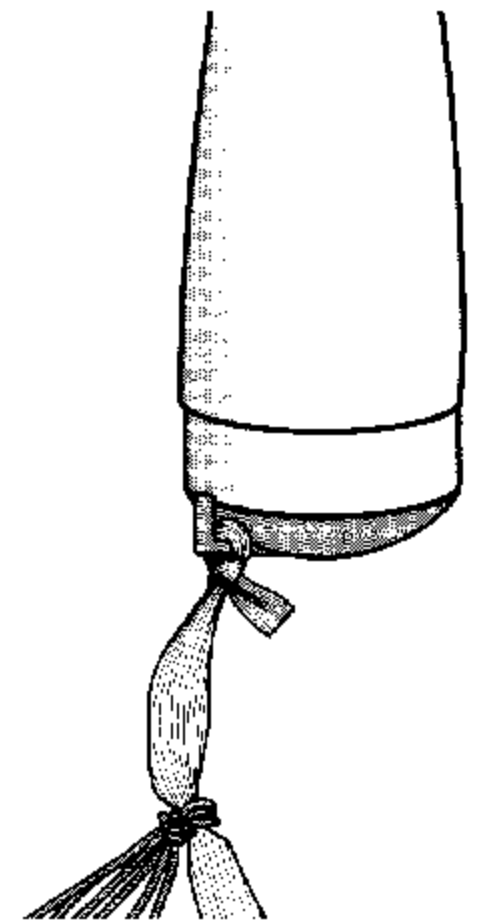
**FIN ASSEMBLY DIAGRAM**

- Coat the fin root edges with a small amount of epoxy and insert into the slots. Seat the fins firmly in the slots and notches. Align the fins carefully. When all the fins have been epoxied into place, fillet the fin/body joints with a generous amount of five minute epoxy, or for best results, 15 or 30 minute epoxy.
- Epoxy the front tip of the forward fins even with the 2" (5.1 cm) mark at the forward end of the airframe tube. **Align the fins carefully with bottom fins, as any misalignment may cause spinning or looping in flight.** When all the fins have been epoxied into place, fillet the fin/body joints with epoxy.
- Epoxy one launch lug at the aft edge of the bottom fin/body tube joint. Consult the illustration for clarification. Repeat with the other lug for the top fin, making sure the lugs are aligned.



- Remove any flashing from the nose cone with a sharp knife. Sand lightly with #400 grit sandpaper before painting. Be sure not to paint the nose cone shoulder, as any paint may make the nose cone fit too tightly.
- Attach the shock cord to the nose cone. Tie the parachute lines to the shock cord line near the nose.

**SHOCK CORD AND PARACHUTE ATTACHMENT**



- Twist the motor retainer in place on the rear centering ring.
- Clean the rocket body with a rag or paper towel. The rocket may now be painted.
- Paint the rocket with a base coat of gray primer and let it dry. For best results, apply two coats of flat white.
- Apply the decals as desired. Refer to the illustration on the Vehicle Data Sheet for suggested placement. Carefully cut out each decal, leaving as little extra material around the colored portions as possible. Stick in place, then rub over the decal with your finger or a burnishing tool.
- Spray the entire model with Krylon Crystal Clear or similar clear coating to protect the finish.

## IMPORTANT!

### READ BEFORE LAUNCHING! NOTIFICATION REQUIREMENTS

North Coast Rocketry™ kits are considered "large model rockets" by Federal Aviation Agency (FAA) regulations. These are rockets weighing more than 16 ounces (453 grams) with motor but less than 52.9 ounces (3.3 lbs or 1500 grams) with motor, and/or requiring more than 4.0 ounces (113 grams) of propellant but no more than 4.4 ounces (125 grams) of propellant for operation.

To fly large model rockets, you must notify the Air Traffic Control facility over your airspace with:

- (a) either your name and address, or, in the event of a group or club launch, the launch coordinator's name and address;
- (b) the estimated number, size, weight, and expected altitudes of the rockets to be flown:

You must provide such notification between 48 and 24 hours prior to launch. Notification may be via phone, fax, in person, or by mail (if you can guarantee delivery within the required time period).

If your launch site is within five miles (8 km) of an airport, you must provide the same information to the airport manager.

Rockets weighing 16 ounces (453 grams) or less with motor and using 4.0 ounces (113 grams) or less of propellant are exempt from the notification requirements.

## PREPPING INSTRUCTIONS

### Suggested motors:

North Coast Rocketry™ F62-6, G70-7

An F62-6 is recommended for the first flight. Use only with North Coast Rocketry™ approved products.

### Prep the Recovery System for flight:

Prepare the rocket for flight by placing some North Coast Rocketry™ recovery wadding into the top of the body tube. Fill the tube loosely with crumpled wadding to a distance about 1.5 times the diameter of the tube. Gently press the wadding down until there is adequate room for the parachute. **DO NOT JAM!**

Grasp the center of the parachute and pull the lines tight to form the parachute in a spike. Gather the lines and lay on top of the parachute. Carefully fold in half, then roll into a loose cylinder. Insert the parachute and then the shock cord into the airframe. Insure that it slides freely in and out. Insert the nose cone, and check for fit. If it is too loose, apply masking tape to the nose cone shoulder to get a snug fit. If it is too tight, sand the shoulder until a firm, but smooth fit is obtained.

### Motor Preparation:

Install the igniter into the motor per the manufacturer's instructions. Remove the motor retainer. Slide the motor into the motor tube until the exposed edge is snug against the motor tube. Twist the motor retainer in place. **It is critical that the motor be firmly retained!** If the motor is loose, it will blow out at ejection and the recovery system will not work properly.

### Pre-Launch Checkout:

Before every flight, perform a complete preflight checkout of your model:

- Check to make sure that the fins are not damaged and are firmly attached.
- Look at the body tube to make sure that there are no crimps, dents, or other damage.
- Make certain that the parachute is tied firmly onto the shock cord.
- Make certain that the shock cord is firmly attached to the nose cone and the Gorilla™ mount. Also, check to see that there are no burns, frays, or damaged areas that may cause the shock cord to fail at ejection.
- Check to see that the model slides freely on the launch rod and that there is no binding, sticking, or other misalignment of the launch lugs.
- Make sure the nose cone comes off with a smooth motion and is not too loose, causing wobbling, nor too tight, so as to not come off at ejection.
- Check other parts and the overall rocket to insure that the flight will be safe and predictable.
- If any problems are detected, correct them before attempting to fly.

## FLYING INSTRUCTIONS:

Fly your rocket from the largest field possible on a clear and calm day. You should find a field that has dimensions at least 1.5 times the expected altitude. For example, for a flight of 1000 feet (305 meters), the field should be at least 1500 feet (457 meters) on each side.

Do not fly near trees, power lines or tall buildings. Do not fly in the vicinity of low flying aircraft. Be sure that the area that you fly in is clear of dry weeds or grass, or other flammable materials, as rocket exhaust may ignite them. Always use a large blast deflector. Use a five foot (1.5 meter) launch rod at a minimum. Fly from a minimum distance of 30 feet (9 meters) for safety and a better view of the flight.

## FLIGHT PROFILE:

When the launch button is pressed, an electrical current will cause the igniter to heat up and ignite the propellant in the rocket motor. This may take as long as one second, depending on the motor type. The motor will build up thrust quickly, and move the rocket into the air. During powered flight, the rocket will build up both velocity and altitude. The motor's propellant will then be consumed, and the delay grain will generate smoke while the rocket coasts to peak altitude. When the delay grain is consumed, the motor's ejection charge will fire, causing the recovery system to deploy. The recovery system then allows the rocket to be returned safely to the ground.

*Fly Safely and Have Fun!*

## IMPORTANT NOTE:

**Always follow the NAR Safety Code and all local regulations and ordinances when flying rockets.**

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# North Coast Rocketry™

## PLEASE NOTE!

The following is an addition to the instructions.

Cut a 1/2" (13 mm) diameter hole in the base of the nose cone. Holding the nose cone upside down, put the clay nose weights inside the nose cone. Using a long dowel, pat the clay in place. Pour a small amount of epoxy into the hole to keep clay weight in place. Prop up to cure.

